



U.S. Department of the Interior  
Bureau of Land Management

# Bering Sea - Western Interior

Resource Management Plan and Environmental Impact Statement

***DRAFT***

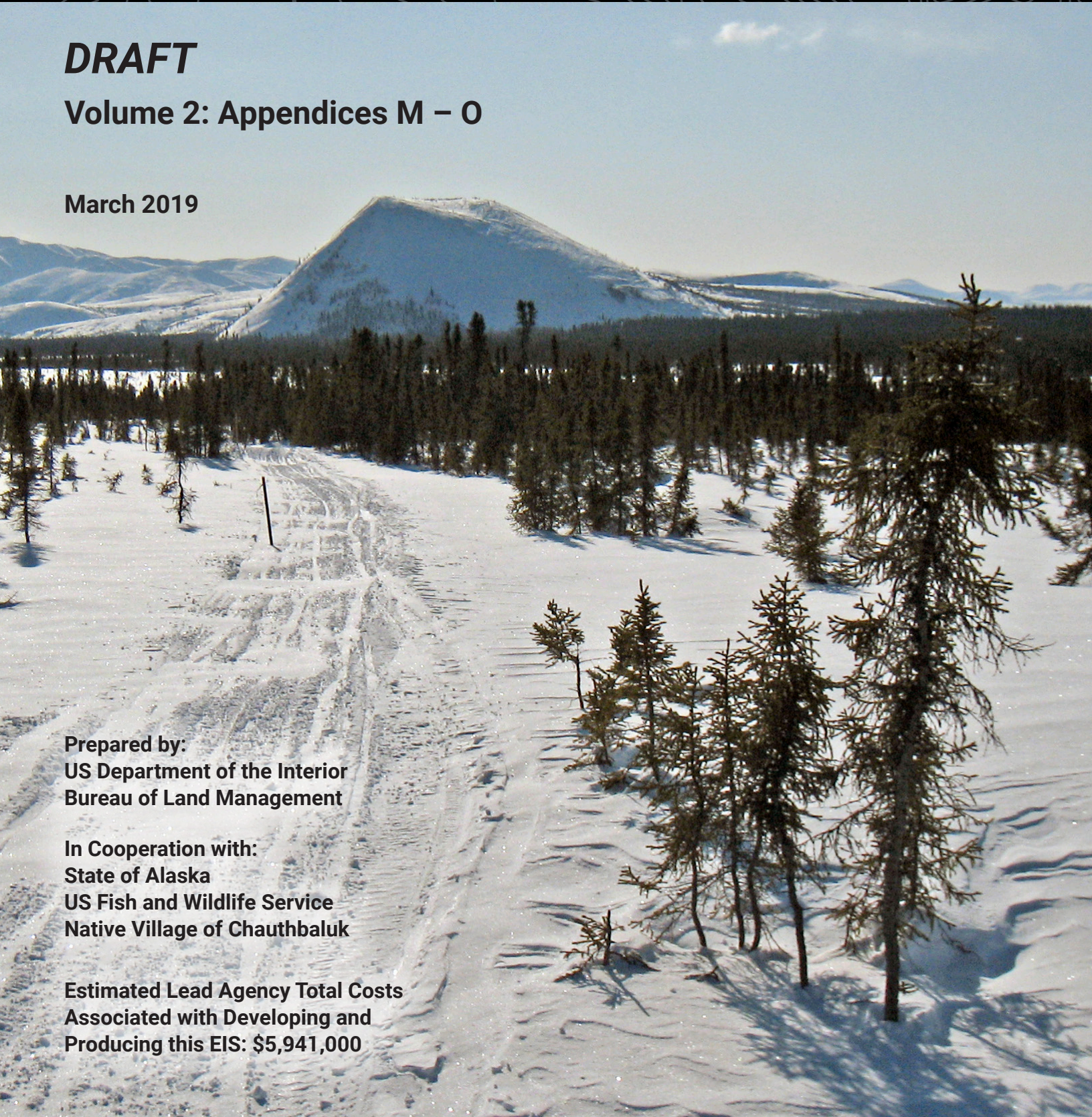
**Volume 2: Appendices M – O**

**March 2019**

**Prepared by:**  
US Department of the Interior  
Bureau of Land Management

**In Cooperation with:**  
State of Alaska  
US Fish and Wildlife Service  
Native Village of Chauthbaluk

**Estimated Lead Agency Total Costs  
Associated with Developing and  
Producing this EIS: \$5,941,000**



## **Mission**

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Cover Photo: Old Woman Mountain, located on the Iditarod National Historic Trail between the Yukon River and the Bering Sea. Photo by Kevin Keeler (BLM).

DOI-BLM-AK-A010-2013-0039-RMP-EIS  
BLM/AK/PL-19/004+1610+A020

---

# **Bering Sea-Western Interior Draft Resource Management Plan and Environmental Impact Statement**

## **Volume 2: Appendices M-O**

Prepared by:

U.S. Department of the Interior  
Bureau of Land Management  
Anchorage, Alaska

In cooperation with:

State of Alaska  
US Fish and Wildlife Service  
Native Village of Chauthbaluk

March 2019

<p><b>Estimated Lead Agency Total Costs Associated with Developing and Producing this EIS: \$5,941,000</b></p>
--

**Blank page.**

## **Table of Contents**

*Volume 1 – Executive Summary, Chapters 1-3, and Appendices A-L*

*Volume 2 – Appendices M-O*

*Volume 3 – Maps*

### **Volume 2**

Appendix M: BSWI Affected Environment Report

Appendix N: Supplemental Impact Analysis Information

Appendix O: Alaska National Interest Lands Conservation Act (ANILCA) Preliminary Section 810 Evaluation

## **Appendix M: BSWI Affected Environment Report**



## Table of Contents

<b>Section 1.</b>	<b>Introduction .....</b>	<b>1-1</b>
<b>Section 2.</b>	<b>Resources.....</b>	<b>2-1</b>
2.1	Air Quality and Air Quality-Related Values.....	2-1
2.1.1	Introduction.....	2-1
2.1.2	Laws, Regulations, and Policies .....	2-1
2.1.3	Resource Indicators.....	2-4
2.1.4	Current Conditions.....	2-6
2.1.5	Resource Changes: Trends and Forecasts .....	2-22
2.2	Climate Change.....	2-22
2.2.1	Introduction.....	2-22
2.2.2	Resource Indicators.....	2-23
2.2.3	Current Conditions.....	2-23
2.2.4	Resource Changes: Trends and Forecasts .....	2-23
2.3	Soils.....	2-33
2.3.1	Introduction.....	2-33
2.3.2	Laws, Regulations, and Policies .....	2-33
2.3.3	Resource Indicators.....	2-33
2.3.4	Current Conditions.....	2-34
2.3.5	Resource Changes: Trends and Forecasts .....	2-41
2.4	Water Resources .....	2-41
2.4.1	Introduction.....	2-41
2.4.2	Laws, Regulations, and Policies .....	2-41
2.4.3	Resource Indicators.....	2-44
2.4.4	Current Conditions.....	2-44
2.4.5	Resources Changes: Trends and Forecasts .....	2-49
2.5	Fisheries .....	2-49
2.5.1	Introduction.....	2-49
2.5.2	Laws, Regulations, and Policies .....	2-50
2.5.3	100-Year Floodplain .....	2-53
2.5.4	Resource Indicators.....	2-54
2.5.5	Current Conditions.....	2-54
2.5.6	Resource Changes: Trends and Forecasts .....	2-64
2.6	Vegetation .....	2-66
2.6.1	Introduction.....	2-66
2.6.2	Laws, Regulations, and Policies .....	2-66



2.6.3	Resource Indicators.....	2-66
2.6.4	Current Conditions.....	2-67
2.6.5	Resource Changes: Trends and Forecasts .....	2-76
2.7	Wildlife and Special Status Species.....	2-78
2.7.1	Introduction.....	2-78
2.7.2	Laws, Regulations, and Policies .....	2-78
2.7.3	Resource Indicators.....	2-81
2.7.4	Current Conditions – Wildlife Species .....	2-82
2.7.5	Current Conditions – Wildlife Habitats .....	2-108
2.7.6	Resource Changes: Trends and Forecasts .....	2-114
2.8	Nonnative Invasive Species (Wildlife and Plant) .....	2-115
2.8.1	Introduction.....	2-115
2.8.2	Laws, Regulations, and Policies .....	2-115
2.8.3	Resource Indicators.....	2-116
2.8.4	Current Conditions.....	2-116
2.8.5	Resource Changes: Trends and Forecasts .....	2-125
2.9	Wildland Fire .....	2-125
2.9.1	Introduction.....	2-125
2.9.2	Laws, Regulations, and Policies .....	2-126
2.9.3	Resource Indicators.....	2-127
2.9.4	Current Conditions.....	2-128
2.9.5	Resource Changes: Trends and Forecasts .....	2-132
2.10	Cultural Resources .....	2-133
2.10.1	Introduction.....	2-133
2.10.2	Laws, Regulations, and Policies .....	2-134
2.10.3	Resource Indicators.....	2-138
2.10.4	Current Conditions.....	2-138
2.10.5	Resource Changes: Trends and Forecasts .....	2-148
2.11	Paleontological Resources .....	2-149
2.11.1	Introduction.....	2-149
2.11.2	Laws, Regulations, and Policies .....	2-150
2.11.3	Resource Indicators.....	2-155
2.11.4	Current Conditions.....	2-155
2.11.5	Resource Changes: Trends and Forecasts .....	2-158
2.12	Visual Resources Management.....	2-158
2.12.1	Introduction.....	2-158
2.12.2	Laws, Regulations, and Policy.....	2-158

2.12.3	Resource Indicators.....	2-160
2.12.4	Current Conditions.....	2-160
2.12.5	Resource Changes: Trends and Forecasts.....	2-161
2.13	Lands with Wilderness Characteristics.....	2-161
2.13.1	Introduction.....	2-161
2.13.2	Laws, Regulations, and Policies.....	2-161
2.13.3	Resource Indicators.....	2-162
2.13.4	Resource Indicators.....	2-163
2.13.5	Current Conditions.....	2-163
2.13.6	Resource Changes: Trends and Forecasts.....	2-165
<b>Section 3.</b>	<b>Resource Uses .....</b>	<b>3-1</b>
3.1	Forestry and Woodland Products.....	3-1
3.1.1	Introduction.....	3-1
3.1.2	Laws, Regulations, and Policies.....	3-1
3.1.3	Resource Indicators.....	3-1
3.1.4	Current Conditions.....	3-2
3.1.5	Resource Changes: Trends and Forecasts.....	3-3
3.2	Grazing.....	3-5
3.2.1	Introduction.....	3-5
3.2.2	Laws, Regulations, and Policies.....	3-5
3.2.3	Resource Indicators.....	3-5
3.2.4	Current Conditions.....	3-5
3.2.5	Resource Changes: Trends and Forecasts.....	3-7
3.3	Locatable and Salable Minerals.....	3-8
3.3.1	Introduction.....	3-8
3.3.2	Laws, Regulations, and Policies.....	3-8
3.3.3	Resource Indicators.....	3-9
3.3.4	Current Conditions.....	3-10
3.3.5	Resource Changes: Trends and Forecasts.....	3-13
3.4	Leasable Minerals.....	3-13
3.4.1	Introduction.....	3-13
3.4.2	Laws, Regulations, and Policies.....	3-13
3.4.3	Resource Indicators.....	3-14
3.4.4	Current Conditions.....	3-14
3.4.5	Resource Changes: Trends and Forecasts.....	3-16
3.5	Lands and Realty.....	3-16
3.5.1	Introduction.....	3-16

- 3.5.2 Laws, Regulations, and Policies ..... 3-16
- 3.5.3 Resource Indicators..... 3-18
- 3.5.4 Current Conditions..... 3-18
- 3.5.5 Resource Changes: Trends and Forecasts ..... 3-32
- 3.6 Recreation and Visitor Services ..... 3-32
  - 3.6.1 Introduction..... 3-32
  - 3.6.2 Laws, Regulations, and Policies ..... 3-32
  - 3.6.3 Resource Indicators..... 3-33
  - 3.6.4 Current Conditions..... 3-34
  - 3.6.5 Resource Changes: Trends and Forecasts ..... 3-37
- 3.7 Travel and Transportation Management ..... 3-38
  - 3.7.1 Introduction..... 3-38
  - 3.7.2 Laws, Regulations, and Policies ..... 3-38
  - 3.7.3 Resource Indicators..... 3-39
  - 3.7.4 Current Conditions..... 3-40
  - 3.7.5 Resource Changes: Trends and Forecasts ..... 3-45
- 3.8 Renewable Energy ..... 3-46
  - 3.8.1 Introduction..... 3-46
  - 3.8.2 Laws, Regulations, and Policies ..... 3-48
  - 3.8.3 Resource Indicators..... 3-51
  - 3.8.4 Current Conditions..... 3-51
  - 3.8.5 Resource Changes: Trends and Forecasts ..... 3-55
- Section 4. Special Designations ..... 4-1**
  - 4.1 Areas of Critical Environmental Concern..... 4-1
    - 4.1.1 Introduction..... 4-1
    - 4.1.2 Laws, Regulations, and Policies ..... 4-1
    - 4.1.3 Resource Indicators..... 4-1
    - 4.1.4 Current Conditions..... 4-2
    - 4.1.5 Resource Changes: Trends and Forecasts ..... 4-6
  - 4.2 National Trails ..... 4-6
    - 4.2.1 Introduction..... 4-6
    - 4.2.2 Laws, Regulations, and Policies ..... 4-6
    - 4.2.3 Resource Indicators..... 4-7
    - 4.2.4 Current Conditions..... 4-8
    - 4.2.5 Resource Changes: Trends and Forecasts ..... 4-17
  - 4.3 Wild and Scenic Rivers..... 4-21
    - 4.3.1 Introduction..... 4-21

4.3.2	Laws, Regulations, and Policies .....	4-21
4.3.3	Resource Indicators.....	4-21
4.3.4	Current Conditions.....	4-22
4.3.5	Resource Changes: Trends and Forecasts .....	4-24
<b>Section 5.</b>	<b>Social and Economic Conditions.....</b>	<b>5-1</b>
5.1	Socioeconomics, Environmental Justice, and BLM Support for BSWI Communities.....	5-1
5.1.1	Laws, Regulations, and Policies .....	5-1
5.1.2	Resource Indicators for Economic Conditions .....	5-2
5.1.3	Resource Indicators for Social Conditions.....	5-2
5.1.4	Current Conditions for Socioeconomics .....	5-3
5.1.5	Current Conditions for Environmental Justice.....	5-15
5.1.6	BLM Support for Planning Area Communities .....	5-15
5.2	Subsistence.....	5-23
5.2.1	Introduction.....	5-23
5.2.2	Laws, Regulations, and Policies .....	5-24
5.2.3	Resource Indicators.....	5-26
5.2.4	Current Conditions.....	5-26
5.2.5	Non-Market Values of Subsistence Resources and Activities .....	5-40
5.2.6	Resource Changes: Trends and Forecasts .....	5-40
5.3	Hazardous Materials and Health and Human Safety .....	5-40
5.3.1	Introduction.....	5-40
5.3.2	Laws, Regulations, and Policies .....	5-41
5.3.3	Resource Indicators.....	5-41
5.3.4	Current Conditions.....	5-42
5.3.5	Resource Changes: Trends and Forecasts .....	5-46
<b>Section 6.</b>	<b>Reference List.....</b>	<b>6-1</b>

### List of Tables

Table 2.1.2-1. National and Alaska Ambient Air Quality Standards..... 2-2

Table 2.1.4-1. Summary of Normal Monthly Air Temperature, Precipitation/Snowfall, and Wind Speed – McGrath, Alaska ..... **Error! Bookmark not defined.**

Table 2.1.4-2. Summary of Normal Monthly Air Temperature, Precipitation/Snowfall, and Wind Speed – Bethel, Alaska ..... **Error! Bookmark not defined.**

Table 2.1.4-3. Summary of Normal Monthly Air Temperature, Precipitation/Snowfall, and Wind Speed – Nome, Alaska ..... **Error! Bookmark not defined.**

Table 2.1.4-4. Survey-Based Emissions ..... **Error! Bookmark not defined.**

Table 2.1.4-5. Donlin Gold Mine, Monitoring Data Summary, 2006-2009 ..... 2-13

Table 2.1.4-6. Alaska Historical and Reference Case GHG Emissions (MMTCO<sub>2</sub>e)..... 2-17

Table 2.2.4-1. Change in Mean Seasonal Temperatures (Degrees F)..... 2-26

Table 2.2.4-2. Trends and Forecasts Related to Climate Change for Resources in the Planning Area..... 2-28

Table 2.4.4-1. Approximate Discharge and Water Quality Parameters of Major USGS-Gaged Streams in the Planning Area..... 2-45

Table 2.4.4-2. Core and contingent aquatic indicators used for Alaska Implementation of the AIM-National Aquatic Monitoring Framework ..... 2-47

Table 2.5.5-1. Fish Species Present in Freshwater Habitats of the Planning Area ..... 2-56

Table 2.5.5-2. Dates of Critical Activity for Important Subsistence, Commercial, and Sport Fish Species in the Planning Area ..... 2-57

Table 2.6.4-1. Vegetation Communities in the Planning Area ..... 2-69

Table 2.6.4-2. Current BLM-Designated Sensitive Plant Species Known within the Planning Area ..... 2-74

Table 2.7.4-1. Native Amphibian and Mammal Species in the Planning Area ..... 2-83

Table 2.7.4-2. Resident, Migratory, Wintering, Rare,\* and Accidental Bird Species Found in the Planning Area ..... 2-97

Table 2.7.4-3. Bird Species of Concern in the Planning Area ..... 2-104

Table 2.7.5-1. Wildlife Habitat in the Current ACECs..... 2-109

Table 2.8.4-1. Nonnative Invasive Plant Species Known to Occur in the Planning Area ..... 2-118

Table 2.8.4-2. Marine or Freshwater Nonnative Invasive Species with Highest Potential for Spread or Introduction to the Planning Area ..... 2-120

Table 2.9.4-1. Planning Area Decadal Fire History..... 2-128

Table 2.9.4-2. Planning Area Historical Fire Regimes Based on Fire Frequency and Severity ..... 2-128

Table 2.9.4-3. Fuel Models within Planning Area ..... 2-129

Table 2.10.4-1. AHRS Site Types in Planning Area Regardless of Land Status..... 2-146

Table 2.10.4-2. AHRS Site Types on BLM-Managed Lands ..... 2-146

Table 2.11.4-1. Paleontological Localities in the Planning Area..... 2-156

Table 2.12.4-1. Visual Resource Inventory Values within the Planning Area ..... 2-160

Table 2.13.5-1. Summary of Findings for Lands with Wilderness Characteristics for Planning Area..... 2-164

Table 2.13.5-2. Subunits Inventoried for Wilderness Characteristics.....	2-164
Table 3.5.4-1. Effect of ANCSA 17(d)(1) Withdrawals on Federal Public Lands .....	3-19
Table 3.5.4-2. R&PP Lands in the Planning Area .....	3-21
Table 3.5.4-3. BLM-Managed Public Lands Considered for Exchange or Disposal in the Planning Area.....	3-21
Table 3.5.4-4. Withdrawals in the Planning Area.....	3-24
Table 3.5.4-5. Lands Considered for Acquisition in the Planning Area .....	3-28
Table 3.6.4-1. Special Recreation Permits in the Planning Area by Type.....	3-37
Table 3.8.1-1. Distribution of BLM-Managed Public Land in Relation to Local Communities .....	3-47
Table 3.8.5-1. FERC Withdrawals Affecting BLM Land in Planning Area.....	3-55
Table 4.1.4-1. Acres of Existing, Nominated, and Potential ACECs in Planning Area .....	4-3
Table 4.3.4-1. Eligibility Determinations of 18 Rivers Located in the Planning Area .....	4-24
Table 5.1.4-1. Social Conditions in Planning Area Communities .....	5-7
Table 5.1.4-2. Economic Characteristics in Planning Area Communities.....	5-13
Table 5.2.4-1. Yukon River Area Communities, Pounds of Resources Harvested by Community.....	<b>Error! Bookmark not defined.</b>
Table 5.2.4-2. Kuskokwim River Area Communities Villages, Pounds of Resources Harvested by Community .....	<b>Error! Bookmark not defined.</b>

### List of Figures

Figure 2.1.4-1. Denali National Park and Preserve Visibility Trends, 1988-2015 (IMPROVE 2016).....	2-15
Figure 2.1.4-2. Denali National Park and Preserve Light Extinction Summary – Clearest Days, 1988-2015 (IMPROVE 2016).....	2-16
Figure 2.1.4-3. Denali National Park and Preserve Light Extinction Summary – Hazyest Days, 1988-2015 (IMPROVE 2016).....	2-16
Figure 2.1.4-4. Alaska Historical and Reference Case GHG Emissions (ADEC 2015b).....	2-19
Figure 2.1.4-5. Net Emissions from GHG “Sinks” and Wildfires in the State of Alaska (Exhibit 26, ADEC 2015b).....	2-19
Figure 2.1.4-6. Typical Noise Levels.....	2-21
Figure 2.2.4-1. Temperature Trends, 1949-2014 for McGrath, Alaska. ....	2-24
Figure 2.2.4-2. Temperature Trends, 1949-2014 for Bethel, Alaska. ....	2-25
Figure 2.2.4-3. Temperature Trends, 1949-2014 for Nome, Alaska.....	2-25
Figure 3.8.1-1. Average Solar Irradiance for Alaska.....	3-47
Figure 3.8.5-1. FAA aircraft navigation beacon at Chandalar Lake in the Brooks Range of northeast Alaska. This is the type and scale of renewable energy development that could occur in the planning area. ....	3-56

### List of Appendices

Appendix M-1: BLM Alaska Sensitive Species

## List of Acronyms

µg/m <sup>3</sup>	micrograms per cubic meter
AAC	Alaska Administrative Code
ACCS	Alaska Center for Conservation Science
ACEC	Areas of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACIWG	Aquatic Core Indicator Work Group
ACRC	University of Alaska Climate Research Center
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AEA	Alaska Energy Authority
AFS	Alaska Fire Service
AHPA	Alaska Historic Preservation Act
AHRS	Alaska Heritage Resource Survey
AIM	Assessment, Inventory, and Monitoring
AIRFA	American Indian Religious Freedom Act
AIWFMP	Alaska Interagency Wildland Fire Management Plan
AKEPIC	Alaska Exotic Plant Information Clearinghouse
AML	Abandoned Mine Land
AMS	Analysis of the Management Situation
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
AOP	Annual Operating Plan
APDES	Alaska Pollutant Discharge Elimination System
AQCR	Air Quality Control Region
ARC	Alaska Road Commission
ARPA	Archaeological Resources Protection Act
AS	Alaska Statute
ASCMCRA	Alaska Surface Coal Mining Control and Reclamation Act
ASIP	Alaska State Implementation Plan
ASOS	Automated Surface Observing System
ASTM	American Society for Testing and Materials
ATV	all-terrain vehicle
AWC	Anadromous Waters Catalog
AWFCG	Alaska Wildland Fire Coordinating Group
BCC	Bird Species of Conservation Concern
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice

BSWI	Bering Sea-Western Interior
Btu	British thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CI	confidence interval
CMP	comprehensive management plan
CSU	conservation system unit
CUA	Controlled Use Area
CWA	Clean Water Act
CYRMP	Central Yukon Resource Management Plan
dBa	A-weighted decibel
DMLW	Division of Mining Land and Water
DOD	Department of Defense
DOI	U.S. Department of the Interior
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESMP	Enhanced Smoke Management Plan
ES&R	emergency stabilization and rehabilitation
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FLM	Federal Land Manager
FLPMA	Federal Land Policy and Management Act
FMP	Fishery Management Plan
FR	Federal Register
GHG	greenhouse gas
GHGRR	Greenhouse Gas Reporting Rule
GIS	geographic information system
HAP	Hazardous Air Pollutant
HVW	high-value watershed
IBA	Important Bird Area
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring Protected Visual Environments
INHT	Iditarod National Historic Trail
KCH	Kilbuck Caribou Herd
KMS	Kolmakof Mine Site



kwh	kilowatt-hour
LMP	locatable mineral potential
MBF	thousand board-feet
MCH	Mulchatna Caribou Herd
MLA	Mineral Leasing Act of 1920
MLRA	Major Land Resource Areas
MMT	million metric tons
MOU	Memorandum of Understanding
MS	Manual Section
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSGP	Multi-Sector General Permit
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NAGPRA	Native American Graves Protection and Repatriation Act
NDVI	normalized difference vegetation index
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NLCS	National Landscape Conservation System
NMFS	National Marine Fisheries Service
NNIS	nonnative invasive species
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSEDC	Norton Sound Economic Development Corporation
NSPS	New Source Performance Standards
NTMC	National Trails Management Corridor
NTSA	National Trails System Act
NWS	National Weather Service
OFM	Outcomes-Focused Management
OHV	off-highway vehicle
OHWM	ordinary high water mark
ORV	outstanding remarkable value
P.L.	Public Law
PFYC	Potential Fossil Yield Classification
PGE	platinum group elements
PLO	Public Land Order
PM <sub>10</sub>	particulate matter less than or equal to 10 micrometers in diameter
PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 micrometers in diameter

PRP	potentially responsible party
PRPA	Paleontological Resources Preservation Act
R&I	relevant and important
R&PP	Recreation and Public Purposes
RAC	Resource Advisory Council
RAM	Removal Action Memorandum
RCRA	Resource Conservation and Recovery Act
REA	Rapid Ecoregional Assessment
REE	Rare Earth Elements
REF	Alaska Renewable Energy Fund
RMA	recreation management area
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
ROW	right-of-way
RSC	recreation setting characteristics
RY	Regulatory Year
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMCRA	Surface Mining Control and Reclamation Act
SNAP	Scenarios Network for Alaska and Arctic Planning
SRMA	Special Recreation Management Area
SRP	special recreation permit
SSS	special-status species
SWMFP	Southwest Planning Area Management Framework Plan
TCP	Traditional Cultural Property
TKC	The Kuskokwim Corporation
TMA	Travel Management Area
TSCA	Toxic Substance Control Act
U.S.C.	U.S. Code
UAS	unmanned aerial system
USDA	U.S. Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WACH	Western Arctic Caribou Herd
WFDSS	Wildland Fire Decision Support System
WNS	White Nose Syndrome
WRCC	Western Regional Climate Center

WSA	Wilderness Study Area
WSR	Wild and Scenic River

## ***Section 1. Introduction***

The purpose of this document is to describe the existing biological, physical, and socioeconomic characteristics of the Bering Sea-Western Interior (BSWI) Resource Management Plan (RMP) Planning Area (planning area), including human uses that could be affected by implementing the alternatives described in Chapter 2 of the BSWI Draft RMP/Environmental Impact Statement (EIS).

It addresses environmental conditions that may have changed since the *Southwest Planning Area Management Framework Plan* (SWMFP) (BLM 1981) and the *Resource Management Plan and Record of Decision for the Central Yukon Planning Area* (CYRMP [BLM 1986a]) were completed as well as key findings and new information identified in the *Analysis of the Management Situation* [AMS], *Bering Sea-Western Interior Resource Management Plan* (BLM 2015a).

The document is organized into four sections: Section 2, Resources; Section 3, Resource Uses; Section 4, Special Designations; and Section 5, Social and Economic Conditions. Each of these four sections is split further into resources or program areas.

Each of these resource or program area sections include an introduction, a description of current conditions, and a description of resource changes: trends and forecasts, that explain the direction of change between the present and some point in the past, and indicators that can be measured to help explain present and future change.

Acreages were calculated using geographic information system (GIS) technology and Bureau of Land Management (BLM) land status as of August 2016, and there may be slight variations in total acres between resources. The planning area includes all lands, regardless of jurisdiction, within the planning area boundaries. However, the BLM makes decisions on only the lands and federal mineral estate that it administers (the decision area).

This page intentionally left blank

## ***Section 2. Resources***

### **2.1 Air Quality and Air Quality-Related Values**

#### **2.1.1 Introduction**

Impacts to air quality and air quality-related values resource are typically evaluated in comparison to air quality standards that are established in context of a robust and complex framework of federal, state, and local regulations. Therefore, a detailed review of relevant air quality standards and regulations follows. Additionally, a review of meteorology and climate in the area serves as important background because of the role it plays in air quality and the effects of natural and human-caused sources of air pollution on local and regional air quality.

#### **2.1.2 Laws, Regulations, and Policies**

##### **Federal Regulations**

The federal Clean Air Act (CAA) and the CAA amendments form the basis for a broad range of regulations that control allowable emissions and ambient concentrations of air pollutants in the environment. This Act grants powers of enforcement to the U.S. Environmental Protection Agency (EPA), which establishes National Ambient Air Quality Standards (NAAQS) to protect the public from air pollution. Current NAAQS are summarized in Table 2.1.2-1, and descriptions of the pollutants themselves are provided below in the Criteria Pollutants section.

Air pollutants for which NAAQS exist are called “criteria” pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (including particulate matter equal to or less than 10 micrometers in diameter and equal to or less than 2.5 micrometers in diameter (PM<sub>10</sub> and PM<sub>2.5</sub>, respectively), and sulfur dioxide (SO<sub>2</sub>). Primary NAAQS are designed to protect public health, whereas secondary NAAQS are designed to protect the public welfare from effects such as visibility reduction, soiling, and nuisance.

Geographic areas where concentrations of a given pollutant exceed an ambient air quality standard are classified as nonattainment areas for that standard. Previously designated nonattainment areas that are now in compliance with air quality standards are classified as maintenance areas. Areas that meet the standards and have met them for several years (usually at least 10 years) are classified as attainment areas. When available ambient air quality data are insufficient for a specific NAAQS, the area is designated either “Unclassifiable/Attainment,” or “Cannot be classified or better than national standards.” For regulatory purposes, such designations are presumed to be attainment. Federal regulations require states to prepare State Implementation Plans (SIP) that identify emission reduction strategies for nonattainment and maintenance areas, and compliance with federal air quality standards. The planning area is currently classified as attainment or unclassifiable/attainment for all current criteria pollutants (Title 40 Code of Federal Regulations [CFR] 81.302).

**Table 2.1.2-1. National and Alaska Ambient Air Quality Standards**

Pollutant	Averaging Time	National Standard (NAAQS)	Alaska Standard	Remarks
Carbon Monoxide (CO)	8-hour	9 ppmv (10 mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>	<i>(Primary)</i> Not to be exceeded more than once per year.
	1-hour	35 ppmv (40 mg/m <sup>3</sup> )	40 mg/m <sup>3</sup>	
Lead (Pb)	Rolling 3-month	0.15 µg/m <sup>3</sup>	0.15 µg/m <sup>3</sup>	<i>(Primary and Secondary)</i> Not to be exceeded.
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	100 ppbv (188 µg/m <sup>3</sup> )	188 µg/m <sup>3</sup>	<i>(Primary)</i> 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
	Annual	53 ppbv (100 µg/m <sup>3</sup> )	100 µg/m <sup>3</sup>	<i>(Primary and Secondary)</i> Annual Mean.
Ozone (O <sub>3</sub> )	8-hour	0.070 ppmv (137 µg/m <sup>3</sup> )	0.070 ppmv	<i>(Primary and Secondary)</i> Annual fourth highest daily maximum 8-hr concentration, averaged over 3 years.
Particulate Matter (PM) Particulate Matter Less than or Equal to 2.5 micrometers in Diameter (PM <sub>2.5</sub> )	Annual	12.0 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>	<i>(Primary)</i> Annual mean, averaged over 3 years.
	Annual	15.0 µg/m <sup>3</sup>	-	<i>(Secondary)</i> 98th percentile, averaged over 3 years.
	24-hour	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	<i>(Primary and Secondary)</i> 98th percentile, averaged over 3 years.
Particulate Matter Less than or Equal to 10 micrometers in Diameter (PM <sub>10</sub> )	24-hour	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	<i>(Primary and Secondary)</i> Not to be exceeded more than once per year averaged over 3 years.
Sulfur Dioxide (SO <sub>2</sub> )	1-hour	75 ppbv (196 µg/m <sup>3</sup> )	196 µg/m <sup>3</sup>	<i>(Primary)</i> 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
	3-hour	0.5 ppmv (1,300 µg/m <sup>3</sup> )	1,300 µg/m <sup>3</sup>	<i>(Secondary)</i> Not to be exceeded more than once per year.
	Annual	-	80 µg/m <sup>3</sup>	Annual mean.
	24-hour	-	365 µg/m <sup>3</sup>	Not to be exceeded more than once per year.
Ammonia [Not a criteria pollutant]	8-hour	-	2.1 mg/m <sup>3</sup>	Not to be exceeded more than once per year.

Source: EPA 2016a; ADEC 2016a

Notes:

mg/m<sup>3</sup> = milligrams per cubic meter

ppbv = parts per billion by volume

µg/m<sup>3</sup> = micrograms per cubic meter

ppmv = parts per million by volume

There are other air pollutants that do not have ambient air standards, but are regulated, directly or indirectly, at their emission level. These include Hazardous Air Pollutants (HAPs), volatile organic compounds (VOCs), and greenhouse gases (GHGs). HAPs, also known as air toxics, are air pollutants that are known to cause cancer or other serious health impacts. They are regulated for stationary sources on a technology basis under National Emission Standards for Hazardous Air Pollutants (NESHAP) rules. VOCs, while also having potential health concerns, are regulated mostly for their involvement in creating photochemical smog under certain conditions. Like HAPs, VOC emissions are regulated on a technology basis, under New Source Performance Standards (NSPS), which also sets limits for some criteria pollutant emissions by source type. GHGs are gases that trap heat in the atmosphere and contribute to climate change (addressed below in Section 2.2, Climate Change). The main GHGs of concern in Alaska are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Until recently, there were no federal or State regulations for GHG emission levels, only guidance, reporting requirements, and permitting thresholds. EPA has recently finalized rules for methane emissions from solid waste landfills and oil and natural gas sources under NSPS. The regulation of GHGs is evolving rapidly. EPA provides up-to-date scientific and regulatory information on its website at <https://www.epa.gov/ghgemissions>.

Other federal air quality regulatory programs include Prevention of Significant Deterioration and the Title V Air Permitting Program for major stationary sources. These programs may apply to some stationary sources in the planning area, depending on specific facility applicability criteria. As with NESHAP and NSPS, they are addressed through permitting as administered by either federal or state air quality agencies, depending on the program, location, and/or source.

The EPA Regional Haze Rule establishes a visibility protection program for federal Class I areas, which include national parks and some wilderness areas (EPA 2016b). The rule requires states to develop and implement protection plans as part of their SIPs. In coordination with the Regional Haze Rule and the State SIP, Federal Land Managers (FLMs) are responsible for protecting increments or limits on the maximum allowable increases in air pollutants and related impacts (such as visibility and deposition) at Class I and other sensitive Class II areas (wilderness areas and wildlife refuges, for example). The FLM is typically involved when a new or modified major facility is proposed within 100 kilometers of one or more of these areas (U.S. Forest Service et al. 2010). For larger facilities (with potential for greater pollutant emission levels), the FLM has discretion on their level of review. The planning area borders Denali National Park and Preserve (Class I), located on the northeast border, and several sensitive Class II areas lies within or adjacent to the planning area, the largest being the Yukon Delta and Innoko National Wildlife Refuges (NWRs), both within the planning area, and Lake Clark National Park and Reserve, outside the planning area, adjacent to the southeast border.

As part of the CAA, the General Conformity Rule establishes a process to ensure that any proposed federal action would not cause or contribute to new violations of air quality standards, increase the frequency or severity of existing violations, or delay the timely attainment of a standard. This Rule only applies to federal actions occurring in nonattainment or maintenance areas, and would, therefore, not currently apply in the planning area.

### **State and Local Regulations**

The Alaska Department of Environmental Conservation (ADEC) is the air quality management agency for the State of Alaska and is responsible for achieving and/or maintaining compliance with federal air quality standards. The Alaska State Implementation Plan (ASIP) is the federally enforceable plan identifying control measures and strategies for meeting these standards. The original ASIP was prepared in 1972 and has been updated regularly to meet changing federal standards and pollutant requirements in



the state (ADEC 1972). The planning area includes portions of two ASIP Air Quality Control Regions (AQCRs): the South Central Alaska Intrastate AQCR (which includes the southern portion of the planning area) and the Northern Alaska Intrastate AQCR (which includes the northern portion of the planning area). As stated above, the planning area is currently classified as attainment or unclassifiable/attainment for all current criteria pollutants.

Current Alaska State Ambient Air Quality Standards are established in the Alaska Administrative Code (AAC) Title 18 AAC Chapter 50; these are shown along with the federal NAAQS in Table 2.1.2-1. Most of the federal standards have been adopted by the State, per 18 AAC 50.010. Alaska also has an ambient standard for ammonia (NH<sub>3</sub>), as shown in Table 2.1.2-1.

Besides attaining and maintaining NAAQS, the ASIP contains provisions for implementing new or revised NAAQS, rule adoption into the ASIP, and State air quality programs (such as motor vehicles, outdoor/agricultural burning, indoor burning (woodstoves), and regional haze programs). Air permitting for commercial business and industry is also part of these programs. The State also has some industrial emission standards, as set forth in 18 AAC 50.050 and 055; these set limits on specific pollutants for certain industrial processes and fuel-burning equipment, including limits on visible emissions. In addition, ADEC operates an air quality-monitoring network to assess compliance with pollutant ambient air quality standards, and to develop strategies for maintenance of other regulatory requirements, such as visibility.

### **Other Agency Policy and Guidance**

The BLM Soil, Water, and Air Program provides coordination and technical assistance for air issues on BLM lands in Alaska and ensures that BLM-related activities maintain air quality standards and noise objectives in cooperation with other federal, tribal, State, and local agencies. As such, air quality decisions and actions within the BLM must comply with the CAA and conform to the ASIP. The program also cooperates with other agencies to monitor climate conditions and trends (BLM 2018a).

BLM's Alaska Fire Service (AFS) is responsible for wildland fire management on all Department of Interior (DOI)-administered land and native corporation lands designated under the Alaska Native Claims Settlement Act (ANCSA). AFS works cooperatively on an interagency basis with other federal, State, and tribal partners through the Alaska Wildland Fire Coordinating Group (AWFCG). This group represents federal and State agencies and native organizations with wildland fire and smoke management responsibilities in Alaska. The AWFCG sets guidance and procedures for smoke mitigation measures for all wildland fire (wildfire and prescribed fire) in Alaska (AICC 2016). ADEC is the regulatory agency responsible for smoke management in Alaska (ADEC 2016b).

### **2.1.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for air quality and air quality-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres accessible to commercial woodland activity
- Acres accessible to livestock grazing
- Acres accessible to mineral development
- Acres accessible to transportation

- Wildland fire management Class I and Class II sensitive airsheds within the planning areas
- Acres where BMPs may be required for allowable actions based on implantation-level decisions

### **Criteria Pollutants**

Summary descriptions of each criteria pollutant are provided below. “Criteria” air pollutants refer to those air pollutants for which the EPA has developed criteria on which to base NAAQS under the CAA.

#### **Carbon Monoxide (CO)**

Carbon monoxide (CO) is a colorless, odorless, nonreactive gas that is a product of incomplete combustion. Emissions are mostly associated with motor vehicles and machinery burning fossil fuels, and, in residential areas, from wood burning stoves and fireplaces. High CO concentrations in the air develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions. These conditions result in reduced dispersion of emissions, leading to potentially elevated CO levels near the sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces its oxygen carrying capacity, resulting in reduced levels of oxygen reaching the brain, heart, and other body tissues. Very high levels of CO are not common in outdoor areas.

#### **Lead (Pb)**

Sources of lead emissions include ore and metals processing, piston-engine aircraft using leaded fuel (avgas), waste incinerators, utilities, and lead-acid battery manufacturers and recyclers. The highest concentrations of lead in air are generally found near lead smelters and general aviation airports. The phase out of leaded gasoline for use in motor vehicles has resulted in dramatically decreased levels of atmospheric lead. Lead has a range of adverse neurotoxic health effects. Depending on the level of exposure, lead can affect the nervous system, kidney function, immune system, reproductive and development systems, and the cardiovascular system.

#### **Nitrogen Dioxide (NO<sub>2</sub>)**

Nitrogen dioxide (NO<sub>2</sub>) is in the group of highly reactive gases known as nitrogen oxides (NO<sub>x</sub>). The primary source of NO<sub>2</sub> is combustion, with emissions from motor vehicles, power plants, and off-road equipment. NO<sub>2</sub> is a lung irritant and can aggravate respiratory diseases and contribute to the development of asthma and infections. NO<sub>2</sub> reacts with other chemicals in the air to form both particulate matter and ozone, which can also be harmful when inhaled (both criteria pollutants, described below). In addition to these health-based effects, NO<sub>2</sub> can react to form acid rain, and nitrate particles, which can affect visibility and cause harmful terrestrial and marine deposition.

#### **Ozone (O<sub>3</sub>)**

Ground level ozone is regulated because of its health and environmental effects. It is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions between NO<sub>x</sub> and VOCs, pollutants emitted by vehicles and other combustion sources, chemical plants, refineries, waste treatment facilities, etc. Unhealthy levels of ozone are more common on hot sunny days in urban areas. However, ozone is a regional pollutant; it can be transported long distances by wind, therefore even rural areas can exhibit high ozone levels. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and other ailments. Ozone

affects sensitive vegetation and ecosystems and can also cause damage to other materials through oxidation.

### **Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>)**

PM<sub>10</sub> and PM<sub>2.5</sub> consist of airborne particles that measure 10 micrometers or less in diameter and 2.5 micrometers or less in diameter, respectively. They represent fractions of particulate matter that can be inhaled into the air passages and the lungs, causing adverse health effects. Particulate matter in the atmosphere results from many kinds of dust and fume-producing industrial and agricultural operations, fuel combustion, wood burning stoves and fireplaces, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition, construction activities, and mining, consist of mostly larger particulate, and are more local in nature. Other sources, such as from combustion, fumes, and secondary formation consist of smaller particulate (fine inhalable) and can have a more regional effect depending on transport mechanisms (i.e., wind). PM<sub>10</sub> and PM<sub>2.5</sub> pose serious health risks, because they can be inhaled deep into the lungs. Depending on their chemical composition, they can contribute to acid rain, and can have adverse terrestrial, vegetative, and marine effects through deposition. Fine particles (PM<sub>2.5</sub>) are a major cause of reduced visibility or haze.

### **Sulfur Dioxide (SO<sub>2</sub>)**

Sulfur dioxide (SO<sub>2</sub>) is primarily formed during combustion of fossil fuels, from power plants and large industrial facilities to locomotives, ships and other vehicles that burn fuel with a high sulfur content. Other sources of SO<sub>2</sub> emissions include ore extraction and natural sources, such as volcanoes. Sulfur dioxide is also a precursor to the formation of atmospheric sulfate and particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. Exposure to SO<sub>2</sub> can be harmful to respiratory systems, both directly and from resultant particulates. Environmental effects of SO<sub>2</sub> are similar to those from particulates, including acid rain, deposition, and haze.

## **2.1.4 Current Conditions**

### **Climate and Meteorology**

The discussion of air quality and atmospheric conditions in the planning area begins with a summary of the local climate and meteorological features. This background information is important in the role it plays in air quality and the effects of natural and human-caused sources of air pollution on local and regional air quality. Climate change is addressed in a separate section (see Section 2.2). Air quality, including levels of GHG in the atmosphere, is interrelated with climate change. Therefore, this section is also useful as background information for the climate change section.

Weather, often termed as meteorology, deals with atmospheric conditions over short time periods (minutes to weeks); standard meteorological variables include temperature, humidity, precipitation, cloudiness, wind speed and direction, and solar radiation. Climate refers to weather ‘behavior’ of the atmosphere, over longer periods of time (months to years); both weather (short-term) and climate (long-term) influence the transport and dispersion of air pollutants. The generation of air pollutants is also affected by both weather and climate, as activity types and scheduling, heating requirements, and travel are often coordinated to meet weather criteria. Daylight hours also have an effect on climate (temperature and solar radiation, for example), and indirectly may also have an effect on air quality by dictating some seasonal construction and operation schedules. Daylight hours in the planning area range from

approximately 19 hours (southern boundaries) to 22 hours (northern boundaries) in the summer and 6 hours (south) to 3 hours (north) in the winter (NOAA 2016).

Due to the expanse of the state, along with the varied geological features, the climate of Alaska is broken out into five major zones (WRCC 2016a). The planning area is subarctic (below the Arctic Circle), and is located primarily within the *transition* climate zone, with influences of other climate zones in some portions of the planning area. The transition zone is located between the *maritime* and *continental* climate zones. The continental zone includes the interior basin, and exhibits large seasonal variation in temperatures, with minimum winter temperatures not uncommonly reaching the -50s (degrees F), and maximum summer temperatures in the upper 70s (degrees F). It is also relatively drier than coastal areas of Alaska, with annual average precipitation of 20 inches. On the other end of the spectrum, the maritime zone, located along the southern regions of the state, along the Gulf of Alaska (including the Aleutian Islands), has more moderate temperature ranges (winter to summer ranges from 20s to 60s (degrees F), with an annual average temperature of 42 degrees F), and precipitation averaging 70 inches of rain. Climate variables in the transition zone lie between those of the continental and maritime zones; annual average temperature is 27 degrees F, ranging from approximately 0 degrees F in winter to the low 60s (degrees F) in summer, and annual average precipitation is approximately 30 inches. Similar to the transitional zone, the *maritime continental* zone is a hybrid of the maritime and continental zones. As in maritime climates, the summer temperatures here are moderated by the open water of the Bering Sea. However, the presence of winter sea ice creates a cooler, more continental winter temperature pattern (approximately 10 degrees F cooler in winter than in the transition zone).

There is not a definitive delineation between the climate zones in the planning area, and some locations may exhibit properties of more than one zone, with the influence of continental zone climate in the northeast, and the influence of maritime continental zone climate on the western boundary of the planning area. Due to its location between the Bering Sea and the extreme nature of air masses in the Interior, much of the planning area is truly a transition zone.

The most comprehensive weather stations representative of the planning area are at McGrath, Bethel, and Nome. Nome is outside the planning area, to the west of the northern portion, and to the north (across Norton Sound) from the western portion. The three station locations represent the influential climate zones within the planning area and reach the approximate extent of the planning area boundaries (McGrath to northeast, Bethel to south, and Nome to northwest; see the BSWI Draft RMP/EIS, Map 1-2). These are considered “first order” National Weather Service (NWS) stations. They are Automated Surface Observing System (ASOS) stations, a joint program between the NWS, Federal Aviation Administration (FAA), and the Department of Defense (DOD), and they provide large and consistent data sets that are normally acceptable for use in air quality analyses (NWS 1999).

Table 2.1.4-1 through Table 2.1.4-3 show the summary of monthly normals of: maximum, minimum, and average temperatures, precipitation, snowfall, and daily wind speed for the McGrath, Bethel, and Nome stations, respectively. Although all are considered to be in the transition climate zone, the McGrath station, within the interior, is more influenced by the continental zone climate than maritime (as shown in the cooler winter temperatures, as compared to other two stations). The Bethel station exhibits some properties of maritime continental zone climate due to its proximity to the Bering Sea. The Nome station (outside the planning area, but somewhat representative of northwesterly coastal areas within the planning area) also shows influence of the maritime continental climate zone, with four months (December through March) showing average minimum temperatures below 0 degree F. The Bethel and Nome stations also show higher average wind speeds than the McGrath station, also a feature of more maritime exposure.

**Table 2.1.4-1. Summary of Normal Monthly Air Temperature, Precipitation/Snowfall, and Wind Speed – McGrath, Alaska**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Ann
Average Maximum Temperature (degrees F)	1.0	11.4	22.9	39.1	56.0	66.8	68.5	63.2	52.9	32.3	13.0	2.2	35.8
Average Temperature (degrees F)	-7.7	4.4	10.5	30.9	47.2	58.3	60.2	55.2	45.5	25.8	7.2	-3.7	27.8
Average Minimum Temperature (degrees F)	-17.2	-11.3	-3.8	16.7	34.9	45.8	49.5	45.4	35.8	18.9	-2.8	-14.8	16.4
Average Total Precipitation (in)	0.99	0.85	0.79	0.71	0.91	1.60	2.27	2.91	2.29	1.37	1.27	1.22	17.16
Average Total Snowfall (in)	14.6	12.3	11.1	6.3	0.8	0.0	0.0	0.0	1.0	9.5	16.6	18.4	90.6
Daily Average Wind Speed (mph)	1.8	2.4	4.3	5.1	5.3	4.5	4.4	3.9	4.0	3.6	2.4	1.5	3.6

Source: WRCC 2016b  
 Period of Record for Ave. Max. Temp, Ave. Min. Temp. Total Precip., and Ave. Snow is 04/01/1939 – 06/09/2016. Period of Record for Ave. Temp. and Ave. Wind Spd. Is July 1996-December 2008.

**Table 2.1.4-2. Summary of Normal Monthly Air Temperature, Precipitation/Snowfall, and Wind Speed – Bethel, Alaska**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Ann
Average Maximum Temperature (degrees F)	12.0	15.4	20.9	33.1	49.6	59.9	62.6	59.7	52.1	35.8	23.4	14.1	36.6
Average Temperature (degrees F)	5.6	14.2	13.0	27.7	41.9	53.3	56.2	53.9	45.7	30.0	18.7	8.1	30.7
Average Minimum Temperature (degrees F)	-0.8	1.4	4.9	17.2	32.6	43.1	48.0	46.6	38.6	24.4	11.3	1.2	22.4
Average Total Precipitation (in)	0.77	0.71	0.75	0.72	0.95	1.55	2.26	3.35	2.50	1.47	1.29	1.06	17.36
Average Total Snowfall (in)	7.9	7.3	8.5	5.4	1.8	0.1	0.0	0.0	0.3	4.1	10.0	10.3	55.7
Daily Average Wind Speed (mph)	13.2	12.3	12.4	11.7	10.0	9.2	9.6	9.3	9.6	10.2	11.1	11.7	10.9

Source: WRCC 2016b  
 Period of Record for Ave. Max. Temp, Ave. Min. Temp. Total Precip., and Ave. Snow is 08/01/1923 – 06/09/2016. Period of Record for Ave. Temp. and Ave. Wind Spd. Is July 1996-December 2008.

**Table 2.1.4-3. Summary of Normal Monthly Air Temperature, Precipitation/Snowfall, and Wind Speed – Nome, Alaska**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Ann
Average Maximum Temperature (degrees F)	13.2	13.7	17.1	26.7	42.6	53.4	57.3	55.8	48.7	34.3	22.9	14.4	33.3
Average Temperature (degrees F)	4.6	9.5	9.7	21.1	36.0	47.9	51.4	49.9	42.9	28.8	18.4	7.7	27.3
Average Minimum Temperature (degrees F)	-2.4	-2.6	-0.2	11.7	29.8	39.7	45.3	44.2	36.6	22.7	10.3	-0.5	19.5
Average Total Precipitation (in)	0.88	0.74	0.60	0.69	0.70	1.07	2.24	3.25	2.42	1.46	1.09	0.91	16.06
Average Total Snowfall (in)	10.3	9.3	7.6	6.8	2.0	0.2	0.0	0.0	0.4	4.6	10.9	10.8	62.9
Daily Average Wind Speed (mph)	9.1	10.7	9.1	9.2	8.4	8.5	9.1	9.4	9.8	9.1	10.1	9.5	9.3

Source: WRCC 2016b

Period of Record for Ave. Max. Temp, Ave. Min. Temp, Total Precip., and Ave. Snow is 08/01/1900 – 06/09/2016. Period of Record for Ave. Temp. and Ave. Wind Spd. Is July 1996-December 2008.

Based on the cooler temperatures and lower wind speeds in the winter months at McGrath, the northeast portions of the planning area would be more likely to have inversion events, which can trap air pollution in stagnant air.

A review of climatological data from additional weather stations in the planning area shows concurrence with the McGrath, Bethel, Nome station normals. These stations are from the National Oceanic and Atmospheric Administration (NOAA)/NWS Cooperative Observer Network, which are operated by volunteer observers. They typically have less complete data sets and are only used to complement the ASOS site data for air quality analyses. An interactive map of available stations, linked to various station data (including monthly normals) is found on the Western Regional Climate Center (WRCC) website.

These climate data are considered broadly representative of climate conditions found over much of the planning area. Additional climate data are available for selected sites from the University of Alaska Climate Research Center (ACRC) (see <http://climate.gi.alaska.edu/Climate/Normals>) as well as from previously noted agency sources. Specific weather events are influenced by variations in elevation, topography, and cloud cover. Wind conditions often reflect channeling and mountain valley flows due to complex terrain, especially in the interior regions. Storms can either develop in or move into the Bering Sea then move north or northeastward, creating strong winds along the western coastal area. Except for local strong wind conditions, wind speeds typically diminish from the coast to the interior. Wind direction trends northeast.

### **Air Pollutant Sources**

As noted above, the planning area is currently classified as attainment or unclassifiable/attainment for all criteria pollutants. Much of the area is remote and rural, and air quality is generally good. Regional and local air quality however, is periodically affected by local, regional, and global natural events and human-caused activities.

There are no large industrial facilities within the planning area. Some typical facilities include small diesel-fired power plants (and other diesel power generation), asphalt plants, rock and gravel plants, bulk storage facilities, and mining. All of these source types require some form of permitting or regulatory notification through ADEC, including quantification of potential emission. Exhaust from diesel power generators in some rural communities can adversely impact local air quality, visibility, and odor. Rural refuse sites and water treatment plants may also create nuisance odor levels. Noise pollution from motorized vehicles occurs locally from vehicles, boats, and aircraft.

Residential emissions also occur in small towns and villages within the planning area. These generally include smaller sources, such as woodstoves, diesel generators, and mobile sources (vehicles and boats). These smaller residential sources are not individually quantified by ADEC, although estimates can be made using population-based emission factors. Survey-based emission inventories by borough were made in 2005 (Sierra Research 2007). Information was collected on seasonal activity and fuel use, and results were extrapolated to other communities based on similarities in geography, location, and size. Several communities within the planning area were included in that study. Borough population-based emission factors for criteria pollutants, VOCs, and NH<sub>3</sub> can be determined from the data and used to estimate base emissions for current and future years.

Table 2.1.4-4 provides the survey emissions for the two boroughs within the planning area, Bethel and Wade Hampton (also known as Kusilvak; approximately 100 kilometers northwest of Bethel), with comparison to all rural communities within the state. Note that these emissions do not include point sources (such as industrial facilities and power plants) or commercial marine and aviation sources. Both

survey year 2005 emissions and future year 2018 (prorated based on population trends at the time of the report) are included. These data have not been updated/revised since the original report in 2007; the population trends have not been verified with actual data for accuracy. Population-based emission factors were calculated based on this information and are also shown in the table. The emission factors, per capita, are lower for all pollutants in the Bethel area, as compared to Wade Hampton and the combined factors for all Rural Communities. Emission factors for 2018 are lower than 2005 factors in most cases. This is due to anticipated increases in combustion efficiency and other emission reduction programs for residential sources.

Oil and gas development potentially produces criteria pollutants, HAPs, VOCs, and GHGs. Although mining activities primarily generate particulate emissions, they can also emit other criteria pollutants, HAPs, VOCs, and GHGs as well. These types of sources are typically located further from rural communities and are less likely to create local impacts in populated areas. Currently, there are no known oil and gas development projects in the planning area (per public ADEC permitting records) (ADEC 2016c).

The most significant pollutants in the planning area are particulate matter: fugitive dust (primarily PM<sub>10</sub>) and wood smoke (primarily PM<sub>2.5</sub>) (ADEC 2016d). Besides the potential health effects of these criteria pollutants, these forms of human-caused and natural air pollution may also impair visibility. Along with fine particulate, the smoke from burning wood contains a mix of gases, some of them harmful toxics (i.e., HAPs). The major sources of fugitive dust in rural Alaska are unpaved roads and exposed or braided riverbeds with high sediment loads. Emissions of these dust/smoke particulate types also vary seasonally, due to climate conditions. During snow-free seasons, the roads and riverbeds have more exposure and are more susceptible to re-entrainment in the atmosphere due to wind events. And in winter, temperature inversions (more likely to occur in continental-influenced climates in the eastern portion of the planning area (nearer to and within the Interior Basin), and at river bottoms or other topographically similar locations) may trap wood smoke and other pollutants at ground level.

Additional sources of particulate emissions in the planning area include volcanic ash and wildfire smoke; these events are not regularly occurring but have the potential for large amounts of emissions in a single event. Pollutants from these events can be characterized and their contribution to ambient concentration levels can be assessed. However, the CAA Exceptional Events Rule exempts these types of sources from inclusion in attainment analyses (EPA 2016c). Therefore, emissions from wildfire or other natural events do not count toward nonattainment status, although prescribed burns are managed in coordination with the ASIP strategies and attainment status.

Wildland smoke from natural or prescribed burns can severely limit local and regional visibility, airborne particulate concentrations may reach health hazard levels, and wildland fire odors can attain nuisance levels. Depending on atmospheric conditions, smoke and ash from large wildland fires outside of Alaska may be transported great distances, adversely affecting air quality within the planning area. The AFS and related fire management working groups collect fire data, including records of acreage burned and other variables that may affect emissions.



**Table 2.1.4-4. Survey-Based Emissions**

Borough/Area	Population	Communities	VOC	CO	NOx	PM <sub>10</sub>	PM <sub>2.5</sub>	SOx	NH <sub>3</sub>
<b>2005 Emission Inventory Data</b>			<b>Annual Emissions (tons/year)</b>						
Bethel	17,086	37	15,352	14,953	1,126	3,292	1,845	56	2
Wade Hampton (Kusilvak)	7,863	20	12,084	10,743	643	6,453	2,014	23	1
Total Rural Communities	249,654	365	360,001	318,650	30,364	196,363	63,853	3,032	84
<b>2018 Emission Inventory Data</b>			<b>Annual Emissions (tons/year)</b>						
Bethel	20,738	37	17,298	15,354	1,430	3,756	2,142	66	2
Wade Hampton (Kusilvak)	9,834	20	14,875	12,220	852	8,066	2,515	28	1
Total Rural Communities	325,959	365	510,423	408,785	38,067	291,337	94,526	3,739	117
<b>2005 Emission Inventory Data</b>			<b>Population-Based Emission Factors (tons/person)</b>						
Bethel			0.90	0.88	0.07	0.19	0.11	0.003	0.0001
Wade Hampton (Kusilvak)			1.54	1.37	0.08	0.82	0.26	0.003	0.0001
Total Rural Communities			1.44	1.28	0.12	0.79	0.26	0.012	0.0003
<b>2018 Emission Inventory Data</b>			<b>Population-Based Emission Factors (tons/person)</b>						
Bethel			0.83	0.74	0.07	0.18	0.10	0.003	0.0001
Wade Hampton (Kusilvak)			1.51	1.24	0.09	0.82	0.26	0.003	0.0001
Total Rural Communities			1.57	1.25	0.12	0.89	0.29	0.011	0.0004

## Air Quality Monitoring

Comprehensive monitoring of air quality in Alaska is difficult due to the size of the state and accessibility issues in remote regions. In addition, air quality monitoring is typically only conducted in areas where pollution is a problem, usually in larger population centers. ADEC conducts some monitoring in smaller towns that are representative of multiple communities, and also monitors in response to air quality complaints. Particulate pollution problems primarily occur in, and have been managed by, the local communities and ADEC individually collaborates with community leadership in locally resolving issues. In general, the status of air quality in the planning area is indicated by public observations and complaints, as reported to ADEC. No ADEC monitoring data are available for the planning area.

ADEC conducted a survey of dust complaints in 2010 (ADEC 2012a).<sup>1</sup> The 2010 survey showed numerous locations in the planning area with dust complaints, and three sites within the planning area initiated monitoring programs (Bethel, Tununak [on the coast, due west of Bethel], and Mekoryuk [on the island across from Tununak]). No data from these sites are provided in the 2010 report.

Based on regional monitoring and agency reports from areas to the east of the planning area (the Eastern Interior, including Fairbanks, Denali National Park and Preserve, and Whitehorse, Yukon Territory), existing air quality in this region is generally excellent, with the exception of periodic smoke and associated particulate matter from summer wildland fires (BLM 2016b). ADEC performed PM<sub>2.5</sub> air monitoring at Denali between April 2000 and June 2003 (ADEC 2012b). This is the nearest, most representative, ambient air monitoring site for the remote regions in the planning area. The highest monitored 24-hour PM<sub>2.5</sub> concentration during this period was 40.5 micrograms per cubic meter (µg/m<sup>3</sup>); ADEC believes this occurred during a wildfire smoke event. More typical values were much lower, the data showing concentrations at 6 µg/m<sup>3</sup> or less 97 percent of the time, and 75 percent of the samples were below the instrument detection level of 2 µg/m<sup>3</sup>.

Donlin Gold conducted ambient monitoring at their proposed site north of Crooked Creek (approximately 155 kilometer northeast of Bethel) between 2006 and 2009 (USACE 2015). This site is located within the planning area, and ambient air quality should be representative of much of the remote portions of the region. The data show that baseline ambient air quality is well within the NAAQS. Table 2.1.4-5 summarizes the data. Note that these data have not been reviewed for accuracy at this time.

**Table 2.1.4-5. Donlin Gold Mine, Monitoring Data Summary, 2006-2009**

Pollutant	Averaging Period	Monitored Value	NAAQS	AAAQS
PM <sub>10</sub>	24-hour	14 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
PM <sub>2.5</sub>	Annual	2.3 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>
	24-hour	14 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>
SO <sub>2</sub>	Annual	<0.0005 ppm	--	0.03 ppm
	24-hour	0.002 ppm	--	0.14 ppm
	3-hour	0.002 ppm	0.50 ppm	0.50 ppm
CO	8-hour	0.4 ppm	9 ppm	9 ppm
	1-hour	0.6 ppm	35 ppm	35 ppm
NO <sub>2</sub>	Annual	0.01 ppm	0.053 ppm	0.053 ppm
	1-hour	0.014 ppm	0.100 ppm	0.100 ppm
O <sub>3</sub>	8-hour	0.052 ppm	0.070 ppm	0.070 ppm

<sup>1</sup> The ADEC is currently conducting another survey; however, the results of the 2016 survey are not yet available.

## Air Quality-Related Values

An air quality-related value is an air quality resource in itself. The resource may include visibility or a specific scenic, cultural, physical, biological, ecological, or recreational resource identified by the FLM for a particular area. These resources may be adversely affected by a change in air quality. This section focuses on visibility as the primary air quality-related value in Alaska.

Visibility is defined as the optical quality of the atmosphere, sometimes quantified as standard visual range. Visibility may be reported as visual range, in units of distance such as miles or expressed in terms of deciview, a measure for describing perceived changes. One deciview is defined as a change in visibility that is just perceptible to an average person.

The Interagency Monitoring Protected Visual Environments (IMPROVE) program was established as part of the Regional Haze Rule to monitor visibility at federal Class I areas. The Bering Sea Wilderness is currently the only Class I area in the U.S. *not* being monitored. This is indicative of the limited data for the state, and specifically the planning area, which has no available data. The nearest IMPROVE site is at Denali National Park and Preserve. Figures 2.1.4-1 through 2.1.4-3 provide summary visibility data for this site (IMPROVE 2016). The first graph in Figure 2.1.4-1 shows the visibility on the haziest and clearest days in Denali National Park and Preserve with the top line showing haziest days, second line from the top showing the natural condition on the haziest days, the third line showing clearest days, and the last line showing the natural condition on the clearest days. The second graph in Figure 2.1.4-2 shows just the visibility on the clearest days, and the third graph in Figure 2.1.4-2 shows just the visibility on the haziest days. The Denali National Park and Preserve site is somewhat representative of the northeastern portions of the planning area. Due to higher winds, and locations closer to the Bering Sea, the western portion of the planning area is expected to have different visibility characteristics and pollutant compositions than these.

The deciview and light extinction variables in these graphs and charts are measures of impairment; the decreasing values show the trend toward improved visibility over time. The Denali National Park and Preserve data show that wildland fires are the largest source of haze forming emissions; see “Haziest Days 1988-2015” pie chart in Figure 2.1.4-3 showing organic carbon as the largest fraction of haze particulate composition. The number of clear days is lowest in summer months, during fire season. The peak in haze in 2015 corresponds to the second highest fire season on record. Overall, Denali National Park and Preserve has some of the cleanest air measured in the U.S. According to the National Park Service (NPS), small amounts of industrial and agricultural contaminants from other continents make their way into the park each year in a recurring seasonal pattern. The peak concentrations of international contaminants generally occur in the late winter and spring. During summer, naturally occurring wildfire smoke is the primary contributor to air quality degradation (NPS 2015).

The ADEC 2015 Regional Haze Report’s Areawide Pollutant Control Program for Regional Haze (ADEC 2015a) identifies these types of emissions, effects, trends, and progress in reduction strategies for improvement of visibility. Overall, Alaska’s contribution of human-caused emissions contributing to visibility impairment at Class I areas is decreasing and is expected to continue decreasing with the implementation of the AWFCG smoke management programs. However, emissions from uncontrollable sources, including natural wildfire event, international sources, global transport of emissions, and offshore shipping in the Pacific are still prominent influences on visibility in Alaska.

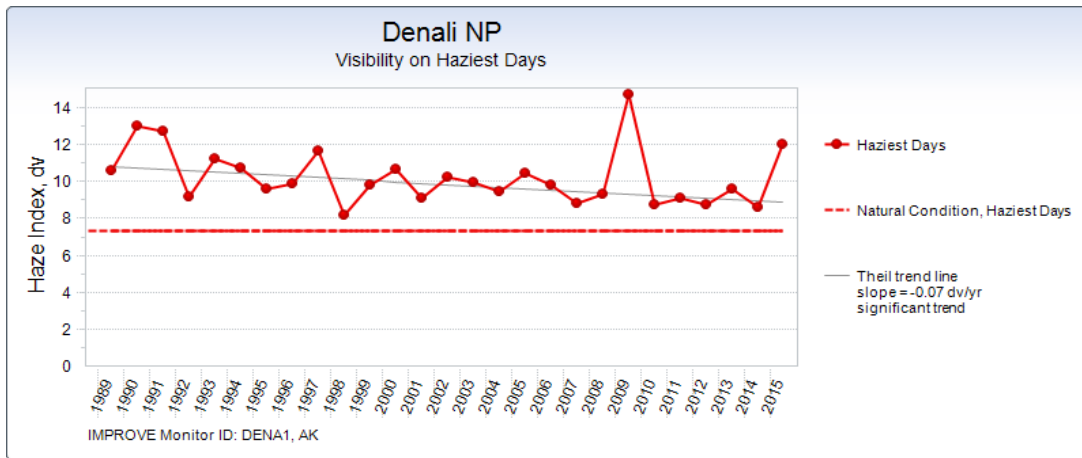
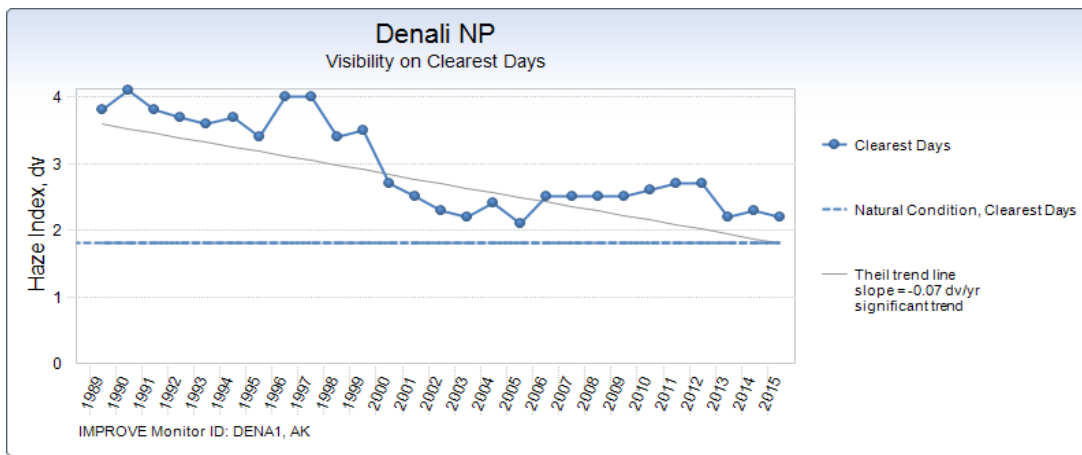
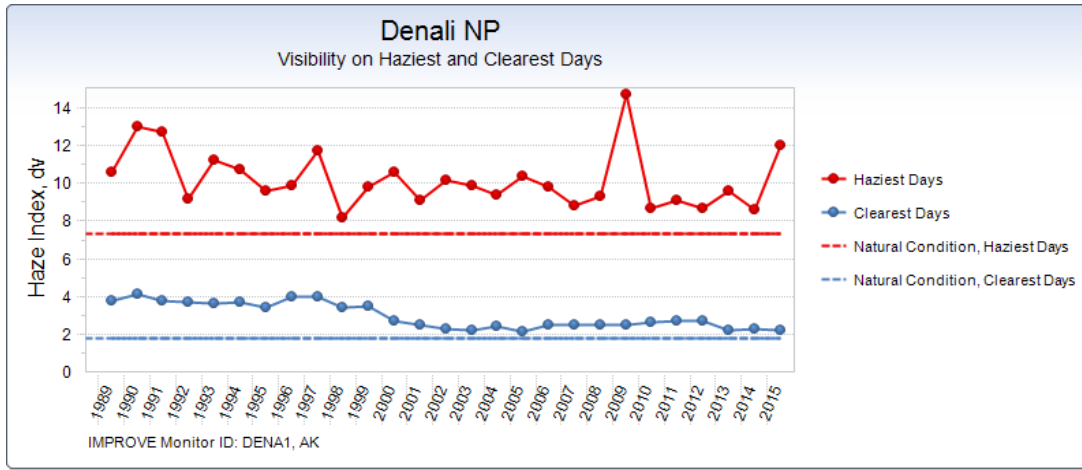


Figure 2.1.4-1. Denali National Park and Preserve Visibility Trends, 1988-2015 (IMPROVE 2016)

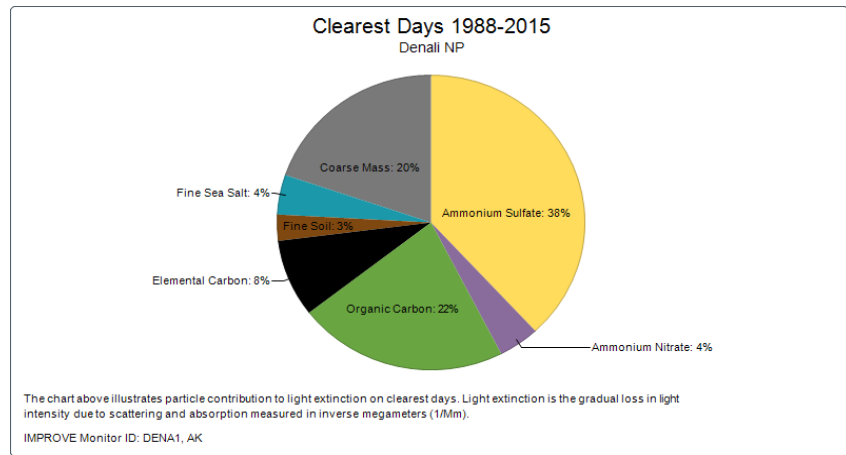
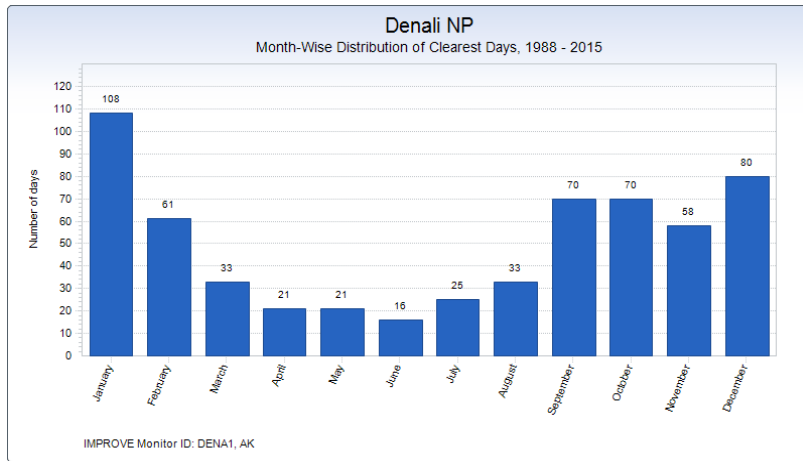


Figure 2.1.4-2. Denali National Park and Preserve Light Extinction Summary – Clearest Days, 1988-2015 (IMPROVE 2016).

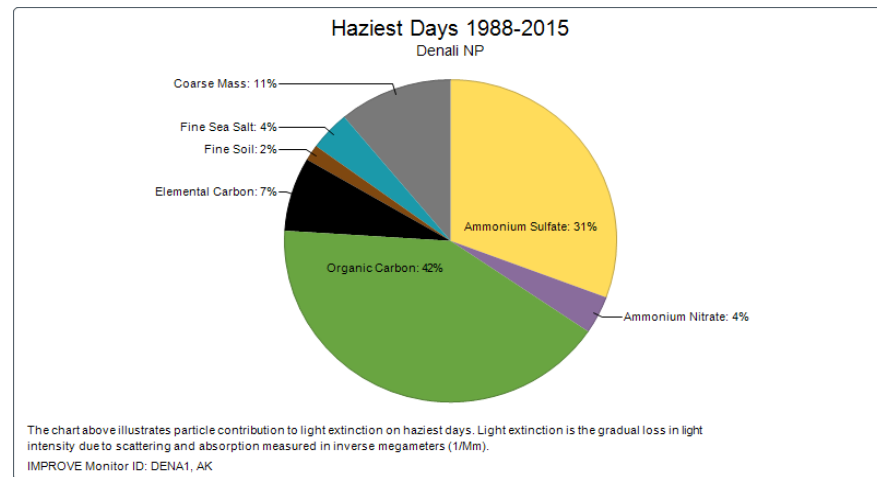
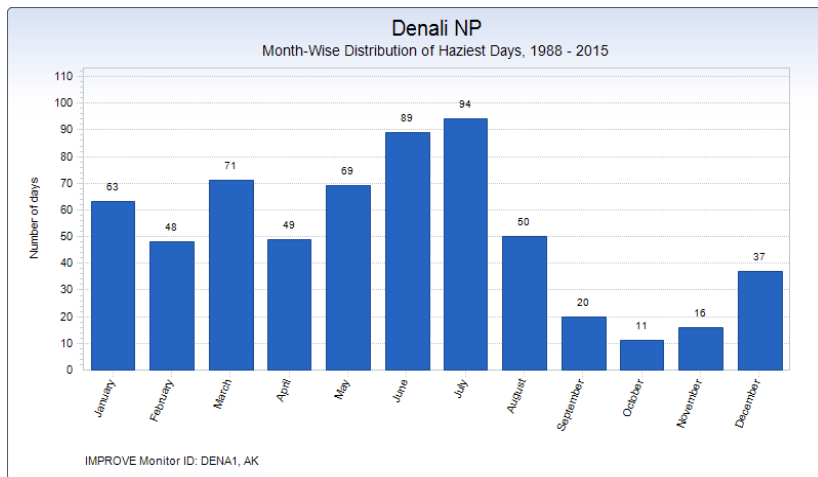


Figure 2.1.4-3. Denali National Park and Preserve Light Extinction Summary – Haziest Days, 1988-2015 (IMPROVE 2016).

Atmospheric deposition refers to the process by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems. It is reported as the mass of material deposited on an area in a given amount of time (kilogram per hectare per year). Wet deposition pertains to air pollutants deposited by precipitation, such as rain and snow. One expression of wet deposition is precipitation pH, a measure of acidity or alkalinity of the precipitation. Dry deposition refers to gravitational settling of particles and adherence of gaseous pollutants to soil, water, and vegetation. Total deposition refers to the sum of the airborne material transferred to the Earth's surface by both wet and dry deposition. The National Atmospheric Deposition Program (NADP) is a project that measures atmospheric deposition and studies its effects on the environment. Data for Denali National Park and Preserve have been collected since 1980 (NADP 2016).

### Greenhouse Gas Emissions

There are no federal or State regulations that establish ambient air quality emissions standards for GHGs. However, the EPA requires mandatory reporting of GHG from large GHG emission sources and in 2010 implemented the rule, referred to as the Greenhouse Gas Reporting Rule (GHGRR), requiring facilities emitting more than 25,000 metric tons of carbon dioxide equivalents (CO<sub>2</sub>e) on an annual basis to report their emissions to the EPA.

The three most relevant greenhouse gases associated with this planning area are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), primarily due to fuel combustion (electric generation and transportation), with lesser amounts from waste and landfilling activities. GHG emissions are presented using a common metric, CO<sub>2</sub>e, which incorporates the relative contribution of each gas to the global average radiative forcing on a global warming potential weighted basis.

In 2015, ADEC prepared a State GHG emission inventory using standard EPA methodologies, applying some fuel and vehicle efficiency adjustments to better represent Alaska (ADEC 2015b). This report provides statewide emissions as well as emissions from the stationary sources required to report under the federal GHGRR. Stationary sources are typically larger industrial facilities operating in the state and are subject to air quality permit requirements.

Table 2.1.4-6 provides the 2015 inventory report's GHG emission in Alaska partitioned by sectors for the years 1990, 2000, and 2005 through 2010, respectively, and includes emission sinks as well. From about 1995 through 2003, GHG emissions were relatively stable at about 50 million metric tons (MMT) of CO<sub>2</sub>e. Emissions peaked in 2005 and by 2009 had declined by about 23 percent. Some of this decline may be due to the relatively recent economic recession as emissions increased in 2010. The industrial sector, including the oil and gas industries, produces the most GHG emissions in the state, followed by the transportation, the residential and commercial, and the electric generation sectors. The waste, agriculture, and industrial process sectors each produce relatively small quantities of GHG in Alaska. Figure 2.1.4-4 summarizes the information graphically.

**Table 2.1.4-6. Alaska Historical and Reference Case GHG Emissions (MMT CO<sub>2</sub>e)**

Sector	1990	2000	2005	2006	2007	2008	2009	2010
Electricity Production	3.05	3.62	3.69	3.96	3.74	3.73	3.65	3.51
Residential & Commercial	4.36	5.27	4.90	5.35	4.97	5.03	4.68	5.02
Industrial	24.87	26.33	27.02	23.21	23.36	21.33	21.04	20.26
Transportation	11.18	14.31	17.37	17.37	16.35	13.89	11.64	13.36
Industrial Processes	1.10	1.17	1.14	0.48	0.47	0.26	0.27	0.29

<b>Sector</b>	<b>1990</b>	<b>2000</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Waste	0.32	0.4	0.45	0.47	0.49	0.5	0.52	0.53
Agriculture	0.05	0.05	0.07	0.07	0.08	0.08	0.09	0.08
<b>Gross Emissions</b>	<b>44.93</b>	<b>51.16</b>	<b>54.64</b>	<b>50.92</b>	<b>49.45</b>	<b>44.81</b>	<b>41.88</b>	<b>43.04</b>
Increase in Gross Emissions Over 1990	0	6.23	9.71	5.99	4.52	-0.12	-3.05	-1.89
Emission Sinks	-6.5	-25.2	5.2	-29.04	-26.06	-30.31	-8.15	-22.37
<b>Net Emissions</b>	<b>38.43</b>	<b>25.96</b>	<b>59.84</b>	<b>21.87</b>	<b>23.39</b>	<b>14.5</b>	<b>33.74</b>	<b>20.67</b>

Source: ADEC 2015b

These data indicate that in recent years, and as the population in Alaska has grown, there is more efficient energy use in these areas, likely due to various conservation and efficiency measures. They also indicate that the way land is used affects the ability of the natural environment to take up and store, or sequester, carbon, serving as “emission sinks” by removing carbon from the atmosphere. The land use, land use change, and forestry sector calculations consider a variety of factors that affect the ability of the soil and plants to store carbon. These emission sink factors are relatively stable over time, with the exception of wildfires, which can vary greatly from year-to-year.

The CO<sub>2</sub> from wildfires is excluded from this 2015 inventory reporting on the basis that it will be absorbed by other plants as they grow to replace those that burned during the fire. However, in addition to releasing CO<sub>2</sub>, wildfires also produce N<sub>2</sub>O and CH<sub>4</sub>, which are less readily incorporated into new plant growth. In addition, these two compounds are stronger GHGs (higher GWPs) than CO<sub>2</sub>. Figure 2.1.4-5 shows the net emissions from emission sinks and wildfires (ADEC 2015b). In most years, this sector sequesters carbon from the atmosphere. However, in years with abundant wildfires, such as 2004 and 2005, this sector contributes additional emissions to the atmosphere. Note: the analysis did not include any consideration of permafrost thaw and subsequent CH<sub>4</sub> emissions; the complexity of such an analysis was beyond the scope of the 2015 inventory report effort.

Because GHGs are global in nature, it is more important to look at the larger scale (as in the State data) and make assessments on individual activity changes in order to evaluate potential effects on resources. The GHG emissions shown above are inclusive of the whole state.

Natural gas and petroleum, and their related industries, account for about 50 percent of the GHG inventory. These sectors are mostly non-existent in the planning area. Therefore, a rough estimate of GHG emissions in the planning area can be made by reducing these statewide GHG emissions by one half (for irrelevant sectors), and then applying a population-based factor of 0.034 (assuming a planning area population of 25,000 (BLM 2015a) and statewide population of 737,625 (ADLWD 2015)). This gives a net GHG emission rate of 0.70 MMT for the planning area in 2010.

GHG emissions from wildland fires can be estimated using EPA emission factors, which provide fuel loading values by region, along with criteria pollutant and GHG emission factors by region (EPA 1996). Prescribed burning emission factors are also provided by fire/fuel configuration. Additional burn data (area, and more detailed fuel type and loading, if available) would be required to apply these factors and estimate emissions.

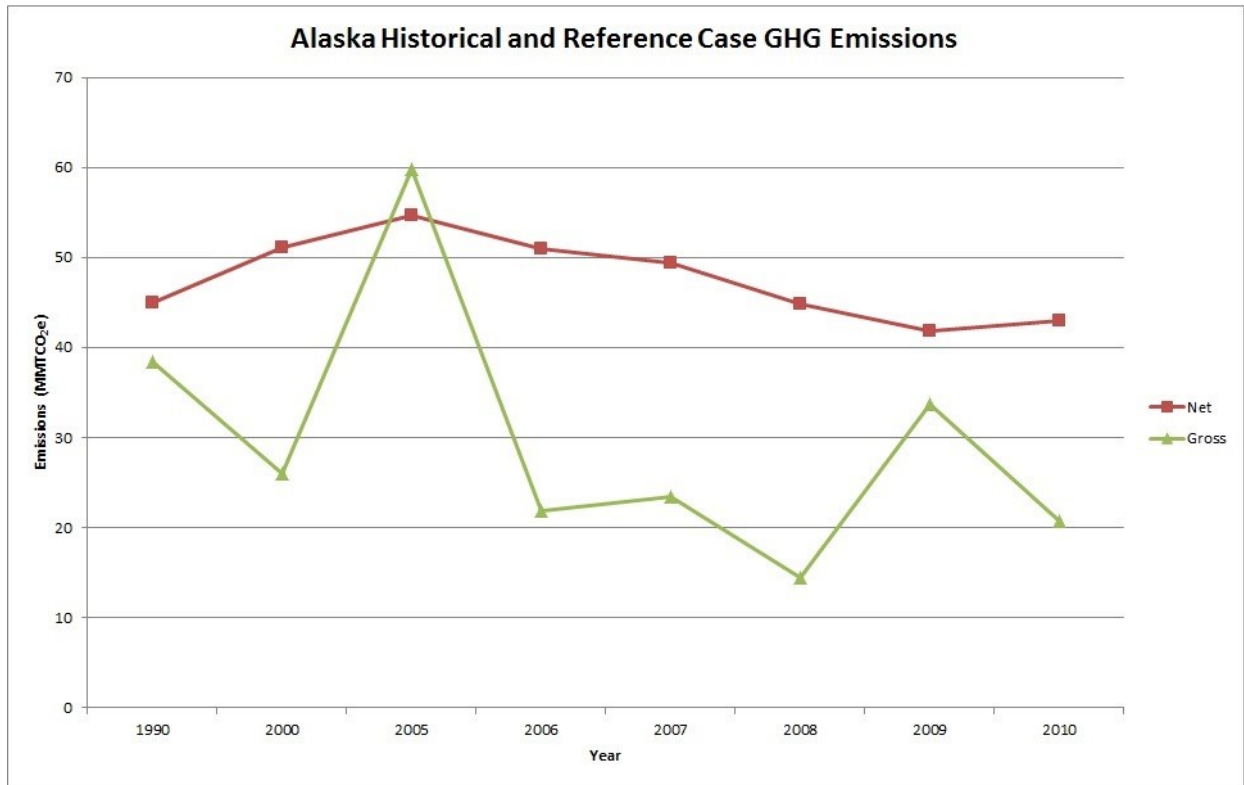


Figure 2.1.4-4. Alaska Historical and Reference Case GHG Emissions (ADEC 2015b)

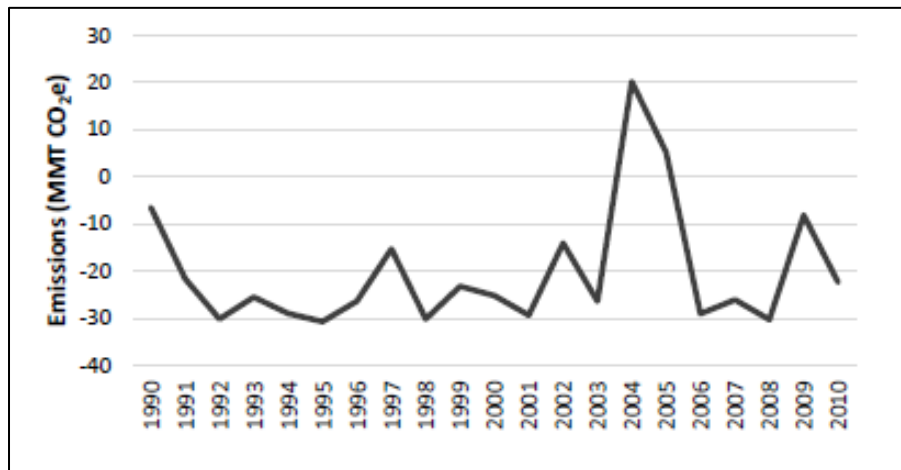


Figure 2.1.4-5. Net Emissions from GHG "Sinks" and Wildfires in the State of Alaska (Exhibit 26, ADEC 2015b)

**Noise**

Sound is mechanical energy transmitted by pressure waves in a compressible medium (such as air) or incompressible medium (such as water). When sound becomes excessive, annoying, or unwanted, it is referred to as noise. Noise may be continuous (constant noise with uniform intensity), steady (constant noise with fluctuating intensity), impulsive (having a high peak of short duration), stationary (occurring from a fixed source), intermittent (occurring at a fixed rate), transient (occurring at a varying rate), or mobile (occurring from a non-fixed source).



The A-Weighted decibel Sound Level, expressed as dBA, can be used to quantify sound and its effect on people (EPA 1978). The A-weighted sound level is based on the dB unit but puts more emphasis on frequencies in the range that humans hear best, and less emphasis on frequencies that humans do not hear well, thus mimicking the human ear. On the dBA scale, normal conversation falls at about 60 to 65 dBA, and sleep disturbance at about 40 to 45 dBA. A change of 1 dBA cannot be perceived by humans, except in carefully controlled laboratory environments. Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference by humans. Loudness (the subjective perception of sound by humans) is generally considered to double for approximately every 6 to 10 dB increase in sound level.

Figure 2.1.4-6 shows typical sound levels for some common indoor and outdoor activities (Caltrans 2009). These are levels that would be heard at the source (or at a distance noted in the scale). Sound levels typically drop off at a rate of 6 dBA for each doubling of distance.

Under the Noise Control Act of 1972 and the Quiet Communities Act of 1978, the EPA has implemented federal regulations covering standards for major sources of noise such as construction equipment, rail carriers and motor carriers, or transport equipment (EPA 2016d).

In the past, the EPA coordinated all federal noise control activities through its Office of Noise Abatement and Control. The EPA phased out the office's funding in 1982 as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to State and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 were never rescinded by Congress and remain in effect today, although essentially unfunded (EPA 2017a). The EPA does not have any regulatory authority governing noise in local communities (EPA 2017b).

Information about aircraft or plane noise is maintained by the FAA. In addition, the Federal Interagency Committee on Aviation Noise was formed in 1993 to provide forums for debate over future research needs to better understand, predict, and control the effects of aviation noise, and to encourage new technical development efforts in these areas (EPA 2017b).

Local governmental (e.g., city) authorities may have local or State laws. In addition, many states run noise pollution programs (EPA 2017b). There are no noise or vibration regulations at the State level in Alaska. However, some communities in the planning area may have established noise ordinances at the local level that could apply to federal actions occurring in the vicinity. For example, in Bethel, the Bethel Municipal Code 18.32.080 Noise, Rural (R) District states:

*No loud noise, whether of public or private origin, shall be permitted within this land use district during the hours from 11:00 p.m. to 6:00 a.m. "Loud noise" is defined as a decibel level that exceeds 80 dBA max at the property line of the parcel within the R district that is receiving the noise. This provision applies to all noise sources, whether generated inside or outside the R district, but does not apply to noise associated with aircraft arriving at or departing from the airport or emergency equipment or signals operated by a government agency.*

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	<b>110</b>	Rock band
Jet flyover at 1,000 feet	<b>100</b>	
Gas lawnmower at 3 feet	<b>90</b>	
Diesel truck at 50 feet at 50 mph	<b>80</b>	Food blender at 3 feet Garbage disposal at 3 feet
Noisy urban area, daytime	<b>70</b>	Vacuum cleaner at 10 feet Normal speech at 3 feet
Gas lawnmower, 100 feet Commercial area	<b>60</b>	Large business office Dishwasher in next room
Heavy traffic at 300 feet	<b>50</b>	Theater, large conference room (background)
Quiet urban daytime	<b>40</b>	Library Bedroom at night, concert hall (background)
Quiet urban nighttime	<b>30</b>	Broadcast/recording studio
Quiet suburban nighttime	<b>20</b>	
Quiet rural nighttime	<b>10</b>	
	<b>0</b>	

**Figure 2.1.4-6. Typical Noise Levels**

Much of the planning area is located in rural and remote regions of Alaska characterized as having very little or no development and, therefore, few sources of artificial noise and vibration. No baseline environmental noise assessments have been conducted in the planning area. Baseline environmental noise assessments aid predictions or modeling of potential wildlife noise impacts, such as territory abandonment/relocation, foraging success, reproduction loss, increase predation due to masking, or pairing success. It can be assumed that noise levels in the planning area are likely to range from a low 25 dBA, representing a quiet, rural nighttime location, to 50 dBA, representing a quiet urban daytime location (Caltrans 2009). According to EPA, noise levels in Wilderness Areas are typically 35 dBA (EPA 1978). Locations near moving water sources (e.g., ocean and rivers) are likely to have increased ambient noise levels, depending on water flow characteristics. Winter months are likely to have lower ambient noise levels due to cessation of water flow at the surface.

Proposed federal actions may produce noise from several types of sources, primarily transportation (e.g., vehicles, boats, and planes), heavy equipment for construction projects and/or facility operations, and mineral development. The effects of these noise sources may vary depending on the noise characterization and subsequent interference. Such noise sources may, for example, be chronic and predictable, which can cue masking in animals; while infrequent and unpredictable noise may initiate a startle response. Baseline noise assessments captured *prior to* the occurrence of any surface disturbance can not only help the prediction or modeling of potential effects to wildlife but assist the BLM and project proponent in considering mitigation measures to reduce the predicted impacts. This can be shown as:

$$(\text{Baseline} + \text{Model} - \text{Mitigation}) = \text{dBA}$$

Both humans and animals in the planning area can be sensitive to sound level or vibration changes. Additional sections in this document contain more detailed information on where humans and animals are located in the planning area, including Fisheries (Section 2.5), Wildlife and Special Status Species (Section 2.7), Cultural Resources (Section 2.10), Recreation and Visitor Services (Section 6), National Trails (Section 4.2), Wild and Scenic Rivers (Section 4.3), Subsistence (Section 5.2), and Hazardous Materials and Health and Human Safety (Section 5.5). Impacts on these noise-sensitive receptors from sound level or vibration changes are discussed in the BSWI Draft RMP/EIS.

### **2.1.5 Resource Changes: Trends and Forecasts**

While quantitative air quality data in the region is sparse, the available data indicate that ambient concentrations of criteria pollutants are well below the NAAQS. Further, the trends observed in the visibility data at Denali provide an indication that air quality in the region is generally improving. Wildfire and fugitive dust are two key sources of air quality pollutants that show a high degree of special and temporal variability and therefore could cause localized poor air quality events in some years under specific meteorological conditions.

As wildfire and fugitive dust could be increased under a warming environment it is possible that air quality could worsen under predicted climate scenarios resulting from climate change. Increased development in the area would also have the potential to adversely impact air quality locally and/or regionally.

## **2.2 Climate Change**

### **2.2.1 Introduction**

The temperature of the planet's atmosphere is regulated by a balance of radiation received from the sun, and the amount of that radiation that is either re-radiated or absorbed. GHGs, as well as water vapor and particulate matter in the atmosphere, keep the planet's temperature warmer than it would be otherwise; allowing the planet to sustain life. While these gases and particles have occurred naturally for millennia, there has been a marked increase in their atmospheric concentration since the start of the industrial age, which may be contributing to climatic variability beyond the historic norm.

Ongoing scientific research has identified the potential impacts of human-caused GHG emissions and changes in biological carbon sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, industrialization and burning of fossil carbon sources have caused CO<sub>2</sub> concentrations to increase dramatically and may contribute to overall global climatic changes. The National Climate Assessment (NCA 2014) states that, "multiple lines of independent evidence confirm that human activities are the primary cause of the global warming of the past 50 years."

The National Climate Assessment reports that the U.S. mean temperature has increased 1.3 to 1.9 degrees F since 1895; overall, Alaska has experienced the largest regional warming of any state in the U.S., with a rise in statewide average annual temperature of 3 degrees F and a rise in average winter temperature of 6 degrees F over the last 60 years. Average annual temperatures in Alaska are projected to rise by an additional 2 to 4 degrees F by 2050 (NCA 2014). As with any field of scientific study, there are uncertainties associated with the science of climate change; as such, there is a high degree of confidence

in the trend of climate change but less certainty about the magnitude. Additionally, there still remain some differing opinions within the scientific community regarding climate science.

Several natural and human-made activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, internal combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs may have a sustained climatic impact over different temporal scales. For example, recent emissions of CO<sub>2</sub> and other GHG gases can influence climate for 100 years.

The impacts of climate change are already affecting communities, natural resources, ecosystems, economies, and public health across the U.S. These impacts are often most significant for communities that already face economic or health-related challenges, and for species and habitats that are already facing other pressures.

It may be difficult to discern whether global climate change is already affecting resources within the planning area. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change described below may not be measurably discernible within the reasonably foreseeable future.

### **2.2.2 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for climate change-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Estimated GHG emissions from the following:
  - Forest product harvesting
  - Recreation, and Travel and Transportation Management (recreational and subsistence vehicle activity)
  - Wildland fire management
  - Development of leasable minerals
  - Locatable and salable mineral development
  - OHV use

### **2.2.3 Current Conditions**

The climate of the planning area was discussed in Section 2.1, Air Quality, as climate and meteorology are crucial in understanding the effects of natural and human-caused sources of air pollution on local and regional air quality. The climatic means, or *normals*, were also discussed in Section 2.1, Air Quality.

### **2.2.4 Resource Changes: Trends and Forecasts**

The trends over periods of record are discussed here. The existing climate in the planning area was roughly based on data from three meteorological stations in or near the planning area. The three station locations represent the influential climate zones within the planning area and reach the approximate extent of the planning area boundaries (McGrath to the northeast, Bethel to the south, and Nome [outside the planning area] to the northwest). GHG emissions, a driving force, and thereby useful indicator of climate

change, were also discussed in Section 2.1, Air Quality, including current conditions and trends of those pollutants.

### Temperature Changes

As discussed in Section 2.1, Air Quality, historical climate and weather information for the planning area is limited, making it difficult for models to determine the exact spatial and temporal variability of projected future conditions. The ACRC maintains historical annual air temperature data from 1949 through 2015.

The planning area has experienced significant climate change over the last half century, as evidenced in the change in mean seasonal temperature over the period and is projected to continue to experience more change over the rest of the 21st century. This is part of a larger warming trend seen across all high-latitude regions.

Figures 2.2.4-1 through 2.2.4-3 (below) show the temperature trends for McGrath, Bethel, and Nome, Alaska, respectively, from 1949 to 2014. These graphs from ACRC show the annual means as dots, the smoothed data (5-year running means) with the red lines, and the solid black line showing the linear trend over the full period (ACRC 2016). In each case, the linear trend shows an increase of several degrees in mean annual temperature over the time period. The data also show a high degree of inter-annual variability in the seasonal means.

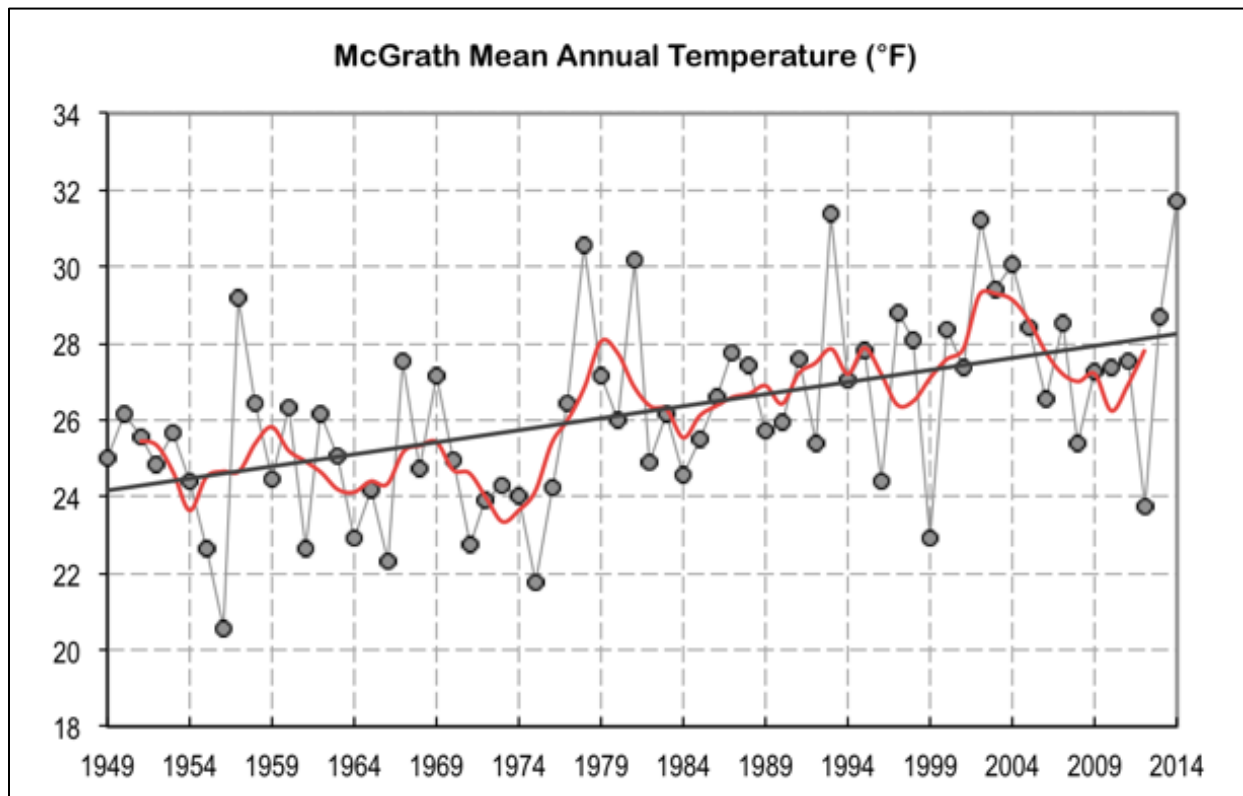


Figure 2.2.4-1. Temperature Trends, 1949-2014 for McGrath, Alaska.

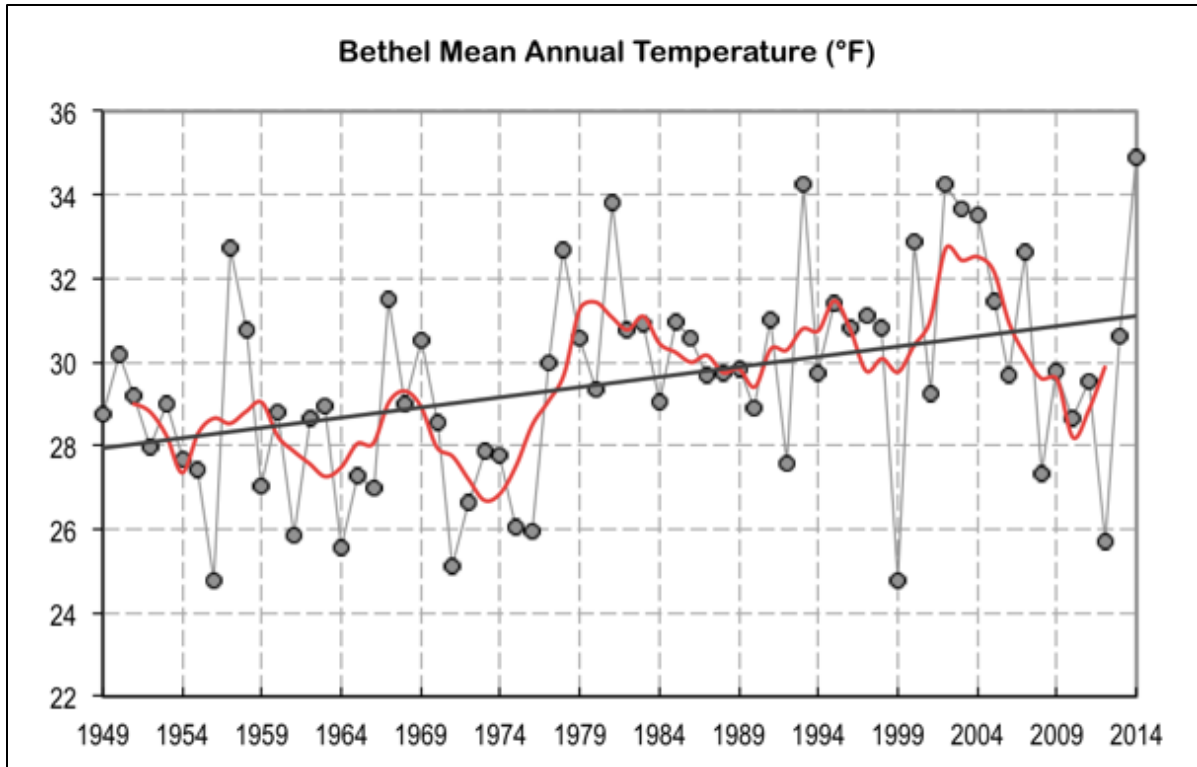


Figure 2.2.4-2. Temperature Trends, 1949-2014 for Bethel, Alaska.

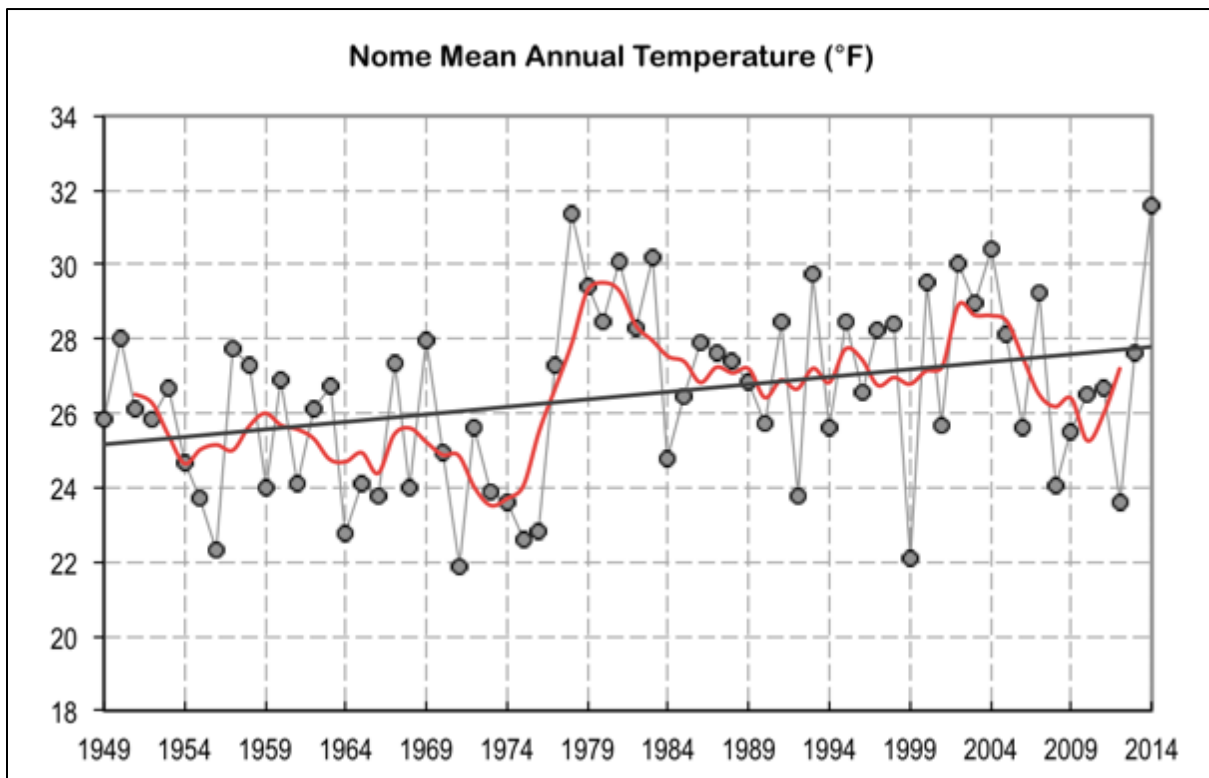


Figure 2.2.4-3. Temperature Trends, 1949-2014 for Nome, Alaska.

Table 2.2.4-1 shows the change in mean seasonal temperatures over this period (ACRC 2016). As shown in the table, warming in winter and spring has contributed more towards increased annual temperatures than summer or autumn.

**Table 2.2.4-1. Change in Mean Seasonal Temperatures (Degrees F)**

Station	Winter	Spring	Summer	Autumn	Annual
<b>1949 through 2015</b>					
McGrath	8.1	4.5	2.4	2.7	4.4
Bethel	7.2	3.7	1.9	1.1	3.5
Nome	4.9	2.6	2.2	1.6	2.8

### Trends of Other Climate-Related and Resource Variables

During the past 50 years, three major trends resulting from warming atmospheric air temperatures have been documented in Alaska: growing season length, permafrost thaw, and increases in wildfire and insect outbreaks (NCA 2014). Details regarding these subjects are provided in specific resource sections related to these physical and biological subjects, including: vegetative communities, soil resources, water resources, fish and aquatic species, wildlife, special status species (SSS), and wildland fire ecology. In general, the length of the growing season and permafrost thaw are directly related to temperature; increases in temperature can cause increases in both of these parameters. These relationships are also shown in the figures in the next section for forecast trends. The relationships between wildland fires and insect outbreaks with warming temperatures are more complex and are discussed in the relevant resource sections.

### Forecasts of Climate Change

The Scenarios Network for Alaska and Arctic Planning (SNAP) is a collaboration between several disciplines to develop and communicate plausible scenarios of the future climate. Data are derived from several climate models to produce climate information and climate projections. They provide modeled forecasts of air temperature and precipitation to many federal, State, and local governments, and non-governmental organizations in Alaska. The SNAP general circulation model compilation tool was prepared for four different 10-year average time periods (the 2010s, 2020s, 2050s, and 2060s), using the mid-range emissions scenario (SNAP 2016). Details regarding the SNAP modeling are provided on their website (SNAP 2016). This includes descriptions of the individual models evaluated to prepare the coupled model, a compilation of 5-models (the “5-model average”) chosen as the most accurate for assessing climate effects for Alaska and the Arctic. The mid-range scenario assumes “a world of rapid economic growth, a global population that peaks mid-century, rapid introduction of new and more efficient technologies, and a balance between fossil fuels and other energy sources.” This emissions scenario provides a more realistic assessment of future climate status on a global level.

Maps 3.2.2-1 through 3.2.2-7 of the BSWI Draft RMP/EIS were created from the Yukon Kuskokwim Lowlands Rapid Ecoregional Assessment (REA) specifically to focus on the planning area. These maps show the projected average values for January temperature, July temperature, total annual precipitation, summer precipitation, winter precipitation, day of freeze, and day of thaw for each of the 10-year average time periods. Model outputs are averaged by decade (as opposed to reporting for a single year) to reduce statistical noise due to inter-annual variability. Also included for each parameter is a map showing the divergence between 2010 and 2060, specifically the maps show the difference between the forecasted

values for the 2060s and the 2010s to support an analysis of the degree of impact in that parameter across the study area.

Maps 3.2.2-1 through 3.2.2-2 of the BSWI Draft RMP/EIS depict a shift towards warmer temperatures in the temperature range for the region in both the July and the January temperatures. The winter minimum and maximum temperatures for the region are projected to increase by approximately 3 degrees between the 2010s and the 2060s. The summer minimum and maximum temperatures for the region are projected to increase by approximately 1 degree between the 2010s and the 2060s. The same general geospatial pattern in temperatures across the planning area persists throughout the time period. The divergence plot for the January temperatures shows that the temperature change over this period was nearly double in the coastal area as compared to the interior portion of the study area.

Maps 3.2.2-3 through 3.2.2-5 of the BSWI Draft RMP/EIS show the projected average annual precipitation, average summer precipitation, and average winter precipitation for the four decadal periods. On an annual basis, in summer, and in winter the models forecast that precipitation will increase in the future throughout much of the study area. The same general geospatial pattern in temperatures across the planning area persists throughout the time period. However, it is unclear whether increased precipitation will be offset by increasing evapotranspiration driven by warmer air temperatures. Therefore, it cannot be assumed that these models suggest a wetter future for the planning area.

Map 3.2.2-6 of the BSWI Draft RMP/EIS shows the projected first freeze day (the first day that the consecutive monthly temperatures transition from above to below 0 degrees C), and Map 3.2.2-7 shows the first thaw day (the first day that the consecutive monthly temperatures transition from below to above 0 degrees C) for the four decadal periods. The biggest changes in first freeze day in the planning area are seen along the southwestern coast of the planning area and the northeastern corner especially at lower elevations. The maps show a shift between the 2010s and the 2060s of first freeze along a much larger portion of the coast not happening until October-December and in the northeastern corner of the study area not happening till later in October. Changes in first thaw day are not as dramatic or heterogeneous as the changes in first freeze days. The maps show a shift between the 2010s and the 2060s of first thaw day of a much larger portion of the study area experience first thaw in late March to late April rather than between late April and Mid-May. Following the trend with freeze and thaw days, the length of the growing season increases by up to approximately 30 days between the 2010s and 2060s. Changes are fairly homogenous throughout the planning area, with the shift being more prevalent early on (between the 2010s and 2020s) in the northern interior regions.

### **Effects on Resources and Resource Uses**

Table 2.2.4-2 shows the trends and forecasts for other planning area resources. Although increases in global GHG emissions are thought to have a causal relationship with global warming, as seen in the above forecast climate scenarios from SNAP, climate change on a local and regional level involves very complex relationships between atmospheric and geological variables beyond GHG emissions. Additional climate change indicators may cross over into other resource variables, which can provide advanced predictors for future changes in climate due to complex interactions. These may include indicators as shown in Table 2.2.4-2 and in the specific resource sections.



**Table 2.2.4-2. Trends and Forecasts Related to Climate Change for Resources in the Planning Area**

Resource	Trends	Forecast
Vegetative communities – Riparian	Specific evidence of climate change affecting riparian vegetation has not been recorded in the planning area. However, a longer growing season and hydrological changes (resulting from permafrost thaw) has likely affected the health and condition of riparian vegetative communities.	The current trends affecting riparian vegetation are predicted to continue. An increasing growing season, potential increases in drought conditions during the hottest months, and hydrological change due to permafrost thaw will likely continue to affect the health and condition of riparian vegetative communities. However, some researchers suggest that riparian ecosystems may be relatively resilient to climate changes because they have evolved under environmental variability and hydrologic extremes.
Vegetative communities – Forests and woodlands	Forests and woodlands have been impacted by a warming atmosphere evidenced by: increases in frequency and extent of wildfire; increases in frequency and extent of insect outbreaks; warmer growing season temperatures; and permafrost thaw and deepening of the soil active layer. Additionally, the arctic tree-line has seen a shift northward and alpine tree-lines are encroaching into higher elevations.	Climate change is predicted to alter the boreal forest through: an overall increase in the fire regime (frequency, severity, area burned, extent, longer season), and increase in insect and disease infestation, an altered treeline, and stand and landscape-scale alteration of the mosaic composition of forests (age, structure, species composition). Additionally, drought stress, permafrost thaw, and deepening soil active layer will affect the landscape mosaic and composition of species.  Four primary hypotheses for forest change in interior Alaska are: (1) landscape-scale conversion of conifer forests to broadleaf-dominated ecosystems resulting from increased fire frequency or severity; (2) the potential diminution of both white spruce ( <i>Picea glauca</i> ) and black spruce ( <i>P. mariana</i> ) across much of their current ranges due to temperature induced drought stress (3) a concomitant invasion of white spruce into previously treeless landscape positions, thereby converting tundra to forest over wide areas; and (4) potential increases in phytophagous insect outbreaks due to warming climate resulting in changes to forest structure. New research suggests that white spruce may gain dominance over black spruce in areas that have experienced permafrost thaw and deepened soil active layer.  Expansion of forests and shrub-lands into tundra areas in the planning area is likely to accelerate with future climate warming deepening active layers and promoting decomposition, which increases available soil nutrients. Additionally, a shift in vegetation zones to higher elevations will likely continue to occur, with species expanding into newly favorable areas and declining in unfavorable areas, which has been well documented in other parts of the world.
Vegetative Communities – Nonnative Invasive Plant Species	Specific evidence of climate change affecting invasive plant species has not been recorded in the planning area. Although it has been suggested that climate change has contributed to invasive species infestations in the state, definitive research has not identified climate change as a strong factor in invasive species establishment or infestation in the planning area.	It has been suggested that invasive plant species previously unable to survive Alaskan environmental conditions may be able to thrive in a warmer Alaska. As climate change is expected to induce large-scale ecosystem function changes for all plant communities, this disturbance may provide an opportunity for invasive plant species to establish and expand in areas they previously would not have survived. The increase in wildland fire associated with climate change will likely be an ideal disturbance for invasive plants to establish and expand.
Vegetative Communities – Other	Tundra communities have shown increased growth rates (remote sensed photosynthetic rates) from 1981 to 2003 indicating an increase in shrub dominance. Shrub expansion, specifically alders, has been noted in the Brooks Range foothills, Yukon-Kuskokwim Delta (observations of village residents), and the Alaska Peninsula.	Climate change will likely drive additional alteration of plant community composition seen through increasing deciduous shrub and graminoid cover at the expense of lichens, mosses, and uncommon forbs. Long-term effects might include general tree-line advance in elevation as well as latitude; colonization of formerly glaciated lands; and transition of woodlands (low tree density) with denser vegetation.

Resource	Trends	Forecast
Soil Resources	Specific evidence of climate change affecting soil resources has not been recorded in the planning area.	Warmer air temperatures and subsequent rise in soil temperature are not likely to alter soil forming processes significantly. However, a rise in soil temperature has and will affect nutrient cycling and evapotranspiration (drier or wetter soil conditions). Decomposition of plant material has historically been very slow in the planning area. However, as soil temperatures rise and permafrost thaws, decomposition rates will increase, which will alter nutrient cycles affecting plant communities and other ecosystem functions. Plant root growth in permafrost areas is limited to the active soil layer (the topmost soil horizons that thaw every summer). As soil temperatures rise, the active layer deepens, and that soil becomes destabilized, leading to erosion and land subsidence. Structurally, the increase in active layer depth is expected to have an adverse effect on the ability of soil to carry loads, such as roads and structures.
Water Resources	The timing of water body's ice break-up has been noted to occur earlier and freeze-up to occur later in the planning area. This directly affects hydrologic function, fish habitat, and therefore, fish population health, water body user access, and may play a role in the frequency and severity of extreme flood events.	Climate change related effects will likely alter a number of hydrologic functions including: seasonal water flow timing and quantities, ice-cover thickness and duration, and the frequency and severity of extreme flood events. Stream and river geomorphology (sinuosity, bars, beaches, bends, ox bows, cut banks, pools, riffles, etc.) are determined by the slopes, discharge volumes, frequency, intensity, timing, obstructions, sediment loading, etc., all of which are continually affected by climate. Increased variation in climate and subsequent hydrology will result in river systems that increasingly move or migrate over the landscape compared to a period of relatively stable climate. Potential disruptions to infrastructure, changes in fish and wildlife habitat, and possible hazards to shoreline communities, fish camps, and recreation users are possible.  It is unclear how stream water temperature will respond to climate change; a direct relationship between air temperature and stream, river, and lake temperature has not been found. Glacial fed streams could potentially become colder if glacial melt increases in a warmer climate.
Air Resources	Specific evidence of climate change affecting the air and atmospheric values has not been recorded in the planning area.	Air pollution due to wildfire is expected to increase. Warmer air temperatures, longer growing season, and permafrost thaw will promote decomposition of ancient stored soil carbon. Decomposition will result in CO <sub>2</sub> (carbon dioxide) and CH <sub>4</sub> (methane) release into the atmosphere and contribute to climate warming. Additionally, increased frequency and extent of fire will contribute to CO <sub>2</sub> emissions, especially in tundra areas that rarely experience fire, and will contribute to more episodes of air quality advisories due to smoke.

Resource	Trends	Forecast
Fish	<p>Sediment and nutrient loading from thermokarst features in Arctic Alaska have been shown to significantly impact headwater stream ecosystems by disrupting primary and secondary production and benthic communities. Thermokarst features would behave in a similar fashion in the planning area. However, it is unclear if this has currently had a direct effect on fish populations.</p> <p>Additionally, it has been suggested that climate change has contributed to reduced population levels of several fish, especially Chinook salmon. However, definitive research has not established climate change as a primary factor in fish population declines.</p>	<p>It is not completely clear how stream and river water temperature will respond to climate change and there is insufficient research to suggest that water temperatures will increase. However, climate change will result in two phenomena that will have major impacts on fish habitat: feeding habitats will remain ice-free for longer and permafrost thaw will destabilize adjacent riparian habitat.</p> <p>A longer ice-free period for streams and lakes could improve the quality of feeding habitats and the longer season will promote fish to mature at an earlier age due to increased feeding in a single year. Spawning could shift later in the year for autumn spawners and earlier in the year for spring spawners to correspond with the time of year that temperatures approach 0 degrees C or the time that aquatic habitats become ice-free.</p> <p>Permafrost thaw will destabilize adjacent terrestrial habitats and increase erosion and runoff into stream systems, increasing stream turbidity. This may reduce primary productivity and aquatic invertebrate populations, decreasing quality of fish feeding habitat. Alternatively, permafrost thaw may increase nutrient input into aquatic systems and increase primary production and invertebrate populations, therefore, increasing fish feeding habitat. Although it is unclear how permafrost thaw will affect fish habitat, it will likely be localized, with some feeding habitat decreasing in quality and some habitat increasing in quality.</p> <p>Additionally, it is unclear how ocean acidification will affect anadromous fish populations who spend multiple years in the ocean before returning to their spawning grounds in the planning area, but it is expected to be a significant impact on these species.</p>
Aquatic Species (include invasive aquatic species threats)	<p>Evidence of climate change affecting aquatic invasive species has not been recorded in the planning area. However, Alaska has seen an increase in aquatic invasive species in the past 10 years, likely due to increased movement of people and goods from areas in the lower 48 that have experienced increases in invasive species.</p>	<p>It has been suggested that invasive aquatic species previously unable to survive Alaskan environmental conditions may be able to thrive in a warmer Alaska. As climate change is expected to induce large-scale ecosystem function changes in riparian and aquatic habitats, this disturbance may provide an opportunity for invasive aquatic species to establish and expand in areas they previously would not have survived.</p>

Resource	Trends	Forecast
Wildlife (include invasive terrestrial species threats)	<p>Caribou populations and their movement in the planning area have changed dramatically in the past 20 years; however, climate change has not been identified as a primary cause of these changes. It is likely that alteration to wildlife habitat has been influenced by climate change related effects. However, specific declines in wildlife populations have not been attributed to climate change and related processes.</p> <p>Moose populations in specific regions of the planning area have recently experienced declines in populations. However, climate change has not been specifically implicated as a cause in these declines.</p>	<p>Climate change is expected to alter the range of most wildlife species primarily through changes in species' habitats. Additionally, parasites and disease that have historically been suppressed by cold temperatures and short summer seasons are expected to increase in presence and impact.</p> <p>Moose populations would likely respond positively to increased fire frequency because it promotes the re-sprouting and re-seeding of deciduous hardwoods (aspen, willow, and birch) that provide winter forage for moose. Additionally, shrub species biomass, abundance, and cover are expected to increase, therefore increasing availability of forage species. Warming air temperatures and lengthened summer season is likely to cause an increase in parasite populations through increased rates for development, reduction in generation times, and broadened seasonal windows for transmission, potentially impacting moose populations.</p> <p>Caribou populations will likely be influenced by increasing fire frequency, reduced winter food sources and increased insect abundance. Lichen is an important source of food for caribou, especially in wintertime. When wildfire burns ground-dwelling lichens, it can take several decades for them return to pre-burn levels. Therefore, fire can decrease wintering caribou habitat health by eliminating lichens. Climate change also has the potential to influence insects, parasites, diseases, snow depth and condition, wind, temperature, and cloud cover, all of which have consequences either directly or indirectly on survival and reproductive success of caribou.</p> <p>Climate change will likely increase the number of days in the nesting season for migratory shorebirds, which is often measured in the number of ice-free days or days above freezing. For example, a study on the influence of season length on nesting range dynamics suggested the recent northerly expansion in distribution of the trumpeter swan is likely a result of earlier spring breakup dates and overall warmer temperatures. However, wetland drying and shrinkage due to deepening active layer and altered drainage may result in less suitable habitat.</p> <p>Climate change is likely to cause a general increase in the number of disease outbreaks in wildlife populations. Climate change is not expected to increase the planning area's risk to establishment of invasive animal species.</p>
Special Status Species – Fauna	Evidence of climate change affecting special status wildlife species has not been recorded in the planning area.	Climate change is expected to affect all BLM Alaska sensitive wildlife species by altering habitat. Increasing wildland fire, increasing length of growing season, altered hydrology due to permafrost thaw, deepening soil active layer, and increases in disease and insect outbreak will likely affect all sensitive species. Each of the 10 wildlife sensitive species will respond differently to changes in their habitats, depending on their specific characteristics and survival strategies.
Special Status Species – Flora	Evidence of climate change affecting special status plant species has not been recorded in the planning area.	Four plant species on the Alaska BLM's Sensitive Species list occur in the planning area. All of these species occur in sparsely vegetated areas or with dwarf vegetation, often on steep slopes and loose rocky terrain. Climate change may promote expansion of shrubby species into higher elevations and reduce habitat for these species.
Wildland Fire Ecology and Management	Wildfire has dominated the disturbance regime of boreal forests for the last 6,000 years. Wildfire maintains age structure, species composition, and diversity in the boreal forest (Van Wagner 1988). However, in the last 50 years, the Alaskan boreal forest has seen a doubling of annual burned area and more than doubled frequency of large fire years.	Fire frequency and extent is expected to increase in the future. The Boreal Alaska Frame-Based Ecosystem Code (Boreal ALFRESCO) developed by University of Alaska Fairbanks Scenarios Network for Alaska and Arctic Planning forecasts an increase in fire events and total area burned in boreal areas of the planning area. Fire is also likely to become an increasingly important factor in promoting permafrost thaw.

Resource	Trends	Forecast
Cultural Resources	Specific evidence of climate change affecting cultural resources has not been recorded in the planning area.	Cultural resources in the planning area will experience greater risk of damage or destruction by wildfire as frequency and extent of fire increases. Permafrost thaw underneath structures could result in ground collapse and significant damage to structures. Increased occurrences of strong storms could damage cultural sites and structures.
Paleontological Resources	Specific evidence of climate change affecting archeological and paleontological resources has not been recorded in the planning area. No archeological or paleontological sites have been affected by erosion, either thermokarst or coastal erosion for storm surges within the planning area.	Deepening of the soil active layer and permafrost thaw will likely cause damage to archeological and paleontological resources; however, the extent and location of damage cannot be predicted. While erosional forces have, in the past, often exposed paleontological deposits, the rate of future erosion is projected to be faster and potentially more damaging. Deepening of the soil organic layer, even without erosional forces, will promote decomposition and could reduce preservation of organic paleontological materials, particularly Pleistocene fossils.
Visual Resources	Specific evidence of climate change affecting visual resources has not been recorded in the planning area. The warming trend experienced over the last half century (and all subsequent effects) has not been shown to be a cause in disrupting any view-sheds in the planning area.	Erosion caused through thermokarsts or other permafrost slumping, and thaw may affect view-sheds near large rivers and coastlines. If climate warming or any subsequent effect of warming develops in the planning area, it could affect the visual resources.
Lands with Wilderness Characteristics	Specific evidence of climate change affecting lands with wilderness characteristics has not been recorded in the planning area. The warming trend experienced over the last half century (and all subsequent effects) has not been shown to be a cause in altering the quality of wilderness characteristics in any regions of the planning area.	The planning area can currently be classified in almost its entirety as having wilderness characteristics. In the future, regardless of extreme or minimal affects occurring due to climate change-related impacts, the planning area will likely continue to display wilderness characteristics in all areas it does currently. One of the requirements to be classified as having wilderness characteristics is naturalness, defined as: appearing to have been affected primarily by the forces of nature and any work of human beings in the area must be substantially unnoticeable. It is likely that most areas of the planning area will continue to display wilderness characteristics, despite climate change-related affects, unless human development occurs.

Note. Information sourced from BLM 2015a, which contains full list of technical references.

## 2.3 Soils

### 2.3.1 Introduction

This section describes the regulatory setting, along with the baseline conditions of in the Project Area. Maps 3.2.3-1 through 3.2.3-3 of the BSWI Draft RMP/EIS show the physiographic regions, geologic boundaries, and soil types in the planning area.

### 2.3.2 Laws, Regulations, and Policies

Several agencies including the State of Alaska, BLM, U.S. Fish and Wildlife Service (USFWS) and multiple ANCSA-recognized Native corporations are involved in the management and use of the lands with the planning area. Specific regulations that apply to the management of soils and other geologic resources are discussed below:

- **The Federal Cave Resources Protection Act of 1988 (43 CFR, Part 37).** This act regulates management and identification of significant caves on federal lands. This act protects, to the extent practicable, significant caves and cave resources.
- **Clean Water Act (CWA).** The EPA is responsible for enforcing the federally-mandated CWA. The CWA establishes the basic structure for regulating discharges of pollutants into waters of the U.S. and for regulating surface water quality standards. Regulations pertinent to soil in the project area include Section 404 of the CWA, which requires individuals, corporations, tribes, or government agencies intending to work in waters of the U.S. to obtain a permit from USACE before initiating any regulated activity. The permit process for Section 404 permits is administered by USACE and EPA. This is relevant to soils because wetlands are defined by soil characteristics.
- **Executive Order (EO) 11988 – Floodplain Management (May 24, 1977).** This executive order requires federal agencies to avoid to the extent possible both long and short term adverse impacts on floodplains, which are prevalent across the southwestern portion of the planning area.
- **Alaska National Interest Lands Conservation Act (ANILCA).** This act specifically provides the State of Alaska with rights to manage all navigable surface waterways, even those that cross through federal lands and maintain access to non-federal areas that may cross through federal lands. Non-navigable waterways remain under federal management.
- **ANCSA.** Some of the lands in the planning area will be affected by ANCSA due to the fact that some native corporation selected BLM-managed public lands have current special protections status or subsurface rights that may be retained after ownership is transferred.
- **AAC Section 11 - Natural Resources.** AAC Section 11 - Natural Resources governs the use, lease and development of all natural resources located within the State of Alaska including oil and gas, minerals and alternative energy sources such as geothermal energy, the development of which all directly impact soils in the area.

A variety of federal and State laws and permit processes affect the use of soils directly or indirectly for specific resource uses. Those provisions will be brought into the analysis in the BSWI Draft RMP/EIS.

### 2.3.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for soils-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Changes in acres of disturbance to soils

#### **2.3.4 Current Conditions**

In general, soils are the resource in this section that may be affected by BLM management practices. Physiography and geology in general will not be changed or altered by management practices set forth in this document and any such alterations. Water resources, leasable/locatable/salable minerals/fluids, and paleontological resources are subsets of geology, or are closely related, and are discussed elsewhere in the RMP.

#### **Physiography and Geology**

The planning area contains a diverse group of 12 different physiographic provinces (Map 3.2.3-1, BSWI Draft RMP/EIS) defined by their geology and surficial expression as defined by Wahrhaftig (1965). The following descriptions are excerpts from that reference. Additional discussion on the uses of the resources associated with the geology of the area is discussed in Section 3.3, Locatable and Salable Minerals, and Section 3.4, Leasable Minerals.

##### ***Yukon-Kuskokwim Coastal Lowland***

The Yukon-Kuskokwim coastal lowland dominates the western portion of the planning area. The coastal lowland is a triangular, lake-dotted marshy plain that rises from sea level on its west margin to 100 to 300 feet at its east end. Many low hills, 2,300 to 2,450 feet high, rise from the western part of the plain. Low ridges, marked by lines of thaw lakes, lie along part of the west coast. The area is crossed by meandering streams of extremely low gradient, many of which are channels or former channels of the Yukon River. These flow west to the Bering Sea. The Yukon River flows along the base of hills on the north side of the lowland and is building a delta into the Bering Sea. On the southeast side of the planning area, the Kuskokwim River ends in a marine estuary that appears to be a drowned river mouth.

The lowland is dotted with innumerable thaw lakes, many of them 10 or more miles long. Some have scalloped shorelines and probably formed through the coalescence of several smaller lakes. Probably 30 to 50 percent of the lowland is lake-surface. Underneath the area is discontinuous permafrost (ground perennially at temperatures below freezing but having no ice).

##### ***Kuskokwim Mountains***

The Kuskokwim Mountains dominate the central portion of the planning area. They are a succession of northeast trending ridges having rounded to flat summits 1,500 to 2,000 feet in elevation and broad gentle slopes. Ridges crest north of the Kuskokwim River average 2,000 feet and are punctuated at intervals of 10 to 30 miles by isolated circular groups of rugged glaciated mountains 3,000 to 4,400 feet in elevation. Valleys have flat floors 1 to 5 miles wide.

The Kuskokwim Mountains are drained by tributaries of the Yukon and Kuskokwim Rivers. Major streams generally flow northeast to southwest; streams are fast and meandering and generally lie near the northwest walls of their valleys. The Kuskokwim River crosses the mountains in a gorge 100 to 400 feet deep incised in an older valley about 1,000 feet deep and 2 to 8 miles wide. Lakes are few. There are oxbow and thaw lakes in the valleys and a few cirque lakes in the glaciated mountains. Permafrost underlies most of the section, and periglacial erosional processes predominate.

### ***Nulato Hills***

The Nulato Hills make up the majority of the northwest portion of the planning area. These consist, in general, of northeast trending even-crested ridges, 1,000 to 2,000 feet in elevation, having rounded summits and gentle slopes. Valleys are narrow and have flat floors that are about 30 feet deep in the upstream portions. Local relief is 500 to 1,500 feet.

The topography is relatively fine textured; gullies are spaced 500 to 1,500 feet apart and second-order tributaries are one-half to 1 mile apart. Three highland areas of steeper ridges rise to about 4,000 feet in elevation. Streams on the east side of the section flow to the Yukon River and those on the west side to Norton Sound. Major streams are markedly parallel, flowing either northeast or southwest, and their courses are eroded along northeast-trending fault zones. Valley heads are generally connected by low passes along the faults. There are a few thaw lakes in the valleys. The entire physiographic province is likely underlain by permafrost.

### ***Nushagak-Big River Hills***

The Nushagak-Big River Hills located in the southeast portion of the planning area are largely rounded, flat-topped ridges rising to an elevation of 1,500 feet on the west and 2,500 feet on the east. The hills have broad gentle slopes and broad flat or gently sloping valleys. Local relief is 1,000 to 2,500 feet. Mountains in the northeastern part rise to an elevation of 4,200 feet. Ridges trend northeast in the eastern part but have no preferred trend in the southwestern part. The hills drain to the Kuskokwim River via the Big, Stony, Swift, and Holitna Rivers. The rivers rise from glaciers in the Alaska Range and flow across the hills. Some, like the Stony and Swift, are braided muddy streams. Others, like the Holitna, are clear and meandering.

Some valleys contain thaw lakes. Ponds are abundant in the moraine-mantled eastern part of the hills. Most of the section is underlain by permafrost, and periglacial erosional processes predominate.

### ***Southern Alaska Range***

The planning area contains the portion of the Southern Alaska Range that drains into the Kuskokwim River basin. The Alaska Range consists of many parallel rugged glaciated north-trending ridges 7,000 to 12,000 feet in elevation; south of Lake Chakachamna the ridges trend northeast and are 4,000 to 6,000 feet in elevation. Between the ridges lie broad glaciated valleys, which have floors less than 3,000 feet in elevation. Local relief is between 4,000 and 9,000 feet. Many spire-like mountains rise in the central part of the range.

Large braided glacial streams follow the north and northeast-trending valleys. They flow north or south to the Kuskokwim River and southwest to the Nushagak or Kvichak Rivers.

Many large lakes occupy glaciated valleys within and on the margins of the range. The largest of these bodies is Lake Clark, which is 49 miles long and 1 to 4 miles wide.

Extensive systems of valley glaciers radiate from the higher mountains. The elevation of the glaciers is lower, and the glaciers are larger on the southeast side of the range than on the northwest and west sides of the range. The extent of permafrost is unknown.

### ***Central Alaska Range***

The planning area contains that portion of the central part of the Alaska Range consisting of two or three parallel rugged glaciated ridges, 6,000 to 9,000 feet in elevation, surmounted by groups of extremely



rugged snowcapped mountains more than 9,500 feet in elevation. The ridges are broken at intervals of 10 to 50 miles by cross-drainage or low passes; most of the drainage appears superposed. The range rises abruptly from lower country on either side, and its longitudinal profile, seen from a distance, is irregular. Denali, 20,269 feet high and the highest mountain in North America, is in the Alaska Range.

The western part of the range drains to the Kuskokwim River. Streams are swift and braided, and most rivers start at glaciers. There are a few rock-basin lakes and many small ponds in areas of ground moraine. Lakes are rare for a glaciated area.

The elevation of the glaciers on the north side of the Alaska Range is 6,000 to 8,000 feet; this change reflects the northward decrease in cloudiness and precipitation as one passes from the Gulf of Alaska coast to the interior. The high mountains are sheathed in ice. Short valley glaciers lie in north-facing valleys in the lower parts of the range. Rock glaciers are common. Permafrost is extensive and solifluction features are well developed.

### ***The Innoko Lowlands***

The Innoko Lowlands lie near the center of the planning area along the Yukon River and are a group of flat river floodplains, dendritic in pattern, with generally steep banks cut into the surrounding hills; in places, however, gentle silt-covered slopes merge with the surrounding hills. The Yukon River and a large tributary, the Innoko River, cross the lowlands. The main part of the lowlands has a complex intersecting network of meandering sloughs of these two rivers.

Oxbow and meander-scroll lakes are abundant in recently abandoned floodplains and partly silted sloughs. Thaw lakes abound in old floodplains and on gentle silt-covered slopes. The lower parts of many tributaries from surrounding hills are dammed by alluvium from the Yukon River and form narrow dendritic lakes. Much of the section is underlain by permafrost.

### ***Holitna Lowland***

The Holitna Lowland located in the southeastern portion of the planning area makes up a small area of largely moraine-covered plain 300 to 800 feet in elevation and is crossed by several low arcuate hummocky ridges marking the end moraines of glacial advances and by broad outwash and meander plains along rivers. The Lime Hills, conspicuous isolated steep-sided ridges in the southern part of the lowland, rise to an elevation of 1,000 to 2,300 feet. The Holitna Lowland is drained by the Kuskokwim River and three of its tributaries, the Stony and Swift Rivers, which are glacial streams from the Alaska Range that have braided gravelly courses, and the Holitna River, a clear meandering stream that rises in uplands to the south. There are numerous morainal and thaw lakes throughout the lowland. This physiographic area probably has discontinuous permafrost.

### ***The Tanana-Kuskokwim Lowland***

A small portion of the western part of the Tanana-Kuskokwim Lowland is located along the east-central boundary of the planning area. It consists of a broad depression bordering the north flank of the Alaska Range with surfaces of diversified origin. Coalescing outwash fans from the Alaska Range slope 20 to 50 feet per mile northward to floodplains along the axial streams of the lowland. Rivers from the range flow for a few miles at the heads of the fans in broad terraced valleys 50 to 200 feet deep. Semicircular belts of morainal topography lie on the upper ends of some fans. The floodplain of the Kuskokwim River is incised 50 to 200 feet below the level of the lowland. Several nearly level projections of the lowland

extend into uplands on the north. Large fields of stabilized dunes cover the northern part of the lowland and lower slopes of adjacent hills between Nenana and McGrath.

The southwestern part of the lowland is drained by the Kuskokwim River; braided glacial streams rising in the Alaska Range flow north across the lowland at intervals of 5 to 20 miles. Outwash has pushed the axial streams of the Kuskokwim River against the base of hills on the north side of the range. Tightly meandering tributaries of low-gradient flow into the physiographic province from the north, and thaw lakes abound in areas of fine alluvium. Thaw sinks are abundant in areas of thick loess cover. The entire section is an area of permafrost. Porous gravel at the heads of the outwash fans has a deep water table and dry permafrost.

### ***Ahklun Mountains***

The northern tip of the Ahklun Mountains province lies within the southwest portion of the planning area. It contains groups of rugged steep-walled mountains that rise abruptly above the lowlands and low hills on the north and east. The peaks have sharp summits 2,000 to 5,000 feet in elevation, separated by broad flat valleys and lowlands. The Ahklun Mountains are drained on the north by shallow, clear streams that flow directly to the Bering Sea and the Kuskokwim River on the northwest. Most rivers are incised in bedrock gorges 20 to 50 feet deep in the downstream parts of their valleys. Drainage is roughly radial, and several streams in the northwestern part flow through canyons that cut directly across structurally controlled ridges. This province is outstanding for the number and beauty of its glacial lakes, which are long narrow bodies of water in U-shaped canyons. Kisaralik Lake is an excellent example; lake depths as great as 900 feet have been reported. A few small cirque glaciers are found in the highest parts of the mountains. Permafrost occurs sporadically.

### ***Bering Platform***

The Bering Platform province includes that portion of the planning area that lies within the Bering Sea. It is a monotonously smooth submarine plain 100 to 500 feet deep bordered on the southwest by a submarine scarp several thousand feet deep. The coastal lowland at the head of Norton Sound is included in this physiographic province. Several islands rise abruptly from the plain. Most of the islands are rolling uplands a few hundred to 1,000 feet high bordered by wave-cut cliffs.

St. Lawrence Island, the largest, is about 100 miles long and 20 miles wide. It is chiefly a lake-dotted bedrock plain less than 100 feet in elevation, above which isolated mountain groups; bordered by old sea cliffs, rise to elevations of 1,000 to 1,500 feet. A large shield volcano with many vents is on the north coast of St. Lawrence Island. St. Matthew and Nunivak Islands consist largely of undissected volcanic topography. Many small rivers drain St. Lawrence Island and Nunivak Island; most small islands have no permanent streams.

Thaw lakes abound on the lowlands of St. Lawrence Island and the lower parts of Nunivak Island; there are small crater lakes on Nunivak Island. Part of St. Lawrence Island and possibly Nunivak Island may be underlain by permafrost. St. Matthew Island, Nunivak Island, and northcentral St. Lawrence Island are made of Cenozoic basalt flows and pyroclastic debris interbedded with some sedimentary rock. St. Lawrence Island is underlain largely by intensely deformed Paleozoic and Mesozoic sedimentary and volcanic rocks and granitic intrusions.

### ***Buckland River Lowland***

The Buckland River Lowlands contain low-elevation rolling hills consisting primarily of Quaternary lava flows covered by a thick layer of windborne silt. Small thaw and oxbow lakes are common along the Buckland River and in other flat valleys.

### **Regional Geology**

The following summary description of regional geology and geologic history is taken from the works of Beikman (1980); Decker et al. (1994); Bundtzen and Miller (1997); Miller et al. (2002, 2005); Goldfarb et al. (2004) as written in the BLM Alaska Technical Report 60, *Mineral Occurrence and Development Potential Report* (Kurtak et al. 2010). The geology is depicted in Map 3.2.3-2 of the BSWI Draft RMP/EIS.

The oldest rocks within the planning area consist of Early Proterozoic metamorphic rocks of the Idono Complex that occur locally within the central Kuskokwim Mountains. Late Proterozoic metamorphic rocks occur in the northern Kuskokwim Mountains and form the depositional basement for Paleozoic shelf deposits. Paleozoic continental margin deposits underlie much of the southwestern Alaska Range and northern Kuskokwim Mountains. These include greenschist facies metaigneous and metasedimentary rocks (Decker et al. 1994). Triassic-aged ultramafic rocks in the Mt. Hurst area are believed to be slivers of dismembered ophiolites, which host chromite occurrences and platinum group elements (PGE)-bearing placers. In the southern Alaska Range, Triassic-aged ultramafic rocks host nickel-copper-PGE mineralization.

Unconformably overlying the older rocks is the regionally extensive Upper Cretaceous Kuskokwim Group, which is primarily a turbidite sequence composed of detritus derived from the varied pre-Cretaceous terranes. The Kuskokwim Group consists largely of rhythmically interbedded sandstone and shale, but local Late Cretaceous tuff layers record intermittent regional volcanic activity. Erosion of pre-Cretaceous rocks occurring to the north provided clastic material, which began to fill basins that formed in the area during middle to Late Cretaceous time. The Kuskokwim Group basin-fill sequence contains prograding turbidite, shallow-marine, and shoreline facies, which suggest that the basin filled in by early Late Cretaceous time (Bundtzen and Miller 1997).

Late Cretaceous to early Tertiary volcanic-plutonic complexes, plutons, and extensive dike and sill complexes, intrude and overlie the Cretaceous flysch basin fill sediments. Extrusive sections of the complexes consist of basal tuffs overlain by andesite and basaltic andesite flows and lesser volcanic agglomerate. Plutonic rocks associated with the complexes range in composition from alkali gabbro to granite, but monzonite and quartz syenite are the most common compositions. Hornfels aureoles, up to 1.2 miles wide, surround the larger plutons such as at the Russian, Horn, and Beaver Mountains. These areas host polymetallic vein-type mineralization. Age data for the plutons indicates a bimodal distribution of ages with one group from 64 to 61 million years and the other 71 to 66 million years. Intrusion of carbonate sequences by plutons resulted in the formation of gold-bearing copper skarn deposits in the Nixon Fork area (Bundtzen and Miller 1997).

The dike and sill complexes cut the sedimentary rocks and form elongate belts. These appear to be structurally controlled in part by northeast-trending high-angle structures such as the Yankee-Ganes Creek and Iditarod-Nixon Fork faults. This includes the Ganes-Yankee Creek and Donlin Creek dike swarms. Locally the dikes have been altered by silicification and contain fine grained arsenopyrite, pyrite, and stibnite. Late-stage quartz veins and veinlet networks associated with the felsic dikes are the source of the gold at deposits such as the Independence Mine and Donlin Creek. Peraluminous granite-porphyry

dikes, stocks, and sills in the area and of similar age contain gold-copper polymetallic deposits such as at Chicken and Vinasale Mountains (Bundtzen and Miller 1997).

The intrusive bodies and dikes are probably the source of the placer gold found in such drainages as Ganes and Flat Creeks and at Nyac. Placer gold has concentrated in both bench and modern stream placers. The modern stream placers were probably formed from reworking of the bench deposits during uplift and subsequent downcutting by area streams. Altered Tertiary-Cretaceous intermediate to mafic dikes, cutting the sedimentary units are associated with epithermal mercury-antimony deposits, concentrated mostly within the Kuskokwim River basin.

Upper Cretaceous nonmarine sedimentary rocks occur within a series of fault-bound basins within the study area. These formations locally contain coal beds, which were mined for use by steamboats on the Yukon River. These occur mainly along that stretch of the Yukon River between Anvik and Kaltag. A large portion of the study area is covered by Quaternary surficial deposits consisting of young river, floodplain, glacial, alluvial, and lake deposits. These young continental sediments are concentrated mostly along the drainage basins of the Kuskokwim and Yukon Rivers.

The youngest volcanic activity within the area consists of subaerial basalt flows and cinder cones of Quaternary to Tertiary age on the south side of Norton Sound. Pleistocene glaciation was confined to some of the isolated mountain ranges in the area such as the Horn and Russian Mountains and in the Alaska Range along the southern boundary of the study area. Cirque glaciers exist to the present day in the higher portions of the southern Alaska Range in the southeast corner of the area.

### **Structural Geology and Tectonics**

The following description of planning area structural geology and tectonics is taken from BLM Alaska Technical Report 60, *Mineral Occurrence and Development Potential Report* (Kurtak et al. 2010; also see Map 3.2.3-2 of the BSWI Draft RMP/EIS).

The structural geology of the study area is dominated by a series of northeast-trending right-lateral strike-slip faults with proposed offsets of up to 90 miles. These faults are listed from north to south: the Kaltag fault near Unalakleet; the Iditarod-Nixon Fork fault near McGrath; and the Denali-Farewell fault (see Map 3.2.3-2 of the BSWI Draft RMP/EIS). Movement along these faults is believed to be dominantly Cenozoic. These faults in part form boundaries between a series of geologic terranes including the Ruby, Nixon Fork, Dillinger, Innoko, Kahiltna, and Farewell terranes. They also cut overlapping younger units such as the Kuskokwim Group. The Farewell terrane makes up the bulk of the rock units within the study area and probably formed a significant part of the North American Continental margin against which the Mesozoic terranes of southern Alaska were accreted (Decker et al. 1994).

Deformation affecting the Kuskokwim Group rocks began in Late Cretaceous time. Rock assemblages were deformed in a right-lateral wrench fault tectonic environment, as characterized by echelon folds and high-angle faults. One of the major right-lateral structures is the northeast-trending Iditarod-Nixon Fork fault along which there may be as much as 58 miles of right-lateral offset. This fault lies within what is termed the "Kuskokwim Mineral Belt" and is spatially associated with both placer and lode deposits within the study area. The Yankee-Ganes Creek fault parallels this structure and is spatially associated with mineralized small intrusive bodies and dike swarms. To the south lies the parallel Denali-Farewell fault, which runs along the Alaska Range front. The fault is estimated to have 80 miles of right-lateral offset. Offset streams and sag ponds along the fault trend are indicative of recent movement (see Map 3.2.3-2 of the BSWI Draft RMP/EIS). The oldest rocks were subjected to multiple fold episodes as characterized by tight isoclinal folds. Late Cretaceous and younger rocks are more broadly folded. This

tectonic movement probably controlled the formation of the Kuskokwim basins and the emplacement of the Late Cretaceous to early Tertiary plutonic and volcanic rocks (Bundtzen and Miller 1997).

## **Mineral Resources**

Mineral resources found within the planning area are discussed in Section 3.3, Locatable and Salable Minerals, and Section 3.4, Leasable Minerals.

## **Soils**

Most soil resources in the planning area are largely in natural condition with minimal human-made disturbance. The planning area is sparsely populated with few commercial facilities or roads, and no large-scale commercial crop, livestock, or grazing activity.

Soils in the planning area have been surveyed on a very broad scale in the Exploratory Survey of Alaska (USDA 1979) and in much greater detail over the central portion of the planning area Soil Survey of Western Interior Rivers Area, Alaska (USDA 2008). The 1979 report covers soils within the Kuskokwim Highlands, the Western Alaska coastal plains and deltas, the Alaska Range and the Bering Sea Islands. The 2008 U.S. Department of Agriculture (USDA) report focused on soils located in approximately 9.7 million acres in the central portion of the planning area that straddles the Yukon and Kuskokwim Rivers as they move from interior to western Alaska and the Bering Sea and includes updated information on the Kuskokwim Highlands the Western Alaska coastal plains and deltas. The soil orders and their respective suborders in the planning area described in the USDA 1979 and 2008 reports in their environmental and hydrologic review of the Yukon and Kuskokwim River watersheds. Soils are depicted in Map 3.2.3-3 of the BSWI Draft RMP/EIS. Widespread alluvial, lacustrine, and eolian deposits occur in the Yukon Flats area. A soil survey and ecological site description of the Nulato Hills was initiated jointly by BLM and the Natural Resources Conservation Service (NRCS) in 2015 and will take several more years to complete. Data from these surveys will be used to further inform BLM management decisions in the future.

Many of the soils in the planning area are poorly developed because the cold climate impedes most soil-forming processes, except organic matter accumulation, and leads to the formation and preservation of permafrost (Ping et al. 2006). Decomposition is extremely slow in cold wet soils; chemical weathering to form clay minerals occurs at a negligible rate; and cryoturbation of soils counteracts typical soil profile development. Soil characteristics tend to vary with topography and slope-aspect. In the uplands, permafrost underlies most of the north slopes and most toe slopes of south-facing slopes. The well-drained and relatively warm soils of upland south-aspect slopes are generally permafrost-free with deeper and more mineral-dominated soils than those on north aspect slopes. In the lowlands, permafrost underlies much of the landscape except major river terraces, alluvial fans, and active floodplains.

Parent materials from which soils in the planning area form include weathered bedrock, lake sediments, glacial deposits, eolian (wind) deposits, alluvium (stream) deposits and volcanic deposits. The upland portions of the planning area have generally thin poorly formed soils comprised of coarse colluvium and fine alluvial sediments and eolian loess (Oldefelt et al. 2016). Lowland soils are more developed and are predominantly comprised of loess, sand and gravelly alluvium derived from mountainous regions with large portions of organic matter (USDA 2008). Large areas of wet organics form extensive plains within the lowland areas of the planning area specifically in the Yukon and Kuskokwim delta regions. These lowlands areas with high organic quotients are less thaw sensitive than their shallow slope counterparts due to the insulative properties of the organic matter (Oldefelt et al. 2016) and generally finer-grained

sediments. The lower slopes of the more mountainous regions are more likely to exhibit erosion or modification because thaw-destabilized soils may freely flow downslope or be washed away by runoff (Oldefelt et al. 2016).

The major soil resource management concerns are soil subsidence, erosion, and thermokarst. Thermokarst is a process whereby the thawing of ice-rich permafrost causes subsidence of the overlying soil. This process forms steep-walled pits that pockmark the landscape and may fill with meltwater from thawing permafrost. In the planning area soils, isolated masses of ground ice occur in deep loess deposits on river terraces and lower side slopes of hills. Areas with masses of ground ice or ice-rich permafrost are particularly sensitive to development, which may damage the insulating organic materials that overly these sensitive soils, and the potential effects of climate change warming these thaw-sensitive soils contributing to a potentially rapidly changing thermokarst landscape. Additionally, as these sensitive soils thaw, vegetation communities that are intrinsic to the stability of the soils will likely change and promote vegetation migration and release of carbon sequestered in these frozen soils (Oldefeldt et al. 2016; McGuire et al. 2016).

Perennially frozen soil also creates many engineering problems. Removal of the insulating surface organic layer for these soils causes thawing in the upper part of the permafrost. This is commonly accompanied by thermokarst and increased potential for erosion. Roads and structures on these soils may settle unevenly. Much of the planning area is affected by discontinuous permafrost. Soils are nearly always saturated in summer in the zone above permafrost and wetlands are prevalent.

### 2.3.5 Resource Changes: Trends and Forecasts

Climate change will continue to lead to increased soil temperatures in the planning area, which could in turn result in active layer destabilization (permafrost thaw), increased soil and streambank erodibility, and increased nutrient cycling and decomposition. The lowland portions of the planning area are extensively and intermittently affected by permafrost and their degradation often exhibits a thermokarst landscape. The predominant sensitive soils in the planning area are located on lowland areas of the planning area and they are the most likely to be affected by permafrost thaw and thermokarst influenced by climate change.

## 2.4 Water Resources

### 2.4.1 Introduction

This section describes the regulatory setting and baseline conditions of water resources; including surface water, groundwater, and water quality; in the planning area.

### 2.4.2 Laws, Regulations, and Policies

**Appropriations Act of 1952, McCarran Amendment.** This Amendment waives the United States' sovereign immunity in suits concerning ownership or management of water rights, as long as they might be affected by the result of the suit. It gives others the right to join in such a lawsuit as a defendant. Prior to the Amendment, sovereign immunity kept the U.S. from being joined in any suits. The Amendment enabled suits concerning federal water rights to be tried in State courts.

**BLM Manual 7200 Series.** The following BLM Manuals influence water management decisions in the planning area:

- BLM Manual 1737: Riparian and Wetland Management

- BLM Handbook H17412: Water Developments
- BLM Manual 6521: State Agencies

**CWA.** The EPA is responsible for enforcing the federally mandated CWA. The CWA establishes the basic structure for regulating discharges of pollutants into waters of the U.S. and for regulating surface water quality standards. Regulations pertinent to surface water resources in the project area include:

- Section 404 of the CWA requires individuals, corporations, tribes, or government agencies intending to work in waters of the U.S. to obtain a permit from USACE before initiating any regulated activity. The permit process for Section 404 permits is administered by USACE and EPA.
- Section 402 of the CWA authorizes the National Pollution Discharge Elimination System permit program, controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. The EPA administered the program in Alaska until permitting authority was transferred to the State in a phased approach beginning in 2008.
- **Stormwater:** Stormwater discharge is caused by runoff from land surfaces and impermeable areas such as pavement and rooftops, during rainstorm and snowmelt events. As a result, stormwater discharges may contain pollutants that could affect surface water quality. In February 2015, ADEC began issuing the Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activity. Operators of industrial facilities including mines requiring an Alaska Pollutant Discharge Elimination System (APDES) Stormwater Permit are eligible to obtain coverage under the 2015-MSGP if their activities are included within one of 29 industrial sectors. Permit applicants must submit a notice of intent and a Stormwater Pollution Prevention Plan that incorporates best management practices (BMPs). Permits would be issued if the ADEC approves the application.
- **Water Quality Protection:** The ADEC has adopted the surface water quality standards published at 18 AAC 70. The State standards must be approved by the EPA before they can be used for actions regulated under the federal CWA. For action under State regulation only, the Alaska surface water quality standards may be used exclusively. ADEC Division of Water administers groundwater quality standards on behalf of the EPA. Alaska groundwater standards focus on protecting groundwater quality through regulation of contaminated sites by the Contaminated Sites Program in the Spill Prevention & Response Division.
- **Source Water Protection:** Wellhead Protection and Source Water Assessment and Protection are national programs funded by EPA designed to help protect and prevent the contamination of drinking water sources. Both programs are part of the Safe Drinking Water Act of 1974 and have the same goal and mission but were created at different times. The ADEC administers this program in Alaska and gives approval to construct and operate public water supply systems; performs plan review and construction approval for domestic sewage systems and permits non-domestic wastewater disposal.

**Alaska Surface Coal Mining Control and Reclamation Act (ASCMCRA).** The Alaska Department of Natural Resources (ADNR), Division of Mining Land and Water (DMLW), administers ASCMCRA and implements regulations for coal mining on private and public lands, which must comply with federal standards. ASCMCRA establishes a program for the regulation of surface mining activities. All coal mining permits including exploration, mining, and reclamation in Alaska must meet ASCMCRA permit requirements. These permits have requirements that protect the natural surface water flow and surface water quality in the area of the mining activity during operations and after closure. The ADNR is tasked

with developing a Cumulative Hydrologic Impact Assessment as part of their permit decision process that would be issued as supporting documentation in the permit approval or denial.

**Alaska Water Use Act.** ADNR, DMLW, Water Management Unit, issues water rights permits and authorizations. There are two kinds of water rights administered:

- A right to use water, which means taking it from streams, lakes, or underground aquifers, or changing the way it flows. Appropriation of a significant amount of water (as defined by 11 AAC 93.035[a] and [b]) on other than a temporary basis requires authorization by a Water Rights Permit. The use has to be a “significant” amount (more than 500 gallons a day for 10 days a year, or 5,000 gallons in a single day).
- A right to reserve water. Reserving water means protecting a specific flow of water, for a specific period of time, in sections of streams or rivers, or reserving water to maintain lake levels. The most common reason for reserving water is protecting fish and wildlife—their habitat, or migration, breeding, and rearing areas.

A water right is defined as a legal right for the use of public surface and subsurface waters under the Alaska Water Use Act (Alaska Statute [AS] 46.15). When a water right is granted, it becomes appurtenant to the land where the water is being used for as long as the water is used. If the land is sold, the water right transfers with the land to the new owner, unless ADNR approves its separation from the land.

**State and Federal Habitat Regulations.** The Alaska Department of Fish and Game (ADF&G) manages fisheries resources and their habitat in State waters (AS, Title 16). The Anadromous Fish Act (AS 16.05.871- .901) requires that an individual or government agency provide prior notification and obtain permit approval from ADF&G Division of Habitat before altering or affecting “the natural flow or bed” of a specified waterbody, or fish stream. All activities within or across a specified anadromous waterbody require approval, including: construction; road crossings; gravel removal; mining; water withdrawals; the use of vehicles or equipment in the waterway; stream realignment or diversion; bank stabilization; blasting; and the placement, excavation, deposition, or removal of any material.

The Fishway Act (or Fish Passage Act AS 16.05.841) requires that an individual or government agency notify and obtain authorization from the ADF&G, Division of Habitat for activities within or across a stream used by fish if it is determined that such uses or activities could represent an impediment to the efficient passage of resident or anadromous fish.

Additionally, the National Marine Fisheries Service (NMFS) manages Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which includes freshwater habitat for anadromous fish species. As surface water is the habitat for fish, these agencies also regulate aspects of surface water hydrology.

**Pollution Prevention Act of 1990.** This created a national policy to have pollution prevented or reduced at the source wherever possible. It also expanded the Toxics Release Inventory.

**Classification and Multiple Use Act** called for classification of federal lands for retention or disposal and for the multiple-use management of the lands that were retained.

**Soil and Water Resource Conservation Act** appraises the status and trends of soil, water, and related resources on non-federal land and assess their capability to meet present and future demands; evaluates current and needed programs, policies, and authorities; and develops a national soil and water conservation program to give direction to USDA soil and water conservation activities.



**Watershed Protection and Flood Control Act of 1954.** The Soil Conservation Service at the USDA provides planning assistance and construction funding for projects constructed by local sponsors, often in the form of flood control districts.

**Wild and Scenic Rivers Act of 1968** was created to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. Rivers may be designated by Congress or, if designated by a State or States and certain requirements are met, the Secretary of the Interior. Each river is administered by either a federal or State agency. Designated segments need not include the entire river and may include tributaries. The designated boundaries generally average one-half mile on rivers outside national parks in Alaska in order to protect river-related values and do not include State or private lands.

**Executive Orders.** The following executive orders influence water management decisions in the planning area:

- **EO 11288**, Prevention, control and abatement of water pollution by federal activities, July 2, 1966
- **EO 11507**, Prevention, control and abatement of air and water pollution at federal facilities, February 4, 1970.
- **EO 11514** as amended by Executive Order 11991, Protection and enhancement of environmental quality, March 5, 1970.
- **EO 11644**, Use of Off-road Vehicles on Public Lands, February 8, 1972 (37 Federal Register [FR] 2877). To the extent this is relevant to this section, 43 CFR 36 addresses non-subsistence off-highway vehicle (OHV) use on DOI lands in Alaska and, 50 CFR 43 and 36 CFR 13 address subsistence OHV use on USFWS and NPS lands in Alaska.
- **EO 11988**, Floodplain Management, May 24, 1977 (42 FR 26951).
- **EO 11990**, Protection of Wetlands, May 25, 1977 (42 FR 26961).
- **EO 12088**, Federal Compliance with Pollution Control Standards, October 13, 1978.
- **EO 12322**, Water resources projects, September 17, 1981.

### 2.4.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for water resources-related values, which that the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- River miles and acreages open to surface-disturbing activities

### 2.4.4 Current Conditions

#### Surface Water

The planning area encompasses approximately 62 million acres of land and includes all lands south of the Central Yukon watershed to the southern boundary of the Kuskokwim River watershed, all lands west of Denali National Park and Preserve and the divide of the Alaska Range to the Bering Sea (see BSWI Draft

RMP/EIS, Map 1-2). Major rivers in regard to management within the planning area include the Yukon, Kuskokwim, Anvik, and Unalakleet.

Water quality impacts can be highly seasonal. Within the planning area, runoff containing natural or human-caused sediment and/or other pollutants can occur during spring snowmelt and heavy rainfall events in summer and fall. Abandoned non-reclaimed placer gold mine operations, active placer mining with erosion control-related non-compliance issues, and runoff from wildfire areas can contribute additional sediment and other pollutants to local streams during summer. Rivers and streams will often be clear running in the winter, albeit at much lower discharge volumes.

Tributaries of the upper Yukon emanate from glaciated areas and carry heavy natural loads of sediment during summer. Except for suspended sediment, water quality is generally good to excellent, with low dissolved solids, dissolved oxygen near saturation, and neutral to moderately basic pH.

Water temperatures during summer are typically less than 14 degrees C (57.2 degrees F). Small streams are often frozen to the bed by midwinter, and temperatures in large rivers are close to freezing. Flows in larger rivers are usually at a minimum in March and maximum in June, July, or August. Winter flows are generally about 20 percent of peak summer flows. Ice on lakes and larger streams is normally about 2 to 4 feet thick by March.

## Discharge

According to GIS analysis of the U.S. Geological Survey (USGS) National Hydrography Dataset river data sets, there are approximately 27,960 miles of streams and rivers and 63,130 acres of lakes and ponds present on BLM-managed public lands in the planning area (BLM 2015a). Timing and duration of flow are solely weather dependent, there are no significant artificial barriers to flow, and no impoundments. Table 2.4.4-1 lists data on discharge volumes where these data are available.

**Table 2.4.4-1. Approximate Discharge and Water Quality Parameters of Major USGS-Gaged Streams in the Planning Area**

Gauge Number	Site Name	Agency	Mean January Discharge (cfs)	Mean June Discharge (cfs)	Period of Record
15300100	Bear Creek at Illiamna	USGS	6.1	7.8	2005-2017
15304010	Crooked Creek	USGS	55	590	2007-2017
15304000	Kuskokwim at Crooked Creek	USGS	13,300	79,200	1951-2017
15303900	Kuskokwim at Lisky's Crossing Near Stoney River	USGS	5,880	25,200	2010-2017
15565447	Yukon at Pilot Station	USGS	62,900	562,000	1978-2017
15564800	Yukon at Ruby	USGS	37,500	476,000	1957-1978
15565200	Yukon at Kaltag	USGS	45,500	645,000	1957-1966

Source: USGS National Water System Web Interface. Note there are numerous other streams and rivers in the planning area that have not been fully measured. January and June results show the range of discharge common in the drainages.

## Water Quality Parameters

The following is a list of parameter used to measure water quality in the planning area.

## **ADEC**

The water quality standards for the State of Alaska (18 AAC 70) are used to protect, maintain, or improve surface water resources in Alaska. Alaska BLM has adopted these water quality standards to protect public health and welfare and enhance the quality of the water on public lands within the state.

## **BLM Alaska Land Health Standards**

BLM Alaska Land Health Standards (BLM 2004) lists possible water quality indicators as:

- water temperature
- dissolved oxygen
- fecal coliform
- turbidity
- pH
- populations of aquatic organisms
- effects on beneficial uses (i.e., effects of management activities on beneficial uses as defined under the CWA and State regulations)
- specific conductivity
- water chemistry, including nutrients and metals
- total sediment yield including bed load
- levels of chemicals in bioassays
- change in trophic status

The water quality parameters typically measured by BLM and other agency personnel in the field include water temperature, dissolved oxygen, pH, specific conductivity, oxidation-reduction potential, and turbidity. Changes in these characteristics along a stream reach or over time can help identify changes in water quality.

## **BLM Assessment, Inventory, and Monitoring Strategy (AIM)**

The Assessment, Inventory, and Monitoring Strategy (AIM) is a national initiative designed to promote integrated, cross-program resource inventory, assessment, and monitoring at multiple scales of management collecting consistent, comparable, and quantitative monitoring data that can be collected once and used many times for multiple reasons across spatial scales. One of the fundamental strategies of AIM is to establish core and contingent/supplemental surface water indicators and standardize how they are measured. Indicators within the AIM Strategy are outlined in Table 2.4.4-2.

While not all the indicators on this list are direct measurements of water quality, many are indirect measurements, such as the presence of abundant aquatic life indicating the water to be relatively free of harmful pollutants. Other indicators that may help assess stream function and health include the following:

- Floodplain connectivity
- Sinuosity

- Riparian vegetation species composition
- Flow duration
- Velocity distribution
- Bedform diversity
- Flow dynamics
- Ground water/surface water interaction
- Sediment transport

**Table 2.4.4-2. Core and contingent aquatic indicators used for Alaska Implementation of the AIM-National Aquatic Monitoring Framework**

Land Health Fundamental	Indicator	Core	Contingent/ Supplemental
Water quality	Acidity	X	
	Salinity	X	
	Temperature	X	
	Turbidity		X
Watershed function and instream habitat quality	Residual pool depth, length and frequency	X	
	Streambed particle sizes	X	
	Bank stability and cover	X	
	Floodplain connectivity	X	
	Large woody debris	X	
	Ocular estimate of instream habitat complexity		X
	Thalweg depth profile		X
Biodiversity / riparian habitat quality	Surveyed cross-sections		X
	Macroinvertebrate biological integrity	X	
	Ocular est. of riparian vegetative cover and structure	X	
	Canopy cover	X	
	Fish assemblage composition/presence		X

Notes Indicators are grouped by the BLM's Fundamentals of Land Health.

## Water Quality Impairments

The water quality in a vast majority of the lakes and rivers in the planning area is in a natural state, and any existing impairment is due to natural conditions in the planning area. Numerous factors affect natural background levels of contaminants, including erosion and aerial deposition of naturally occurring contaminants, such as mercury. In general, turbidity levels are naturally elevated in most Alaska streams during high-flow events, regardless of land use. Glacial outwash streams have naturally elevated turbidities year-round.

Sources of human-caused pollution, including sediment affecting water quality, are usually classified as point sources or nonpoint sources. Point source pollution originates from a direct source such as permitted discharge from water treatment plants or mining operations, or direct runoff from construction projects, and is easy to monitor and regulate. Nonpoint source pollution originates from sources that are difficult to

measure or regulate, such as urban runoff, atmospheric deposition of human-caused pollutants, and broad areas where vegetation has been removed or severely impacted.

Land use practices on lands not under BLM management can affect water quality on BLM-managed land. Many of the water courses within the planning area flow through private, Native corporation, State, and other federally managed lands. In many cases, BLM can only address water quality-related issues that arise from activities on BLM-managed land or through cooperative efforts with ADEC and ADNR.

Since the mid-1990s there has been a gradual and more consistent effort by BLM Alaska to ensure compliance with State regulations regarding water management and water quality. It is assumed that stricter enforcement of water quality standards for placer mine operations has improved water quality (including turbidity) downstream of active mines. Under existing conditions, there are about 38 miles of streams within active mining claims.

CWA Section 303(d) requires monitoring and management of water bodies impaired by pollutants. According to Alaska's Final 2012 Integrated Water Quality Monitoring and Assessment Report (ADEC 2013), there are two water bodies within the planning area on the impaired Section 303(d). Both are in the Aniak Watershed, and exceed water quality standards for antimony, arsenic, and mercury:

- **Red Devil Creek.** Red Devil Creek was placed on the 2010 Section 303(d) list for non-attainment of the toxic and other deleterious organic and inorganic substances standard for antimony, arsenic, and mercury. Sampling and data collected in 1971, 1979, 1988, and 1999 have documented exceedances for the metals antimony, arsenic, and mercury (ADEC 2013). The Red Devil mine site that is causing this impairment is under consideration for the Superfund National Priorities List (NPL) but did not make the NPL in 2011. The BLM began sampling, including surface soil, groundwater, sediment and surface water. A record of decision (ROD) is anticipated in the near future (BLM 2015a).
- **Kuskokwim River.** The Kuskokwim River was placed on the 2010 Section 303(d) list for non-attainment of the toxic and other deleterious organic and inorganic substances standard for antimony, arsenic, and mercury (ADEC 2013). Sampling and data collected in 1971, 1979, 1988, and 1999 have documented exceedances for the metals antimony, arsenic, and mercury. The Red Devil mine site that is causing this impairment is under consideration for NPL but did not make the NPL in 2011. A ROD to remediate this problem is expected in the near future (BLM 2015a).

## Groundwater

Groundwater is an important source of drinking water for communities in the planning area. In addition, groundwater maintains stream flow, supporting critical fish habitat. In the summer, the streams and rivers may transport heavy loads of glacial silt, making surface water unsuitable for household use. Use of groundwater avoids this seasonal problem. About 50 percent of Alaska's population and 90 percent of the state's rural residents depend primarily on groundwater for public supplies (ADEC 2008).

Unconsolidated sand and gravel deposited as alluvium or glacial outwash form the most productive aquifers in the planning area (Map 3.2.4-1 of the BSWI Draft RMP/EIS). In major watersheds these deposits comprise thick highly transmissive aquifers that yield large quantities of good quality water to wells. In many smaller upland and mountain valleys, limited groundwater is available in alluvium beneath permafrost or in unfrozen alluvium beneath or adjacent to riverbeds. The groundwater level generally reaches a seasonal low during late winter months, March or April, normally the period of lowest stream discharge. Watersheds are shown in Map 3.2.4-2 of the BSWI Draft RMP/EIS.

The presence of permafrost can greatly impact aquifers. Where the permafrost is shallow, groundwater can perch near the land surface and promote rapid runoff to streams during break up. Depending on its extent, permafrost may also act as a confining unit for aquifers in sub-permafrost aquifers. In such cases, natural discharge of water confined beneath the permafrost is possible only through unfrozen zones that perforate the permafrost layer (Miller et al. 1999). Factors that locally affect the presence and thickness of permafrost include air temperature, soil and rock type, relief, slope aspect (steepness and the direction that the slope faces), vegetation, snow cover, and the presence of surface-water bodies or flowing groundwater. In the planning area, permafrost is discontinuous.

Most of the groundwater in unconsolidated deposits is suitable for domestic uses with moderate or minimal treatment. Locally, the most common treatment problems in groundwater systems are for naturally occurring concentrations of arsenic, antimony, iron, and manganese in excess of the recommended federal drinking-water standards (ADEC 2008). Alluvial groundwater is typically a calcium bicarbonate or calcium magnesium bicarbonate type and is hard to moderately hard and may require treatment for some uses.

### **2.4.5 Resources Changes: Trends and Forecasts**

Climate change could alter precipitation patterns, increase evaporation, and alter water quality in the planning area. Changes in precipitation could affect the availability of water resources by raising or lowering surface water and groundwater levels seasonally or from year to year. Increased or more erratic surface water flow would make the water more turbid, thereby decreasing water quality. Increased temperatures and vegetation growth would increase the rate of evaporation and evapotranspiration, thereby altering the water budget for watersheds in the planning area. Given that many aquifers are present below permafrost, aquifers can be impacted by melting of permafrost, either due to surface disturbance, or climate change. This could also impact groundwater recharge, storage capacity, movement, and discharge in the planning area.

In view of projected climate warming and increased global demand for fresh water, Alessa et al. (2011) noted that Alaska is a relatively water-rich region of the world and its role in future international water markets may be significant. They suggest the state's exceedingly long coastline provides ample locations for establishing ice-free export infrastructure that would make it possible to ship water in large quantities.

At present only a small proportion of the freshwater in the planning area, as well as in Alaska in general, has been developed or modified. Substantial water resource development is not expected in the reasonably foreseeable future because a majority of the planning area is remote, with little or no road access, and no expectation of large-scale industrial development.

## **2.5 Fisheries**

### **2.5.1 Introduction**

The purpose of this section is to describe fisheries resource characteristics of the planning area that could be affected by implementing the various management alternatives described in Chapter 2 of the BSWI Draft RMP/EIS. The section provides background information on relevant fisheries and fish habitat laws, regulations, and policies. Fisheries resource indicators are identified that will be used to evaluate impacts associated with management decisions. Fish and fish habitat resources, activities and stressors potentially impacting them, and how the resources are projected to change are further discussed.

### 2.5.2 Laws, Regulations, and Policies

Several federal and State laws, regulations and statutes directly govern the management of fish, fish habitat, and commercial, subsistence, and sport fishing in Alaska. Within the planning area, the State of Alaska has primary direct responsibility for the management of fishing seasons, fish harvest allocation, fish habitat management, and protection. The BLM manages one subsistence fishing district in the Unalakleet drainage and relies on in-season data provided by the ADF&G to determine openings and closures.

#### **Magnuson-Stevens Fishery Conservation and Management Act (MSA) and Essential Fish Habitat (EFH)**

The MSA of 1996, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), establishes procedures designated to identify, conserve, and enhance EFH for those species regulated under a federal Fishery Management Plan (FMP). Section 305(b)(2) of the MSA requires federal agencies to consult with the NMFS on all actions or proposed actions authorized, funded, or undertaken by the agencies that might adversely affect EFH.

The EFH Guidelines, 50 CFR 600.05 – 600.930, outline the procedures that federal agencies must follow to satisfy MSA consultation requirements. Federal agencies must provide the NMFS with an EFH Assessment if the federal action may adversely affect EFH. An EFH Assessment is to include the following contents (50 CFR 600.920(e)): (1) a description of the action, (2) an analysis of the potential effects of the action on EFH and managed species, (3) the federal agency's view of the effects of the action, and (4) proposed mitigation, if necessary.

EFH guidelines were set forth by the NMFS to help Fisheries Management Councils fulfill requirements of the MSA. Consultation between federal permitting or action agencies and the NMFS Habitat Conservation Division is required by the MSA when a federal action agency determines the action it is approving may adversely affect EFH designated through FMPs. The MSA also requires that the federal permitting or action agency respond to comments made by NMFS.

EFH is defined as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (50 CFR Part 600). For the purposes of this definition:

- "waters" means aquatic areas and their associated physical, chemical, and biological properties;
- "substrate" means sediment, hard bottom, structures underlying the waters, and associated biological communities;
- "necessary" means the habitat required to support a sustainable fishery and healthy ecosystem; and
- "spawning, feeding, and breeding" means to encompass the complete life cycle of a species (50 CFR 600).

EFH is designated based on the best available scientific information and the information levels defined by the MSA (NMFS 2005) listed below:

- Level 1 – distribution
- Level 2 – density or relative abundance
- Level 3 – growth, reproduction, or survival rates

- Level 4 – production rates

In the planning area, EFH has been designated under the FMP for Salmon Fisheries in the Exclusive Economic Zone off the Coast of Alaska (Salmon FMP). The Salmon FMP has designated all waters offshore of Alaska as EFH for all five species of Pacific salmon. The FMP also designates waters identified by the ADF&G Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (Anadromous Waters Catalog [AWC]) (Johnson and Litchfield 2016a–c) as important for Pacific salmon, as EFH. Salmon EFH in Alaska is based primarily on Level 1 distribution information.

## **ANILCA**

The significance of the ANILCA to management within the planning area is discussed in detail in other sections of this document. In the context of fish management, Section 1314 regarding State management authority and Title VIII regarding subsistence are particularly relevant. Title VIII declares that:

*the continuation of the opportunity for subsistence uses by rural residents of Alaska, including both Natives and non-Natives, on the public lands and by Alaska Natives on Native lands is essential to Native physical, economic, traditional, and cultural existence and to non-Native physical, economic, traditional, and social existence.*

Title VIII establishes that non-wasteful subsistence uses of fish and wildlife and other renewable resources shall be the priority consumptive uses of all such resources on the public lands of Alaska when it is necessary to restrict taking in order to assure the continued viability of a fish or wildlife population or the continuation of subsistence uses of such population, the taking of such population for non-wasteful subsistence uses shall be given preference on the public lands over other consumptive uses (ANILCA section 802); Title VIII also establishes that the Secretary shall permit on the public lands appropriate use for subsistence purposes of snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulation (ANILCA section 811). Access and reasonable opportunity to harvest fisheries resources must be maintained as the preferred use on federally managed lands. Federal management cannot unduly restrict access to, or harvest of, subsistence fish resources.

## **State of Alaska Fishway Act, AS 16.05.841**

The Fishway Act (AS 16.05.841), requires that all dams or other obstructions constructed below the ordinary high water mark (OHWM) in a stream that supports salmon or other fish provide for efficient passage of fish. The statute requires submittal of plans and specifications to the Commissioner of the ADF&G for review and pre-construction approval. The Commissioner has delegated this authority to the Division of Habitat. Upon review of plans and specifications, the Division of Habitat either issues a Fish Habitat Permit authorizing the construction and maintenance of the structure or makes recommendations for plan modifications to ensure that fish passage will be maintained. Once permitted, all structures must be maintained free of obstructions and are required to be supplied with a sufficient amount of water to allow for the free passage of fish as long as the structure is present.

Implementation of AS 16.05.841 is somewhat discretionary in that the Division of Habitat can determine a permit is not needed if the activity is unlikely to affect fish passage. Activities subject to review and permitting under the statute can include the construction of dams, culverts, bridges, ice bridges, the use of fish exclusion intake screens associated with water withdrawals, aspects of placer mining, suction dredge mining, and any other mechanized activities that could block fish passage. Activities conducted with hand



tools typically do not require a Fish Habitat Permit. Implementation of AS16.05.841 applies to all lands within Alaska regardless of ownership.

### **State of Alaska Anadromous Fish Act, AS 16.05.871**

AS 16.05.871(a) of the Anadromous Fish Act requires the Commissioner of the ADF&G to specify the portions of streams, rivers, lakes and ponds that are important for the spawning, rearing, or migration of anadromous fish. This section of the Act established the creation of and maintenance of the AWC in State statute. The statute further establishes that prior to conducting most any mechanized activity below the OHWM, and in cases, activities occurring above the OHWM, of a stream section listed in the AWC that could affect anadromous fish habitat that applicants must submit complete and detailed plans and specifications for their project to the Commissioner for review and approval through issuance of a Fish Habitat Permit. The Commissioner has delegated this authority to the Division of Habitat. The review and approval process is similar to that described for the Fishway Act.

The Anadromous Fish Act authorities are much broader than those of the Fishway Act, as they specify the proper protection of fish and game (e.g., fish habitat as enumerated by the AWC) in connection with the proposed action. Fish passage, as required by the Fishway Act, is the minimum requirement under the Anadromous Fish Act. Any mechanized activity that occurs within the OHWM of a listed stream segment requires issuance of Fish Habitat Permit under the statute. Unlike the Fishway Act, issuance is not discretionary. Examples of activities that require issuance of a Fish Habitat Permit under AS16.05.871 include any activity that could divert, obstruct, pollute, or change the flow or bed of a specified waterbody, the use of wheeled, tracked, or excavating equipment, or log-dragging equipment in the bed of a specified waterbody. Fish Habitat Permits issued under the Anadromous Fish Act undergo review consistent with the ADF&G Mitigation Policy, which seeks, in order of preference, to avoid, minimize, rectify, reduce, and lastly to compensate for unavoidable impacts. Final issued permits are conditioned to ensure the proper protection of important anadromous fish habitats. Conditions can be more or less stringent, depending on the known cataloged habitat uses. For example, activities occurring within documented salmon spawning areas will necessarily be more stringent than those occurring in areas only known to be used for summer rearing. Implementation of AS16.05.871 applies to all lands within Alaska regardless of ownership.

### **State of Alaska Fishing Regulations**

Subsistence, commercial, and sport fishing is regulated by the ADF&G Commercial and Sport Fish Divisions under the oversight of the Board of Fisheries. The Board of Fisheries' main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state's fishery resources. The Alaska Board of Fisheries is charged with making allocative decisions, and the ADF&G is responsible for management based on those decisions. The Alaska Board of Fisheries is established under AS 16.05.221 for the purposes of the conservation and development of the fisheries resources of the state. The Alaska Board of Fisheries has the authority to adopt regulations described in AS 16.05.251 including: establishing open and closed seasons and areas for taking fish; setting quotas, bag limits, harvest levels and limitations for taking fish; and establishing the methods and means for the taking of fish. The Alaska Board of Fisheries has authority over the regulations in Title 5 AAC Chapter 1 through Chapter 77.

Commercial and subsistence fisheries are generally managed in-season by district and sub-district with controlled opening and closings. In the planning area, the 2016-2019 Arctic-Yukon-Kuskokwim

Commercial, Subsistence, Personal Use Finfish and Shellfish Fishing Regulations apply (ADF&G 2016a). Sport fishing regulations for the planning area are in the annual Northern Alaska Sport Fishing Regulations Summary, organized by major drainages/geographic region; Kuskokwim-Goodnews Drainages, Yukon Drainage, and Northwestern Drainages (ADF&G 2018a).

### **Subsistence Fishing**

Subsistence fisheries are managed by the ADF&G in state waters and by the Federal Subsistence Board in federal public waters. In the Unalakleet River, upstream of the Chirokey River, the BLM Field Manager is authorized to open the closed area. ADF&G reports are used to manage the openings.

The State of Alaska defines subsistence uses of wild resources as “noncommercial, customary and traditional uses” for a variety of purposes. As defined by AS 16.05.940, these subsistence uses include: direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption (ADF&G 2016b).

AS 16.05.258, Subsistence Use and Allocation of Fish and Game, directs the Alaska Board of Fisheries to identify fish stocks that support subsistence fisheries and, if there is a harvestable surplus of these stocks, adopt regulations that provide reasonable opportunities for these subsistence uses to take place. Whenever it is necessary to restrict harvests, subsistence fisheries have a preference over other uses of the stock.

#### **2.5.3 100-Year Floodplain**

The 100-year floodplain is the area inundated by the 100-year flood or the 1 percent annual exceedance probability flood. It is the flood event that has a 1 percent chance of being equaled or exceeded in any single year. It is often mistakenly thought of as the flood that occurs every 100 years. In actuality, if one has a project located within the 100-year floodplain and the project life is expected to be 30 years, it would have a 25 percent chance of experiencing flood damage due to a 100-year flood. For a project with an anticipated life of 15 years, the chance of incurring flood damage due to a 100-year flood would be 14 percent.

The 100-year floodplain is difficult to accurately map without extensive ground surveys. On-the-ground surveys conducted within the Central Yukon planning area typically employ the Freeboard Approach, which is based on the current 1 percent annual chance flood elevation, with the addition of freeboard to account for uncertainties in future conditions (see Guidelines of Implementing EO 11988, Floodplain management; October 2015) to determine the horizontal floodplain. With this approach, the BLM uses three times maximum bankfull depth as an estimate of the 100-year floodplain.

Given the difficulty of remotely mapping the 100-year floodplain and the desire to convey the intent of the various management alternatives to the reader, riparian buffer distances are used in this report as proxies for the 100-year floodplain. Buffer distances are given as a distance from bankfull elevation and are dependent on stream order. Buffer distances apply to each side of the stream, as follows:

Stream Order	Buffer Distance (feet)
1st and 2nd	100
3rd	500
4th and 5th	1,000
6th, 7th, and 8th	1,500

### 2.5.4 Resource Indicators

The conditions that are established in the discussion below provide a baseline for fisheries-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions outlined in the BSWI Draft RMP/EIS.

- Stream miles right-of-way (ROW) open, avoidance, or exclusion areas
- Waterbodies acreage within ROW open, avoidance, or exclusion areas
- Stream miles within commercial woodlands closed, permittable, and permitted for harvesting
- Waterbodies acreage within commercial woodlands closed, permittable, and permitted for harvesting
- Stream miles within areas open and closed to grazing
- Waterbodies acreage within areas open and closed to grazing
- Acres open to locatable, salable, and leasable minerals
- Linear miles of potential stream/acres of potential pond/lake habitat potentially affected
- Linear miles of documented anadromous stream/acres of documented anadromous pond/lake habitat potentially affected, including all documented anadromous fish spawning habitats potentially affected
- Acres of designated Areas of Critical Environmental Concern (ACECs)

### 2.5.5 Current Conditions

#### Habitat and Fish Resources

There are approximately 133,853 miles of streams and rivers and 3.91 million acres of lakes and ponds within the planning area, and 17,962 miles of streams and 414,967 acres of lakes and ponds have been cataloged as important for the spawning, rearing and migration of anadromous fish (Johnson and Litchfield 2016 a–c). Of the habitats cataloged in the AWC within the planning area, there are approximately 5,248 miles of streams and rivers and 287,550 acres of lakes and ponds designated as EFH for Pacific salmon. Approximately 23 percent (30,507 miles) of all streams and 1.4 percent (53,796 acres) of pond/lake habitats in the planning area occur on BLM-managed public lands. Similarly, about 22 percent (3,997 miles) of anadromous streams, less than 1 percent (34 acres) of anadromous lakes and ponds, less than 24 percent (3,950 miles) of EFH streams and less than 1 percent (34 acres) of EFH lakes and ponds cataloged in the AWC are on BLM-managed public lands in the planning area (see Maps 3.2.5-1 and 3.2.5-2 of the BSWI Draft RMP/EIS). However, it is recognized that the AWC is only a subset of actual important anadromous fish habitats as the AWC reflects the extent of salmon documented through fish surveys, and not necessarily the actual limits of salmon habitat. It is estimated that

potentially half of the anadromous waters habitat in the state have not been documented (ADF&G 2013a). It is certain that additional important anadromous habitats remain undocumented.

Currently, there is a lack of comprehensive information about adult salmon stock population structure, abundance, timing, distribution, and critical habitats on much of the BLM-managed public lands in the planning area. Many of the miles of streams and rivers not documented as anadromous waters have been shown to have resident fish in the ADF&G Alaska Freshwater Fish Inventory, which maps freshwater fish locations. While surveys have not been conducted to identify their presence, it is highly likely that fish are present in many more areas. In addition to streams and rivers, there are many lakes, sloughs, and other off-channel habitats in the planning area that support resident fish species. Few population surveys or critical habitats have been identified for non-anadromous fish on BLM-managed public lands in the planning area.

The planning area is composed of three watersheds: the Unalakleet, Kuskokwim, and lower portion of the Yukon Rivers. The Unalakleet River drainage within the planning area has approximately 8,145 miles of stream habitat, 887 miles of documented anadromous stream habitat and 292 miles of documented anadromous fish spawning habitat, which includes 849 miles of pacific salmon stream EFH and 292 miles of stream spawning EFH (BSWI Draft RMP/EIS, Map 3.2.5-1 and 3.2.5-2; Johnson and Litchfield 2016c). The drainage also has 26,920 acres of lake and pond habitat including 306 acres of documented anadromous fish habitat, none of which has been documented as important for spawning. Within the Unalakleet River drainage 6,022 miles of stream habitat, 603 miles of anadromous stream habitat and 163 miles of documented spawning habitat occur within BLM-managed public lands. While 4,270 acres of lake and pond habitat is located on BLM-managed public lands within the planning area, none have been documented as anadromous fish habitat. Of the BLM-managed land, 567 miles of stream EFH and 163 miles of stream spawning EFH are documented. The Unalakleet River drainage is used for spawning and rearing by all five Pacific salmon species, whitefish (predominantly least cisco and resident round whitefish), and a variety of other resident fish species.

The Yukon River drainage within the planning area has 53,173 miles of stream habitat, 6,724 miles of documented anadromous stream habitat, including 2,039 miles of known anadromous fish spawning habitat, 6,557 miles of stream EFH and 2,039 miles of stream spawning EFH (BSWI Draft RMP/EIS, Map 3.2.5-1 and 3.2.5-2; Johnson and Litchfield 2016a, 2016b). The drainage also has 1.45 million acres of lake and pond habitat including 57,055 acres of documented anadromous fish habitat including 107 acres of lacustrine spawning habitat. Within the Yukon River drainage 14,363 miles of stream habitat, 1,953 miles of anadromous stream habitat, and 977 miles of spawning habitat occur within BLM-managed public lands. Similarly, 27,038 acres of lake and pond habitats, 40 acres of which are anadromous habitats occur within BLM-managed public lands; no lacustrine anadromous spawning habitats are currently identified on BLM-managed public lands within the Yukon drainage. Of the BLM-managed land, 1,942 miles of stream EFH and 977 miles of stream spawning EFH are documented. The Yukon River drainage is used for spawning and/or rearing by all five Pacific salmon species, sheefish, broad whitefish, humpback whitefish, least and Bering cisco, and lamprey, as well as resident fish species.

The Kuskokwim River drainage within the planning area has 72,477 miles of stream habitat, 10,350 miles of which are documented as anadromous stream habitat, including 2,039 miles of known anadromous fish spawning habitat, 1,441 miles of stream EFH and 350 miles of stream spawning EFH (BSWI Draft RMP/EIS, Map 3.2.5-1 and 3.2.5-2; Johnson and Litchfield 2016a, 2016b). The drainage also has 2.43 million acres of lake and pond habitat including 357,606 acres of documented anadromous fish habitat of

which 24,902 acres is documented lacustrine spawning habitat. Within the Kuskokwim River drainage 10,122 miles of stream habitat, with 1,441 miles of anadromous stream habitat, and 359 miles of documented anadromous fish spawning habitat occur within BLM-managed public lands. Similarly, 22,488 acres of lake and pond habitats occur within BLM-managed public lands, however only 0.4 acres are documented as important anadromous fish habitat. Of the BLM-managed land, 1,441 miles of stream EFH and 350 miles of stream spawning EFH are documented, while no lacustrine EFH is documented. The Kuskokwim River drainage is used for spawning and/or rearing by all five Pacific salmon, whitefish, lamprey, and rainbow smelt. The only known spawning area for rainbow smelt in the Kuskokwim River occurs within the planning area near Upper and Lower Kalskag but is outside of BLM-managed public lands. Significant whitefish spawning areas are identified in the Swift River area and specifically for sheefish in the Big River drainage.

Native fish species are widely distributed throughout the planning area and occur in a wide variety of habitats. Forty native species, including nearshore marine fish, are known to be supported by the planning area (USFWS 2004). Twenty-eight freshwater fish species occur within the planning area, possibly including two BLM sensitive species, Alaskan brook lamprey and Arctic char (Table 2.5.5-1). All five Pacific salmon occur within the planning area and EFH is identified for each species in the State of Alaska AWC. In addition to Pacific salmon, eight additional anadromous fish species are present within the freshwaters of the planning area: Pacific lamprey, broad whitefish, humpback whitefish, least cisco, Bering cisco, sheefish, Dolly Varden, and rainbow smelt (Table 2.5.5-1). Table 2.5.5-2 provides approximate sensitive periods of the year for select subsistence and commercially important fish species in the planning area.

Important salmon fisheries are based in the rivers of the planning area. Fish species in the planning area may be described by four general groupings all of which can overlap in use. These include: subsistence, commercial, sport, and forage. In rural Alaska, subsistence fish species are extremely important for both diet and culture. Fish caught for subsistence include all five Pacific salmon species (Chinook, chum, pink, sockeye, and coho salmon), and non-salmon species such as whitefish, sheefish, burbot (also known as lush), northern pike, Alaska blackfish, Dolly Varden, rainbow trout, rainbow smelt, and Arctic lamprey. There is a commercial fishery for chum, sockeye, pink, and coho salmon and also a commercial fishery for Bering cisco and Arctic lamprey within the planning area, but not in habitats managed by the BLM. Sport fish species include Arctic grayling, northern pike, burbot, rainbow trout, Dolly Varden, sheefish, and salmon. Forage species are important prey for other species and include longnose suckers, slimy sculpin, lake chub, and ninespine stickleback.

**Table 2.5.5-1. Fish Species Present in Freshwater Habitats of the Planning Area**

Family	Scientific Name	Common Name	Native
Esocidae	<i>Esox lucius</i>	<i>northern pike</i>	x
Catostomidae	<i>Catostomus</i>	<i>longnose sucker</i>	x
Cottidae	<i>Cottus cognatus</i>	<i>slimy sculpin</i>	x
Cyprinidae	<i>Couesius plumbeus</i>	<i>lake chub</i>	x
Gasterosteidae	<i>Pungitius</i>	<i>ninespine stickleback</i>	x
Lotidae	<i>Lota</i>	<i>burbot</i>	x
Petromyzontidae	<i>Lampetra japonica</i>	<i>Arctic lamprey</i>	x
	<i>Lampetra alaskense</i> <sup>1</sup>	<i>Alaskan brook lamprey</i>	x
	<i>Lampetra tridentate</i>	<i>Pacific lamprey</i>	x
Percopsidae	<i>Percopsis omiscomaycus</i>	<i>trout-perch</i>	x

Family	Scientific Name	Common Name	Native
Osmeridae	<i>Osmerus mordax</i> <sup>3</sup>	rainbow smelt	x
	<i>Hypomesus olidus</i>	pond smelt	x
Salmonidae	<i>Coregonus nasus</i> <sup>3</sup>	broad whitefish	x
	<i>Coregonus pidschian</i> <sup>3</sup>	humpback whitefish	x
	<i>Coregonus laurettae</i> <sup>3</sup>	Bering cisco	x
	<i>Coregonus sardinella</i> <sup>3</sup>	least cisco	x
	<i>Prosopium cylindraceum</i>	round whitefish	x
	<i>Stenodus leucichthys</i> <sup>3</sup>	sheefish/inconnu	x
	<i>Oncorhynchus gorbuscha</i> <sup>2,3</sup>	pink salmon	x
	<i>Oncorhynchus keta</i> <sup>2,3</sup>	chum salmon	x
	<i>Oncorhynchus kisutch</i> <sup>2,3</sup>	coho salmon	x
	<i>Oncorhynchus nerka</i> <sup>2,3</sup>	sockeye salmon	x
	<i>Oncorhynchus tshawytscha</i> <sup>2,3</sup>	Chinook salmon	x
	<i>Oncorhynchus mykiss</i>	rainbow trout	x
	<i>Salvelinus namaycush</i>	lake trout	x
	<i>Salvelinus alpinus</i> <sup>1</sup>	Arctic char	x
<i>Salvelinus malma</i> <sup>3</sup>	Dolly Varden	x	
<i>Thymallus arcticus</i>	Arctic grayling	x	
Umbridae	<i>Dallia pectoralis</i>	Alaska blackfish	x

<sup>1</sup>BLM sensitive species, possible – not documented as present.

<sup>2</sup>EFH species

<sup>3</sup>State of Alaska anadromous species.

**Table 2.5.5-2. Dates of Critical Activity for Important Subsistence, Commercial, and Sport Fish Species in the Planning Area**

Species	Crucial Season	Approximate Dates
Arctic grayling	spawning	May–June
	egg incubation	May–July
Burbot	spawning	February – March
	egg incubation	February – April
Chinook salmon	spawning	July–August
	egg incubation	July–February
Coho salmon	spawning	August–October
	egg incubation	August–March
Chum salmon	spawning	July–August
	egg incubation	July–April
Rainbow smelt	spawning	May
	egg incubation	May – mid-June
Northern pike	spawning	May–June
	egg incubation	May–July
Whitefish species	spawning	September–November
	egg incubation	September–March

### Chinook Salmon

The Alaska Board of Fisheries listed Yukon River Chinook salmon as a stock of yield concern in 2000, according to guidelines set forth in the Policy for the Management of Sustainable Salmon Fisheries (5

AAC 39.222). Continued in 2007, this designation is based on the inability to maintain expected yields, or harvestable surpluses, above the stock's escapement needs, despite the use of specific management measures. Unalakleet River Chinook salmon were also listed as a stock of yield concern in 2004 (Kent and Bergstrom 2009).

Social and economic hardship for many communities in rural and urban Alaska has been created because of a statewide downturn in productivity and abundance of Chinook salmon, which are crucially important to subsistence, commercial, and sport users across diverse fisheries in Alaska (ADF&G 2013a).

### **Coho Salmon**

Although their distribution in portions of the Yukon and Kuskokwim Rivers are not as well understood as that of Chinook or chum salmon, coho salmon have been documented throughout the planning area, and spawning populations are well-documented in the Unalakleet River drainage of the Kuskokwim and much of the Yukon.

Although not as abundant as chum salmon in the Yukon River drainage, coho salmon are an important subsistence resource. There are commercial fisheries for coho salmon in all three watersheds inside the planning area, as well as a small commercial fishery for coho salmon outside the planning area in the upper Yukon River and Tanana River. However, the harvest of coho salmon is constrained because of the stock of concern status for fall chum salmon, which have overlapping run times and are susceptible to similar types of fishing gear on the Yukon River.

### **Chum Salmon**

Chum salmon have the widest distribution of Pacific salmon species: in North America, they range from California to Alaska (Hale et al. 1985). Within this range, the Yukon River is the greatest producer of chum salmon (Morrow 1980). In addition to contributing to an important commercial fishery, chum salmon in the planning area are widely used for subsistence purposes. The Yukon River has distinct summer and fall chum salmon runs, with summer chum salmon entering the river in June, and fall chum salmon entering the river in late June or July. While summer chum salmon are primarily used as a food source for dogs, fall chum salmon tend to have a higher oil content, and are generally of higher quality (Morrow 1980). Summer chum salmon generally spawn in the lower part of the Yukon River drainage, with over half the summer chum salmon spawning in the Anvik River.

In 2000, under the State of Alaska Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222), Yukon River summer and fall chum salmon were designated as stocks of concern. For their failure to produce an expected harvestable surplus, fall chum salmon were considered stock of yield concerns. While this designation was continued in 2004, based on estimates of fall chum salmon run sizes that were at or above average between 2003 and 2006, it was discontinued in 2007.

### **Arctic Grayling**

Once found in many parts of the northern United States, Arctic grayling have almost disappeared from many areas due to habitat loss, overfishing, and competition from nonnative species (ADF&G 2007a); however, in Alaska they are widespread, and are present throughout the planning area. Arctic grayling generally remain in freshwater throughout their lifecycle and are popular sport fish. The preferred habitats for Arctic grayling are clear waters of large rivers, rocky streams, and lakes (Mecklenburg et al. 2002).

## **Whitefish**

Inhabiting nearly all rivers and other freshwater habitats in the planning area, whitefish are the most abundant type of fish north of the Alaska Range (ADF&G 2007a). Common whitefish in the planning area include round-, broad-, and humpback whitefish; least- and Bering cisco; and sheefish. Round- and humpback whitefish and ciscoes provide some sport fishing opportunities; while sheefish are the most sought-after sport fish of the whitefishes in the planning area. Sheefish, broad whitefish, humpback whitefish, and ciscoes are important subsistence resources. There is a small commercial fishery for Bering cisco in the lower Yukon River.

## **Northern Pike**

Found in waters throughout the planning area, northern pike are an important subsistence and sport fish resource. Spending the winter in relatively deep waters in rivers and lakes, northern pike move into marshy off-channel habitats in the spring and early summer to spawn. Fish begin spawning during the spring of their third year (Cheney 1971). Eggs hatch within 4 weeks of spawning, and the fry feed on zooplankton and aquatic insects until they reach a size of 2 inches (5 centimeters), at which point the fry shift to a fish diet (Morrow 1980).

### ***Distribution – Kuskokwim Watershed***

Sheefish, broad and humpback whitefish are culturally significant species along the Kuskokwim River and throughout much of the watershed, they are harvested for subsistence use by residents of many communities up and down the entire river and throughout the whitefish annual cycle. Whitefish are harvested on their wintering areas in the lower estuarine portion of the Kuskokwim, in spring and summer in both pre-migration foraging areas and as migrants in the main river, during fall spawning along the middle and upper river, and during their late fall downriver migration. Whitefish are often caught before salmon in the spring and offer an opportunity for fresh fish early in the season. In recent years, Chinook salmon have been in decline and there has been a resulting increase in harvest of whitefish and other salmon species. This trend has been particularly significant in the last couple of years during which early season subsistence fishing on the Kuskokwim River was restricted to the use of small-mesh “whitefish” nets. Even prior to the recent decline of Chinook salmon, however, whitefish were a consistently important component of the Kuskokwim River subsistence harvest, comprising between a quarter to nearly 60 percent of the annual non-salmon subsistence harvest (Harper et al. 2012).

Whitefish spawning areas are limited in the Kuskokwim watershed. The proposed Sheefish Spawning ACEC (BLM 2018b) includes the most important of only four known humpback whitefish spawning areas, and one of only two broad whitefish spawning areas (Harper et al. 2012; BLM 2018b) (BSWI Draft RMP/EIS, Map 3.4.1-2). About 80 percent of sheefish radiotagged in the Kuskokwim River drainage in a study conducted by the ADF&G were relocated in a 15.5-mile reach of the Big River during spawning, suggesting the area is of particular significance to sheefish (Stuby 2012). Other sheefish were relocated in shorter stretches of the Middle and South Fork Kuskokwim River during the spawning period (Stuby 2012). Of those important spawning habitats, approximately 3 miles of habitat occur on BLM managed lands.

While the AWC does not identify the Swift River as important whitefish spawning habitat, Harper et al. (2012) reports “The Swift River spawning area is probably the most important area thus far identified for humpback whitefish in the Kuskokwim River drainage based upon the spawning destination of radio-tagged fish” (Harper et al. 2012). The whitefish species that spawn in the Swift River have been



documented to overwinter and feed in the lower reaches of the Kuskokwim River, indicating they move over 500 miles from the lower Kuskokwim River to the Swift River to spawn. There are approximately 18 subsistence communities between the Swift River and the lower reach of the Kuskokwim River that utilized these fish. In addition, the telemetry work confirmed that fish spawning within the Swift River did indeed migrate downstream into the lower Kuskokwim River to overwinter and are harvested throughout the river as an important subsistence resource. Because these populations occur along hundreds of miles of the Kuskokwim River over the course of their annual cycles, from the upper river to the tidally influenced lower river, they are considered spawning habitats. Spawning areas include the lower reaches of the Holitna River (south of Itulilik) and its tributaries, which include the Chuckowan and Kogruklu Rivers and Shotgun Creek. Further south and west there are whitefish spawning areas within the Hoholitna River to White Lake and the South Fork tributary of the Hoholitana River. There are also several whitefish spawning areas within the lower Kuskokwim watershed including south of Bethel, Nimgum Creek is also shown as another area for whitefish spawning.

## **Factors Impacting Fisheries Resources**

### ***Habitat Disruption***

The major activities that are affecting, or are likely to affect, fish habitat and aquatic productivity within the planning area are activities with the potential to cause surface disturbances near water bodies and activities that occur within waterbodies. Major activities that occur within the planning area that have the highest potential to affect fish production include placer mining, hard rock mining, and gravel mining within or near important fish habitats; timber harvests near important fish habitats; and stream crossings of roads, trails, and utility corridors in important fish habitats. Stream crossings with potential to impact fish production include road crossings with culverts and bridges, ice bridges, fords with heavy equipment and light-duty equipment including OHVs, and trench-buried utility crossings. Activities and stream crossings that occur within particularly sensitive habitats such as spawning and overwintering habitats, or those that could preclude or inhibit access to those habitats, have the highest potential to impact fish productivity.

Human activity has been minimal in the majority of the watersheds in the planning area and most riparian and stream habitats are in natural condition. However, placer mining at Tuluksak, the upper Innoko River drainage, the Ophir mining area, and Iditarod/Flat Mining Districts and other placer mines throughout the planning area have likely affected fish habitat. No studies have been identified within the planning area that quantify the impacts to fish and aquatic habitats. While outside the planning area, streams impacted by placer mining during the early 1980s gold rush in Interior Alaska, the Birch and Chatanika River drainages were found to be in poorer overall condition with significantly reduced riparian habitat and invertebrate productivity (Weber and Post 1985; Weber 1986; Townsend 1987). Mined streams exhibited high turbidity, high suspended solids, and increased erosion and substrate embeddedness when compared to reference streams in the drainages (Weber and Post 1985; Weber 1986; Townsend 1987). There were cases in the Birch Creek drainage where historically present fish populations in streams affected by placer mining had been reduced or entirely displaced (Weber and Post 1985). In the mid-1980s, a collaborative approach involving multiple State agencies and miners was undertaken and best practices were designed and implemented, resulting in an immediate reduction in suspended solids in the upper Chatanika River drainage (Townsend 1987). Variable success has been seen in active restoration efforts in reestablishing viable fish habitats and populations in Alaska. Restoration success has been largely related to the complexity of the rehabilitation goals (Parry et al. 1993). Parry et al. (1993) found that 47 percent of restoration projects were successful in meeting their restoration goals, while about 20 percent were either

partially successful or unsuccessful. The remainder of projects reviewed had either uncertain outcomes or were still too early in the process to determine success. They found that projects focused on creating salmon spawning habitats were most variable in terms of a successful long-term outcome.

There are 765 rivers and streams in the planning area. The water quality in a vast majority of the lakes and rivers in the planning area are unperturbed and represent natural conditions. Any existing impairments in these unperturbed waters are due to natural conditions in the planning area. The following exceptions exist to this general rule (ADEC 2013; BLM 2015a):

- Red Devil Creek was placed on the 2010 Section 303(d) list for non-attainment of the toxic and other deleterious organic and inorganic substances standard for antimony, arsenic, and mercury. Water quality and sediment are impacted by the presence of processed tailings left in place by past mining activity. Sampling and data collected sporadically since 1971 and regularly since 2010 have documented exceedances for antimony, arsenic, and mercury adjacent to mine workings but concentrations of all three metals meet ambient water quality standards at the mouth of the creek (where it discharges into the Kuskokwim River). The BLM initiated a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) investigation/feasibility study of the mine site and adjacent reach of the Kuskokwim River in 2010. It is anticipated that future cleanup action will address the processed tailings and impacted soil and sediment.
- Gray et al. (2000) conducted a study near the Red Devil Mine site to evaluate the effects of abandoned mercury mines on fish and the aquatic ecosystem. Fish tissue samples from Arctic grayling (*Thymallus arcticus*) and Dolly Varden (*Salvelinus malma*) collected downstream from mercury mines, including the Red Devil Mine, on the Kuskokwim River contained as much as 420 and 620 nanograms per gram mercury (wet weight muscle). These concentrations were several times higher than that in fish collected from regional baseline sites. Gray et al. (2000) concluded that elevated mercury concentrations in freshwater fish collected near abandoned mercury mines indicate that some biologically available mercury is bioaccumulated; however, the sample size (n=8) was limited and did not include top-predatory species more susceptible to methylmercury bioaccumulation, such as northern pike.
- The Kuskokwim River was placed on the 2010 Section 303(d) list for non-attainment of the toxic and other deleterious organic and inorganic substances standard for antimony, arsenic, and mercury. The section of the Kuskokwim River placed on the Section 303(d) list is adjacent to the Red Devil Mine and is a direct result of sediment sampling and analysis conducted as part of the CERCLA investigation. Water quality in this section of the Kuskokwim River has not been shown to be impacted by contaminants migrating from the mine site. The middle Kuskokwim River runs through a highly mineralized region of Alaska that contains mercury, antimony, gold, silver, and polymetallic deposits (Szumigala and Swainbank 1998). This area is referred to as Alaska's "mercury belt" because of the numerous mercury mineral deposits and mines in the watershed (Gray et al. 2000). Two hundred twenty-eight of the 332 cinnabar (mercury sulfide) locations in Alaska are within the Yukon-Kuskokwim region; 82 of these have been mined. Elemental mercury, or quicksilver, was produced from eight mines at five locations along the Kuskokwim River, including the Alice and Bessie (or Parks), Kolmakof, Cinnabar Creek, Lucky Day, and Red Devil mines. The Red Devil Mine, abandoned in 1971, was the largest, but Cinnabar Creek also produced substantial amounts of mercury (Sainsbury and MacKevett 1965). Remnant waste rock and processed ore are still present from early and mid-twentieth century mines (USGS 2003). Recent efforts by the BLM to establish a baseline condition of several different metals in fish tissue, including mercury and methyl mercury (MeHg; the most toxic form), along a roughly 270-mile stretch of the Kuskokwim River and selected tributaries between the Aniak and Takotna Rivers has provided significant insight regarding key fish species

movement patterns and the identification of areas causing the greatest exposure to metals, including mercury (BLM 2016b). While it is clear that the mineralized region of the Kuskokwim River basin contributes significantly a variety of metals detected in the aquatic environment, including mercury; it is unclear what role the many mined areas within the basin contribute regarding the levels of metals at the larger river scale. A supplemental investigation and feasibility study conducted by the BLM in 2016-2017 quantifies the environmental risk to human health and the environment attributable to tailings in Kuskokwim River sediment that originated on the Red Devil Mine site.

- In 2010, BLM and ADF&G sampled several hundred fish from the middle Kuskokwim River and eight tributaries. Sampling included both forage fish species and top-predatory fish, such as northern pike and burbot. These sampled were analyzed for 19 metals, including mercury, and the data are currently being analyzed by a USFWS Toxicologist. Preliminary results indicate a similar pattern of contamination as samples collected in the lower Kuskokwim and Yukon Rivers during the last decade with larger, older fish exhibiting higher concentrations than smaller, younger fish. These data also indicated that top-predatory fish species had higher concentrations in the two major tributaries, the Holitna and George Rivers, compared to the middle Kuskokwim River samples. Preliminary results also indicated that forage fish collected from Red Devil Creek had increased concentrations of mercury compared to other sampled tributaries.
- The upper 81 river miles of the Unalakleet River was designated as “Wild” by ANILCA. When this river was designated as a component of the National Wild and Scenic (WSR) System (National System), Congress intended that it would be preserved in a free-flowing condition, and that the river and its immediate environment would be protected for the benefit and enjoyment of present and future generations.

Placer mining typically involves stripping vegetation and topsoil and often rerouting streams into temporary or permanent bypass channels to reach gold or desired metals in the streambed gravels (Yeend et al. 1998). Due to gold-bearing gravels often being associated with the historic stream beds, mining the gold resource requires disturbing the benches and lowlands connected by stream valleys. This disturbance can lead to increased erosion of stream banks and stream beds, which in turn can increase turbidity and suspended solids, as well as increase substrate embeddedness. High suspended and total sediment load can persist for many years because revegetation may be slowed by stripping of the overburden, lack of organic material in mine waste (tailings) piles, and lack of stream channels during high flows in unconsolidated tailings piles (Kennedy and Langley 2007). Of the 6,618 mining claims currently within the planning area, 219 are under federal management (Kurtak et al. 2010). As of December 2016, there are four active placer mines, one active lode mine, and two temporary placer mine closures on BLM-managed lands in the planning area. The number of active and temporarily closed mines changes annually.

Increased substrate embeddedness and turbidity, resulting from active and abandoned mining claims, both directly and indirectly impact fish populations. Reynolds et al. (1989) reported that decreased survival of Arctic grayling fry and juveniles in Birch Creek resulted from the loss of interstitial space in the stream bed due to siltation. However, indirect effects of mining, such as loss of summer feeding and reproduction habitat, may have more severe effects on Arctic grayling and other fish species populations than direct effects (Reynolds et al. 1989). While Birch Creek is outside of the planning area, the situation is applicable to the current area of interest and represents potential effects from unregulated mining activity.

Development of material sources and placer mining within floodplains could have a variety of effects on fish and habitat. Material extraction sites studied in Arctic and Subarctic floodplains in Alaska have demonstrated adverse and some beneficial effects on fish and fish habitat (Joyce et al. 1980; Ott et al.

2014). The effects of gravel extraction from floodplains on fish and fish habitat is dependent on many factors including the type and size of the river, method of material extraction employed, and the amount of material extracted. Material site development can lead to destabilization of river channels, river channel capture, floodplain widening, increased erosion and sedimentation, increased water velocities, reduced water quality, and can lead to aquatic habitat shifts. In some instances, material site development has been documented to cause surface flows into the gravels creating a barrier to fish passage (Joyce et al. 1980). Fish habitat changes then lead to changes in fish distributions in terms of fish species and age class distributions within the altered habitats. Material sites that alter the hydrologic regime of a stream can have long-term deleterious effects on fish and their habitats (Joyce et al. 1980). The study by Joyce et al. (1980) determined that active channel mining should be avoided as much as possible, particularly when important spawning or wintering habitats are nearby. Fish entrapment potential was also documented where extraction sites left depressions in floodplains that were flooded at high water and then became isolated as water levels dropped. However, Joyce et al. (1980) did identify configurations, which could produce habitat enhancements and minimize the potential for stream altering processes to be initiated, such as specific gravel mining methods of floodplain features, limitations of gravel removed specific to stream type and size, and location of removal sites. Furthermore, the AWC does not consider the value of contributing headwater streams to the productivity and health of anadromous sections of stream further down in the watershed. Implementation of the guidelines identified has led to benefits to local fish populations, including the creation of wintering habitats and productive feeding habitats.

Ott et al. (2014) summarizes fish use of several gravel mine sites on Alaska's North Slope, most constructed as pits that were subsequently connected to nearby drainages. They noted that rehabilitated gravel mining sites connected to small streams often provide the only overwintering habitat in the drainage for fish and that those connected even to larger drainages can provide an appreciable increase in available naturally occurring overwintering habitat that are often limited to a small number of deepwater pools. Gravel mine sites developed on the North Slope since the mid-1990s have been designed with primary rehabilitation goals, when practicable, to provide for fish overwintering, but also to provide shallow water habitats to foster both productivity and enhanced overwintering habitat. The concepts presented by Joyce et al. and Ott et al. could be applied to reclamation activities outside of material source development including placer mine reclamation.

Timber harvest activities have the potential to destabilize soils within drainages and reduce the function of riparian zones along streams. These activities can increase stream temperatures, turbidity, total suspended solids, increase substrate embeddedness, and generally lead to decreased stream function and fish productivity. Affects are scale- and location-dependent with larger scale harvests having higher potential for impacts to fish than smaller scale personal-use firewood cutting. Harvest locations near particularly sensitive fish habitats, such as spawning and overwintering habitats, can have the highest potential to impact fish survival. Road/equipment stream crossings including ice bridge construction can also affect fish survival and habitats by directly compromising spawning and overwintering habitats, or by affecting access to those important habitats as described below for stream crossings.

Stream crossings of roads and trails can impede the free and efficient passage of fish and can, in some cases, lead to increased erosion, sedimentation, substrate embeddedness, and a loss of lower trophic level production. Any condition that increases water velocity, decreases water depth, decreases flow or causes flow to go subsurface, or blocks a watercourse would impede fish passage and alter hydro-geomorphic river processes. The effects of altering fish passage can vary depending on the timing and duration of the blockage. For example, some spring-spawning resident fish are dependent on short windows during spring when conditions are optimal for spawning, particularly Arctic grayling and northern pike. Arctic

grayling is a common species in the planning area that spawn in a fairly narrow temperature window each spring. Blockages of even a few days just after breakup can affect spawning success and result in low or failed age classes. Failure to reach preferred spawning habitats when water temperature conditions become optimal can lead to spawning in locations with suboptimal habitat, resulting in reduced fry production. This type of effect could indirectly affect the population for several years after the event. Blockages can also affect fish survival by inhibiting fish access to viable wintering habitat. Conversely, blockages preventing fish from migrating from wintering habitats to vital summer feeding and rearing habitats would also affect fish survival.

Streams crossings that appreciably alter river flows and stream processes can also affect fish productivity by causing increased turbidity, sedimentation, and erosion. However, direct habitat effects from most stream crossings remain relatively localized. The greatest potential for direct effects on fish productivity would be from placement of crossings within sensitive habitats previously described. Compromised fish passage associated with stream crossings has the highest potential for long-term effects on fish productivity.

### ***Invasive Species***

Fourteen nonnative invasive fish species have been identified as occurring in Alaska, including Atlantic salmon (*Salmo salar*) and yellow perch (*Perca flavescens*) (McClory and Gotthardt 2008). Of these fourteen species, some are considered native to other parts of the state but have been noted in new parts of the state in which the species was not previously known to occur and was not considered native. None of the listed fish species have been demonstrated to establish breeding populations in Alaska. Northern pike, a fish species that does occur within the planning area, is considered to be a nonnative invasive fish species in parts of the state but is considered native within the entire planning area (ADF&G 2018b).

Section 2.8, Nonnative Invasive Species, provides a discussion of non-fish aquatic invasive species, such as Elodea, Chinese mitten crab, Chytrid fungus, invasive tunicates, New Zealand mudsnails, northern pike, Quagga mussels, red-legged frog, and zebra mussels (ADF&G 2016c).

## **2.5.6 Resource Changes: Trends and Forecasts**

### **Fisheries**

Based on past commercial, subsistence, and personal use fisheries harvest data, resident fish production is generally forecasted to remain stable in the planning area. However, there have been concerns about the status of the Kuskokwim's whitefish populations. Traditional ecological knowledge has indicated that whitefish abundance and size has declined in recent decades, while recent research has determined that age at maturity, mean age, and overall size have declined. When 1) the overall scarcity of spawning grounds, 2) changes in size and age structure, and 3) increased harvest in recent years are all considered together, it is clear that these species are of particular conservation concern. In this context, the spawning areas identified by the BLM (2016a) within the proposed Whitefish Spawning ACEC are not only rare, but irreplaceable insofar as they play a crucial role in sustaining those vulnerable populations.

Chinook salmon production in the planning area has been considerably less than the long-term average, however some indication of a rebound in 2016 in the Yukon and Kuskokwim drainages has been observed. Highly restricted and/or prohibited commercial, subsistence, and personal use harvest of Chinook salmon in the planning area over the past decade is expected to continue until escapement goals are achieved. Because Chinook salmon are encountered incidentally in other fisheries, a suite of strategies

will be used to minimize impacts to the run. Fall chum salmon production over the past two decades has substantially fluctuated, particularly in the Yukon River. Large swings in production are expected to continue. Escapement and harvest monitoring projects are in place to aid in managing for sustained yield objectives. Proposal 194, Yukon River Drainage Fall Chum Salmon Management Plan (5 AAC 01.249), was submitted to revise management triggers for subsistence and commercial fisheries.

Because coho salmon runs overlap with fall chum, and they are susceptible to similar types of fishing gear, harvest is expected to remain constrained on the Yukon River. Proposal 199 has been submitted to the BOF for consideration of changes to the Yukon River Coho Salmon Management Plan (5 AAC 05.369) to allow late season harvests after the majority of fall chum salmon have migrated through.

## **Habitat**

The forecasted extent of disturbances to habitat is expected to remain minimal throughout the majority of the watersheds in the planning area. Activities that occur within the planning area that have the highest potential to affect fish production include placer mining, hard rock mining, and gravel mining, timber harvests, and stream crossings of roads, trails, and utility corridors in important fish habitats. Impacts from these potential activities are unknown, though not expected to substantially increase in the near future.

A consideration of the attributes and processes crucial to sustaining functioning lotic ecosystems is required when determining the conditions and trends of stream and river systems. The Aquatic Core Indicator Work Group (ACIWG) characterized functioning lotic ecosystems as the integrated product of hydrologic, geomorphic, chemical, and biotic processes by following the BLM's four fundamentals and proper functioning condition (Prichard et al. 1998; Gregory et al. 1991). The interaction of hydrologic processes with channel structure/stability, riparian vegetation, and water quality collectively determine the habitat suitability for aquatic biota: one of the primary beneficial uses of BLM streams and rivers. The ACIWG used these four ecosystem processes and their associated attributes to guide the selection of aquatic core and contingent indicators.

To prioritize attributes for indicator development, the ACIWG also used the conceptual framework of stressor-response model relationships (Noon et al. 1999). Specifically, group members were able to conceptualize the mechanisms by which land uses (e.g., grazing, timber harvest, oil and gas development, and recreation) impact key ecosystem processes and attributes, as well as how the magnitude and direction of the impacts vary as a function of intrinsic drivers, by using published studies and their best professional judgment. For example, livestock grazing can act as an extrinsic stressor to stream systems via multiple pathways, as more than 80 percent of western riparian areas have been affected (Kauffman et al. 1997). Reductions in vegetative cover can potentially increase stream temperature and changing instream biotic assemblages due to an increase in thermal loading (Tait et al. 1994; Beschta 1997; Herbst et al. 2012). Similarly, changes in channel morphology and an increase in fine sediment loading can be initiated by alterations in vegetative composition and cover (Knapp and Matthews 1996; Coles-Ritchie et al. 2007; Herbst et al. 2012); however, the degree of alteration is potentially dependent on the intrinsic drivers of local climate, lithology, and topography. Ideally, the guidance for ameliorating adverse impacts to lotic systems will be in the predictive or anticipatory models identifying linkages between crucial ecosystem attributes, monitoring indicators, human-caused disturbances, and management actions.

The AIM protocol will be applied to establish the current aquatic condition of the planning area and will establish the aquatic conditions at the land use plan scale initially, which will be refined over time. The AIM framework for aquatic monitoring will focus on establishing reference conditions for key fish and

aquatic habitat quality indicators including for water quality, watershed function and habitat quality, and biodiversity and riparian habitat quality (BLM 2015b).

## **Invasive Species**

The 2010 BLM Alaska State Invasive Species Policy (Instruction Memorandum [IM] AK-2011-001a ) provides statewide guidance for nonnative invasive species (NNIS) management (BLM 2010a), and incorporates principles outlined in the 2004 National Strategy and Implementation Plan for Invasive Species Management (U.S. Forest Service 2004); the 2016 *Safeguarding America's Lands and Waters from Invasive Species: a National Framework for Early Detection and Rapid Response* (DOI 2016); and the 2016 *Arctic Invasive Alien Species (ARIAS) Action Plan* (CAFF 2016).

Existing regulations intended to reduce the introduction of NNIS in Alaska include the ADF&G prohibition on sport angler use of felt soles in fresh waters of Alaska, effective January 1, 2012 (ADF&G 2012); the Alaska Board of Game's prohibition of footwear with absorbent, fibrous material soles for hunters in fresh water effective January 1, 2013; the State of Alaska regulations concerning permitted conditions and prohibitions for importing, possessing, transporting, or releasing fish and animals into the wild Alaska (AS 03.05.010, AS 03.05.027, AS 03.05.040, AS 44.37.030, AS 03.05.090, 11 AAC 34.130, 11 AAC 34.140, 11 AAC 34.160, 11 AAC 34.170, AAC 34.115); and the ADNR quarantine of five aquatic invasive plants, effective March 5, 2014 (ADNR 2014).

## **2.6 Vegetation**

### **2.6.1 Introduction**

This section presents the regulatory framework, resource indicators, current conditions, and trends and forecasts for vegetation resources in the planning area.

### **2.6.2 Laws, Regulations, and Policies**

The BLM Alaska Land Health Standards and Guidelines (BLM-AK IM 2004-23) provide general guidance for managing healthy ecosystems, focusing on retaining natural populations consistent with potential and capability of the landscape. The BLM National Vegetation Classification and Associated Mapping (BLM-AK IM 2013-11) provides a standard, hierarchical classification system for existing vegetation consistent with the 2008 National Vegetation Classification Standard. The BLM Revegetation and Wildlife Habitat Rehabilitation Criteria for Upland Mine Reclamation on BLM-Managed Lands in Alaska (IM-AK-2017-01) provides consistent and measurable parameters for evaluating revegetation of mining operations through clear benchmarks for reclamation success. This policy criteria applies to uplands and a delineated portion of the flood prone area disturbed by mining operations and complement Reclamation Effectiveness Monitoring criteria for placer-mined streams. Naturally reclaimed sites would need to display approximately 70 percent or more native plant foliar cover for a minimum of two growing seasons with an absence of NNIS above baseline.

### **2.6.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for vegetation-related values, which that the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Removal or degradation of vegetation communities due to proposed human disturbances associated with the following:
  - Surface-disturbing actions
  - Woodland harvest actions
  - Fire and fuels treatments
  - OHV use
  - Livestock grazing
  - Land disposals
- Extent of vegetation communities identified for protection, monitoring, reclamation, and mitigation, and/or adherence to cited standards associated with other resource uses or designations.

## 2.6.4 Current Conditions

### Vegetation Communities

Vegetation provides many key functions in ecosystems, such as serving to insulate and stabilize soil, to prevent erosion, as a carbon dioxide sink, as an oxygen source, to maintain species diversity, and to provide wildlife habitat. Vegetation has economic benefits such as providing grazing habitat, berries for subsistence, or firewood, and is an integral part of scenery and viewsheds.

Vegetation can be measured in many ways to provide information on ecosystem health. BLM's land management policies are directed toward managing for healthy vegetation communities that support resilient ecological systems. As defined in the Alaska BLM Statewide Land Health Standards (BLM 2004), functioning physical condition is a characteristic of a component of an ecosystem (usually a portion of a landscape or watershed) that indicates the degree of sustainability of that component. Properly functioning condition is an attribute of a landform that indicates its ability to produce desired natural resources in a sustained way. Potential natural condition refers to the desired functioning condition within the planning area for vegetation. Several indicators were selected to measure landscape maintenance within a statistically significant range of variability from potential natural condition. These include the following:

- amount of bare ground
- vegetation composition and distribution
- nonnative invasive plant species presence
- presence of plant species of management concern
- vegetation height
- soil aggregate stability
- moss/ duff depth
- active layer depth (when permafrost in present)
- other indicators to be determined with neighboring landowners and partners

NNIS are addressed in Section 2.8, Nonnative Invasive Species.



## **Ecoregions**

Ecoregions are relatively large geographic areas with characteristic and distinct climate, geology, and assemblages of vegetation and natural communities. Lands managed by the BLM in the planning area occur primarily in the following ecoregions: Yukon-Kuskokwim Delta, the Nulato Hills, the Kuskokwim Mountains, and the Davidson Mountains, with some area in the Kotzebue Sound Lowlands, Lime Hills, Alaska Range, and Tanana-Kuskokwim Lowlands (Nowacki et al. 2001). The climate is generally subarctic with a more oceanic subarctic regime in the western regions, and a more continental subarctic climate in the interior of the planning area. Precipitation is variable throughout the area, ranging between 10-100 inches annually.

## **Vegetation Community Types**

Vegetation in the planning area occurs in characteristic community types, which tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. A vegetation community is the basic unit of vegetation that allows for the representation of an assemblage of ecologically interrelated vegetative species (Daubenmire 1968). Specific vegetation community types are regionally important vegetation classes that represent the characteristic vegetation assemblages and encompass many of the dominant ecological processes and patterns of the planning area.

There are many unknown factors concerning the extent and current condition of vegetation communities in the planning area due to limited on-the-ground inventory and monitoring information. Many parcels of BLM-managed public lands in the planning area are remote and difficult to efficiently access. However, there are several datasets available with vegetation or related parameter information. Available datasets derived from satellite imagery have been applied to create vegetation community type (also referred to as vegetation cover type) maps. These datasets assign a vegetation cover class at a resolution of 30m x 30m pixels and has adequate accuracy assessments (54 percent and higher) (Boggs et al. 2016a).

There is also MODIS-derived NDVI (normalized difference vegetation index) metrics available for the State of Alaska, including for the planning area, from the USGS EROS Center, accessed from the GINA (Geographic Information Network of Alaska) website (GINA 2018). These data provide information about a variety of vegetation metrics, including onset of greenness, end of greenness, duration of greenness, rate of green up, and related parameters that provide information on seasonality and changes in vegetation.

Published Ecological Site Description reports are available from NRCS for locations within the planning area, including Major Land Resource Areas of Alaska (MLRAs) 230-Yukon-Kuskokwim Highlands, 238-Yukon-Kuskokwim Coastal Plain, and 240-Nulato Hills-Southern Seward Peninsula Highlands (NRCS 2018). Published soil information is also available for the Western Interior Rivers Area, which covers sections of MLRA 230, as well as parts of MLRA 229-Interior Alaska Lowlands and MLRA 237-Ahklun Mountains, which partially overlap the planning area (NRCS 2008, updated information available on Web Soil Survey). A 2016 forest inventory report with vegetative cover mapping for the Kuskokwim from Lower Kalskag to McGrath is expected to be published in early 2019.

Vegetation community types, derived from existing classifications and supervised satellite imagery classification, are illustrated for the planning area in BSWI Draft RMP/EIS, Map 3.2.6-1. Table 2.6.4-1 provides acreages of vegetation communities within the planning area.

Vegetation community type descriptions for the planning area are based on levels III and IV of the Viereck et al. (1992) classification and encompass the habitat requirements for most native species in the

planning area. These classes were analyzed in the Yukon Lowlands-Kuskokwim Mountains-Lime Hills REA, an assessment conducted by the Alaska Center for Conservation Science (ACCS; formerly the Alaska Natural Heritage Program) in cooperation with the BLM (Trammell et al. 2014). Vegetation classification tiers to the classification structure described in BLM-AK IM 2013-11; the Viereck system predates the National Vegetation System Classification adopted in 2008 but follows the same classification procedure for existing vegetation community types.

Forest insect and disease activity detected during annual aerial surveys by the U.S. Forest Service (Forest Service) and ADNR over the last 15 years reflect modest activity levels within the planning area, with defoliators and bark beetles being the most prominent forest pests detected (U.S. Forest Service 2015).

**Table 2.6.4-1. Vegetation Communities in the Planning Area**

<b>Vegetation Community</b>	<b>Acres</b>	<b>Percent of Total Planning Area (%)</b>
Bare Ground	1,338,834	2.14
Deciduous Forest (Open-Closed)	2,722,339	4.35
Dwarf Shrub	4,444,748	7.10
Dwarf Shrub-Lichen	7,447,950	11.90
Burn Scar	435,331	0.70
Freshwater or Saltwater	4,314,515	6.89
Herbaceous (Aquatic)	15,098	0.02
Herbaceous (Marsh) (Interior Alaska, Cook Inlet basin)	9,415	0.02
Herbaceous (Marsh) (Northern and Western Alaska)	1,393,769	2.23
Herbaceous (Mesic) (Interior Alaska, Cook Inlet basin)	622,217	0.99
Herbaceous (Mesic) (Northern and Western Alaska)	401,591	0.64
Herbaceous (Wet) (Interior Alaska, Cook Inlet basin)	1,323,320	2.11
Herbaceous (Wet) (Northern and Western Alaska)	3,121,839	4.99
Herbaceous (Wet-Marsh) (Tidal) (Western Alaska, Cook Inlet basin)	845,360	1.35
Ice-Snow	950,171	1.52
Lichen	330,909	0.53
Low Shrub	5,845,188	9.34
Low Shrub/Lichen	216,790	0.35
Moss	104,385	0.17
Sparse Vegetation (Interior Alaska, Cook Inlet basin)	20,946	0.03
Sparse Vegetation (Northern and Western Alaska)	16,751	0.03
Tall Shrub (Open-Closed)	4,872,160	7.78
Tussock Tundra (Low shrub or Herbaceous)	1,397,589	2.23
Unclassified	1,162,074	1.86
Urban, Agriculture, Road	3,468	0.01
White spruce or Black spruce (Open-Closed)	7,604,843	12.15
White spruce or Black spruce (Woodland)	5,645,151	9.02
White spruce or Black spruce/Lichen (Woodland-Open)	2,932,829	4.69
White spruce or Black spruce-Deciduous (Open-Closed)	3,047,496	4.87
<b>Grand Total</b>	<b>62,587,077</b>	<b>100.00</b>

Upland and lowland black spruce (*Picea mariana*) forests are common in the eastern side of the planning area and may provide a suitable source of biomass for communities. Black spruce forests tend to occur in open canopy stands on lowlands and north-facing uplands, such as sites with cold and wet soils and typically shallow permafrost. The ground layer is typically dominated by feathermosses (*Hylocomium* spp.) and sphagnum moss (*Sphagnum* spp.). Lichens can be abundant, especially in older stands and in areas with shallow or rocky soils. Common shrubs are willow (*Salix* spp.), green alder (*Alnus viridis*), shrub birch, Labrador tea (*Ledum* spp.), bog blueberry (*Vaccinium uliginosum*), and low bush cranberry (*Vaccinium vitis-idaea*). Birch (*Betula papyrifera*) and white spruce (*Picea glauca*) occur occasionally. Black spruce forests are also highly flammable. Following fire, a black spruce stand may be replaced by a community very similar to the previous forest community, except that black spruce occur only as seedlings, and an increase in abundance of herbs, grasses, and shrubs typically occur for a number of years. In drier sites and/or conditions of severe fire (exposed mineral soil), black spruce may be replaced by birch or aspen (*Populus tremuloides*).

White spruce is found on warmer, well-drained sites and is also often the spruce species occurring at tree-line. White spruce is a late-succession seral stage, which is typically preceded by deciduous forest. Mixed stands of white spruce and aspen or birch are common. Common shrubs in white spruce stands are blueberry (*Vaccinium* spp.), low bush cranberry, and Labrador tea. Feathermosses often dominate the ground layer and herbs include horsetails (*Equisetum* spp.) and pumpkinberry (*Geocaulon lividum*). In well-drained floodplain sites, white spruce often occurs with balsam poplar (*Populus balsamifera* subsp. *balsamifera*) and alder (*Alnus* spp.) shrub and will replace the balsam poplar as succession proceeds. At treeline, white spruce occurs in an open woodland (often mixed with black spruce) with shrub birch (*Betula nana*, *B. neoalaskana*) and willow understories. Commercial logging for manufacturing in Interior Alaska is focused on white spruce stands on productive sites.

Pure deciduous forests occur relatively infrequently in the planning area. Deciduous forests are found most commonly on south-facing slopes or well-drained sites on other aspects. Aspen dominates on the drier, south-facing slopes while birch stands occur on somewhat cooler, moister sites such as east- and west-facing slopes. Aspen stands often have in the shrub layer willow, highbush cranberry (*Viburnum edule*), prickly rose (*Rosa acicularis*), and buffaloberry (*Shepherdia canadensis*); and in the herb layer bedstraw (*Galium* spp.), pumpkinberry, and bluejoint reedgrass (*Calamagrostis canadensis*). Mosses and lichens are typically scarce. If moisture is sufficient, white spruce may establish and dominate in late succession. Birch dominated stands typically have alder, willow, rose (*Rosa* spp.), highbush cranberry, and low bush cranberry as shrubs. Bluejoint reedgrass or horsetail are often the dominant herb, and heavy leaf litter limits moss and lichen cover. Drier birch stands can have scattered white spruce and may be replaced by white spruce in late succession, while wetter sites can contain some black spruce and may be replaced by black spruce. Narrow stands of balsam poplar can occur along larger rivers.

Non-forested lowland bogs occur where shallow permafrost impedes drainage and the soil remains too wet for tree growth. These bogs are dominated by tussock-forming cottongrass (*Eriophorum vaginatum*) or Bigelow's sedge (*Carex bigelowii*). Where shrub cover exceeds 25 percent, they are generally considered shrublands and include shrub birch, Labrador tea, bog rosemary (*Andromeda polifolia*) and bog cranberry (*Vaccinium oxycoccus*). Cottongrass tussock tundra occurs on shallow slopes in the uplands as well.

Shrub types occur in a variety of habitats. Shrubs may be abundant in many sites following wildland fire. Willows and alder shrublands often occur in moist draws and along rivers and streams. Alder slopes occur occasionally near treeline. The most common shrubland is dominated by dwarf birch and Labrador tea; it

occurs commonly near treeline and also on north facing slopes and areas with little slope or poor drainage. Dwarf birch shrublands often intergrade with open woodland black spruce and tussock tundra.

Above treeline, low shrub grades into the lower-stature dwarf shrub tundra, which is typically dominated by bog blueberry, crowberry (*Empetrum nigrum*), low bush cranberry, and bearberry (*Arcostaphylos alpina*). Lichens and mosses can be abundant. Wet areas above treeline often support herbaceous communities.

Steep south-facing slopes may support steppe-like (treeless) communities. They are dominated by drought-tolerant species of bunchgrasses, sage (*Artemisia* spp.), and a variety of herbs. Although they occur on a very small proportion of lands, they support a high number of species endemic (limited in distribution to a particular locality) to Alaska or Beringia (an area comprising the Bering Strait and adjacent Siberia and Alaska, which was ice-free in past glacial time periods), as well as other species characteristic of the intermountain western U.S. They are sites of typically high species diversity and, due to atypical vegetation, add diversity to the surrounding area. Many of the BLM Alaska sensitive and watch species plants in the planning area occur on these “steppe” sites. Where not as steep or dry, these south-facing slopes support open aspen forests and also open white spruce or birch.

### **Vegetation Communities of Interest**

The vegetation communities described below are of particular interest to prevent from diverging from potential natural conditions:

- I. Tall shrub, low shrub, and floodplains (generalized moose habitat)
- II. Lichen habitats (generalized caribou habitat)
- III. White spruce on well-drained floodplains
- IV. Dwarf shrub and sparsely vegetated areas (generalized BLM Sensitive plant species habitat)
- V. Herbaceous wetlands

**Tall shrub** is dispersed throughout the planning area. This class is defined by areas with 25 percent to 100 percent of tall shrub cover. The shrub layer is comprised primarily of alder and/or willow. At least 25 percent of these sites consist of shrubs greater than 1.3 m in height. Tall shrub is widespread on mountains and hill slopes, and elevations range from 22 to 4,875 feet. Soils are typically mesic. Common tall shrubs include Siberian alder (*Alnus viridis* ssp. *fruticosa*), green alder, grayleaf willow (*Salix glauca*), Barclay’s willow (*Salix barclayi*), and tealeaf willow (*Salix pulchra*). Additional species include red elderberry (*Sambucus racemose*), bog blueberry, low bush cranberry, dwarf birch, marsh Labrador tea (*Ledum palustre* ssp. *decumbens*), crowberry, beauverd spirea (*Spiraea stevenii*), mountain-avens (*Dryas* spp.), and white arctic mountain heather (*Cassiope tetragona*). Mosses include splendid feathermoss (*Hylocomium splendens*) and dicranium moss (*Dicranum* spp.). This class is often mosaicked with low shrub tundra and dwarf-shrubs.

**Low shrub** occurs throughout the planning area. This class is defined as shrubs with 25 percent to 100 percent vegetation cover where shrubs greater than 4.3 feet in height contribute less than 25 percent of vegetation cover of the site, and either more than 25 percent of the site consists of shrubs between 0.6 and 4.3 feet in height, or shrubs between 0.6 and 4.3 feet in height are the most common shrubs. The low shrub vegetation is common on wet and mesic mountain slopes, hill slopes, flats, and stream banks and also occurs in lowlands and wetlands. Low shrub sites occur from 20 feet to 6,255 feet within the planning area. Patch size is small to large, can be matrix-forming, and are often linear along small

streams. Soils range from mesic, wet, mineral, and organic peat. Permafrost is often present. Common shrubs include dwarf birch, marsh Labrador tea, tealeaf willow, grayleaf willow, barenground willow, Chamisso's willow, Bebb's willow, Barclay's willow, crowberry, leatherleaf (*Chamaedaphne calyculata*), bog blueberry, and sweetgale (*Myrica gale*). Other shrubs include Siberian alder, Kamchatka rhododendron (*Rhododendron camtschaticum*), bog cranberry, marsh fivefinger (*Comarum palustre*), and Alaska bog willow (*Salix fuscescens*). Additional species include bluejoint reedgrass, water sedge (*Carex aquatilis*), and sphagnum moss (*Sphagnum* spp.). Lichen cover (primarily *Cladina* spp.) can be greater than 20 percent and occur in large patches between shrubs.

**Floodplains and riparian areas** are the lands adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge. These fluvial plains include meandering or straight active streams, braided channels, abandoned channels, oxbows, and alluvial terraces. Permafrost is typically absent. Floodplains represent a biophysical setting and occur in large, continuously connected vegetated, un-vegetated and water polygons that follow the major rivers. Two types of forested floodplain biophysical settings occur in floodplains, including colder Interior Alaska sites with permafrost underlying the ancient terraces and warmer southern Interior Alaska sites with no permafrost underlying the ancient terraces. Riparian vegetation follows large and small order streams, both perennial and ephemeral.

**Lichen habitats** occur both independently and among many other vegetation types (white spruce woodlands, dwarf shrub, and low shrub) that have 20 percent or more lichen cover. They tend to occur on summits, ridgelines, hillslopes, riparian benches, and other well drained sites. Foliose and fruticose lichens usually dominate and include navel lichen (*Umbilicaria* spp.), world map lichen (*Rhizocarpon geographicum*), star reindeer lichen (*Cladina stellaris*), racomitrium moss (*Racomitrium lanuginosum*), flavocentraria lichen (*Flavocetraria* spp.) and witch's hair lichen (*Alectoria ochroleuca*). Common dwarf shrubs found amongst lichens include alpine azalea (*Loiseleuria procumbens*), dwarf birch, marsh Labrador tea, crowberry, and bog blueberry. When lichens are found in black or white spruce woodlands, the shrub layer is open and typically includes dwarf shrub, buffaloberry, bearberry, bog blueberry, or crowberry. Lichens (primarily *Cladina* spp.) often occur in small round patches between trees.

**White spruce on floodplains** generally occurs as co-dominant or dominant species in the canopy. Tree cover ranges from 10 percent to 100 percent, with 75 percent or more of the trees being needle leaf. White spruce on floodplains occurs at lower elevations with generally flat slopes. Other sub-dominant trees include *Betula neoalaskana* and *Populus tremuloides*. Common understory shrubs may include *Rosa acicularis*, *Vaccinium vitis-idaea*, *Betula nana*, *Alnus* spp., *Shepherdia canadensis*, and *Linnaea borealis*. Common herbaceous species include *Pyrola* spp., *Equisetum* spp., *Calamagrostis canadensis*, *Carex* spp., *Eriophorum angustifolium*, *Eriophorum vaginatum*, *Carex bigelowii*, and *Mertensia paniculata*. Common bryophytes may include *Hylocomium splendens*, and *Pleurozium schreberi*. Lichens, such as *Cladina* spp., may be abundant.

**Dwarf-shrub and sparse vegetation** is primarily distributed throughout the southern region of the planning area. The shrub layer is composed of *Dryas*, ericaceous, and/or *Salix* species. At least 25 percent of the site consists of shrubs less than 0.6 feet in height. Dwarf-shrub and sparse vegetation commonly occurs on sideslopes, ridges, summits, floodplains, valleys, late-lying snow beds, and bluffs. Elevation ranges from 20 to 7,449 feet. Sites are typically dry to mesic with lithosols common. Permafrost can be present or absent beneath this vegetation type. Patch size ranges from small to large. This vegetation type does not include peatland plateaus or wetlands. Plant species diversity is high in dwarf-shrub sites. Common dwarf-shrub species include *Dryas integrifolia*, *D. octopetala*, *Betula nana*, *Cassiope tetragona*,

*Salix arctica*, *S. phlebophylla*, *S. reticulata*, *S. rotundifolia*, *Vaccinium uliginosum*, *V. vitis-idaea*, *Empetrum nigrum*, *Rhododendron tomentosum* ssp. *decumbens*, *Diapensia lapponica*, *Harrimanella stelleriana*, *Kalmia procumbens*, and *Arctous* spp. Common herbaceous species may include *Boykinia richardsonii*, *Geum glaciale*, *Pedicularis lanata*, *Eriophorum angustifolium* ssp. *triste*, *Senecio lugens*, *Anemone* spp., *Hierochloe alpina*, *Arnica lessingii*, *Carex scirpoidea*, *C. bigelowii*, *C. microchaeta*, *C. scirpoidea*, *Festuca* spp., *Lupinus arcticus*, *Artemisia globularia*, *Bistorta officinalis*, *Luzula* spp., *Antennaria alpina*, and *Equisetum* spp. Common mosses may include *Rhytidium rugosum*, *Aulacomnium turgidum*, *A. palustre*, *Distichium capillaceum*, *Hylocomium splendens*, *Racomitrium* spp., *Dicranum elongatum*, *Pleurozium schreberi*, *Polytrichum* spp., and *Tortula ruralis*. Lichens may be common and can include *Cladina rangiferina*, *C. stellaris*, *Cetraria cucullata*, *Stereocaulon* spp., *Alectoria nigricans*, and *Thamnolia vermicularis*. Some south facing slopes also support a unique assemblage of species, including *Artemisia frigida*, *Artemisia alaskana*, *Juniperus communis*, *Arctostaphylos uva-ursi*, *Shepherdia canadensis*, *Pseudoroegneria spicata*, *Bromopsis pumPELLIANA*, *Calamagrostis purpurascens*, *Festuca altaica*, and *Poa* spp.

**Herbaceous wetlands** occur throughout the planning area, with some regions having greater concentrations than others. Shrubs contribute less than 25 percent of the vegetation cover, while herbaceous species contribute more than 25 percent in this vegetation type. Sites can be wet with no standing water, permanently wet, flooded with standing water, or permanently flooded and dominated by aquatic plants. Herbaceous wetlands do include herbaceous peatlands, but not tussock tundra. Herbaceous wetlands occupy elevations ranging from 19 to 8,122 feet in the planning area. Permafrost ranges from absent to common. This class occurs in areas of thermokarst. In periodically wet or continually flooded sites, vegetation is dominated by emergent herbaceous plants such as sedges, cattails, and rushes. Dominant vegetation includes Northwest Territory sedge (*Carex utriculata*), softstem bulrush (*Schoenoplectus tabernaemontani*), broadleaf cattail (*Typha latifolia*), buckbean (*Menyanthes trifoliata*), water horsetail (*Equisetum fluviatile*), common spikerush (*Eleocharis palustris*), marsh fivefinger, common mare's-tail (*Hippuris vulgaris*), and pendantgrass (*Arctophila fulva*). Other common species include water sedge, Northwest Territory sedge, woollyfruit sedge (*Carex lasiocarpa*), tall cottongrass (*Eriophorum angustifolium*), bluejoint reedgrass, water arum (*Calla palustris*), and marsh horsetail (*Equisetum palustre*). Shrubs include dwarf birch, sweetgale, gray alder (*Alnus incana* ssp. *tenuifolia*), and willow species. Permanently flooded sites may be dominated by a variety of rooted or floating aquatic herbaceous species, including yellow pond-lily (*Nuphar polysepala*), pondweeds (*Potamogeton* spp.), common duckweed (*Lemna minor*), bur-reeds (*Sparganium* spp.), and water buttercups (*Ranunculus* spp.). Other common species include milfoil species (*Myriophyllum* spp.), common mare's tail, spiny-spore quillwort (*Isoetes tenella*), and water-starworts (*Callitriche* spp.). In areas of closed bogs and poor fens, thick peat-forming sedges dominate, including tufted bulrush (*Trichophorum cespitosum*), manyflower sedge (*Carex pluriflora*), creeping sedge (*Carex chordorrhiza*), livid sedge (*Carex livida*), and red cottongrass (*Eriophorum russeolum*). Dwarf and low shrubs include bog cranberry, bog rosemary, bog blueberry, marsh Labrador tea, and crowberry. Aquatic mosses can be present including sphagnum moss species.

## Rare Ecosystems

Ecosystems that are considered rare, or of special conservation value, occur within the planning area. Special conservation value ecosystems are defined as those that support unique assemblages of specialized and/or diverse flora and fauna within a small geographic area or restricted range. For these ecosystems within the planning area, remoteness preserves many in pristine condition, yet some naturally

uncommon systems are in decline due to their intrinsic vulnerabilities (small, unconnected systems subject to changes in hydrology, or shifts in microclimate) or large-scale threats (such as climate change or development) (Boggs et al. 2016b). These ecosystems within the planning area have been identified as pingos (or dome-shaped mounds consisting of a layer of soil over a large core of ice, occurring in permafrost areas) in interior Alaska that support forests; tamarack (*Larix laricina*) dominated associations; dunes that have been stabilized by forests, typically aspen/black spruce; limestone geologic substrate areas; and serpentine geologic substrate areas. These areas are not well mapped at this time.

### Sensitive Plant Species

Within the planning area, there are no plant species listed, proposed, or a candidate for listing as threatened or endangered under the Endangered Species Act (ESA). However, the BLM-Alaska Special Status Species list includes 32 sensitive plant species found within Alaska, all of which are ranked S1, S2, or S3 by the ACCS. Many species on this list do not occur within the planning area. There are four BLM-Alaska sensitive plant species that have been documented in the planning area, three of which have been found to occur on BLM-managed public lands through on-the-ground inventory (Table 2.6.4-2 and Map 3.2.6-2 of the BSWI Draft RMP/EIS).

**Table 2.6.4-2. Current BLM-Designated Sensitive Plant Species Known within the Planning Area**

Scientific Name	Common Name	Occurrences in Planning Area	Occurrences on BLM-Managed Land
<i>Douglasia beringensis</i>	Arctic dwarf primrose	14	11
<i>Koeleria asiatica</i>	Oriental junegrass	1	1
<i>Smelowskia pyriformis</i>	Pearshaped smelowskia	20	3
<i>Trisetum sibiricum</i> ssp. <i>torale</i>	Siberian false-oats	1	0

These sensitive plant species were found primarily on three vegetation land-cover classes (defined by the Vegetation Map and Classification of Northern, Western, and Interior Alaska, Boggs et al. 2016a):

- Bare-ground, sparsely vegetated mesic herbaceous areas (more than 20 percent herbaceous cover and over 50 percent bare-ground)
- Dwarf shrub
- Persistently snow-covered areas

Map 3.2.6-1 of the BSWI Draft RMP/EIS shows the extent of these vegetation land-cover classes in the planning area. The known locations of the three sensitive species on BLM-managed land were found primarily on higher elevations, on mountain side slopes of the Lime Hills, Nulato Hills, Terra Cotta Mountains, Kuskokwim Mountains, and Alaska Range.

Calcareous soils are formed on the shale and limestone parent materials of the Nulato Hills and Lime Hills but are an uncommon substrate in the planning area. Unique plant communities occur on this soil type due to its relatively higher soil pH, deficiency of some nutrients and excess of other nutrients, and low moisture content. The three sensitive plant species on BLM-managed public land occur on these substrates among sparsely vegetated, dwarf shrub, and bare-ground plant communities. The species assemblages that occur on calcareous soils are less common than similar land-cover types that occur on soils of lower pH.

Presence of rare species highly associated with calcareous soils can be used as a bioindicator of the health of bare-ground, sparsely vegetated, dwarf shrub plant communities. These plant communities are least common in the planning area and although they are currently considered to be in a stable and healthy condition (due to the lack of development in their habitat), they may be impacted in the future by telecommunication towers, OHV trails, or transmission line corridors.

Trends for these special status plant species are unknown. Extremely limited inventory and monitoring efforts for rare plants have occurred in the planning area. However, most sensitive plant species populations in Alaska occur in undisturbed habitats and, therefore, are assumed to be unaffected by rural development, nonnative invasive and noxious species (Carlson and Shepard 2007), and other human impacts.

### **Wetlands and Riparian Areas**

Uplands are lands above the riparian/wetland area, or active floodplains of rivers and streams, and includes lands not influenced by the water table or by free or unbound water; commonly represented by tow slopes, alluvial fans, and side slopes, shoulders and ridges of mountains and hills.

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Riparian areas are defined as an area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and streambanks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not have vegetation dependent on free water in the soil.

A variety of plant communities or types can occur in wetlands. Hydrophytic vegetation (vegetation typically adapted for life in saturated soil conditions) is one indicator of wetlands. Shallow permafrost, which results in near-surface saturated soils occurs throughout much of the planning area and many Interior Alaska plants are adapted to saturated soil conditions. As a result, large parts of the planning area would be considered wetlands, including much of the black spruce forests in lowlands and north-facing slopes. In addition, many shrublands and tussock tundra communities have saturated soils that would result in their consideration as wetlands.

More detailed information on riparian and wetland habitat is found in Section 2.4, Water Resources, and Section 2.5, Fisheries.

### **Vegetation and Wildland Fire**

Northern boreal forests are adapted to wildland fires. After a fire, vegetation recovers by sprouting from roots, from underground or canopy seed banks, or from seed transported from outside the burned area via wind, animals, or other vector. The exact response varies by fire intensity, season, moisture condition, and plant species. In general, sites with more severe fire (greater organic layer consumption and more mineral soil exposure) and lower soil moisture are more likely to change from spruce-dominated to deciduous-dominated following fire (Johnstone and Hollingsworth 2007). Some later successional species, especially lichens, will be scarce in post-fire stands for long periods. Lichens, which are important winter forage for caribou and reindeer, typically require 60-to-80 years to reach abundance (Thomas et al. 1996; Joly et al. 2003; Collins et al. 2011). Black spruce often replaces itself as the dominant tree in the absence of competition from other tree species. Post-fire recovery of white spruce stands depends on the stage of



seed production at wildland fire occurrence and the distance to unburned spruce as sources of new seed and/or the presence of dispersal agents.

In terms of climate change, wildland fire is not specifically mentioned but may need to be considered in calculations of GHG per the BLM Permanent IM 2017-003 such that all relevant National Environmental Policy Act of 1969 (NEPA) documents are consistent with Council on Environmental Quality (CEQ) guidance for the planning area (BLM 2017a). More detailed information on wildland fire is found in Section 2.9, Wildland Fire.

### **2.6.5 Resource Changes: Trends and Forecasts**

Vegetative communities in this large and relatively inaccessible planning area are largely undisturbed by human activities. Given the relatively natural condition of much of the landscape, maintaining land health rather than restoring it is key in managing vegetation and multiple land uses.

Vegetation communities within the planning area are trending favorably and maintaining proper functioning condition. Active management of vegetation has been minimal since the drafting of the SWMFP (1981), and has consisted primarily of fire suppression activities, a small number of authorized harvests of forest products. The loss of vegetation from development has been insignificant within the planning area.

Maintenance for properly functioning condition is ensuring that ecological processes are being maintained while supporting healthy forest conditions and providing productive habitats, biotic populations and communities and resources to local communities.

### **Mining**

Placer mining has caused local disturbance of riparian vegetation in a small portion of the planning area. Changes in requirements for reclamation of placer mined lands (initiated in 1981), and changes in mining practices have resulted in generally faster and more effective natural revegetation of mined sites. In some cases, however, placer-mined land has not recovered functionally or in terms of vegetation health. Riparian areas, and their associated streams and wetlands, are also indicators of watershed health, as they are among the first landscape features to reflect damage from improper management or natural events within the watershed.

New metrics for determining when to release mining reclamation were adopted in 2017. These describe the vegetation conditions miners are expected to meet in order for reclamation to be approved and bonds to be released. These measures were developed to ensure sites were on the correct track to provide acceptable wildlife habitat over time.

### **Off-Highway Vehicle Use**

OHV route use patterns throughout the planning area typically start at a community or an access point along a community road, river-boat landing site, or airstrip, and radiate outward as terrain permits, with routes leading to the location of potential subsistence resources. There are 60 rural communities within the planning area, with 26 in the immediate vicinity of BLM-managed public lands. Almost all routes have been established casually, and without regard to surface soil and vegetation conditions or the viability of repeated use of the route. Most summer overland routes in the planning area are located in terrain that is treeless due to climatic conditions, presence of permafrost, soil types, wetlands, and/or elevation. The use of modern OHVs for subsistence, hunting, transportation, and recreational activities has substantially increased since the 1980s and the SWMFP (BLM 1981). Almost all overland summer

routes evident today within the planning area are the result of OHV use in the past two to three decades. Improvements in all-terrain vehicle technology have led to vehicles traveling faster and farther onto public lands (BLM 2015a). The increased production, acquisition, and use of summer OHVs that are “two-person-wide,” as compared to the current predominance of “single-person-wide” OHVs may result in an increase in the width of overland travel routes from such vehicles, with an increase in the number of impacted acres and associated resources (BLM 2015a).

## **Climate Change**

Warming climate trends are expected to continue to impact vegetation, resulting in altered growth patterns, shifting habitat ranges, hydrological changes, and shifts in wildland fire timing, number, and severity.

Potential shifts of white spruce and black spruce habitat may occur (Barber et al. 2000; McGuire et al. 2010; Beck et al. 2011). New research suggests that white spruce may gain dominance over black spruce in areas that have experienced permafrost thaw and deepened soil active layer (Roland et al. 2013). White spruce has been shown to exhibit varying responses to warming climates depending on geographical area. In the western part of the planning area, white spruce is growing better than ever before, while in the eastern part, growth has declined to record low levels, presumably due to drought stress (Juday et al. 2015; Barber et al. 2000; Lloyd and Fastie 2002). It is suggested that spruce that decrease in growth as temperatures increase are very near survival limits. Large-scale biome shifts are possible and have been illustrated through modeled potential scenarios for Alaska (SNAP-EWHALE 2012). There may also be potential increases in vegetation-impacting insect outbreaks altering forest structure (Volney and Fleming 2000).

Closed-basin wetlands have been drying in many areas of Alaska (Riordan et al. 2006), and evidence suggests that large-scale drought trends, including reduced precipitation or changes in precipitation seasonality, will continue within the planning area (USGS 2016).

Expansion of forests and shrub-lands into tundra areas in the planning area is likely to accelerate with future climate warming deepening active layers, promoting decomposition, which increases available soil nutrients. Additionally, a shift in vegetation zones to higher elevations is likely to continue to occur, with species expanding into newly favorable areas and declining in unfavorable areas; this phenomenon has been well documented in other parts of the world (Lenoir et al. 2008). Studies have recorded woody vegetation (trees and shrubs) encroachment into alpine habitats and sedge wetlands in nearby Denali National Park and Preserve between 1976 and 2005 (NPS 2011). Treeline in portions of the planning area has been noted as rising. Studies have noted tundra conversion to shrub or forest (Cooper 1986; Suarez et al. 1999; Lloyd and Fastie 2002; Lloyd and Fastie 2003; Stueve et al. 2011).

Fire regimes in Alaska spruce forest types have been generally characterized by low frequency/high intensity fire events. The range of reported fire cycles reported by Viereck (1983) is roughly 40–120 years for black spruce forest and 80 to 150 years for floodplain white spruce. Wildland fires have changed in timing and increased in frequency in the twenty-first century. Large acreages burned in Alaska were recorded in 2004, 2005, and in 2015. Wildland fires tend to occur earlier in the spring compared to historical conditions, possibly due to warmer winters and reduced snow cover (USGS 2016). Expected changes include vegetation type conversion at a landscape scale due to changes in fire frequency or severity (Rupp et al. 2000; Johnstone et al. 2010; Shenoy et al. 2011). As mentioned earlier, wildland fire is not specifically mentioned but may need to be considered in calculations of GHG per the BLM Permanent IM 2017-003 such that all relevant NEPA documents are consistent with CEQ guidance for

the planning area (BLM 2017a). More detailed information on wildland fire is found in Section 2.9, Wildland Fire.

Climate change may contribute to a northward expansion or increased populations of native spruce bark beetle (*Dendroctonus rufipennis*) infestations, which were documented in the late 1990s and early 2000s, and impacted forest cover primarily in the Kenai Peninsula (ADNR 2018; USDA 2018). Current and prior outbreaks have been attributed to warming winters that allow the species to overwinter, increasing population size.

## **2.7 Wildlife and Special Status Species**

### **2.7.1 Introduction**

Approximately 50 species of mammals, 152 species of birds, and one species of amphibian are found in the planning area. With the exception of big game animals and some bird species, current numbers and population trends for these species on BLM lands in the planning area are unknown, and no specific management goals have been established. This section provides baseline information on the wildlife habitats and species in the planning area, including SSS and habitats of high value to wildlife.

Information on trends in populations and habitat condition are provided, where information is available.

### **2.7.2 Laws, Regulations, and Policies**

This section provides a general summary of the applicable agencies with jurisdictional authority and their relevant regulatory requirements related to wildlife and SSS in the planning area. This information is provided to increase the understanding of the alternatives being considered and associated impact analysis.

#### **State of Alaska**

The responsibility for managing wildlife populations traditionally rests with the State of Alaska, except in special cases. These cases include the management of marine mammals, migratory birds, and federally listed threatened or endangered species, which are, at least in part, the responsibility of the federal government. Additionally, in Alaska, subsistence harvest management on federal lands is also a federal responsibility and several federal agencies share in this responsibility, including the BLM. The BLM conducts wildlife habitat management and population monitoring, which supports the State of Alaska's wildlife population management objectives, and the Federal Subsistence Management Program necessitated by ANILCA.

ANILCA requires management of BLM lands in Alaska not only to provide healthy populations, but also to minimize impacts on subsistence resources and use of those resources. ANILCA section 802 states, "...consistent with sound management principles, and the conservation of healthy populations of fish and wildlife, the utilization of public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands."

#### **BLM Wildlife Habitat Management**

Current wildlife habitat management is a sub-activity (6500) of the BLM manual and includes management of wildlife habitat on public lands. On federal lands, under Title VIII of ANILCA, ensuring a priority for harvests of fish and wildlife and other renewable resources by subsistence users is also a BLM responsibility, mandated under ANILCA. The State of Alaska operated a subsistence management

program on all lands in Alaska that met the federal requirements until July 1990, when the Alaska Supreme Court decision in *McDowell v. State of Alaska* became effective. In the McDowell decision, the court ruled that the statutes used by the State to provide a subsistence priority for rural Alaskans violated the equal protection clause of the Alaska Constitution. The court allowed the State government six months to remedy the situation before the decision became effective. The State was unsuccessful in amending its laws to comply with ANILCA Title VIII. On July 1, 1990, the federal government was forced to assume management of subsistence activities on federal public lands in Alaska. On federally managed lands in Alaska, Title VIII of ANILCA mandates that qualified rural subsistence users be accorded a priority for harvesting fish and wildlife over non-rural residents of the state.

The federal government's subsistence regulations created the Federal Subsistence Board and charged it with the responsibility for subsistence activities on federal public lands in Alaska. The Board is composed of Alaska Regional Directors of the USFWS and the NPS; the Alaska Regional Forester (Forest Service); the BLM State Director; and the Alaska Area Director of the Bureau of Indian Affairs (BIA). These regulations delegate authority to BLM for management of subsistence resources on federal public lands managed by BLM.

**BLM Manual 6840** - SSS Management establishes the BLM's primary policy on the management of SSS, including plants. BLM SSS include species listed or proposed for listing under the ESA, candidate species, and species delisted from the ESA for a period of five years after delisting. SSS also include those that require special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, as determined by the BLM State Director.

**BLM Manuals 1730, 1740-45, 6500-6800**-Wildlife Management, Habitat Management, Population Management. Departmental Manuals Parts 135, 500-501, 515-520, 585-619, 630-644, 702-729 and 765. It is BLM policy to manage habitat with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish, and plant resources on public lands.

These manuals provide DOI Policy guidance for wildlife management and public land management including forest, minerals, lands, special programs, and NEPA.

## Federal Acts

### *ANILCA*

The significance of the ANILCA to management within the planning area is discussed in detail in other sections of this document. In the context of fish management, Section 1314 regarding state management authority and Title VIII regarding subsistence are particularly relevant. Title VIII declares that:

*the continuation of the opportunity for subsistence uses by rural residents of Alaska, including both Natives and non-Natives, on the public lands and by Alaska Natives on Native lands is essential to Native physical, economic, traditional, and cultural existence and to non-Native physical, economic, traditional, and social existence.*

Title VIII establishes that nonwasteful subsistence uses of fish and wildlife and other renewable resources shall be the priority consumptive uses of all such resources on the public lands of Alaska when it is necessary to restrict taking in order to assure the continued viability of a fish or wildlife population or the continuation of subsistence uses of such population, the taking of such population for nonwasteful subsistence uses shall be given preference on the public lands over other consumptive uses (ANILCA section 802). Title VIII also establishes that the Secretary of the Interior shall permit on the public lands

appropriate use for subsistence purposes of snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulation (ANILCA section 811).

### ***Fish and Wildlife Coordination Act***

The act authorizes the Secretary of the Interior to assist federal, State, and other agencies in the development, protection, rearing and stocking fish and wildlife on federal lands, and to study the effects of pollution on fish and wildlife. Acting agencies are required to consult with the USFWS and the State of Alaska species managing agencies to develop mitigation or compliance for proposed land use authorizations.

### ***Federal Cave Resources Protection Act***

Caves on federal lands are managed under 43 CFR, Part 37. These regulations provide guidance for identifying, nominating, evaluating, and designating significant cave resources. The purposes of this Act are (1) to secure, protect, and preserve significant caves on federal lands for the perpetual use, enjoyment, and benefit of all people; and (2) to foster increased cooperation and exchange of information between governmental authorities and those who utilize caves located on federal lands for scientific, education, or recreational purposes. It is the policy of the U.S. that federal lands be managed in a manner that protects and maintains, to the extent practical, significant caves.

### ***ESA***

The ESA requires all federal agencies to conserve and protect all species, subspecies or populations of plants and animals and the ecosystems upon which they depend, that have been officially listed as threatened or endangered by the Secretary of the Interior. The act also requires consultation with USFWS and NMFS if any action may affect a federally listed species or its critical habitat.

### ***Bald and Golden Eagle Protection Act***

The act provides for protection of bald eagles and golden eagles by prohibiting, except under certain specified conditions, the taking, possession, and commerce in such birds, their nests, eggs, or feathers. This act is administered by the USFWS.

### ***Migratory Bird Treaty Act***

This act establishes a federal responsibility for the protection of international migratory birds. The act provides for regulations to control taking, selling, transporting and importing birds, their nests, eggs, parts or products and provides enforcement authority and penalties for violations. It also establishes the regulatory framework for sport and subsistence harvest of migratory birds under the jurisdiction of the USFWS.

### ***EO 13186, Responsibility of Federal Agencies to Protect Migratory Birds***

This order directs federal agencies to take certain actions to conserve migratory birds in the furtherance of the obligations of the U.S. under the migratory bird conventions and Migratory Bird Treaty Act. It also directs agencies to enter into a Memorandum of Understanding (MOU) with the USFWS that outlines measures that will be utilized to ensure migratory bird conservation in conjunction with carrying out agency missions. In their 2010 MOU, the BLM agreed to evaluate effects of their actions on migratory

birds during the NEPA process and identify where take reasonably attributable to agency actions may have a measurable adverse effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. In coordination with the USFWS, BLM would develop conservation measures and ensure monitoring of the effectiveness of conservation measures to minimize, reduce or avoid unintentional take (BLM 2010b).

### ***Federal Land Policy and Management Act***

The FLPMA authorizes the designation of ACECs to protect and prevent irreparable damage to fish and wildlife, and other resources. The Act places fish and wildlife on an equal footing with other traditional land uses. It requires consideration of fish and wildlife resources before approval of land exchanges.

### **2.7.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for wildlife and SSS-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS. Because monitoring is typically limited in scope for any given species or habitat, few quantitative indicators are possible. Acres of habitat type, (e.g., caribou calving habitat or raptor nesting habitat), is the primary indicator by which the impacts of each alternative will be assessed. “Wildlife habitat,” as used in the indicators below, refers to all land that may support wildlife, regardless of its condition or quality. As developed areas support some species of wildlife (e.g., bats in mine buildings), the analysis assumes that the entire planning area provides some type of wildlife habitat.

- Areas where land uses that could result in adverse impacts to wildlife habitat connectivity between known and/or protected habitat are not permitted, as measured by number, size (acres), and/or location of connectivity corridor(s) and the management measures associated with these geographic areas (e.g., mineral entry, ROW).
- Riparian areas (defined as areas within 300 feet of streams) in the planning area.
- Riparian areas open to locatable and salable mineral development in areas of medium to high mineral potential, as measured by overlap of riparian areas with areas of medium to high mineral potential.
- Areas where land uses that could result in adverse impacts to nesting raptors are not permitted, as measured by the management measures associated with these geographic areas.
- Acres of the planning area in which there are no restrictions on mineral development, commercial woodland harvest, ROWs, and OHV use.
- Acres of the planning area in which there are no restrictions on mineral development, commercial woodland harvest, ROWs, and OHV use, that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.
- Acres of the planning area covered by protections that target key wildlife habitat: connectivity corridors, Innoko Bottoms, riparian areas, caribou and moose calving and wintering areas, moose and caribou crucial winter habitat.
- Acres of land acquisitions and disposal in the planning area.
- Acres of land acquisitions and disposals that overlap riparian areas, the Innoko Bottoms Priority Wildlife Habitat Area, Audubon Important Bird Areas, caribou and moose calving and wintering areas, potential caribou migration habitat, wood bison range, and muskox range.

- Riparian areas protected as high-value watersheds (HVWs) that overlap caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; Innoko Bottoms.
- Acres of the planning area within Travel Management Areas (TMAs) and the management measures associated with these geographic areas.
- Acres of caribou habitat in planning area with limitations on OHV use.
- Acres of the planning area within TMAs and the management measures associated with these geographic areas.
- Acres of Visual Resource Management (VRM) Class I and II that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.
- Acres of lands managed for wilderness characteristics that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms
- Acres of lands designated as ACECs that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.
- Acres of lands within WSR corridors that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.
- Acres of migratory bird habitat covered by seasonal use restrictions

#### 2.7.4 Current Conditions – Wildlife Species

Information on current conditions of wildlife species in the planning area is most extensive for species that are the focus of monitoring and management. Important species for game management and subsistence uses within the planning area include muskox (*Ovibos moschatus*), caribou (*Rangifer tarandus*), moose (*Alces alces*), wood bison (*Bison bison athabascae*), brown bears (*Ursus arctos*), black bears (*Ursus americanus*), and furbearers (wolf [*Canis lupus*], wolverine [*Gulo gulo*], mink [*Neovison vison*], muskrat [*Ondatra zibethicus*], hoary marmot [*Marmota caligata*], beaver [*Castor canadensis*], red fox [*Vulpes vulpes*], river otter [*Lontra canadensis*], weasel [*Mustela* sp.], lynx [*Lynx canadensis*], and marten [*Martes americana*]), as well as marine mammals (seals, Pacific walrus [*Odobenus rosmarus divergens*], and beluga whale [*Delphinapterus leucas*]), and waterfowl. These species are important for purposes of subsistence and sport hunting, and their presence as a whole is a sign of biological diversity and ecological health (BLM 2015a).

Monitoring and management of game species in the planning area supports the State of Alaska's wildlife population management objectives. Efforts have been made over the past 20 years to inventory and monitor population, distribution, and habitat of some key wildlife populations (moose, caribou, muskox, waterfowl, land birds). Most monitoring is conducted in conjunction and cooperation with the ADF&G. The planning area encompasses, wholly or in part, Wildlife Management Units (Units) 18, 19A, 19B, 19C, 19D, 20C, 21A, 21D, 21E, and 22A, as discussed in Section 5.2, Subsistence, and shown on Map 3.5.2-1 of the BSWI Draft RMP/EIS.

Table 2.7.4-1 presents a list of amphibian and mammal species known to occur in the planning area.

**Table 2.7.4-1. Native Amphibian and Mammal Species in the Planning Area**

<b>Common Name</b>	<b>Scientific Name</b>
<b>Amphibian</b>	
Wood frog	<i>Rana sylvatica</i>
<b>Large land mammals</b>	
Black bear	<i>Ursus americanus</i>
Brown bear	<i>Ursus arctos</i>
Caribou	<i>Rangifer tarandus granti</i>
Dall sheep	<i>Ovis dalli dalli</i>
Moose	<i>Alces alces</i>
Muskox	<i>Ovibos moschatus</i>
Plains bison (nonnative game species managed by the State of Alaska)	<i>Bison bison bison</i>
Wood bison (ESA threatened / Section 10(j) population)	<i>Bison bison athabascae</i>
<b>Small land mammals</b>	
Alaskan (tundra) hare	<i>Lepus othus</i>
Arctic fox	<i>Alopex lagopus</i>
Arctic ground squirrel	<i>Spermophilus parryii</i>
Arctic shrew	<i>Sorex arcticus</i>
Beaver	<i>Castor canadensis</i>
Brown lemming	<i>Lemmus sibiricus</i>
Collared lemming	<i>Dicrostonyx torquatus</i>
Coyote	<i>Canis latrans</i>
Dusky shrew	<i>Sorex monticolus</i>
Ermine	<i>Mustela erminea</i>
Gray wolf	<i>Canis lupus</i>
Hoary marmot	<i>Marmota caligata</i>
Least weasel	<i>Mustela rivalis</i>
Little brown bat	<i>Myotis lucifugus</i>
Lynx	<i>Lynx canadensis</i>
Marten	<i>Martes americana</i>
Masked shrew	<i>Sorex cinereus</i>
Meadow jumping mouse	<i>Zapus hudsonius</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Mink	<i>Mustela vison</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern bog lemming	<i>Synaptomys borealis</i>
Northern red-backed vole	<i>Clethrionomys rutilus</i>
Porcupine	<i>Erethizon dorsatum</i>
Pygmy shrew	<i>Microsorex boyi</i>
Red fox	<i>Vulpes vulpes</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
River otter	<i>Lontra canadensis</i>
Singing vole	<i>Microtus gregalis</i>
Snowshoe hare	<i>Lepus americanus</i>
Tundra shrew	<i>Sorex tudrensis</i>
Tundra vole	<i>Microtus oeconomus</i>



Common Name	Scientific Name
Wolverine	<i>Gulo gulo</i>
<b>Marine mammals-adjacent to coastal areas</b>	
Bearded seal (Threatened)	<i>Erignathus barbatus</i>
Beluga whale	<i>Delphinapterus leucas</i>
Harbor seal	<i>Phoca vitulina</i>
Northern fur seal	<i>Callortinus ursinus</i>
Ribbon seal	<i>Phoca fasciata</i>
Ringed seal (Threatened status was overturned but is currently under appeal)	<i>Phoca hispide</i>
Spotted seal	<i>Phoca largha</i>
Steller sea lion (Western DPS – Endangered)	<i>Eumetopias jubatus</i>
Walrus	<i>Odobenus rosmarus</i>

DPS = distinct population segment

## Mammals

### ***BLM Sensitive Species –Mammals***

The BLM has utilized the ranking system developed by the Alaska Natural Heritage Program and The Nature Conservancy, plus an international network of natural Heritage Programs and Conservation Database Centers, which assess state and global rarity, for assistance in developing Special Status and sensitive species lists for Alaskan plants and animals.

There is only one BLM sensitive mammal species known or likely to occur within the planning area: the Alaskan hare (2010 BLM Alaska Sensitive Species List [IM AK-2010-018]). The complete list of BLM Alaska sensitive species is found in Appendix A, BLM Alaska Sensitive Species. A brief description of this species is below, followed by brief descriptions of other important terrestrial mammals that occur in the planning area.

### **Alaskan Hare**

The Alaskan hare, also called the tundra hare, is found only in western Alaska and the Seward Peninsula in open and upland tundra areas and is larger than the more widely distributed snowshoe hare, although both species have grey-brown fur in summer and turn white in winter (ADF&G 1994). Alaskan hares are found in open and alpine tundra habitats, in areas with dwarf willow, grasses sedges and heath, its main food sources (Murray and Smith 2008). It occupies habitats from sea level to 2,100 feet (Flux and Angermann 1990), and its range includes the southern Nulato hills, including lands managed by BLM within the planning area. The total size of the current population is not known; however, it is thought to be stable and healthy (Murray and Smith 2008). Habitat loss has been identified as a threat to Southern populations of the species, with climate change a possible factor, although complete data are lacking (Murray and Smith 2008). There are currently no conservation measures in place, and there is no closed season and no limit for the harvest of Alaskan hares throughout the planning area (ADF&G 2018c).

## ***Other Terrestrial Mammals***

### **Caribou and Reindeer**

Two major caribou herds depend on habitats within the planning area for either winter or summer ranges and during seasonal migrations; the Western Arctic Caribou Herd (WACH), and the Mulchatna Caribou Herd (MCH) (Map 3.2.7-4 of the BSWI Draft RMP/EIS). The Kilbuck Caribou Herd (KCH) has been a distinct population in the past but has been assimilated by the larger MCH. The relatively small Beaver Mountain, Sunshine Mountain, Farewell-Big River and Rainy Pass and Tonzona caribou herds in the McGrath area also range within the planning area but use relatively small portions of BLM-managed public lands within their range (Seavoy 2011). Caribou herd populations are naturally cyclic in nature, with the timing of decline and increases and population size being difficult to predict. Overhunting, varying weather patterns, population density, predation by wolves and grizzly bears, and disease outbreaks influence population size (ADF&G 2015a).

Alaska reindeer, also known as Chukotkan reindeer, are domesticated caribou (*Rangifer tarandus granti*) that exist as different subspecies. They were introduced to Alaska from Siberia, Russia over 100 years ago. Reindeer have frequently escaped and joined wild caribou herds in Alaska, and wildlife biologists have had concerns that interbreeding may reduce the fitness of caribou herds. However, studies have shown that genetic differences between wild caribou and domestic reindeer in Alaska are high, indicating limited gene flow between them and data has shown that major adverse effects of reindeer interbreeding with caribou have not occurred (Cronin and Patton 2002).

### **Western Arctic Caribou Herd**

The WACH, the largest caribou herd in the state, migrates into the northern portions of the planning area (Units 22A and 21D) in mid to late winter. Winter ranges of the herd extend south of Unalakleet in some years, and historically, as far south as St. Michael (Western Arctic Caribou Herd Working Group 2011), although in some years since 1996, much of the WACH has wintered on the eastern half of the Seward Peninsula, outside the planning area (ADF&G 2011). Caribou from this herd are an important subsistence species for rural residents as well as game for sport hunters. Factors that influence the WACH population size include human harvest (sport and subsistence), predation, environmental contaminants, range degradation, weather events, resource development and road construction, and disease. The WACH range condition has not been monitored, however, satellite collar location data shown caribou avoiding winter range habitat burned by wildfire (Joly et al. 2007; Joly et al. 2009). In addition, winter icing events caused by rain on existing snow packs have been documented in recent years, causing high, localized mortality of the herd.

The WACH population is currently in decline, although the rate of decline seems to have eased recently. A population survey conducted in 2016 places the herd population at 201,000 (ADF&G 2016d). The previous estimate of 235,000 animals was made in July 2013 (ADF&G 2014a), which is lower than the 325,000 caribou estimated in the 2011 census, and down from the peak of 490,000 animals in 2003 (ADF&G 2014a). The management objective is to manage for a healthy population using strategies adapted to population levels and trends while recognizing that caribou numbers naturally fluctuate (ADF&G 2015a).

Caribou calving range and winter range for both the WACH and the MCH are recognized as the most sensitive habitats, and protective management should be considered for all BLM-managed public lands within these habitats. These herds are widely migratory, and seasonal habitats that are important to the

herds will vary over time. Management decisions will need to account for this variability to be effective and maintain the viability of these herds.

#### Mulchatna Caribou Herd

Over the past 30 years, the MCH has made dramatic changes in its range, splitting into two distinct east and west sub-herds on both summer and winter range, with total range encompassing more than 60,000 square miles (Woolington 2011).

The MCH ranges south of the Kuskokwim River and extends to the coasts of Bristol and Kuskokwim bays; however, portions of the herd's calving areas and migration habitats are within the northern portions of the planning area (ADF&G 2011). BLM works cooperatively with ADF&G and USFWS Togiak NWR to monitor the movements and distribution of the MCH. The management objective for the herd is to maintain a population of 30,000 to 80,000 caribou, with a minimum bull: cow ratio of 35:100, and to manage the herd for maximum opportunity to hunt caribou (Woolington 2011).

#### Kilbuck Caribou Herd

Historically, the KCH range was located in the Kilbuck and Kuskokwim Mountains southeast of Bethel. Their range included the western portion of Units 19B and 17B that includes portions of current BLM-managed public lands within the planning area. However, since 1994, large numbers of the MCH have expanded their range into this area and have essentially assimilated the KCH (ADF&G 2011). These caribou herds are, therefore, managed as one in Unit 18, which includes portions of BLM-managed public lands in the planning area within its range.

#### Beaver Mountains, Sunshine Mountains, Farewell-Big River and Rainy Pass, Tonzona Caribou Herds

Five relatively small caribou herds exist in the McGrath area, and include the Beaver Mountains, Sunshine Mountains, Farewell-Big River, Rainy Pass, and Tonzona herds, all of which are distinct from the much larger MCH. These herds combined total annual range is within the drainages of the Kuskokwim River in Unit 19, the Innoko River drainage in Unit 21A, and between the Iditarod and Innoko drainages and the Yukon River downstream to Blackburn Creek in Unit 21E, all within the planning area, but with only small portions of the range on BLM-managed public lands. Current estimated population sizes of these herds are based on incidental observations and hunter harvest information; although a minimum population count was last completed in 2007 for the Sunshine and Beaver Mountain herds. The most current minimum population size estimates include: Beaver Mountain: 100–150; Sunshine Mountain: 100–125 animals (Seavoy 2011). Surveys in 2005 estimated 1,500–2,000 in the Rainy Pass herd, 750–1,500 in the Farewell-Big River herd, and 750–1,000 in the Tonzona herd, although hunter reports suggested far fewer animals were present during 2008–2009 years (Seavoy 2011). Lichen habitat on winter ranges for all five herds is abundant and not thought to be limiting population size (Seavoy 2011). Both sport and subsistence harvest of the herds is low, with minimal population estimate surveys conducted.

The management objectives are as follows (ADF&G 2015a):

- Farewell-Big River Herd – provide for a harvest of up to 100 bull caribou.
- Rainy Pass Herd – provide for a harvest of up to 75 bull caribou.
- Sunshine and Beaver Mountains Herds – provide for a combined harvest of up to 25 caribou.
- Tonzona Herd – provide for a harvest of up to 50 caribou.

## Moose

Moose occur throughout the planning area in lower elevations, along major rivers and recently burned areas that have generated stands of willow, aspen and birch shrubs. Map 3.2.7-5 of the BSWI Draft RMP/EIS shows the moose habitat within the planning area. They forage on early successional trees and shrubs, including aspen and birch, and in particular, willow. During fall and early winter, mid- to high-elevation shrub and open spruce habitats support higher densities of moose. As snow accumulates through winter, moose tend to concentrate at lower elevations and especially along riparian areas of creeks and rivers. In summer, moose are more widely dispersed, and pregnant cows often travel long distances to low-elevation areas with abundant wetlands for calving and summer.

Populations vary considerably between game management units and even major watersheds in the planning area, as numbers are affected greatly by predation and winter severity. In areas with little predation and low to moderate snowfalls, and preferred willow shrub habitats, moose populations can be relatively high. In some areas, moose populations are limited by the quality and quantity of food resources, especially in the winter when snow depth limits access to browse. Moose populations are also limited by predation (wolves, black and brown bear), hunting, and severe weather (Crouse and Crouse 2008).

Unit 18 includes BLM-managed public lands north of the Yukon River between Marshal and Russian Mission. Moose densities in this area (Paimiut Slough area), much of which is BLM-managed public lands, grew from an estimate of 3,614 moose in 2006 ( $\pm 18.1$  percent) to 5,597 moose in 2013 ( $\pm 14.9$  percent) (Perry 2014). The density of this moose population has changed from 2.3 moose/mi<sup>2</sup> in 2006 to 3.6 moose/mi<sup>2</sup> in 2013. Moose composition surveys in 2013 revealed 72 calves per 100 cows, and 41 bull moose per 100 cows in the Lower Kuskokwim portion of the unit (Perry 2014). Population management for the unit focuses on providing moose for consumptive human harvest. Since 2010, BLM has worked cooperatively with the USFWS, Innoko NWR to provide subsistence permits for the Paimiut Slough area and the adjacent Unit 21E for a winter moose subsistence hunt. The moose population in the Middle Yukon count area grew from an estimate of 418 moose in 2002 ( $\pm 22.4$  percent) to 2,748 moose in 2012 ( $\pm 16.6$  percent) (Perry 2014). The density of this moose population has changed from 0.4 moose/mi<sup>2</sup> in 2002 to 2.4 moose/mi<sup>2</sup> in 2012.

In Unit 19, BLM-managed public lands are largely north of the Kuskokwim River from Aniak to Stony River, and south of the Kuskokwim River from McGrath to Lime village, largely in Units 19A and 19D. Moose population estimation surveys have been conducted by ADF&G in portions of Unit 19A five times since February 2005 (Seavoy 2014). In the Holitna count area, estimated moose densities ranged from 0.44 observable moose/mi<sup>2</sup> in 2008 ( $\pm 28$  percent) to 0.25 observable moose/mi<sup>2</sup> in 2011 ( $\pm 18$  percent). Analysis of the 2011 survey data including sightability correction factors produced a density of 0.43 total moose/mi<sup>2</sup> ( $\pm 36$  percent). In the Aniak count area, estimated moose densities ranged from 0.39 observable moose/mi<sup>2</sup> in 2006 ( $\pm 15$  percent) to 0.33 observable moose/mi<sup>2</sup> in 2011 ( $\pm 15$  percent). Confidence intervals overlap for these surveys and no trend is detected in either area. Moose population abundance has not been measured in Unit 19B, but densities are likely at or below those found in Unit 19A.

Composition counts in the Holitna count area in 2001 indicated only 6 bulls per 100 cows and 8 calves per 100 cows. In the Aniak count area during a 2004 survey there were 20 bulls per 100 cows and 23 calves per 100 cows (Seavoy 2014). These low density and productivity numbers prompted ADF&G to conduct aerial wolf control in unit 19A in March 2004, January 2006, and May 2006, and in May 2009, reauthorized through 2014 (Seavoy 2014). During the most recent surveys (2013), there were 55 bulls per

100 cows and 50 calves per 100 cows in the Holitna count area and 38 bulls per 100 cows and 41 calves per 100 cows in the Aniak count area (Seavoy 2014).

Spring twinning surveys in unit 19A in the Aniak trend count area in 2008 recorded 100 percent of cows with calves had twins, indicating that habitat is of good quality (Seavoy 2010). The Central Kuskokwim Working Group, made up of multiple users, developed the Central Kuskokwim Moose Management plan, which was finalized in 2004. The group works with ADF&G, USFWS, and BLM to promote an increase in moose population for the area through increased harvest reporting, reducing predation through predator control, minimizing illegal harvest of cows, and informing hunters on current moose population information and using survey results and traditional knowledge in moose management decisions (Seavoy 2010).

Wolf control was authorized in the Bear Control Focus Area around McGrath (Unit 19D) in 1995, 2000, 2001, 2003, 2006 and reauthorized in 2009 through 2014 (Seavoy 2014). The estimated population of moose in this area ranged from 440 moose in 2001 to 658 moose in 2011 (Seavoy 2014). In the larger surrounding area, the lower Kuskokwim moose management area, population estimates ranged from 868 in 2001 to 1,820 in 2009.

Moose population estimation surveys have not been conducted in Unit 19C. However, moose numbers in Unit 19C are likely similar to those of the late 1980s and early 1990s (Seavoy 2014). Trend count data indicate 134 moose/hour were detected in 2009 and 110 moose/hour were detected in 2010. These detection rates are similar to those during 1987–1997 when an average of 150 moose/hour were detected (range 100–194 moose/hour).

ADF&G estimated 3,800 moose (0.6 moose/mi<sup>2</sup>) in Unit 20C outside Denali National Park and Preserve during 2011 and 2012, based on a smaller moose survey area in eastern Unit 20C in November 2011.

In Unit 21, BLM-managed public lands are in Units 21A and 21E in the Yukon and Innoko River area. Moose densities in 21A in 2009 were 0.50 moose/mi<sup>2</sup>, and in 21E, 1.2 moose/mi<sup>2</sup> (Pierce and Seavoy 2008). Fall composition counts in 2009 indicated 36–64 bulls:100 cows, and 8–40 calves per 100 cows in Unit 21A, and composition counts in 2010 in 21E indicated 32 bulls:100 cows and 18 calves:100 cows (Pierce and Seavoy 2008). Twinning rates in 21E in spring 2010 were 50 percent (Pierce and Seavoy 2008). In 2008, the BLM cooperated with ADF&G, USFWS, and the Innoko NWR on a moose satellite collaring project to determine moose movement, habitat use, and survival in Units 21A and 21E. The study that concluded in 2013 documents seasonal movements between the lowlands and adjacent hills (ADF&G 2014b).

In Unit 22, BLM-managed public lands are in the southern Nulato Hills from the mouth of the Golsovia River north to the Shaktoolik River, and in the Unalakleet Wild River Corridor above the Chirosky River. BLM has worked cooperatively with ADF&G from 2003 to 2012 to survey moose in the Unalakleet watershed in Unit 22A, within the planning area. Moose populations have been declining since 1995, and a complete closure of hunting in the central Unit 22A began in 2005, in an effort to increase the population. A limited subsistence-only hunt was initiated in 2009, with a joint State and federal moose hunt by permit. In Unit 22A, the 2012 GSPE (geospatial population estimation) survey estimated 545 observable moose (90 percent confidence interval [CI]: 452–638), 0.23 moose/mi<sup>2</sup>, 24 calves: 100 adults, and a 19 percent recruitment rate (ADF&G 2014b). These results indicate a significant rate of increase in the population between the 2003 and 2012 surveys; however, moose densities are very low compared to other areas in Alaska, as well as within the planning area. Therefore, limited harvest levels will likely remain in place until the 22A moose population increases.

In Units 21A and 21E, moose populations appear to be stable (Pierce 2014). The current population estimate for Unit 21A is 2,442 observable moose. Because this estimate is not corrected for sightability it is a conservative estimate. The current population estimate for all of Unit 21E is 6,959 moose. This is below the Unit 21E intensive management objective of at least 9,000 moose (9,000–11,000).

In Unit 21D, the moose population trend counts during Regulatory Year (RY) 11–RY12 showed a generally stable index to abundance in Unit 21D over recent years as previously described (Stout 2014). Density estimates in the western Galena GSPE analysis area of Unit 21D also indicated a stable trend. In 2010 769 moose were classified during the GSPE survey (covering 3,516 mi<sup>2</sup> in the upper Bear Creek and upper Dulbi River drainages). In the 2011 GSPE survey (which overlapped survey areas sampled in RY01 and RY04) 5,620 moose were classified. By combining estimates for individual drawing hunt areas in Unit 21D, a Unit 21D population of 8,611 observable moose was estimated in RY11. This estimate did not change for RY13 because no GSPE surveys were conducted. The population estimate for the total area calculated from the 2011 survey was not significantly different (95 percent CI) from the 2001 or 2004 estimates; however, the 2011 point estimate was lower than 2001 and 2004. The regression analysis of the 1987–2011 survey estimates indicated a slight decline ( $P = 0.08$ ; 95 percent CI).

In Unit 22A, the 2012 GSPE survey estimated 545 observable moose (90 percent CI: 452–638), 0.23 moose/mi<sup>2</sup>, 24 calves: 100 adults, and a 19 percent recruitment rate (ADF&G 2013b). This is a 14 percent rate of increase between 2008 and 2012, and current densities (0.23 moose/ mi<sup>2</sup>) are above what was found in the area during the late 1980s.

### **Bison**

The two subspecies of bison (wood bison and plains bison) that have been introduced into the planning area are closely related. Physical and genetic differences distinguish the two subspecies, although they are genetically very similar and have historically interbred when located in the same geographic area (Cronin et al. 2013). Maintenance of two genetically distinct subspecies appears to be dependent on preventing interbreeding by keeping herds separated geographically (i.e., by distances of 100 miles or more) (ADF&G 2007b). The wood bison is the largest surviving native terrestrial mammal in North America. Plains bison are smaller and lighter in color than wood bison. Historically, the range of the wood bison was generally north of that occupied by the plains bison and included most boreal regions of northern Alberta; northeastern British Columbia; a small portion of northwestern Saskatchewan; the western Northwest Territories south and west of Great Slave Lake; the Mackenzie River Valley; most of The Yukon Territory; and much of interior Alaska (USFWS 2016).

Map 3.2.7-6 of the BSWI Draft RMP/EIS shows the ranges of wood bison and plains bison within the planning area.

### **Wood Bison**

Wood bison have historically inhabited large portions of Interior Alaska for approximately 10,000 years, but gradually diminished and disappeared from Alaska altogether about 200 years ago (ADF&G 2007b). Wood bison were listed as endangered under the ESA in 1969. Their status was changed to threatened in 2012. The ESA requires a range of protections for listed species and various restrictions on land use to protect habitat. Concerns about these protections and restrictions generated opposition to restoring wood bison in Alaska. Therefore, ADF&G worked with USFWS to develop a federal rule, which was published in 2014 (79 FR 26175), to designate wood bison in Alaska as a nonessential experimental population under Section 10(j) of the ESA. This classification status greatly reduced restrictions and gave ADF&G primary management responsibility for leading and implementing the restoration effort.

In 2015, the ADF&G released 130 wood bison to the wild along the Innoko River near the community of Shageluk. About 16 wild born calves were recruited into the population in the summer of 2015. As of October 2015, the core range of these wood bison, known as the Lower Yukon/Innoko Rivers Herd, was within 30 miles of Shageluk, except for two lone bison that have explored habitats along the Yukon River from Russian Mission to Galena.

### Plains Bison

A population of introduced plains bison has been established in the Farewell area south of the Kuskokwim River and west of the Alaska Range (ADF&G 2016e). The bison in the Farewell population are descendants of animals that were transplanted from Montana in 1928 to Delta Junction, outside the planning area. The Farewell herd inhabits the Farewell area of the drainages flowing into the Kuskokwim River upstream of the Lower Kalskag in Units 19C and 19D. The herd was established by a translocation of 18 animals from the Delta Bison Herd in 1965 and supplemented by an additional transplant of 20 bison from the Delta herd in 1968. The Farewell herd is important for conservation because DNA samples confirmed this is a pure plains bison strain, unlike many herds in the Lower 48 that have some cattle incursions in the genome (ADF&G 2014c).

Harvest is managed by a drawing permit system. Between 10 and 80 permits were issued annually since hunting began in 1972, and annual harvest averaged about 20 animals. The management objective is to maintain a minimum population of 300 bison, allowing for an annual harvest of up to 40 bison. Bison habitat in the Farewell area is currently maintained by frequent naturally occurring fires. The herd grew over the years and numbered about 350 animals by the late 1990s. Then bison numbers began declining around 2000; a 2007 survey counted 187 animals. The population most likely decreased because of a combination of declines in the quality of their fire driven habitat, and too much harvest of female bison. Harvest was reduced to 10 permits each year, and a wildland fire in the area in 2010 rejuvenated the habitat and improved the quality of the forage. Numbers began increasing and the 2014 survey counted about 400 bison.

### Muskox

Muskox, an important subsistence species, are found mainly on the Seward Peninsula, but populations are increasing and have expanded into previously unoccupied and unsurveyed habitat in the planning area in the southern Nulato hills, between Shaktoolik and Unalakleet (BSWI Draft RMP/EIS, Map 3.2.7-6; Harper and McCarthy 2017). The most current total population estimate for muskox on the Seward Peninsula, adjacent to the planning area is approximately 2,287 animals, including 164 animals found in recent surveys within the planning area near Shaktoolik in Units 22A and a portion of Unit 21D (Harper and McCarthy 2017). There are currently no muskox hunts in Unit 22A (Harper and McCarthy 2017); however, the demand to establish a limited subsistence hunt in the unit is increasing. BLM administers permits for a limited subsistence muskox hunt on federal lands in Unit 22B, outside, but adjacent to the northern border of the planning area.

Based on ADF&G survey results, the muskox population on the Seward Peninsula was increasing between 1970 and 2007, stable during 2007 to 2010, and then declined between 2010 and 2012 (Harper and McCarthy 2017). The population overall was stable between 2012 and 2015 although the core count area experienced a decline. The open tundra habitats of the Seward Peninsula and the southern Nulato Hills are not considered limiting for muskox. Limiting factors may include predation, nutrition, and disease.

### **Dall Sheep**

Dall sheep are found on the north side of the Alaska Range east of the Nenana River, west of the Delta controlled use area, outside of, but adjacent to the eastern edge of the planning area (ADF&G 2013c) (BSWI Draft RMP/EIS, Map 3.2.7-6). There is an open sport hunting season for sheep in Unit 19, in mountainous sheep habitat of the Alaska Range on the eastern boundary of the planning area; however, these lands are managed by the State of Alaska or within the Lake Clark National Preserve, and outside BLM management.

Density of sheep observed during the latest ADF&G surveys in 2013 was lower than the last count 2010 (1.7 and 2.8 sheep/mi<sup>2</sup>) (ADF&G 2014d). The lower densities were in large part due to fewer lambs, which apparently had very poor survival in 2013. The percentage of legal rams identified during 2013 (5.8 percent) was slightly higher than 2010 (4.8 percent). However, there is no level of precision associated with these surveys. The higher percentage of full-curl rams observed was likely due to the fact fewer sheep were seen overall in 2013, yet a similar number of full-curl rams. The number of lambs observed in 2013 was the lowest recorded since 2008 in these areas. The ewe-like category was also the lowest of any survey with 273 in 2013 compared to 491 in 2010. A significant icing event in January 2013, as well as a very late break-up in May, may have had an adverse impact on ewe-like sheep and lambs (ADF&G 2014d).

Sheep populations are influenced by snow depth, summer drought and predation by wolves, coyotes and golden eagles, and populations typically fluctuate irregularly (ADF&G 2013c). Dall sheep have naturally low birth rates, and live in difficult high alpine environments, causing naturally low population growth rates. Disease is also an important factor as Dall sheep are extremely susceptible to respiratory diseases introduced by domestic livestock when domestic sheep and goats are allowed to occupy wild sheep ranges (ADF&G 2013c). Domestic sheep and goats are carriers of bacteria that may cause substantial wild sheep mortality as a result of respiratory disease. In order to manage domestic sheep and goats to sustain wild sheep, it is policy of the BLM to (1) achieve effective separation of BLM-authorized domestic sheep or goats from wild sheep on BLM-managed public lands, and (2) to minimize the risk of contact between the species (BLM 2016d).

### **Brown (Grizzly) Bear**

Brown bears are found throughout the planning area. Biological requirements dictate what parts of their home range are preferred at different times of the year. Brown bears are only active for a portion of the year, denning within their home ranges from October to April (or longer in the case of females with cubs). When not in dens, bears occupy all available habitats within their home range to take advantage of seasonally available food sources. Populations and local densities vary depending on the productivity of the habitat and seasonal availability of forage and prey. The current condition of brown bear habitat in the planning area has not been quantified. For the most part, the habitat is in a natural condition. Although the statewide brown bear population is estimated at 30,000 animals (ADF&G 2010a), the number of brown bears in the planning area is unknown. However, the ADF&G brown bear management reports for each Unit estimate bear densities using an estimate of habitat quality. The latest report (ADF&G 2015b) estimated 350-400 brown bears in Units 21B, 21C, and 21D, assuming 25 bears/1,000mi<sup>2</sup> in the highest density bear habitat and 10 bears/1,000km<sup>2</sup> in the remainder of the reporting area. In Unit 21D the best bear habitat is in the Nulato Hills (ADF&G 2015b).

Brown bears are an important traditional subsistence species, and many are taken annually through sport and subsistence hunts in the planning area. Brown bears are capable predators of newborn moose and



caribou and can also kill and eat healthy adults of these species (ADF&G 2010a). ADF&G removed four brown bears during a predator control program conducted in May 2013, in an effort to decrease moose calf predation by bears, and thereby, increase moose populations in Unit 19A (ADF&G 2015c).

Brown bear populations are stable or increasing within the planning area. However, bears are predatory on local moose populations and the Alaska Board of Game has chosen to give subsistence and sport hunting of moose a higher priority than predators like wolves and bears (OSM 2016). Liberal hunting regulations in the planning area reflect a management effort to reduce bear numbers to increase moose and caribou populations.

### **Black Bear**

Black bears are found throughout the planning area. Statewide, an estimated 100,000 black bear inhabit Alaska (ADF&G 2010b), although the number of black bears and population trends are unknown for the planning area. However, the ADF&G black bear management reports for each Unit estimate bear densities using an estimate of habitat quality. The latest report (ADF&G 2014e) reports the population for the entire management area [Units 19A, 19B, 19C, 19D, 21A, and 21E] is estimated to be 8,300–16,600 black bears, based on overall densities of 15–30 bears/100 mi<sup>2</sup>. The population has probably been stable or slowly increasing since 1995, based on local observations (ADF&G 2014e).

Black bears are opportunistic and depend on both plant and animal food sources. In the spring, freshly sprouted vegetation, including grass, horsetails, and poplar buds, is an important food source for bears. Bears readily scavenge winter-killed animals, and in some areas black bears are effective predators on newborn moose calves.

However, bears are predatory on local moose populations, which have subsistence and sport hunting priority over predators like wolves and bears (OSM 2016). Liberal hunting regulations in the planning area reflect a management to reduce bear numbers to increase moose and caribou populations. ADF&G began predator control of black bears in Unit 19A in 2013 in an effort to increase moose populations by reducing predation of moose calves by black bears. ADF&G removed 84 black bears during a predator control program conducted in May 2013, in an effort to decrease moose calf predation by bears and thereby increase moose populations in Unit 19A (ADF&G 2015c). Predator control for brown bears and black bears in 19A occurred in May 2013 and May 2014 for both species. The 2014 removal was 40 independent black bears and 9 independent brown bears.

### **Gray Wolf**

Wolves are managed by the State of Alaska as both furbearers and big game (ADF&G 2016f). Wolves occur throughout mainland Alaska. Presently wolves are common over much of the state with densities as high as one wolf per 25 square miles in favorable habitats with abundant prey. In general, wolves use a wide variety of habitats and are found throughout the planning area but are more abundant in areas where numbers of prey species are greater. They are carnivorous, and in most of Alaska, moose and/or caribou are their primary food. During summer, small mammals including voles, lemmings, ground squirrels, snowshoe hares, beaver and occasionally birds and fish supplement their diet (ADF&G 2013b). Wolf populations are limited by prey species abundance, and in some areas by human harvest (e.g., McGrath area) or direct control activities. Wolves have become more numerous on the Seward Peninsula, especially in areas occupied by wintering caribou from the Western Arctic caribou herd and muskox herds that have expanded their historic range eastward (ADF&G 2013b). Wolves are a natural predator on moose and caribou, and wolf control efforts in portions of Units 19 and 21 have been carried out by

ADF&G in recent years to increase ungulate populations (ADF&G 2015a). The ADF&G is currently conducting active Intensive Management programs in Units 19A and 19D (ADF&G 2016g). In Unit 21E an Intensive Management program is authorized but would occur only if moose abundance dropped below one moose per square mile, which has not occurred. These efforts are often controversial and sometimes have inconclusive results (ADF&G 2015a).

### **Furbearers**

Furbearers include those species of mammals that are routinely sought by licensed trappers who place commercial value on the animals' pelts or are considered subsistence species and are trapped for traditional uses. Furbearers found in the planning area include beaver, red fox, lynx, marten, mink, muskrat, marmot, river otter, coyote, wolverine, weasel, and wolf (ADF&G 2013b). Coyotes are uncommon in the planning area but are increasing in portions of Interior and western Alaska. Wolves are discussed above. Most furbearer harvest (by both hunting and trapping) in the planning area is by subsistence and recreational users or is done opportunistically while engaged in other activities. Definitive species population and distribution information is not available, and consequently, ADF&G wildlife biologists rely upon annual trapper harvest reports and opinions, and field observations by department personnel to gauge furbearer status and trend information. The price paid for animal pelts is the greatest determining factor in trapper harvest effort, and subsequently affects harvest. Reporting of harvest is required for only a few species, those required to be sealed (marked with metal tag) by ADF&G employees (e.g., lynx, river otter, wolf, and wolverine).

The ADF&G collects and reports information regarding furbearer management and harvest. The information below has been summarized from the latest ADF&G reports:

- The Furbearer Management Report of Survey-inventory Activities, 1 July 2009–30 June 2012 (ADF&G 2013b) provides detailed information for each species every 2 or 3 years by the area management biologists for game management units in their areas.
- The Alaska Trapper Report (Parr 2016) presents data collected from state questionnaire sent to active trappers.

### **Wolverine**

Wolverines are generally distributed throughout Alaska and the planning area (ADF&G 2013b). Wolverines are a wide-ranging species with populations that are naturally at low densities and require large expanses of wilderness. The primary natural mortality factors are starvation, being killed by larger predators, primarily wolves, and by other wolverines. Wolverines are vulnerable to harvest and because of their limited reproductive capability can be sensitive to overharvest (ADF&G 2008). Sustainable harvests in heavily trapped areas of Alaska depend on the presence of refugia as the source population of wolverines. They have tremendous physical endurance, with movements of 40 miles in a day documented (ADF&G 2013b). In general, males have larger home ranges than females, females not accompanied by kits have larger ranges compared to females with kits, and home range size and use changes with season of the year. In Alaska, resident male home range sizes are large, ranging between 200–260 square miles. Resident females have home ranges as large as 115 square miles. Home range size and use patterns are thought to be a response to the availability of resources being food or for adult females the presence of persistent snow cover for denning. Studies in southcentral Alaska found that wolverines preferred higher elevations during the summer and lower elevations during the winter due to varying food availability (ADF&G 2013b). Data indicate that wolverines will move long distances in short periods of time to take advantage of these resource sites. Population levels within the planning area are unknown; however,

wolverine numbers are naturally low, and as human recreational pursuits expand into more remote areas, greater protection of natal denning areas may become an important management issue. Wolverine pelts are an important subsistence resource in the planning area.

In Alaska, wolverines are classified as both big game and as a furbearer, and in the planning area open seasons are between November and February, with no limits on numbers taken (ADF&G 2016g). Wolverines were reported by trappers as scarce with no information regarding the trend (Parr 2016).

#### River Otter

The river otter is widely distributed across Interior Alaska. Although river otters are long-lived (20 or more years), they do not breed until two or more years old, and produce only two or three pups annually, keeping their numbers naturally low (Solf and Golden 2013). No population estimates or trend analysis for river otters in the planning area are available. There is no limit on trapping otters from November to March within the planning area (ADF&G 2016g). Harvest of otters is relatively low within the planning area, with reported harvest averaging 35 otter per year in Unit 19 and 15 per year in Unit 21 through the 1998–2009 regulatory years (ADF&G 2013b). Because of their strong terrestrial-aquatic association, river otters are especially vulnerable to human impacts to their habitat, such as mining. River otter were reported by trappers as scarce with no change in the trend (Parr 2016).

#### Beaver

The beaver is widely distributed and common throughout forested areas of Alaska, although current populations are unknown. Beavers are ecosystem engineers that modify streams and surrounding woodlands and provide habitat for numerous other species. Modifications by beavers can improve the health of riparian habitats, raise the water table, improve downstream water quality, and create or improve habitat for fish, amphibians, invertebrates, birds, and large land mammals (ADF&G 2018d). Beaver is an important subsistence species and is trapped for both its fur and meat in the planning area, although reported harvest has declined in the past decade, due to lower pelt prices (Harper and McCarthy 2013). Few non-residents trap beaver. The trapping season is from September to June. There is no limit on take by trapping within all game management units in the planning area. Sealing of beaver is not required so current harvest information is limited (ADF&G 2016g). Beaver in the planning area were reported by trappers as abundant with no change regarding the trend (Parr 2016).

#### Marten

Marten are found throughout forested habitats of Interior Alaska and within the planning area. Marten are the focus of most trapping effort in Units 19 and 21 due to their fur value. Sealing is not required, and so definite harvest figures are not known. There is no limit on trapping in Units 21 and 19, with an open season from November through February annually (ADF&G 2016g). Marten in the planning area were reported by trappers as common with no change regarding the trend (Parr 2016).

#### Coyote

Coyote range throughout the planning area. Coyotes were first noted in the state shortly after the turn of the twentieth century. Populations were first reported on the mainland of southeastern Alaska, and then slowly expanded northward into the upper Tanana Valley from which they radiated in all directions and into the planning area. A statewide population peak occurred around 1940; since that time, numbers have declined in many areas (ADF&G 2007c). ADF&G does not document coyote harvest or conduct population surveys in a regular manner; therefore, current populations are unknown. Coyote in the planning area were reported by trappers as scarce with no information regarding the trend (Parr 2016).

### Red Fox

Red fox range widely throughout Alaska except for some southeastern islands, the western Aleutians, and Prince William Sound. Population trend is unknown, but the population is estimated to be abundant and bag limits are unlimited, with seasons between November and April (ADF&G 2016g). Red fox can also be a vector for the transmission of rabies, which is caused by a virus spread in the saliva of infected animals. All warm-blooded mammals can be infected. In Alaska, rabies occurs most often in arctic fox and red fox from the north coast, west coast and Alaska Peninsula (ADF&G 2013b). Red fox in the planning area were reported by trappers as scarce with no information regarding the trend (Parr 2016).

### Muskrat

Muskrat are found throughout Alaska's mainland, except the Arctic Slope north of the Brooks Range, and are common throughout the planning area. Muskrat habitat is most abundant in the broad floodplains and deltas of major rivers and in marshy areas dotted with numerous small lakes - habitats common in the planning area. No specific information is available on population sizes or trends for muskrat, and bag limits from trapping are unlimited (ADF&G 2016g). Muskrats in the planning area were reported by trappers as scarce with no change regarding the trend (Parr 2016).

### Mink

Mink are found throughout Alaska. Mink are aggressive carnivores and will consume virtually everything of manageable size that they can capture (ADF&G 2013b). Little is known of the status of mink in the planning area. Mink are found in close association with water, preferring saltwater beaches and riparian habitats of lakeshores, marshes, and stream banks (ADF&G 2013b). Within Units 19 and 21, the trapping season for mink is November to February and the bag limit is unlimited (ADF&G 2016g). Mink in the planning area were reported by trappers as scarce with no change regarding the trend (Parr 2016).

### Lynx

Lynx inhabit much of Alaska's forested terrain and use a variety of habitats, including spruce and hardwood forests, and both subalpine and successional communities. The best lynx habitat in Alaska occurs where fires or other factors create and maintain a mixture of vegetation types with an abundance of early successional growth. This provides the best habitat for snowshoe hares and other small prey. Lynx populations fluctuate cyclically and are associated with snowshoe hare population cycles (ADF&G 2016h). Within Units 19 and 21, the trapping season is November to March and the bag limits for trapping lynx are unlimited (ADF&G 2016g). Lynx in the planning area were reported by trappers as scarce with no information regarding the trend (Parr 2016).

The current population numbers for most furbearer species on BLM-managed public lands in the planning area are unknown. Habitats remain relatively undisturbed in the planning area, and most populations likely fluctuate within normal levels.

### Bats

The only bat species known to occur in the planning area is the little brown bat. The planning area contains Ordovician limestone and dolomite, which locally hosts karst features. In the Hoholtna River drainage these include vertical solution cavities and sink holes large enough to be entered, but of unknown vertical extent. It is unknown if any of these cavities have been explored or if they are used by bats. BSWI Draft RMP/EIS, Map 3.2.7-7, shows the potential bat habitat in the planning area, which is the known lode mines, along with areas of geologic areas that may include cave/karst habitat; however, it should be noted that bats may occur anywhere in the planning area and are also known to inhabit human

structures. There may be additional karst features in other parts of the planning area underlain by limestone and dolomite.

Little brown bats are managed as “unclassified game” in Alaska and there are no seasons or bag limits. Bats may only be harassed or killed under the terms of a wildlife nuisance permit issued by the ADF&G.

This species appears to be uncommon in interior Alaska, but few data are available (Whitaker and Lawhead 1992). Colonies ranging in size from 70 (Salcha River; Whitaker and Lawhead 1992) to 200 (Fairbanks; Rydell et al. 2002) and 461 (White Sulfur Hot Springs, Southeast Alaska; West and Swain 1999) reported in the literature. They are abundant relative to other bat species documented in Alaska (Parker 1996).

The BLM is required to comply with the Federal Cave Resources Protection Act regarding caves in the planning area. Caves on federal lands are managed under 43 CFR, Part 37. These regulations provide guidance for identifying, nominating, evaluating, and designating significant cave resources. According to the Federal Cave Resources Protection Act, a cave is “any naturally occurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or manmade. Such term shall include any natural pit, sinkhole, or other feature, which is an extension of the entrance.”

The following description of the different types of roosting habitat is summarized from the Alaska Zoo (2016). The little brown bat occupies three types of roosts (resting places): Day, night, and hibernation roosts. Locations of roosts are chosen based on the presence of stable ambient temperatures. Day and night roosts are used by active bats and include, but are not limited to, buildings, trees, under rocks, and in piles of wood. Day roosts have very little or no light, provide good shelter, and typically have southwestern exposures to provide heat for arousal from daily torpor. Night roosts are selected for their confined spaces where large concentrations of bats can cluster together to increase the temperature in the roost. Night roosts are usually away from day roosts, which may diminish the accumulation of feces at day roosts and avoid signaling predators. Day and night roosts are inhabited during spring, summer, and fall months, whereas during the winter, hibernacula sites are used. The little brown bat hibernates from September/October to April/May. Hibernacula include, but are not limited to, caves, tunnels, abandoned mines and similar sites. This species does not show territoriality at roosts and large colonies of as many as 300,000 bats have been reported in a single roost.

Tessler and Snively (2014) reported the results of the citizen science-based Alaska Bat Monitoring Project, which was initiated in 2004 to investigate the distribution, habitat use, and seasonal ecology of the little brown bats in Southcentral, Central, and Western Alaska. As of 2012, reports of bats had come in from 252 unique locations across the focus area, including Kotzebue, White Mountain, Saint Michael, and the Semidi Islands, which represent significant range extensions for bats in the state. Ninety-seven percent of 111 roosts reported were located in human structures. Maternity colonies were identified in 48 locations, all in human structures. The majority of observations were reported in late July, August, and September, but observations were recorded every month of the year. The 25 reports of bats observed during the winter months (October to April) were all associated with buildings unless observed flying outdoors; no hibernacula in natural substrates were documented. The authors concluded that the timing and locations of winter observations imply that bats in the most northerly areas are likely non-migratory and overwinter in human structures, while winter observations in Southcentral Alaska suggest both migratory and non-migratory behavior.

The population size and status of little brown bats in Alaska is unknown (ADF&G 2016j). They are apparently widespread but in low numbers. Threats include disease (ADF&G 2016j), habitat loss (Parker 1996; Parker et al. 1996), use of pesticides (Fenton and Barclay 1980; Agosta 2002), use of cyanide in mining (Helfferich 1991), and destruction of caves and shafts associated with karst topography (Agosta 2002).

Hibernating bats are sensitive to human disturbance (Thomas 1995). Special precautions should be taken when mine and cave surveys are conducted during breeding periods and winter hibernation. Disturbance of breeding colonies can cause young to lose their grasp and fall to their death. Disturbance during hibernation can cause bats to use up stored fat reserves and starve to death.

Currently, insectivorous bats in North America are experiencing sudden and dramatic population declines resulting from two new threats: large-scale wind energy development is causing unprecedented mortality in several migratory tree-dwelling bat species in eastern North America; and White Nose Syndrome (WNS), a devastating fungal infection that has contributed to the death of 5–6 million bats in northeastern North America since 2006 (ADF&G 2016j). Hibernating bats with WNS arouse more frequently and for longer than normal, causing them to burn their winter fat reserves prematurely and resulting in death from starvation. Although bat-to-bat contact is believed to be the primary means of transmission, humans may also play a role by spreading fungal spores on clothes and caving gear. WNS has not been documented in Alaska but was confirmed in Washington State in 2016.

The lack of information on overwintering habits of bats in Alaska, as well as the absence of any baseline data on population sizes and trends will complicate the ability to detect WNS and monitor its impacts should the disease reach Alaska. The extent to which these threats may impact the conservation or persistence of bats in Alaska is unknown because information on the distribution, habitat associations, and ecology of Alaska's bats is lacking.

## Birds

A total of 158 species of birds are known to occur in the planning area (Table 2.7.4-2). Migratory birds that are considered BLM SSS or birds of conservation concern are considered in further detail.

**Table 2.7.4-2. Resident, Migratory, Wintering, Rare,\* and Accidental Bird Species Found in the Planning Area**

Common Name	Scientific Name
Red-throated loon	<i>Gavia stellata</i>
Pacific loon	<i>Gavia pacifica</i>
Common loon	<i>Gavia immer</i>
Arctic loon	<i>Gavia arctica</i>
Yellow-billed loon	<i>Gavia adamsii</i> <sup>^</sup>
Horned grebe	<i>Podiceps auritus</i>
Red-necked grebe	<i>Podiceps grisegena</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Pelagic cormorant	<i>Phalacrocorax pelagicus</i>
Red-faced cormorant	<i>Phalacrocorax urile</i>
Tundra swan	<i>Cygnus columbianus</i>
Trumpeter swan	<i>Cygnus buccinator</i> <sup>^</sup>
Canada goose	<i>Branta canadensis</i>

<b>Common Name</b>	<b>Scientific Name</b>
Greater white-fronted goose	<i>Anser albifrons</i>
Snow goose	<i>Chen caerulescens</i>
Emperor goose	<i>Philacte canagica</i> <sup>^</sup>
Cackling goose	<i>Branta canadensis minima</i>
Brant	<i>Branta bemicia</i>
Green-winged teal	<i>Anas carolinensis</i>
Blue-winged teal	<i>Anas discors</i>
Mallard	<i>Anas platyrhynchos</i>
Northern pintail	<i>Anas acuta</i>
Northern shoveler	<i>Anas clypeata</i>
Gadwall	<i>Anas strepera</i>
American wigeon	<i>Anas americana</i>
Canvasback	<i>Aythya valisineria</i>
Redhead	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Greater scaup	<i>Aythya marila</i>
Lesser scaup	<i>Aythya affinis</i>
Black scoter	<i>Melanitta nigra</i>
White-winged scoter	<i>Melanitta deglandi</i>
Surf scoter	<i>Melanitta perspicillata</i>
Harlequin duck	<i>Histrionicus histrionicus</i>
Long-tailed duck	<i>Clangula hyemalis</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
Common goldeneye	<i>Bucephala clangula</i>
Bufflehead	<i>Bucephala albeola</i>
Common merganser	<i>Mergus merganser</i>
Red-breasted merganser	<i>Mergus merganser</i>
Osprey	<i>Pandion haliaetus</i>
Northern harrier	<i>Circus cyaneus</i>
Golden eagle	<i>Aquila chrysaetos</i> <sup>^</sup>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Northern goshawk	<i>Accipiter laingi</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Rough-legged hawk	<i>Buteo lagopus</i>
American kestrel	<i>Falco sparverius</i>
Merlin	<i>Falco columbarus</i>
Peregrine falcon	<i>Falco peregrines</i>
Gyrfalcon	<i>Falco rusticolus</i>
Short-eared owl	<i>Asio flammeus</i> <sup>^</sup>
Boreal owl	<i>Aegolius funereus</i>
Great gray owl	<i>Strix nebulosa</i>
Great-horned owl	<i>Bubo virginianus</i>
Snowy owl	<i>Bubo scandiacus</i>

Common Name	Scientific Name
Northern hawk owl	<i>Surnia ulula</i>
Spruce grouse	<i>Falcapennis canadensis</i>
Ruffed grouse	<i>Bonasa umbellus</i>
White-tailed ptarmigan	<i>Lagopus leucura</i>
Rock ptarmigan	<i>Lagopus muta</i>
Willow ptarmigan	<i>Lagopus lagopus</i>
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>
Lesser sandhill crane	<i>Grus canadensis</i>
Black-bellied plover	<i>Pluvialis squatarole</i>
American golden plover	<i>Pluvialis dominica</i>
Pacific golden plover	<i>Pluvialis fulve</i>
Semipalmated plover	<i>Charadrius semipalmatus</i>
Lesser sand plover (Mongolian plover)	<i>Charadrius mongolus*</i>
Black oystercatcher	<i>Haematopus bachmani</i>
Greater yellowlegs	<i>Tringa melanoleuce</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Wandering tattler	<i>Heteroscelus incanus</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Semi-palmated sandpiper	<i>Calidris pusilla</i>
Pectoral sandpiper	<i>Calidris melanotos</i>
Least sandpiper	<i>Calidris minutilla</i>
Spotted sandpiper	<i>Actitis macularius</i>
Whimbrel	<i>Numenius phaeopus</i>
Bristle-thighed curlew	<i>Numenius tahitiensis</i>
Bar-tailed godwit	<i>Limosa lapponica</i>
Hudsonian godwit	<i>Limosa haemastica</i>
Black turnstone	<i>Arenaria melanocephala</i>
Ruddy turnstone	<i>Arenaria interpres</i>
Surfbird	<i>Aphriza virgata</i>
Rock sandpiper (Bering Sea)	<i>Calidris ptilocnemis tschuktschorum^</i>
Red knot	<i>Calidris canutus* ^</i>
Sanderling	<i>Calidris alba*</i>
Dunlin (Arctic-breeding)	<i>Calidris alpina arctica</i>
Semipalmated sandpiper	<i>Calidris pusilla</i>
Western sandpiper	<i>Calidris pusilla</i>
Least sandpiper	<i>Calidris minutilla</i>
Baird's sandpiper	<i>Calidris bairdii*</i>
Long-toed stint	<i>Calidris subminuta*</i>
Red-necked stint	<i>Calidris ruficollis*</i>
Pectoral sandpiper	<i>Calidris melanotos*</i>
Sharp-tailed sandpiper	<i>Calidris acuminata*</i>
Buff-breasted sandpiper	<i>Tryngites subruficollis*</i>
Short-billed dowitcher	<i>Limnodromus griseus</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Wilson's snipe	<i>Gallinago gallinago</i>



<b>Common Name</b>	<b>Scientific Name</b>
Red-necked phalarope	<i>Phalaropus lobatus</i>
Red phalarope	<i>Phalaropus fulicaria</i> *
Pomarine jaeger	<i>Stercorarius pomarinus</i>
Long-tailed jaeger	<i>Stercorarius longicaudus</i>
Parasitic jaeger	<i>Stercorarius parasiticus</i>
Bonaparte's gull	<i>Larus piladelphia</i>
Mew gull	<i>Larus canus</i>
Herring gull	<i>Larus argentatus</i>
Glaucous gull	<i>Larus hyperbor</i>
Glaucous-winged gull	<i>Larus glaucescens</i>
Slaty-backed gull	<i>Larus schistisagus</i>
Black-legged kittiwake	<i>Rissa tridactyla</i>
Sabine's gull	<i>Xema sabini</i>
Arctic tern	<i>Sterna paradisaea</i>
Belted kingfisher	<i>Megaceryle alcyon</i>
Aleutian tern	<i>Sterna aleutica</i>
Common murre	<i>Uria aalge</i>
Kittlitz's murrelet	<i>Brachyramphus brevirostris</i>
American three-toed woodpecker	<i>Picoides dorsalis</i>
Black-backed woodpecker	<i>Picoides arcticus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Leuconotopicus villosus</i>
Northern flicker	<i>Colaptes auratus</i>
Olive-sided flycatcher	<i>Contopus cooperi</i> ^
Alder flycatcher	<i>Empidonax alnorum</i>
Say's phoebe	<i>Sayomis saya</i>
Northern shrike	<i>Lanius excubitor</i>
Gray jay	<i>Perisoreus canadensis</i>
Black-billed magpie	<i>Pica hudsonia</i>
Common raven	<i>Corvus corax</i>
Horned lark	<i>Eremophilla alpestris</i>
Tree swallow	<i>Tachycineta bicolor</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Bank swallow	<i>Riparia riparia</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Black-capped chickadee	<i>Poecile hudsonica</i>
Boreal chickadee	<i>Parus hudsonica</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Hermit thrush	<i>Catharus guttatus</i>
Varied thrush	<i>Ixoreus naevius</i>
American robin	<i>Turdus migratorius</i>
Eastern yellow wagtail	<i>Motacilla flava tschutschensis</i>
American pipit	<i>Anthus rubescens</i>

Common Name	Scientific Name
Bohemian waxwing	<i>Bombycillagarrulus</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Townsend's warbler	<i>Dendroica townesndi</i>
Blackpoll warbler	<i>Dendroica striata</i> <sup>^</sup>
Yellow warbler	<i>Dendroica petechia</i>
Wilson's warbler	<i>Wilsonis pusilla</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
American tree sparrow	<i>Spizella arborea</i>
Fox sparrow	<i>Passerella iliaca</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Song sparrow	<i>Melospiza melodia</i>
Brown creeper	<i>Certhia americana</i>
Pacific wren	<i>Troglodytes troglodytes</i>
American dipper	<i>Cinclus mexicanus</i>
Golden-crowned kinglet	<i>Regulus saarapa</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Arctic warbler	<i>Phylloscopus borealis</i> <sup>*</sup>
Northern wheatear	<i>Oenanthe oenanthe</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
Slate-colored junco	<i>Junco hyemalis</i>
Lapland longspur	<i>Calcarius lapponicus</i>
Snow bunting	<i>Plectrophenax nivalis</i>
McKay's bunting	<i>Plectrophenax hyperboreus</i> <sup>* ^</sup>
Rusty blackbird	<i>Euphagus carolinus</i> <sup>^</sup>
Red crossbill	<i>Loxia curvirostra</i>
White-winged crossbill	<i>Loxia leucoptera</i>
Pine grosbeak	<i>Pinicola enucleator</i>
Pine siskin	<i>Carduelis pinus</i>
Gray-crowned rosy finch	<i>Leucosticte tephrocotis</i>
Common redpoll	<i>Carduelis flammea</i>
Hoary redpoll	<i>Carduelis homemanni</i>

Source: BLM 2015a and USFWS Innoko NWR bird list

\* Indicates "rare" birds and denoted in BLM 2015a

<sup>^</sup> BLM-AK Sensitive

Migratory birds are known to occupy every habitat type within the planning area including riparian, wetland, forest, shrub, and alpine tundra. Given Alaska's short summers, the success of nesting birds depends greatly on their ability to locate suitable nesting habitat in a timely fashion, endure infrequent adverse weather conditions, evade predators, and avoid disruption of their normal routine. Suitable nesting habitat is especially important to the success of nesting birds, as it enables them to meet the specific needs of rearing young while expending as little energy as possible in the process. Because bird

species occupy a wide variety of habitats, it is difficult to generalize on habitat condition. However, most of the planning area is in a natural state.

### ***Summary of Surveys***

Nesting bird surveys have been conducted on the Unalakleet and Anvik Rivers annually since 1997. These surveys have recorded the presence of 45 species of song birds, waterfowl, shorebirds and raptors, including grey-cheeked thrush, and blackpoll warbler, both BLM sensitive species (BLM 2018b).

### ***Raptors***

There have been numerous raptor surveys in the planning area, some long-term, although most were focused on cliff-nesting species such as peregrine falcons, golden eagles, and gyrfalcons. White and Boyce (1978) documented high densities of nesting raptors on many rivers in western Alaska, including the Kisaralik River. Mindell (1983) surveyed 16 rivers within BLM jurisdiction in southwestern Alaska from 1979 to 1982 and found that gyrfalcons, golden eagles and osprey were widespread but generally uncommon breeders, and that high densities of gyrfalcons and golden eagles were found in a few areas. Mindell also observed merlin, northern harrier, sharp-shinned hawk, goshawk, great-horned owl, hawk owl, American kestrel, boreal owl, short-eared owl and great gray owl. Gerhardt (1989) surveyed selected areas of the southern Akinuk Mountains and found 10 nests of rough-legged hawk, merlin, and gyrfalcon.

Between 1991 and 2004, the Yukon Delta NWR conducted annual surveys of cliff-nesting raptors in the Kilbuck Mountains of western Alaska and resumed the surveys in 2012. McCaffery et al. (2011) studied gyrfalcons in the Askinuk Mountains, the Ingakslugwat Hills, and the Kilbuck Mountains and reported that the extensive uplands north of the Yukon River and east of the Kuskokwim River support 79 nesting territories. A fourth area, the Andreafsky Wilderness, was searched less frequently and less comprehensively, but McCaffery et al. (2011) reported that it may support even higher local densities than the primary study areas. In addition to cliff nests, gyrfalcons were also observed nesting in trees in at least three geographically separate regions.

Portions of the Kuskokwim River between Aniak and McGrath contain significant amounts of cliff-nesting habitat for peregrine falcons. These areas are on a mosaic of BLM, State, and Native corporation land ownership.

Peregrine falcons were listed as threatened under the ESA in 1970 and were de-listed in 2003 due to evidence of population recovery (USFWS 2016). As part of the post-delisting process, surveys for the peregrine falcon nesting and productivity surveys were conducted on the Kuskokwim River between Aniak and McGrath from 2000-2004, and again in 2008, 2011, and 2013. These surveys concentrated on the cliff nesting habitats along that portion of the Kuskokwim River. These surveys showed a recovery in the number of nesting pairs of peregrine falcons on cliff nesting habitats along the Kuskokwim River from the low population levels during the 1970s and 1980s when the species was listed as threatened under the ESA (Seppi 2007).

The number of peregrines and young produced were compared with data from 1976 when populations were first accurately assessed. The results of this study and comparisons with earlier data suggest that the peregrine population was at or near its lowest level in 1976, then steadily increased throughout the 1980s and early 1990s. In 2004, 20 pairs of peregrines occupied nesting territories, indicating the nesting population may still be increasing.

## Special Status Species

BLM SSS include species listed or proposed for listing under the ESA and species that are designated as BLM Alaska sensitive species by the State Director. Currently, the only ESA-listed species in the planning area is the wood bison, which is listed as threatened. The recently reintroduced population of wood bison was designated as a nonessential experimental population under section 10(j) of the ESA. This special rule allows some of the management requirements of the ESA to be relaxed to facilitate acceptance by local landowners and managers. Within this final rule, there are exemptions for the incidental effects of development, land management and other lawful activities, and for regulated hunting, in order to ensure management flexibility.

Should any additional species within the planning area be listed in the future, the requirements of BLM policy will be followed, including the need for consultation under Section 7 of the ESA. Therefore, no further discussion or analysis of this category of SSS is provided.

The emphasis of SSS management by the BLM will be an ecosystem management approach that will attempt to reduce the likelihood of a species being listed under the ESA, although specific measures will be taken to conserve species and their habitats when necessary.

The BLM Alaska has utilized the ranking system developed by the ACCS (formerly the Alaska Natural Heritage Program) and The Nature Conservancy, plus an international network of natural Heritage Programs and Conservation Database Centers, which assess state and global rarity, for assistance in developing Special Status and sensitive species lists for Alaskan plants and animals. Species designated as BLM sensitive must be native species that occur on BLM-managed public lands, and for which BLM has significant management capability to affect their conservation status. In addition, one of the following two criteria must also apply:

1. There is information that a species is known or predicted to undergo a downward trend such that viability of the species or a distinct population segment of the species is at risk across all or a significant portion of its range, or
2. The species depends on ecological refugia, specialized habitats or unique habitats, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.

Brief descriptions of BLM Alaska sensitive bird species known or likely to occur in the planning area are included below in Table 2.7.4-3 (2010 BLM Alaska Sensitive Species List [IM AK-2010-018]).

The BLM Alaska Watch List species are species for which data are insufficient to satisfy sensitive species eligibility criteria in Manual 6840. They should be emphasized for inventory, monitoring, and research as funding and time allow and should be re-evaluated during subsequent sensitive species list revisions. A few watch species of note are discussed in the following sections.

### ***Bird Species of Conservation Concern***

In addition to the BLM sensitive birds discussed above, there are several other species that the USFWS lists as Bird Species of Conservation Concern and/or are “featured species” in Alaska’s Wildlife Action Plan (ADF&G 2015c). Interim guidance has directed BLM planners to consider these species of concern during the planning process. These species are listed in Table 2.7.4-3 with BLM sensitive and watchlist species. These species are designated for a variety of reasons. They may be small in population or range, showing a decline in populations in part or all their range, dependent on habitats viewed as susceptible to human disturbance or development, or considered worthy of more intensive monitoring due to any of

these factors. In addition to Alaska “featured species” and the USFWS Bird Species of Conservation Concern (BCC), species that the *Partners in Flight* organization has designated as Alaska Priority Species, are listed in this table.

**Table 2.7.4-3. Bird Species of Concern in the Planning Area**

Species	BLM-Alaska <sup>a</sup>	USFWS BCC <sup>b</sup>	USFWS BCR4 <sup>c</sup>	Alaska SWCS <sup>d</sup>	Alaska State <sup>e</sup>	BPIF <sup>f</sup>
Yellow-billed loon	Sensitive					
Red-throated loon	Watch Species			featured		
Emperor goose	Sensitive					
Grey-cheeked thrush	Watch Species				SOC	Priority
Long-tailed duck				featured		
Olive-sided flycatcher	Sensitive	BCC/N		featured	SOC	Priority
Trumpeter swan	Sensitive	BCC Interior Population				
Blackpoll warbler	Sensitive	BCC/R, Region 7		featured	SOC	Priority
Townsend's warbler	Watch Species			featured	SOC	Priority
McKay's bunting	Sensitive					
American peregrine falcon		BCC/N		BCR4	featured	SOC
Golden eagle	Sensitive					
Harlequin duck						
Black scoter		GBADC		featured		
Surf scoter		GBADC		featured		
Buff-breasted sandpiper	Watch Species	BCC/N		featured		
Rusty blackbird	Sensitive			featured		Priority
Bristle-thighed curlew	Sensitive					
Red knot	Sensitive					
Bering Sea rock sandpiper	Sensitive					
Kittlitz's murrelet	Sensitive					
Wandering tattler				featured		
Solitary sandpiper		BCC/N		featured		
Short-billed dowitcher		BCC/N	BCR4			
Hudsonian godwit	Watch Species	BCC/N	BCR4			
Bar-tailed godwit	Watch Species					
American golden plover		BCC/N	BCR4			
Northern harrier		BCC/N	featured			
Short-eared owl	Sensitive	BCC/N		featured		
Surfbird		BCC/N	BCR4			
Arctic tern		BCC/R region 7		featured		
Arctic warbler		BCC/R region 7				
Whimbrel		BCC/N	BCR4			
Gyrfalcon						Priority

Species	BLM-Alaska <sup>a</sup>	USFWS BCC <sup>b</sup>	USFWS BCR4 <sup>c</sup>	Alaska SWCS <sup>d</sup>	Alaska State <sup>e</sup>	BPIF <sup>f</sup>
Sharp-tailed grouse						Priority
American dipper						Priority
Northern shrike						Priority
White-winged crossbill						Priority
Bohemian waxwing						Priority
Black-backed woodpecker						Priority
Boreal owl						Priority
Varied thrush						Priority
Great Gray owl						Priority
Golden-crowned sparrow						Priority

a Species listed by BLM in Alaska as sensitive or as watch species.

b Species listed as a Bird of Conservation Concern (BCC) in US (N) or portion (region 7 = Alaska) and Game Birds Above Desired Condition (GBADC).

c Species listed as a Bird of Conservation Concern in Bird Conservation Region 4 (Interior Alaska) (BCR4).

d Species listed in the Alaska State Wildlife Conservation Strategy as a featured species.

e State of Alaska designated species of concern (SOC).

f Species listed by the Alaska Boreal Partners in Flight as Priority Species in Alaska.

g Not likely found in planning area in significant numbers

### ***BLM Sensitive Bird Species in the Planning Area***

#### **Trumpeter swan**

Due to the remote nature of their preferred habitat in Alaska, trumpeter swans have been relatively unaffected by human development in Alaska, and during a 1990 census were found to number over 13,000 statewide (Conant et al. 2002). Trumpeter swans breed widely in central and southern Alaska (Mitchell and Eichholz 2010), including areas in the upper Kuskokwim River watershed on BLM-managed public lands within the planning area. Breeding habitat includes a wide variety of wetlands with irregular shorelines, emergent vegetation, diverse communities of aquatic plants and early ice-off (Mitchell and Eichholz 2010), with the amount of human disturbance and regional climate also affecting habitat use and productivity. Adults are predominately herbivorous (submerged and emergent vegetation), but occasionally eat fish and fish eggs. Cygnets feed on aquatic invertebrates and vegetation. In the post-breeding period, when cygnets are able to fly, trumpeter swans congregate at staging areas in preparation for flying southward. Habitat use during migration is limited by ice, forage, and disturbance; freshwater marshes, ponds, lakes, rivers, and brackish estuaries with high abundance of preferred aquatic plant rhizomes and tubers (La Montagne et al. 2003). These staging areas are usually large shallow lakes and represent important trumpeter swan habitat.

#### **Emperor goose**

The emperor goose is unique to Alaska and eastern coastal Siberia; its breeding range is primarily restricted to the west-coastal areas of the Yukon-Kuskokwim Delta, and most of the world's population winters in the Aleutian Islands (Schmutz et al. 2011). The population appears to be stable in North America, with the 2015 spring count, taken on the spring staging areas in southwestern Alaska, estimated at just over 98,000 birds (USFWS 2015). Breeding habitats are within the planning area boundaries, but do not include lands BLM manages. Migration staging areas are in coastal lagoons and estuaries and outside of the planning area.

### **Golden eagle**

Golden eagles are found breeding throughout the planning area, and use habitats dominated by rugged topography and mountainous terrain, near or above tree line, and along riparian areas, although the species is found in low densities throughout most of the northern hemisphere (Peterson et al. 1991; Young et al. 1995). Cliff nests are most common, but nesting on human-made structures also occurs (Kochert et al. 2002). Prey items in Alaska include arctic ground squirrels, snowshoe hares and arctic hares (Poole and Bromley 1988). Long-term surveys show declines in nesting populations in the western United States, but not Alaska or Canada (Kochert and Steenhof 2002), although availability of food and nesting sites determines nesting density (Hunt et al. 1995). Much remains unknown about the breeding ecology of golden eagle populations in Alaska and Canada (Kochert et al. 2002)

### **Bristle-thighed curlew (*Numenius tahitiensis*)**

Bristle-thighed curlews breed exclusively in Alaska and make long-distance trans-oceanic migrations to winter on remote islands in the south Pacific (Marks et al. 2002). Breeding grounds are known only in western Alaska between the Yukon River and the northern Seward Peninsula, and include an area in the southern Nulato Hills within the planning area and managed by BLM. Population surveys of known breeding range in 1988–1992 yielded about 3,200 breeding pairs, 60 percent of which used habitats in the southern Nulato Hills, and are characterized by rolling upland tundra and dwarf shrub meadows (Marks et al. 2002). The worldwide population is naturally small, breeds only in two areas in Alaska, and winters on islands in Oceania, making the population particularly vulnerable to disturbance, degradation of habitat, and human impacts.

### **Short-eared owl (*Asio flammeus*)**

Short-eared owls occur throughout Alaska and can be found across the planning area. Habitats include marshes, grasslands, and tundra, particularly where populations of prey species such as voles and lemmings are found (Wiggins et al. 2006). The species is found nearly worldwide, although the population trend shows a 30 percent decline in the past 10 years (BirdLife International 2012). Fluctuations in the short-eared owl population, due most likely to cyclical variation in the population of voles, make it difficult to determine long-term trends. However, declines have been recorded from many parts of the species range, and short-eared owls are listed as an at-risk species by Partners in Flight. Development and agriculture in the lower 48 states, which result in loss of winter habitat, are the most significant threats to the North American population (Wiggins et al. 2006).

### **Olive-sided flycatcher (*Contopus cooperi*)**

Olive-sided flycatchers breed at low densities throughout the coniferous boreal and coastal forests of Alaska, including central, southcentral, southeast, and occasionally western Alaska (Kessel and Gibson 1978), and are found throughout BLM-managed public lands in the planning area. It breeds in habitat along forest edges and openings, including burns; natural edges of bogs, marshes, and open water; semi-open forest; and harvested forest with some structure retained. Tall, prominent trees and snags, which serve as singing and foraging perches, and unobstructed air space for foraging, are common features of all nesting habitats (Altman and Sallabanks 2012). Olive-sided flycatchers are highly migratory, with principal wintering ranges in Central America and northern South America (Boreal Songbird Initiative 2016). In Alaska, the birds use relatively open boreal forest (Kessel and Gibson 1978) and are often associated with openings such as meadows, muskegs, burns, and logged areas and water (streams, beaver ponds, bogs, and lakes) (Altman 1997). Birds prey almost exclusively on flying insects and often forage

from the tops of snags or dead branches at the top of live trees. During nesting season in Alaska, birds most frequently prey on yellow-jacket wasps and dragonflies (J. Wright in Altman and Sallabanks 2012). North American Breeding Bird Survey data indicate population declines since 1966 across much of the North American range with an overall decline of 2.7 percent per year from 1966 to 2011 (Sauer et al. 2012). In Alaska, a population decline of 3.1 percent per year occurred from 1966 to 2007, based on data from 56 breeding bird survey routes (Sauer et al. 2012). Factors in population declines likely include habitat changes or alteration in both wintering and nesting grounds, changes in availability of prey species, exposure to pesticides, nest predation, and forest management practices (Altman and Sallabanks 2012). In Alaska, habitat concerns include logging, salvage logging associated with beetle infestations in white spruce, and fire suppression. Olive-sided flycatchers have been recorded annually during Breeding Bird Surveys conducted along the Unalakleet and Anvik rivers within the planning area (Pardieck et al 2018).

### **Blackpoll warbler (*Dendroica striata*)**

Blackpoll warblers occur throughout western and interior Alaska and northern Canada, are found across the planning area in boreal forest and riparian shrub habitats, and in the transition zones between tundra and taiga (DeLuca et al. 2013). The birds winter in northern South America below 9,842 feet elevation in wooded habitats and undertake the longest migration of any North American warbler, with some individuals traveling over 5,000 miles from Alaska to Brazil (Nisbet et al. 1995). Diet during the nesting season consists primarily of adult and larval insects (Tramer and Tramer 1977). Data from the North American Breeding Bird Survey indicate this species has suffered the steepest long-term decline of any neotropical nearctic migrant landbird since 1980, with populations diminished by over 50 percent and 90 percent across breeding ranges in Alaska and Canada, respectively (Sauer et al. 2005). A large proportion (25 percent) of the global population is estimated to breed in Alaska (Gotthardt et al. 2012). Blackpoll warblers have been recorded annually during Breeding Bird Surveys conducted along the Unalakleet and Anvik rivers within the planning area (Pardieck et al 2018).

### **Rusty blackbird (*Euphagus carolinus*)**

Rusty blackbirds are found throughout the planning area, and in Alaska nests in black spruce forests or willow shrubs near water (Matsuoka et al. 2010). The species feeds mainly on seeds and insects. Rusty blackbirds have declined alarmingly (85 to 95 percent) in numbers over the past 40 years (1970–2010), creating an interest in the study of this species (Matsuoka et al. 2010). Factors contributing to this decline include wetland loss in southeastern North America, contaminants on the nesting grounds, poisoning of other blackbird species on winter roosts, and increased disturbance on boreal wetland breeding habitats outside the planning area, although other unknown factors may be involved (Avery 2013). Rusty blackbirds have been recorded annually on Breeding Bird Surveys conducted along the Unalakleet and Anvik Rivers, both on BLM-managed public lands within the planning area (Pardieck et al 2018).

### **McKay's bunting (*Plectrophenax hyperboreus*)**

McKay's buntings are found only in Alaska, breed exclusively on St. Matthew Island in the North Central Bering Sea, and winter along the Bering Sea coast from Kotzebue to Cold Bay (Montgomerie and Lyon 2011). The McKay's bunting is similar to the snow bunting (*Plectrophenax nivalis*) but is considered a separate species due to its morphological distinctiveness and geographical isolation (Montgomerie and Lyon 2011). The total breeding population of McKay's buntings is estimated at 31,200 birds (Matsuoka and Johnson 2008). There is no immediate threat to the population, but due to the small population size



and very restricted breeding range, the species is susceptible to introduced predators (rats, weasels, fox) and reindeer grazing disturbing nesting habitats (Matsuoka and Johnson 2008). McKay's buntings have been observed in Unalakleet in March (Pardieck et al 2018) and likely use winter habitats in the coastal areas of Norton Sound that are within the planning area and managed by BLM.

### **2.7.5 Current Conditions – Wildlife Habitats**

The planning area includes a variety of upland and lowland vegetation communities (see Table 2.7.5-1) that provide important breeding, wintering, and migration habitat for the wildlife species described in the previous section. This section focuses on areas that the BLM has identified as important from a wildlife habitat or conservation perspective.

#### **Current ACECs**

The wildlife habitat within the 11 current ACECs is described below. Nineteen new ACECs have been nominated. The BLM (2016a) evaluated 30 ACECs and concluded that a total of 17 ACECs met both the relevance and importance criteria. The size and wildlife habitat of the current 11 ACECs are presented in Table 2.7.5-1 (BLM 2018b).

#### **Migratory Bird Habitat**

The USGS (2016) designated five Bird Conservation Regions in Alaska as part of the North American Bird Conservation Initiative to provide a framework that would facilitate coordinated conservation and evaluations of major bird initiatives. Two of these overlap the boundaries of the planning area: Western Alaska and Northwest Interior Forest (BSWI Draft RMP/EIS, Map 3.2.7-1). Within these two regions are several subregions. The subregions that overlap the boundaries of the planning area are described below. These summaries of bird use are useful for their descriptions of bird use by habitat.

##### ***Western Alaska***

This region consists of the coastal plain and mountains of western and southwestern mainland Alaska. The Sub-regions that overlap the planning area are: A) Subarctic Coastal Plain and Seward Peninsula, and B) Ahklun and Kilbuck Mountains and Bristol Bay-Nushagak Lowlands. Permafrost is continuous except in southern parts of the region. Sea cliffs are present as are mountains that exceed 3,300 feet in elevation. Wet and mesic graminoid herbaceous communities dominate the lowlands and numerous ponds, lakes, and rivers dot the landscape. Tall shrub communities are found along rivers and streams and low shrub communities occupy uplands; forests of spruce and hardwoods penetrate the region on the eastern edge. High densities of breeding waterfowl and shorebirds are found on the coastal plain of the Yukon and Kuskokwim Rivers. Intertidal areas support millions of shorebirds during migration (e.g., dunlins, western sandpipers, red knots, and bar-tailed godwits). Western Alaska includes a unique Beringian breeding avifaunal element (e.g., black turnstone, bristle-thighed curlew) and several Old World species are regular breeders or migrants in this region (e.g., sharp-tailed sandpiper, red-throated pipit, white wagtail). Passerine diversity is greatest in tall, riparian shrub habitats (e.g., arctic warbler, gray-cheeked thrush, blackpoll warbler) and raptors (e.g., gyrfalcon, rough-legged hawk) nest along the riverine cliffs. Mainland sea cliffs contain nesting colonies of, largely, black-legged kittiwakes, common murres, and pelagic cormorants.

**Table 2.7.5-1. Wildlife Habitat in the Current ACECs**

ACEC	Acres	Wildlife Habitat Description
Anvik River ACEC (existing)	115,106	<p>North American Breeding Bird surveys have been conducted on the Anvik River annually since 1997, as part of a nationwide census to determine bird population trends. The surveys detected 43 species of song birds, shorebirds, waterfowl and raptors, including rusty blackbird, a BLM SSS. In 2003, harlequin duck aerial helicopter surveys were conducted in the upper portions of the Anvik River (Otter Creek, Swift River, and Beaver Creek) watershed to determine use of the habitats during spring migration by harlequin duck breeding pairs. The survey found low densities of harlequin ducks equal to 0.007 pairs/kilometer of river surveyed. Harlequin ducks have been considered a BLM sensitive species but were removed from the list in 2008.</p> <p>The Anvik River watershed provides habitats for populations of moose, black bears and brown bears, as well as shrub habitats for at least 45 species of land birds, waterfowl, shorebirds and raptors. The watershed exists in a pristine state, with little permanent human development, and an intact ecological hierarchy including predators (wolves, brown bears, black bears, lynx) to terrestrial and aquatic prey species, including four species of salmon. This large parcel of land is also situated between two wildlife refuges and may help to provide some connectivity between them.</p>
Kuskokwim River Raptor Nesting Habitat ACEC	6,072	<p>In 1981, The Kuskokwim River area was important nesting habitat for bald eagles, golden eagles, osprey, and gyrfalcons. The concentration of these important or endangered species was the basis for ACEC designation.</p> <p>As part of the post-delisting, surveys for the peregrine falcon nesting and productivity surveys were done on the Kuskokwim River between Aniak and McGrath from 2000-2004, and again in 2008, 2011, and 2013. These surveys concentrated on the cliff nesting habitats along that portion of the Kuskokwim River. These surveys showed a recovery in the number of nesting pairs of peregrine falcons on cliff nesting habitats along the Kuskokwim River from the low population levels during the 1970s and 1980s when the species was listed as threatened under the ESA.</p> <p>The bluffs and cliffs along the Kuskokwim River provide nesting habitat for many species of raptors and are not found in abundance in other portions of the planning area. The cliff nesting habitats are situated along the river corridor and provide an important food source for nesting raptors. The cliff habitats along the river in that area produce at least 20 peregrine and 20 rough-legged nests annually.</p>
Peregrine Falcon Nesting Habitat ACEC	8,096	<p>The peregrine falcon nesting habitat ACEC was nominated to protect cliff nesting habitats and active nest sites along the Yukon River. While peregrine falcon populations have increased and stabilized since the species was delisted from a threatened status in 1999, these areas remain important cliff nesting habitats along the Yukon River.</p>
Drainages of the Unalakleet River ACEC	415,184	<p>Breeding bird surveys have been conducted on the Unalakleet River annually since 1997. These surveys have recorded the presence of 45 species of song birds, waterfowl, shorebirds and raptors, including grey-cheeked thrush, blackpoll warbler (BLM sensitive species).</p> <p>The Unalakleet River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik. The watershed is also a natural, complete ecosystem with an intact ecological food web.</p>
North River ACEC	137,349	<p>The North River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik. The watershed is also a natural, complete ecosystem with an intact ecological food web.</p>
Box River Treeline Research Natural Area (RNA) ACEC	13,592	<p>The Box River Treeline RNA is important winter habitat for the Western Arctic Caribou Herd.</p>

ACEC	Acres	Wildlife Habitat Description
Inglutalik ACEC	71,716	The Inglutalik ACEC provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik. The watershed is also a natural, complete ecosystem with an intact ecological food web.
Ungalik River ACEC	112,719	The Ungalik River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik. The watershed is also a natural, complete ecosystem with an intact ecological food web.
Shaktoolik River ACEC	192,591	The Shaktoolik River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik.
Kateel River ACEC	568,083	The Kateel River watershed provides habitat for moose, caribou, brown bear, wolf, wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users. The watershed is also a natural, complete ecosystem with an intact ecological food web.
Gisasa River ACEC	278,057	The Gisasa River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users.
<b>Total Existing ACECs Acres:</b>	<b>1,918,565</b>	

Source: BLM 2018b

### ***Northwest Interior Forest***

This region is an extensive (278,800 square miles) patchwork of ecological types. The Sub-regions that overlap the planning area are: A) Interior Highlands and Ogilvie Mountains, B) Alaska Range/Wrangell Mountains/Copper Plateau, and B) Interior Forested Lowlands and Uplands, Interior Bottomlands, and Yukon Flats. A mosaic of vegetation communities arise from the interplay of elevation, permafrost, surface water, fire, and aspect. All forest types (needleleaf, deciduous, and mixed) are found in the region and are dominated by white spruce, black spruce, poplars, and paper birch. Tall shrub communities occur along rivers, drainages, and near treeline. Bogs, consisting of low shrubs and shrub-graminoid communities, are common in the lowlands. Alpine dwarf scrub communities are common in Interior Highlands and throughout mountainous regions; highest elevations are generally devoid of vegetation. Despite the varied ecoregions, many bird species are shared among the regions. Lowlands, bottomlands and flats harbor many species of migrating and breeding waterfowl (e.g., northern pintail, northern shoveler, green-winged teal) and swans. These ecoregions, combined with forested lowlands and uplands support breeding shorebirds such as greater and lesser yellowlegs, solitary and spotted sandpipers, and common snipe. American golden-plovers and surfbirds are found in alpine habitats in Interior Highland and mountainous ecoregions. A suite of passerines inhabit forest, scrub, and graminoid communities in the region. Black-capped and boreal chickadees, ruby-crowned kinglets, Swainson's thrushes, yellow-rumped warblers and dark-eyed juncos are common forest species. Tall shrub communities host white-crowned, American tree, and fox sparrows, Wilson's and yellow warblers, gray-cheeked thrushes, and common redpolls, among others. At high elevations, horned lark and Lapland longspur are common breeders.

The Important Bird Areas Program (IBA), a global initiative of BirdLife International (implemented by Audubon and local partners in the United States), is an effort to identify and conserve areas that are vital to breeding, migrating, and wintering birds. Because of the vast, intact habitats in Alaska, there are more globally significant IBAs in this state than any other in the U.S. (Audubon 2014).

Map 3.2.7-2 of the BSWI Draft RMP/EIS shows the locations of the three IBAs in the planning area. The following descriptions of these areas are summarized from Audubon 2016.

The Andreafsky Wilderness IBA is a vast area of rolling montane tundra that supports about 60 percent (2,500 pairs) of the world's breeding population of bristle-thighed curlews, a unique species of large upland nesting shorebird that is listed as "vulnerable" in the world list of threatened birds. The BLM and USFWS manage approximately 97 percent of the IBA. The habitat consists of dwarf shrub meadows, low shrub/tussock tundra, tall shrub, mixed shrub/thicket tundra, lichen meadow, and shrub meadow/tundra. While there are no major threats to birds in this area, subsistence harvest may pose a threat to breeding adults, while eggs and nests may be trampled occasionally by caribou in the area. Land use consists of occasional hunting and recreation, although difficult terrain and difficult access to the area limit the number of visitors.

The Iditarod River Lowlands IBA is a large wetland complex within the Innoko NWR, a relatively flat plain dominated by numerous slow-moving silty rivers, small lakes, streams, and bogs. There are no BLM lands in this IBA, but it is in the planning area. This region is a transition zone between interior boreal forest and the shrub-land and tundra common in western and northern Alaska. One of the primary reasons for establishment of the Innoko Refuge was protection of the vast wetland complex surrounding the confluence of the Innoko and Iditarod Rivers important to waterbirds during many life stages. The unique water regime in this area, characterized by frequent flooding and slow drawdown of lakes, creates excellent habitat for breeding, molting, and migrating birds. The Iditarod River Lowlands is home to

molting greater white-fronted geese, and breeding populations of several species identified as BCC by the USFWS, including American golden-plover, solitary sandpiper, whimbrel, and Hudsonian godwit. Landbird species common to the area include olive-sided flycatcher, blackpoll warbler, and rusty blackbird. All three of these species reach some of their highest known breeding densities in riparian habitats in western Alaska. Due to the region's remoteness and lack of human inhabitants, direct threats to bird life are few. The major threat is large-scale ecological shifts due to climate change. A recent study of wetland drying across interior Alaska from 1950 until 2002 documented the highest wetland area loss (31 percent) on the Kaiyuh Flats, just 93 miles north of Innoko NWR.

The Turquoise Lake IBA lies partially within the planning area. The Turquoise Lake basin lies within Lake Clark National Park and Preserve on the west slope of the Neacola Mountains of southwestern Alaska. The 5-mile-long by 1.5-mile-wide lake is located 2,503 feet above sea level and is one of a series of glacially formed, east/west oriented lakes whose moderate to steep-sloping valley walls include remnants of the most recent series of recessional Late Wisconsin glacial moraines. From the surface of Turquoise Lake these stair-step moraine terraces rise an additional 787-2,096 feet onto gently rounded plateaus. Information from several studies over 10 years points to the importance of this montane area as nesting habitat for a unique assemblage of birds, most notably several medium- to large-sized shorebirds and several passerine species. Species known to breed in the area include American golden-plover, surfbird, wandering tattler, Baird's sandpiper, gray-crowned rosy-finch, and northern wheatear. Enough data and anecdotal observations have been collected to suggest that this region represents not only a major breeding range extension for most of these species but also support significant numbers of each. Recent regional and national shorebird conservation planning efforts have identified certain shorebird species (including many of the above species) and habitats as being of high conservation concern, primarily due to documented or perceived population declines and/or restricted distributions.

### **Innoko Bottoms**

The Innoko Bottoms area (BSWI Draft RMP/EIS, Map 3.2.7-3) corresponds to the Proposed Innoko Bottoms Wildlife Area, which includes BLM-managed land within the ADF&G-designated Paradise Controlled Use Area (CUA). The Paradise CUA was established in 1977 to reduce the competition between sport and subsistence moose hunters by preventing hunting access to the area by aircraft (ADF&G 2014a). The Paradise CUA is closed to the use of aircraft for hunting moose, including the transportation of moose hunters, their hunting gear, or parts of moose.

#### ***Habitat***

The Innoko Bottoms area is bounded on the north by the Innoko NWR, on the east by the Innoko River, on the west by Yukon River, and on the south by the confluence of the two rivers. Riverine habitats and wetlands hydrologically connected to the Innoko and Yukon Rivers have extensive shallow areas and seasonally fluctuating water levels that produce favorable conditions for aquatic plant growth. Seasonal flooding of the lowlands inhibits succession of woody shrubs and promotes growth of grasses and sedges creating large open meadows interspersed with boreal forest habitats on higher terrain. The area contains abundant meandering sloughs and oxbow lakes that provide high-value habitat for waterfowl and moose.

#### ***Waterfowl***

The Innoko Bottoms area is an important waterfowl production area, with the highest densities of water birds observed along river corridors where water levels of associated lakes fluctuate to create important breeding habitat (Platte 1996). Spring flooding of the Innoko and Yukon Rivers provides a large area of

temporary islands that are less accessible to predators, and provide nesting habitat for ducks, geese and swans. Flooded sloughs and hydrologically connected wetlands in the area provide nesting and brood rearing habitat for at least 10 species of dabbling and diving ducks (Seppi 1993).

The area between the Yukon and Innoko Rivers supports two mapped traditional migratory flight lines of breeding water bird pairs (Platte 1996), and the area provides a stopover sight for waterfowl migrating to the Y-K Delta during spring migration (Spragens 2016).

### ***Moose***

The Innoko Bottoms area supports known winter concentrations of moose (BSWI Draft RMP/EIS, Map 3.2.7-5), providing lower-elevation foraging areas with abundant willows for browse in the floodplain meadows (ADF&G 2014a). Moose densities for the larger management area (Unit 21E) are estimated at 1.2 moose per square mile (ADF&G 2014d), although densities are likely higher than this in the Innoko Bottoms area. Riparian willow stands along the Yukon and Innoko Rivers provide winter moose browse (ADF&G 2014a), and support known winter concentrations of moose (BSWI Draft RMP/EIS, Map 3.2.7-5).

### ***Wood Bison***

In the spring and summer of 2015, a nonessential experimental population of wood bison (the Lower Yukon/Innoko Rivers herd) was released in the Innoko Bottoms area near the village of Shageluk by the ADF&G. The site was determined to be appropriate for the release, in part because of its large size and abundant suitable forage for bison (ADF&G 2018e).

The reintroduction has been successful, with most of the herd remaining in the Innoko Bottoms area, and stable to slowly increasing population numbers and successful breeding and calf survival documented (ADF&G 2017b). The ADF&G wood bison management plan calls for growth of the Lower Yukon/Innoko Rivers wood bison herd, and population models suggest that the 130 animals reintroduced to the wild in 2015 could grow to about 250 by 2021 and to 500 by about 2030, based on growth observed in populations reintroduced to areas of Canada in recent decades. Biologists are closely monitoring how the newly reintroduced bison are responding to their new habitat. The ADF&G will manage the population under sustained yield principles, which will allow limited subsistence and sport hunting when the herd reaches a population level that can sustain harvest (ADF&G 2015b).

As shown in BSWI Draft RMP/EIS, Map 3.2.7-3, Innoko Bottoms also provides important connectivity corridors between the Innoko NWR and the Yukon Delta NWR. Connectivity corridors are climate-resilient corridors that facilitate movement between conservation lands. These corridors were identified using the geodiversity model described in Magness et al (2018). The model uses topographic inputs to define geodiversity of the landscape and uses resistance surfaces to identify the most efficient but permeable paths between conservation units. From a planning perspective, connectivity corridors represent a small percentage of total BLM land area that can be managed for structural landscape connectivity. These corridors can help maintain general wildlife habitat connectivity, increase species adaptability to climate change, minimize habitat fragmentation and loss, and avoid or minimize barriers to wildlife movement (Magness et al. 2018).

### ***Subsistence Hunting***

Fall hunting in the area for moose and waterfowl is largely by Yukon and Innoko River village residents using river boats. A winter subsistence moose hunt occurs in February and March using snowmobiles. Moose are an important subsistence resource for village residence of the area.

Two federal moose hunts occur in Unit 21E in September and March and include the Innoko Bottoms area. A State nonresident permit drawing for a September hunt in Unit 21E was established in fall 2006 to limit nonresident sport hunting of moose.

### ***Land Use Plan Decisions***

The proposed Innoko Bottoms Priority Wildlife Habitat Area would be consistent with BLM Planning Handbook H-1610-1 (Appendix C, E: Fish and Wildlife [BLM 2005]) and also support Secretarial Order 3356 by enhancing waterfowl production and waterfowl hunting opportunities in Alaska as well as in states along the Pacific Flyway and areas where migratory waterfowl will be wintering. The Innoko Bottoms area is an important waterfowl production area in Alaska and contributes to waterfowl populations nationwide.

The establishment of the Innoko Bottoms Priority Wildlife Habitat Area also supports Secretarial Order 3362 by working with the State wildlife agency to enhance moose and introduced wood bison populations to protect habitats important to their winter range and seasonal movements. Conservation of the area provides access to the area for moose hunts by sport and subsistence users and helps ensure healthy populations of moose and wood bison, using the best available wildlife management practices.

Moose populations in the Innoko Bottoms area are recognized as having some of the highest population densities in the State of Alaska by both Alaska resident and non-resident sport and subsistence hunters. Wood bison in the area are recognized for their remnant character as well as public interest for a species that has been absent from the landscape but recently been re-introduced to the area.

### **2.7.6 Resource Changes: Trends and Forecasts**

In general, populations of wildlife in the planning area appear to be fluctuating within what is likely a natural range. Exceptions probably include several migratory bird species that are affected by impacts on winter ranges or migration routes occurring outside of Alaska, such as the olive-sided flycatcher (*Contopus cooperi*), and rusty blackbird (*Euphagus carolinus*).

Caribou herd populations are naturally cyclic in nature, but recent research has suggested that increased tundra fires in northwestern Alaska could decrease the availability and quality of winter habitat available to caribou over the short term (up to 55 years), potentially influencing caribou herd population dynamics and reducing sustainable harvest levels (Joly et al. 2007).

Moose populations in some regions of the planning area have recently experienced declines, although populations vary considerably across the planning area.

The wood bison management plan calls for growth of the Lower Yukon/Innoko Rivers herd. Population models suggest that the 130 animals reintroduced to the wild in 2015 could grow to about 250 by 2021 and to 500 by about 2030, based on growth observed in populations reintroduced to areas of Canada in recent decades. Biologists are closely monitoring how the newly reintroduced bison are responding to their new habitat. The ADF&G will manage the population under sustained yield principles, which will allow limited hunting (ADF&G 2015b).

Additional information on population trends is provided on a species-by-species basis in the Current Conditions – Wildlife Species section earlier in this document.

## **2.8 Nonnative Invasive Species (Wildlife and Plant)**

### **2.8.1 Introduction**

This section presents the regulatory framework, resource indicators, current conditions, and trends and forecasts for NNIS in the planning area.

### **2.8.2 Laws, Regulations, and Policies**

The BLM Alaska Land Health Standards and Guidelines (BLM 2004) provide general guidance for managing healthy ecosystems, focusing on retaining natural populations consistent with potential and capability of the landscape. The guidelines state that seeding and planting nonnative vegetation should only be used in cases where native species are not available in sufficient quantities; where native species are incapable of maintaining or achieving standards; or where nonnative species are essential to the functional integrity of the site.

The 2017 Department of the Interior Department Manual, Part 524 (Invasive Species Management), Chapter 1 (Invasive Species Policy), establishes DOI policy that directs bureaus/offices to manage the risk of invasive species in their activities, and to minimize that risk where applicable and practicable, including preventing the introduction, establishment, and spread of invasive species, and providing for eradication and control to minimize adverse impacts, such as impacts to the environment, human health, cultural resources, and the economy. The 2010 BLM Alaska State Invasive Species Policy (IM AK-2011-001a) provided statewide guidance for NNIS management (BLM 2010a), and incorporates principles outlined in the 2004 National Strategy and Implementation Plan for Invasive Species Management (U.S. Forest Service 2004); the 2016 Safeguarding America's Lands and Waters from Invasive Species: a National Framework for Early Detection and Rapid Response (DOI 2016); and the 2016 Arctic Invasive Alien Species (ARIAS) Action Plan (CAFF 2016).

The BLM Manual has three sections that apply specifically to NNIS management. These include 9220 – Integrated Pest Management (1981), 9015 – Integrated Weed Management (1992), and 9011 – Chemical Pest Control (1992).

The Carlson-Foley Act of 1968 (Public Law [P.L.] 90-583) provides authorization for federal agency or department heads to control noxious plants on federal lands in compliance with approved agency or department plans.

EO 13112, Invasive Species (1999) provides guidelines to prevent the introduction of invasive species and provide for their control and to minimize economic, ecological and human health impacts that invasive species cause. This EO established the National Invasive Species Council, which regularly updates National Invasive Species Council Management Plans (2001-2018).

The 2007 ROD for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007a) guides actions regarding application of 11 herbicides. The 2016 ROD for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States Programmatic Environmental Impact Statement (EIS) guides actions regarding these three herbicides for application control options for NNIS on BLM lands in Alaska (BLM 2016e). The Federal Insecticide, Fungicide, and Rodenticide Act of 1975 (7 U.S.



Code [U.S.C.] 136 et seq.) establishes an extensive regulatory system for controlling the sale, distribution, and application of pesticides.

The Plant Protection Act (Title IV of the Agricultural Risk Protection Act of 2000) consolidates and modernizes statutes pertaining to plant protection, importation, transport, and quarantine that were previously addressed in various statutes, including the Federal Noxious Weed Act of 1974, the Federal Plant Pest Act, and the Plant Quarantine Act. The act also provides authorization for such entities as Animal and Plant Health Inspection Service to enforce transportation and quarantine practices to prevent NNIS spread.

Existing regulations intended to reduce the introduction of NNIS in Alaska include the ADF&G prohibition on sport angler use of felt soles in fresh waters of Alaska, effective January 1, 2012 (ADF&G 2012); the Alaska Board of Game's prohibition of footwear with absorbent, fibrous material soles for hunters in fresh water effective January 1, 2013 (ADF&G 2013d); the State of Alaska regulations concerning permitted conditions and prohibitions for importing, possessing, transporting, or releasing fish and animals into the wild Alaska (AS 03.05.010, AS 03.05.027, AS 03.05.040, AS 44.37.030, AS 03.05.090, 11 AAC 34.130, 11 AAC 34.140, 11 AAC 34.160, 11 AAC 34.170, AAC 34.115); and the ADNR quarantine of five aquatic invasive plants, effective March 5, 2014 (ADNR 2014).

### 2.8.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for NNIS-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Potential for increase in colonization and/or spread of nonnative invasive plants (terrestrial and aquatic) and wildlife (fish, aquatic invertebrates, and mammals) due to the following:
  - Surface-disturbing minerals actions
  - Wildland fire, firefighting actions, and prescribed fire
  - Woodland harvest actions
  - Recreation visitor use
  - Livestock grazing
  - Travel and transportation management actions, including OHV use

Extent of occurrence of all taxa of invasive species will be presented in this section. Changes to these extents may be analyzed in terms of acres affected (plants), acres of wildland fire, acres of prescribed fire, number of permits issued for permitted activities, estimated recreational use volume, miles of waterway affected (aquatic freshwater plants or aquatic animals), amount of vessel traffic, estimated OHV use, known or estimated aircraft use and landings, or estimated or modeled numbers, vectors, and range (terrestrial animals or marine animals) as appropriate.

### 2.8.4 Current Conditions

#### Nonnative Invasive Terrestrial Plant Species

In this document, the term nonnative invasive plant is an inclusive term to describe plants that are not native to Alaska. The term “weed” is commonly used for nonnative species but is often applied to both native and nonnative vegetation and is considered any plant that is growing where it is undesirable. The

term invasive species applies to a species whose introduction does or is likely to cause economic or environmental harm or harm to human health (EO 13112). Of the nonnative invasive plants known to occur within the planning area, some may be considered noxious plants. In BLM's national plan, Partners Against Weeds, An Action Plan for the Bureau of Land Management, a "noxious weed" is defined as "a plant that interferes with management objectives for a given area of land at a given point in time" (BLM 1996). As defined in the Alaska BLM Statewide Land Health Standards (BLM 2004), native species are any species of plant or animal naturally occurring within a given area of land or body of water; or part of the original flora or fauna of the United States; or indigenous. A noxious weed is referred to as an undesirable plant because it is of no forage value (or even toxic) or is capable of invading a community and replacing native species.

Most invasive species occur in disturbed areas such as along roadsides and within communities. Invasive species also occur in association with disturbances from placer mining, recreation, road repair and gravel extraction. Most of these species come from South America, Europe, Asia, or Russia. These plants were usually imported, either intentionally for their perceived value to humans, or inadvertently as contaminants in other products. Invasive species include plants able to establish on a site where they were not present in the original plant composition. Invasive species aggressively out-compete native species within a community and often alter the physical and biotic components enough to affect the entire ecological community. Invasive species are of particular concern following a disturbance.

Presence of nonnative invasive terrestrial plant species is undesirable as a departure from properly functioning condition (see Section 2.6, Vegetation, for a discussion of properly functioning condition in the context of the planning area). Several indicators can be applied annually as a proxy for field surveys or field monitoring activities in order to assess risk of new infestations or to assess risk of spread of existing populations. These include:

- Acres of burned areas or human activity (including fire suppression or prescribed fire activities) that are proximate to existing infestations
- Acres of planned construction activities, such as new roads, structures, temporary or permanent camps
- Number of permitted mining activities
- Number of special permits issued
- Estimated recreational use (number of users)
- Estimated OHV use (number of vehicles)
- Statewide nonnative invasive plant data to assess new potential threats near the planning area
- Plane or helicopter landings, boat launchings (self-reported or other)
- Habitat mapping that incorporates predicted temperature and precipitation data to predict likely areas of infestation

If field surveys are conducted for detection or monitoring purposes, locations should focus on:

- Recently burned areas
- Areas of recreation use, such as trails, OHV tracks, or campsites
- Special permit areas
- Documented areas of presence or infestations (see Table 2.8.4-1)

- Mining activity areas
- Areas with any reclamation activities
- Any locations with surface-disturbing construction or other activity
- Landing pads or landing strips
- Boat launches or landings
- Areas around structures, cabins, or other infrastructure
- High likelihood areas determined by predictive habitat mapping
- Areas identified by prior surveys as having high likelihood of infestation
- Areas reported through the State of Alaska's online reporting system (phone, online, or email, <http://www.adfg.alaska.gov/index.cfm?adfg=invasive.report>)

**Table 2.8.4-1. Nonnative Invasive Plant Species Known to Occur in the Planning Area**

Family	Scientific Name	Occurrences	Common Name	Rank
Amaranthaceae	<i>Amaranthus retroflexus</i>	1	redroot pigweed	45
Asteraceae	<i>Crepis tectorum</i>	126	narrowleaf hawksbeard	56
	<i>Gnaphalium uliginosum</i>	1	marsh cudweed	Not Assigned
	<i>Leontodon autumnalis</i>	7	fall dandelion	51
	<i>Leucanthemum vulgare</i>	8	oxeye daisy	61
	<i>Matricaria discoidea</i>	85	pineappleweed	32
	<i>Senecio vulgaris</i>	2	common groundsel	36
	<i>Taraxacum officinale</i>	60	common dandelion	58
	<i>Tripleurospermum inodorum</i>	3	scentless false mayweed	48
Brassicaceae	<i>Brassica napus</i>	1	rapeseed	47
	<i>Brassica rapa</i>	3	field mustard	50
	<i>Capsella bursa-pastoris</i>	11	shepherd's purse	40
	<i>Descurainia sophia</i>	5	herb sophia	41
	<i>Lepidium densiflorum</i>	1	common pepperweed	25
Campanulaceae	<i>Campanula rapunculoides</i>	1	rampion bellflower	64
Caryophyllaceae	<i>Cerastium fontanum</i> ssp. <i>Vulgare</i>	7	big chickweed	36
	<i>Stellaria media</i>	36	common chickweed	42
Chenopodiaceae	<i>Chenopodium album</i>	70	lambsquarters	37
Fabaceae	<i>Caragana arborescens</i>	3	Siberian peashrub	74
	<i>Melilotus albus</i>	1	white sweetclover	81
	<i>Trifolium variegatum</i>	1	whitetip clover	Not Assigned
	<i>Trifolium hybridum</i>	8	alsike clover	57
	<i>Trifolium pratense</i>	3	red clover	53
	<i>Trifolium repens</i>	22	white clover	59
	<i>Vicia cracca</i> ssp. <i>cracca</i>	2	bird vetch	73
Lamiaceae	<i>Galeopsis bifida</i>	16	splitlip hempnettle	50
	<i>Galeopsis tetrahit</i>	8	brittlestem hempnettle	50
Orobanchaceae	<i>Euphrasia nemorosae</i>	3	common eyebright	42

Family	Scientific Name	Occurrences	Common Name	Rank
Plantaginaceae	<i>Linaria vulgaris</i>	9	butter and eggs	69
	<i>Plantago major</i>	80	common plantain	44
Poaceae	<i>Bromus inermis</i>	5	smooth brome	62
Poaceae	<i>Elymus repens</i>	6	quackgrass	59
	<i>Hordeum jubatum</i>	74	foxtail barley	63
	<i>Hordeum vulgare</i>	3	common barley	39
	<i>Lolium multiflorum</i>	1	Italian ryegrass	41
	<i>Lolium perenne</i>	2	perennial ryegrass	52
	<i>Phleum pratense</i>	1	timothy	54
	<i>Poa annua</i>	6	annual bluegrass	46
	<i>Poa pratensis</i> ssp. <i>irrigata</i>	7	spreading bluegrass or Kentucky bluegrass	52
	<i>Schedonorus pratensis</i>	1	meadow fescue	Not Assigned
Polygonaceae	<i>Fallopia convolvulus</i>	2	black bindweed	50
	<i>Polygonum aviculare</i>	41	prostrate knotweed	45
	<i>Rheum rhabarbarum</i>	1	garden rhubarb	Not Assigned
	<i>Rumex acetosella</i>	12	common sheep sorrel	51
	<i>Rumex crispus</i>	3	curly dock	48
Ranunculaceae	<i>Ranunculus repens</i>	3	creeping buttercup	54
Rosaceae	<i>Prunus padus</i>	2	European bird cherry	74
	<i>Prunus virginiana</i>	2	chokecherry	74
	<i>Sorbaria sorbifolia</i>	1	false spiraea	Not Assigned
Violaceae	<i>Viola tricolor</i>	1	johnny jumpup	34

Source: AKEPIC 2016

Known nonnative invasive plant species populations within the planning area have been documented with the Alaska Exotic Plant Information Clearinghouse (AKEPIC) of the ACCS (formerly the Alaska Natural History Program) (AKEPIC 2016) (BSWI Draft RMP/EIS, Map 3.2.8-1). There are 50 species representing 15 families with 758 total occurrences within the planning area, with risk rankings from 32 to 81 (Table 2.8.4-1). Ranking is a score between 0 and 100 based on ecological impacts, biological characteristics and dispersal ability, distribution, and feasibility of control. Scores greater than 80 indicate the species is Extremely Invasive, 70 to 79 are Highly Invasive, both very threatening to Alaska; scores of 60 to 69 are Moderately Invasive, while 50 to 59 are Modestly Invasive, both posing substantial risks to ecosystems in Alaska; scores of 40 to 49 are Weakly Invasive, and scores less than 40 are considered Very Weakly Invasive, and probably do not require as much attention as other species (Nawrocki et al. 2011; Carlson et al. 2008).

ACCS has been controlling infestations of nonnative invasive plant species around the Rohn cabin since 2009 (ACCS 2015). This cabin is a hub of activity for the Iditarod Trail Sled Dog Race, in which a large amount of materials are transported to the site, such as straw for dog bedding. Control methods include a combination of hand pulling, tarping with landscape fabric, and mulching with local materials. The Nixon Fork mine is also thought to have done some invasive control work. There are no other known organized control or eradication efforts underway on known nonnative invasive plant species within the planning area, or on BLM lands within the planning area.

BSWI Draft RMP/EIS, Map 3.2.8-1 illustrates location and numbers of known nonnative invasive terrestrial plant species in the region based on 2016 AKEPIC data. At all known locations, between one and sixteen species were recorded. In some locations, the number of individuals per species or number of species was high, so a scaled map legend best depicts the density across the landscape. The number of species is scaled by smaller green dots (one species), then larger yellow dots (2-5 species), then larger orange dots (lighter shade, 6-10 species; darker shade, 11-15 species), and finally the largest red dot (16 species). Areas with greater concentrations of species may be sources of potential invasion into neighboring non-invaded areas and may be target areas for focused control or eradication efforts. Highest concentrations of species are found in developed areas including villages, roadways, boat landings, airstrips, and trails.

### Nonnative Invasive Aquatic Species

Fish and aquatic biota and habitat, both freshwater and marine, can be affected by invasive species introduced to streams, lakes, ponds, wetlands, estuaries, beaches, coastal areas, and other aquatic habitat. Table 2.8.4-2 lists nonnative invasive aquatic species (plant and animal) that are either known to occur in Alaska or gives the nearest known location for species considered to be high risk to Alaska aquatic habitats. Both freshwater and marine habitats exist in the project area that may be vulnerable to infestation by nonnative invasive aquatic species.

**Table 2.8.4-2. Marine or Freshwater Nonnative Invasive Species with Highest Potential for Spread or Introduction to the Planning Area**

Category	Common Name	Scientific Name	Vector	Habitat and Ecophysiology	Nearest Occurrence
Fish	Atlantic salmon	<i>Salmo salar</i>	Escapement from pens	Estuarine environments. Voracious feeder on juvenile native crab and shellfish.	Washington State and British Columbia fish farms; a few individuals found in Southeast-Southcoastal Alaska areas
Fish	yellow perch	<i>Perca flavescens</i>	Deliberate introductions	Warm or cool lakes, ponds, sluggish streams, lakes with soft bottoms; eats zooplankton then crabs, snails, isopods, and insect larvae. Can compete with native resident fish species.	Native to most of North America including parts of northern Canada; few individuals have been found in central Alaska; species is considered eradicated in Alaska
Crab	European green crab	<i>Carcinus maenas</i>	larval transport in ballast water	Estuarine environments. Voracious feeder on juvenile native crab and shellfish.	British Columbia
Algae	caulerpa, killer seaweed	<i>Caulerpa taxifolia</i>	aquarium dumps; larval transport in ballast water	Cold temperate marine environments. Common aquarium species. Grows voraciously on all surfaces in marine environments. Outcompetes all other species.	Northern California (considered eradicated)
Algae	Asian kelp, wakame	<i>Undaria pinnatifida</i>	larval transport in ballast water; hull fouling	Cold temperate marine environments. Cultivated food species. Outcompetes other species and smothers marine surfaces.	Argentina, New Zealand

Category	Common Name	Scientific Name	Vector	Habitat and Ecophysiology	Nearest Occurrence
Amphipod	no common name	<i>Monocorophium ascherusicum</i>	ballast water	Free marine species. Ecophysiology largely unknown.	Pacific Ocean
Amphipod	no common name	<i>Elasmopus rapax</i>	ballast water	Free marine species, depth range from about 0 to 100 meters. Often among algae in shallow sub-tidal habitats.	Pacific Ocean
Ascidian - colonial tunicate	sea squirt, marine vomit, d-vex	<i>Didemnum vexillum</i>	floating rafts, infested material, infested aquaculture stock	Forms colonies. Completely smothers seafloor, grows over all substrate and other organisms, destroys marine habitat.	Sitka, AK; west coast of North America
Ascidian - colonial tunicate	star ascidian, golden star tunicate	<i>Botryllus schlosseri</i>	floating rafts, infested material, infested aquaculture stock, hull fouling	Forms colonies in flat sheets that often appear lobate. Adheres to docks, boat hulls, buoys, ropes, pilings, rocks, mussels, solitary sea squirts, seaweeds, and eelgrass. Filter feeder by water pump.	West coast of North America; Asian Pacific Ocean
Ascidian - colonial tunicate	sea squirt	<i>Botrylloides violaceus</i>	floating rafts, infested material, infested aquaculture stock, hull fouling	Forms colonies arranged in columnar systems with a firm, clear matrix. Adheres to docks, boats hulls, buoys, ropes, pilings, rocks, eelgrass blades, and seaweeds. Overgrows mussels, barnacles, bryozoans, and solitary sea squirts. Filter feeder by water pump.	Detected in Gulf of Alaska; North Pacific Ocean
Ascidian - solitary tunicate	vase tunicate, sea squirt	<i>Ciona intestinalis</i>	hull fouling, infested materials, ballast water	Solitary form with vase-like shape. Grows on pilings, aquaculture gear, floats, and boat hulls. Lower intertidal to tidal zone	Asian and North Pacific Ocean
Ascidian - solitary tunicate	transparent ciona, Pacific transparent sea squirt	<i>Ciona savignyi</i>	hull fouling, infested materials, ballast water	Solitary form with pillar-like shape up to 15 cm long. Forms dense patches on docks, pilings, marinas, harbors, and aquaculture structures.	West coast of North America
Ascidian - solitary tunicate	club tunicate, stalked tunicate	<i>Styela clava</i>	hull fouling, infested materials, ballast water	Solitary form with club-like shape up to 20 cm long. Often covered with other organisms. Grows on rocks, floats, pilings, oyster and mussel shells, and seaweeds. Filter feeder by siphon.	Asian Pacific Ocean
Bryozoan	no common name	<i>Waterispora subtorquata</i>	hull fouling	Colonial growth on rocks, shells, docks, vessel hulls, pilings, debris, kelp holdfast, other bryozoans.	Pacific Ocean

Category	Common Name	Scientific Name	Vector	Habitat and Ecophysiology	Nearest Occurrence
Bryozoan	spiral tufted bryozoa	<i>Bugula neritina</i>	hull fouling	Colonial growth in upright, bushy, branching tufts up to 15 cm, often mistaken for seaweed. Filter feeding by tentacles. Grows in intertidal to shallow subtidal zones on docksides, buoys, pilings, rocks, shells, seaweeds, sea grasses, sea squirts, and other bryozoans.	Pacific Ocean
Snail	Japanese drill snail, hornmouth snail	<i>Ceratosoma inornatum</i>	larval transport in ballast water	Estuarine and marine habitats in cool waters. Feeds voraciously on oysters.	British Columbia
Snail	Eastern oyster drill, Atlantic oyster drill	<i>Urosalpinx cinera</i>	ballast water	Intertidal and shallow subtidal waters to a maximum depth of 15m. Common on rocks and oyster reefs. Feeds on oysters, barnacles, mussels, and snails.	British Columbia
Snail	Eastern mud snail	<i>Nassarius obsoletus</i> ( <i>Ilyanassa obsoleta</i> )	larval transport in ballast water	Mud flats in intertidal and shallow subtidal zones, in sounds and inlets. Forms large herds. Feeds on diatoms, algal detritus, worms, dead fish, crabs, and other animal remains.	Northern California
Copepod	no common name	<i>Oithona davisae</i>	ballast water	Free marine species in temperate coastal waters. Ecophysiology largely unknown.	Detected in Pacific Ocean near California
Aquatic Plant, Marine	cordgrasses	<i>Spartina</i> spp. ( <i>S. alterniflora</i> , <i>S. anglica</i> , <i>S. alterniflora x foliosa</i> , <i>S. densiflora</i> , <i>S. densiflora x foliosa</i> , <i>S. patens</i> )	floating plant parts	Mudflats. Fills and uplifts habitats. Alters fish nursery habitat structure and shoreline structure.	British Columbia
Aquatic Plant, Freshwater	elodea, waterweed	<i>Elodea</i> spp. ( <i>E. nuttallii</i> , <i>E. canadensis</i> , hybrids)	plant parts, transport by float plane or boat	Still or moving freshwater lakes, ponds, and streams. Tolerates freezing and very cold temperatures. Can reproduce from tiny fragments. Spreads rapidly. Outcompetes native aquatic vegetation and chokes waterways.	Chena Slough, Fairbanks, AK; Kenai Peninsula, AK; Anchorage, AK; Matanuska-Susitna Valley, AK

Source: Davis 2015; Shaw 2015

Fourteen nonnative invasive fish species have been identified as occurring in Alaska, including Atlantic salmon (*Salmo salar*) and yellow perch (*Perca flavescens*) (McClory and Gotthardt 2008). Of these fourteen species, some are considered native to other parts of the state but have been noted in new parts of the state in which the species was not previously known to occur and was not considered native. None of the listed fish species have been demonstrated to establish breeding populations in Alaska. Northern pike, a fish species that does occur within the planning area, is considered to be a nonnative invasive fish species in parts of the state but is considered native within the entire planning area (ADF&G 2018b).

Only one nonnative invasive freshwater plant species, elodea or waterweed (*Elodea canadensis*, *E. nuttallii*, and hybrids) is known within the State of Alaska. This species could survive in habitats within the planning area, although elodea is not currently known to occur within the planning area. Elodea can be transported by several vectors including freshwater vessels, floatplanes, birds such as waterfowl, or on gear or equipment.

Only one nonnative invasive marine species, the seasquirt (*Didemnum vexillum*), is known to occur within the State of Alaska near Sitka. Vessel traffic to the Port of Bethel is a potential vector for nonnative invasive marine species introduction. Ballast water and hull fouling (biofouling) are two major vectors for aquatic invasive species, particularly marine invasive species. Biofouling is considered one of the strongest vectors of invasion transport in marine environments. In Alaska, the EPA Vessel General Permit required for barges outlines BMPs for hull fouling prevention and management but has no regulatory authority. The U.S. Coast Guard, under the Department of Homeland Security, provides information about voluntary anti-fouling practices.

Presence of nonnative invasive aquatic species is undesirable in an ecological context. Several indicators can be applied annually as a proxy for field surveys or field monitoring activities in order to assess risk of new infestations or to assess risk of spread of existing populations. These include:

- Barge traffic numbers (Port of Bethel or smaller ports)
- River vessel volume estimates or counts
- Floatplane landings and boat launchings (self-reported or other)
- Number of special permits issued in or near aquatic habitats
- Estimated recreational use (number of users) in or near aquatic habitats
- Estimated OHV use (number of vehicles) in areas adjacent to aquatic habitats
- Aquatic habitat modeling that incorporates predicted water temperature or level changes to predict likely areas of infestation
- ADF&G statewide data on known infestations
- Vector models that predict rate and direction of spread if infestations are discovered near the planning area

If field surveys are conducted for detection or monitoring purposes, locations should focus on the specific species of interest (freshwater or marine), and include:

- Marine traffic areas (port sites, docks, cargo storage areas, port infrastructure)
- Aquatic areas adjacent to recreation use, such as boat launches, docks, or campsites
- Special permit areas in or near aquatic habitats
- Any newly documented areas of presence or infestations
- Areas with any reclamation activities in or near aquatic habitats
- Any locations with surface-disturbing construction or other activity in or near aquatic habitats
- Water bodies big enough for floatplane presence
- Boat launches or landings
- High likelihood areas determined by predictive habitat or vector modeling



- Areas identified by prior surveys as having high likelihood of infestation
- Areas reported through the State of Alaska's online reporting system (phone, online, or email, <http://www.adfg.alaska.gov/index.cfm?adfg=invasive.report>)

### Nonnative Invasive Mammal Species

Alaska currently has few nonnative invasive mammal species that have spread to the point of causing major ecological effects, except on the Aleutian Islands (ADF&G 2015c). Norway rats (*Rattus norvegicus*) are a nonnative invasive terrestrial mammal species that has colonized numerous cities and islands in Alaska, including Dutch Harbor, Nome, and Fairbanks (ADF&G 2015c). The potential for invasions of rats from barges and other vessels has existed for many years; however, if any have reached shore in any coastal communities or the Port of Bethel within the planning area, they have apparently not persisted or established known colonies. This may be the result of typical invasion barriers, which include a combination of biological factors (e.g., predation by domestic and wild predators), physical factors (e.g., widely distributed small communities that reduce the availability of suitable habitats) and simple luck or lack of sufficient repeated introductions. Rats can have a variety of adverse effects on the ecosystem and other terrestrial mammals, including competition for a wide range of food resources and the potential to spread parasites and diseases. Rats have had devastating effects on some islands, primarily by eating seabirds and disrupting their nesting efforts, but also by changing vegetation patterns and the presence of other predators (AMNWR 2007). Invasions of rats have typically occurred when rats living on marine vessels have escaped while the vessel was in port, or during shipwrecks. Under Alaska law (5 AAC 92.141), it is illegal for any property owner or vessel operator to knowingly transport Muridae rodents (including Norway rats) into Alaska and it is the responsibility of the property or vessel owner to develop and implement ongoing rodent control and eradication plans if any such rodents are discovered.

Presence of nonnative invasive mammal species is undesirable in an ecological context. Due to the currently small numbers of known species in Alaska, there are few indicators that can be applied to assess risk of new infestations or to assess risk of spread of existing populations. These include the following:

- Barge traffic numbers (Port of Bethel or smaller ports)
- River vessel volume estimates or counts
- Historical records of introduction
- Vector models that predict rate and direction of spread if infestations are discovered near the planning area
- ADF&G data on statewide infestations

If field surveys are conducted for detection or monitoring purposes, locations should focus on the following:

- Marine traffic areas (port sites, docks, cargo storage areas, port infrastructure)
- Any newly documented areas of presence or infestations
- High likelihood areas determined by predictive habitat or vector modeling
- Areas identified by prior surveys as having high likelihood of infestation
- Areas reported through the State of Alaska's online reporting system (phone, online, or email, <http://www.adfg.alaska.gov/index.cfm?adfg=invasive.report>)

## Other Nonnative Invasive Species

Nonnative invasive bird and invertebrate species have been detected in Alaska but are not known within the planning area (ADF&G 2015c). Nonnative invasive insect species are forest pests tracked by the Alaska Forest Health Protection Program of ADF&G, in cooperation with the Forest Service, including the introduced birch leaf miner (*Fenusa pusilla*). Birch defoliation has been detected within the planning area in aerial insect and disease detection surveys (U.S. Forest Service 2015), which may indicate presence of the nonnative invasive birch leaf miner but may also be attributed to native insects such as aphids (superfamily *Aphidoidea*). Currently, no serious nonnative invasive pathogens are known to occur in Alaska. Nonnative invasive pathogens include microscopic organisms such as viruses that can cause disease in trees, plants, birds, or wildlife species.

### 2.8.5 Resource Changes: Trends and Forecasts

As most vegetative communities in this large and relatively inaccessible planning area are largely undisturbed by human activities, the volume of NNIS is low. Concentrated populations are found near areas of human disturbance. Given the relatively pristine condition of much of the landscape, early detection and rapid response to any new infestations is key to maintaining healthy landscape conditions. Additional species, beyond those known to occur in the planning area, have been recorded regionally that could potentially move into the planning area. Transport vectors or pathways for invasion include vehicles, vessels, planes, or equipment moving from an invaded location to a non-invaded location without proper sanitation or cleaning practices; ballast water exchange; contaminated soil, nursery stock, or seeds; natural transport through wind, water, animal, or other natural process movement across the landscape; or intentional transport as a result of deliberate action to translocate an organism. Increases in surface-disturbing activities or development may provide additional habitat for establishment of additional or expanded NNIS populations. Control or eradication of existing population should be considered to prevent infestations from spreading into new or larger areas. Education efforts concerning NNIS risks, pathways and vectors may help reduce unintentional and intentional introductions and transport.

Climate change is predicted to increase suitable habitat for all taxa of NNIS in all environments, including terrestrial, marine aquatic, and freshwater aquatic habitat. Alaska was at one time thought to be too cold to support large-scale populations of NNIS; however, invasion demography studies suggest that repeated introductions of viable species within an area of suitable habitat is a stronger driver in successful and persistent nonnative invasive populations. Once established, NNIS have adaptations that may enable them to persist and outcompete native species.

Of serious concern is the potential for introduction and spread of nonnative invasive pathogens such as virus-causing diseases that may impact fish or wildlife species (ADF&G 2015c). Increases in wildfire frequency and severity due to a changing climate have the potential to increase available habitat for invasions, as well as providing more opportunity for introduction by equipment, vehicles, and gear vectors.

## 2.9 Wildland Fire

### 2.9.1 Introduction

This section discusses the policy, management direction, and resource conditions impacting wildland fire in the decision area. A brief history of fire in the planning area, as well as a discussion of fire frequency

and severity and prevalent fuel models in the planning area is included. Vegetation conditions are further discussed in Section 2.6, Vegetation.

## 2.9.2 Laws, Regulations, and Policies

Fire management in Alaska is regulated through the following guidances and procedures:

- Federal Wildland Fire Management Policy of 1995
- Review and Update of the 1995 Federal Wildland Fire Management Policy (January 2001)
- Guidance for Implementation of Federal Wildland Fire Management Policy (February 13, 2009)
- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10 Year Comprehensive Strategy (August 2001)
- Record of Decision: Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (2007)
- BLM Fire Management Handbook #H-9211-1, Healthy Forests Restoration Act of 2003
- BLM Burned Area Emergency Stabilization and Rehabilitation Handbook #H-1742-1 (2007)
- Alaska Land Use Plan Amendment for Wildland Fire and Fuels Management (2016)
- Healthy Forests Restoration Act 2003
- The Federal Land Assistance, Management and Enhancement Act of 2009 (FLAME Act) and Alaska Enhanced Smoke Management Plan for Planned Fire Procedures Manual June 3, 2015 Department of Interior Manual 620 DM 5
- Alaska Master Cooperative Wildland Fire Management and Stafford Act Agreement (2015 or most current)
- Alaska Statewide Annual Operating Plan (2017 or most current)
- Alaska Interagency Wildland Fire Management Plan (2017 review, or most current)

The federal policy identifies guiding principles, management intent and implementation strategies that are to be used to achieve fire management goals and objectives identified in land use plans or specific fire management plans. These principles and policies address fire fighter and public safety, fire management and ecosystem sustainability, response to wildland fire, use of wildland fire, rehabilitation and restoration, protection priorities, wildland urban interface, planning, science, preparedness, suppression, prevention, standardization, interagency cooperation and coordination, communication and education, agency administrator and employee roles and evaluation (USDA et al. 2009).

Federal wildland fire policy forms the basis for all BLM fire management programs in Alaska. In Alaska, the BLM Alaska Fire Service was created to provide suppression services for all DOI agencies and lands conveyed under ANCSA (BLM-AFS 2016). Department of the Interior Manual 620 Chapter 5, the Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement (Alaska Master Agreement) and the Alaska Statewide Annual Operating Plan (Alaska AOP) work together to define an interagency organization that manages wildland fire across agency boundaries throughout the state. The organization separates protecting responsibilities from jurisdictional responsibilities to reduce duplication and provide efficiencies of scale. Current BLM fire management direction for the planning area is defined in the 2005 Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska Environmental Assessment (AK-313-04-EA-001). Operational direction for fire management on BLM-

managed public lands is further defined in the 2005 BLM – Alaska Wildland Fire Management Plan and is supported by direction in the 2006 Alaska Interagency Wildland Fire Management Plan (AIWFMP).

The response to a wildfire is based on the ecological, social, and legal consequences associated with the fire. Suppression strategies are based on the circumstances under which a fire occurs; and will prioritize firefighter and public safety, protecting human communities and infrastructure, and protecting natural and cultural resources threatened.

The AIWFMP, which has been incorporated by reference into the Alaska AOP, defines four Fire Management Options that provide initial response direction for managing wildfires in Alaska. The Management Options span jurisdictional boundaries and are designed to collectively achieve the following:

- Prioritize areas for protection actions and the allocation of available firefighting resources to achieve protection objectives;
- Optimize the ability to achieve land use and resource management objectives and integrate fire management, mission objectives, land use, and natural resource goals; and
- Reinforce the premise that the cost of suppression efforts should be commensurate with the values identified for protection (AWFCG 2016).

Management options are reviewed on an annual basis and may be updated as needed through a process defined in the AIWFMP to ensure they remain consistent with direction provided by jurisdictional RMPs.

For fires extending beyond initial-attack BLM Fire Managers use a decision support process to guide and document wildfire management decisions, provide situational assessments, analyze hazards and risk, define implementation actions and document decisions and rationale for those decisions (FEC 2009). The current decision support process used by BLM, other federal agencies, and the State of Alaska is the Wildland Fire Decision Support System (WFDSS). The WFDSS process is used by managers to bring together the values, objectives, and management requirements identified by all affected jurisdictions; analyze risk associated with the fire using a suite of tools that includes fire behavior and spread prediction models; develop courses of action designed to meet objectives; and document decisions and rationales. The process is iterative and requires periodic re-assessment in order to ensure selected courses of action continue to support objectives and maintain an appropriate level of risk.

### **2.9.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for wildland fire-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS:

- Extent and severity of potential wildland fires
- Potential for human caused fire
- Areas open to fuels treatments, treatment priorities, and restrictions on treatments
- Potential for changes to fuel model acres and fire behavior, including burn severity

## 2.9.4 Current Conditions

### Fire History

Wildfires within the planning area are predominantly ignited by lightning. Human caused fires result from ignitions from campfires, burning debris, vehicles and other sources. In general, fire frequency increases from coastal areas into the interior (BLM 2015a). Fires are rare within 100 miles of the coast. Fire history data for large wildfires reported by BLM from 1977 to 2016 within the planning area show a total of 8,875,141 acres burned (See Table 2.9.4-1) (BLM GIS 2016). Decadal acres burned have increased from a low of 541,421 in the 1980s to a high of 2,709,820 acres in the 1990s (BLM GIS 2016). Acres burned have continued to exceed 2.0 million acres for each 10-year period from 1990 through 2010 (BLM GIS 2016).

**Table 2.9.4-1. Planning Area Decadal Fire History**

Years	Acres Burned
1977-1980	730,136
1980-1990	541,421
1990-2000	2,709,820
2000-2010	2,607,432
2010-2016	2,286,332
<b>Total</b>	<b>8,875,141</b>

Note: Includes all BLM-managed and non-BLM-managed lands within the planning area  
Source: BLM GIS 2016

### Fire Regime

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention but including the possible influence of aboriginal fire use (Agee 1993; Brown and Smith 2000). The five natural fire regime groups are classified based on the average number of years between fires (fire frequency or mean fire interval) combined with characteristic fire severity reflecting percent replacement of dominant overstory vegetation (NIFIT 2010). These five natural fire regimes are defined in Table 2.9.4-2. Approximately 61 percent of the planning area is located with Fire Regime Groups III, IV, and V (BSWI Draft RMP/EIS, Map 3.2.9-2). The balance of the planning area comprises 14 percent with unburnable surface material, and 25 percent for which the fire regime has not been determined.

**Table 2.9.4-2. Planning Area Historical Fire Regimes Based on Fire Frequency and Severity**

Fire Regime Group	Fire Frequency and Severity	Percent Vegetation in Planning Area by Fire Cycle (%)	Acres in Planning Area
I	0-35 years; low severity (surface fire most common)	0	0
II	0-35 years; high severity (stand replacement)	0	0
III	35-100+ years; mixed severity	7	3,838,950.5
IV	35-100+ years; high severity (stand replacement)	31	19,766,504
V	> 200 years; high severity (stand replacement)	23	14,335,450

Note: Includes all BLM-managed and non-BLM-managed lands within the planning area. Approximately 14 percent of the planning area is unburnable, and 25 percent is indeterminate.

Sources: Fire regime group definitions source FRCC Guidebook version 3.0, September 2010. Planning area vegetation data source LANDFIRE data (Barrett et al. 2010)

## Fire Fuel Models

Fuels within the planning area include a mix of burnable vegetation types ranging from boreal hardwood and conifer forests to shrub and sedge dominated tundra (see BSWI Draft RMP/EIS, Map 3.2.9-3). Twenty of the forty fuel models in Scott and Burgan's comprehensive set (Scott and Burgan 2005) are represented within the planning area; including models for grasses, shrubs, timber, and non-burnable vegetation types. Table 2.9.4-3 shows the acreage associated with each of these models within the planning area.

Black spruce forests are the most common forest type within the planning area. The interior of the planning area is dominated by Alaskan black spruce communities that form mosaics with quaking aspen-birch, white spruce, and mixed wood (spruce-hardwood) stands. Black spruce is adapted to fire through semi-serotinous cones held high in the canopy that rain seed for several years post-fire. Their seeds can germinate and survive on remaining duff after low and moderate severity fires. High severity fires that burn to mineral soil favor the establishment of birch or aspen. Black spruce is susceptible to crown fire because they retain lower branches near ground level and maximum foliar moisture content is much lower than other conifer species. Wildfire is carried easily from low branches to crowns especially when understory shrubs are present providing ladder fuels to the tree canopy (Fryer 2014).

The major timber fuel models within the planning area include:

- TU4, which includes stands dominated by either black spruce or black/white spruce paper birch, tamarack, and quaking aspen
- TU1, which includes closed white spruce forest types and some scattered paper birch or balsam poplar
- TU5, which includes white spruce, ranging in cover from 25–60 percent, black spruce, paper birch, and aspen and a resin birch shrub layer.
- TU3, which includes overstory dominated by black spruce with low productivity, white spruce and paper birch.

The major shrub fuel component within the planning area is SH 2, comprised of birch, willow or ericaceous shrubs.

The major grass fuel models within the planning area include GR1 and GR2. These communities mostly comprise tundra dominated by grasses and sedges, primarily tussock cotton grass (*Eriophorum vaginatum*) or Bigelow's sedge (*Carex bigelowii*). Associated species are dryas, lichens, bearberry, Vaccinium species, crowberry, mountain heath, and cassiope. Mosses and lichens are nearly continuous (Scott and Burgan 2005; Cella et al. 2008).

**Table 2.9.4-3. Fuel Models within Planning Area**

Fuel Model Code	Fuel Model Name	Fuel Model and Fire Behavior Description	Fuel Model Acres within Planning Area
NB 1	Non-burnable	Consists of land covered by urban and suburban development.	2,114.8
NB 2	Non-burnable	Consists of Land covered by permanent snow or ice is included	127,559.7
NB 8	Non-burnable	Includes land covered by open bodies of water such as lakes, rivers	4,909,670.6
NB 9	Non-burnable	Includes bare ground	4,845,233.8

Fuel Model Code	Fuel Model Name	Fuel Model and Fire Behavior Description	Fuel Model Acres within Planning Area
GR 1	Grass - short grass	Includes short, sparse grass - predicted spread rate and flame length are low compared to other GR models. These communities are dominated by dryas, fruticose lichens, bearberry, Vaccinium species, crowberry, mountain heath, cassiope, sedges are common, primarily tussock cotton grass ( <i>Eriophorum vaginatum</i> ) or Bigelow's sedge ( <i>Carex bigelowii</i> ), mosses and lichens are nearly continuous. Dwarf willows and shrubs, like alder, may be tall or short with less than 25 percent cover growing (Scott and Burgan 2005; Cella et al. 2008).	8,980,472.3
GR 2	Grass - low load	Low Load - Short, Sparse Dry Climate Grass - Load is greater than GR1, and fuelbed may be more continuous. These communities are dominated by dryas, fruticose lichens, bearberry, Vaccinium species, crowberry, mountain heath, cassiope, sedges are common, primarily tussock cotton grass or Bigelow's sedge, mosses and lichens are nearly continuous. Dwarf willows and shrubs, like alder, may be tall or short with less than 25 percent cover growing (Scott and Burgan 2005; Cella et al. 2008).	6,530,732.1
GR 3	Grass-coarse	Low Load, Very Coarse, Humid Climate Grass - Grass and herb fuel load is relatively light; fuelbed depth is about 2 feet.	604,952.6
GR 4	Grass-moderate load	Moderate Load, Dry Climate Grass - Continuous, dry-climate grass load and depth are greater than GR2; fuelbed depth is about 2 feet.	190,694.4
GS 1	Grass Shrub -low load	Low Load, Dry Climate Grass-Shrub - Primary 1 carrier of fire in GS1 is grass and shrubs combined. Shrubs are about 1 foot high, grass load is low. Spread rate is moderate; flame length low.	1,855,389.4
SH 1	Shrub – low load	Low Load, Dry Climate Shrub - Primary carrier of fire is woody shrubs and shrub litter. Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate is very low; flame length very low.	179,460.1
SH 2	Shrub – moderate load	Moderate Load, Dry Climate Shrub - The primary carrier is woody shrubs and shrub litter, moderate fuel load (higher than SH1), no grass fuel present, spread rate is low; flame length low. Comprised of birch, willow or ericaceous shrubs.	3,717,768
SH 3	Shrub – moderate load	Moderate Load, Humid Climate Shrub - Primary carrier of fire in SH3 is woody shrubs and shrub litter. Moderate shrub load, possibly with pine overstory or herbaceous fuel, fuel bed depth 2 to 3 feet. Spread rate is low; flame length low.	713,291
TL 1	Timber Litter – low load	Low Load Compact Conifer Litter - Primary carrier of fire is compact forest litter. Light to moderate load, fuels 1 to 2 inches deep, spread rate is very low; flame length very low.	11,719.5
TL 2	Timber Litter-low load	Low Load Broadleaf Litter - Primary carrier of fire is broadleaf (hardwood) litter spread rate is very low; flame length very low.	3,019,850.9
TL 3	Timber Litter-moderate load	Moderate Load Conifer Litter - Carrier of fire is moderate load conifer litter, light load of coarse fuels. Spread rate is very low; flame length low.	258,096.8
TL 6	Timber Litter-moderate load	Moderate Load Broadleaf Litter - Carrier of fire is moderate load broadleaf litter, less compact than TL2, spread rate is moderate; flame length low.	2,320,178.7
TU 1	Timber-Understory-low load	Low Load, Dry Climate Timber-Grass-Shrub – Primary carrier of fire is low load of grass and/or shrub with litter. Spread rate is low; flame length low. Includes closed white spruce forest types and some scattered paper birch or balsam poplar	5,890,772.8
TU 3	Timber-Understory-moderate load	Moderate Load, Humid Climate Timber-Grass-Shrub - Primary carrier of fire is moderate forest litter with grass and shrub components. Extinction moisture is high. Spread rate is high; flame length moderate. Includes overstory dominated by black spruce with low productivity, white spruce and paper birch.	74,491.7
TU 4	Timber-Understory Dwarf Conifer	Dwarf Conifer with Understory - Primary carrier of fire is short conifer trees with grass or moss understory. Spread rate is moderate; flame length moderate. Dominated by either black spruce or black/white spruce paper birch, tamarack, and quaking aspen	7,289,361.8

Fuel Model Code	Fuel Model Name	Fuel Model and Fire Behavior Description	Fuel Model Acres within Planning Area
TU 5	Timber-Understory- High load	Dwarf Conifer with Understory - Primary carrier of fire is heavy forest litter with a shrub or small tree understory. Spread rate is moderate; flame length moderate. Includes white spruce, ranging in cover from 25–60%, black spruce, paper birch, and aspen and a resin birch shrub layer.	5,017,930.9

Source: Scott and Burgan 2005

Includes all BLM-managed and non-BLM-managed lands within the planning area.

## Fuels Management

BLM uses an integrated vegetation management approach to achieve hazardous fuels management objectives. Management actions include vegetation manipulation to remove hazardous fuels to reduce the severity, intensity and spread of wildfire. Common treatment methods include prescribed fire, mechanical manipulation (e.g., mowing), applying herbicides, seeding, and biological treatments to reduce fuels or create fuel breaks. Treatments are strategically placed to support suppression operations, protect human communities and protect important resource values. Vegetation manipulation treatments serve also to improve vegetative health by enhancing species diversity and sustainability. Following treatments, areas may be seeded where residual vegetation is not adequate to naturally revegetate or to prevent soil erosion. Minimal restriction on hazardous fuels treatments are currently in place, however, there have been few BLM hazardous fuel treatment projects implemented within the planning area.

Prescribed fire is used to alter, maintain, or restore vegetative communities to achieve desired resource conditions and protect life, property, and values that would be degraded or destroyed by wildfire. The BLM utilizes the Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS484) (2014) for guidance, procedures, and planning prescribed fires. This handbook identifies; goals and responsibilities, risk management, which includes requirements for preparation of prescribed fire burn plans, ignitions plans, contingency planning and smoke monitoring (NWCG 2014). Minimal restriction on prescribed fires are currently in place, however, there have been no known prescribed fires in the planning area other than pile burning.

## Emergency Stabilization and Rehabilitation

The BLM utilizes the Burned Area Emergency Stabilization and Rehabilitation Handbook #1742 (2007), which provides policies, standards, and procedures used for stabilization and rehabilitation of burned areas following wildfire. Emergency stabilization and rehabilitation (ES&R) management includes planned actions to minimize the threats to life and property resulting from wildfire and to stabilize and prevent unacceptable degradation of natural and cultural resources from the effects of wildfire (BLM 2007b). Treatments to stabilize and/or rehabilitate burned areas may include installation of erosion control structures, removal of hazardous trees, replacement of burned or damaged values, soil stabilizations treatments such as seeding, planting, mulching, stabilization, invasive plant and weed control, and use closures. ES&R funds can only be spent on ANCSA corporation lands when there is a "direct benefit" to federal lands as authorized by the Wyden Amendment, such as preventative measures on Native corporation lands designed to prevent degradation of nearby federal lands (AWFCG 2016). ES&R project priorities within the planning area include; providing public health and safety, erosion control treatments, tree felling, slash spreading, travel corridor treatments, repair of facilities and infrastructure and post fire monitoring.



## Smoke Management

Smoke is managed by the BLM in consultation with the ADEC, the authority responsible for managing air quality within the state. Smoke from wildfire is not regulated but is considered in control tactics. Smoke from prescribed fire is addressed in burn plans, which are developed in consultation with the ADEC and the Alaska Enhanced Smoke Management Plan (ESMP), written and adopted by the Alaska Wildland Fire Coordinating Group. The ESMP outlines the process and identifies issues that need to be addressed to ensure that prescribed fire minimizes smoke and air quality problems. Prescribed burns are planned to be implemented under favorable atmospheric conditions for smoke dispersion. Historically, there have been no known prescribed burns within the planning area. The AWFCG maintains an Air Quality and Smoke Management Committee.

## Fire Prevention

Fire prevention includes agencies, partners, affected groups, and individuals working together to prevent unauthorized ignition of wildfires. The primary goal of fire prevention and education is to reduce human caused fires through education. Most fires within the planning area are lightning caused with few human-caused fires; see Table 2.9.4-1. Fire prevention and education efforts are challenged by the remoteness of communities in the planning area. Prevention education is provided in conjunction with local fire crew training, Community Wildland Fire Protection Planning, FireWise planning, and organized workshops and conferences in larger communities. The AWFCG maintains a Fire Prevention Committee.

### 2.9.5 Resource Changes: Trends and Forecasts

Ecological condition of most vegetation within the planning area show little departure from historical conditions as the planning area is remote, access is limited, and there have been relatively few resource uses or activities that have changed vegetation conditions. Areas where ecological conditions show a vegetation departure from historic conditions include areas disturbed from wildfire, road construction, logging along river corridors, and areas where nonnative plant species have established (BLM 2015b). Native spruce bark beetle (*Dendroctonus rufipennis*) infestations were documented in the late 1990s and early 2000s, and impacted forest cover primarily in the Kenai Peninsula (ADNR 2018; USDA 2018). Current and prior outbreaks have been attributed to warming winters that allow the species to overwinter increasing population size. Infestations can change fuel types and contribute to increased large woody debris accumulation. However, there is little evidence that dead or diseased trees have greatly increased the intensity, size, or duration of wildland fires in the planning area.

The highest level of anthropomorphic vegetation changes in the planning area can be seen in areas along river corridors and near mines logged for fuel wood. Most BLM-managed land, however, is not near navigable rivers. It is anticipated that future conditions of vegetation would continue to be impacted by these factors on a limited, site specific basis. There have historically been few BLM hazardous fuel treatment projects implemented within the planning area and no prescribed fires. It is anticipated that future treatments would continue to be limited but may be implemented for the protection of site specific resources.

The location, number, and size of wildfire may be impacted by changing climate conditions. As noted in Section 2.2, Climate Change, Alaska has experienced the largest regional warming of any state in the U.S., with a rise in statewide average annual temperature of 3 degrees F and a rise in average winter temperature of 6 degrees F over the last 60 years. Average annual temperatures in Alaska are projected to rise by an additional 2 to 4 degrees F by 2050 (NCA 2014).

These warming conditions have contributed to the increase in the number and size of wildfires. Increased summer temperatures dry fuels increasing the potential for wildfires ignition and spread. Decadal acres burned within the planning area have increased from a low of 541,421 in the 1980s to a high of 2,709,820 in the 1990s. Decadal acres burned have continued to exceed 2 million in Alaska for each of the ten-year periods from 1990 through 2010 (see Table 2.9.4-1). Drought conditions have reduced fuel moisture in vegetation and organic soil layers increasing the potential for larger more intense wildfires. Larger wildfires may cause potential shifts of forest types that currently dominate the Alaskan boreal forest resulting in a decline in abundance of black spruce and increasing the potential of deciduous forests in former black spruce habitat (Euskirchen et al. 2010). Ecosystems in the planning area are stressed by climate change.

## 2.10 Cultural Resources

### 2.10.1 Introduction

It is important to note that under NEPA, impacts to all types of cultural resources are considered even if they are not National Register of Historic Places (NRHP)-eligible, i.e., designated as “historic properties” per the National Historic Preservation Act (NHPA). A wide range of cultural resource types can include, but are not limited to:

- “Cultural resources” can refer to specific locations and/or tangible remains and material evidence resulting from, or associated with, past human activity. Cultural resources also include traditional cultural properties, defined by associations with the practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. Cultural resources encompass a diverse array of property types including sites, buildings, structures, objects, and districts.
- Historic properties defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria” (36 CFR 800.16), and as used in Section 106 of the NHPA.
- Native American (in this case, Alaska Native) cultural items such as human remains, funerary items, sacred objects, and objects of cultural patrimony.
- Archaeological resources, which include pre-contact (i.e., dating to the period in North America predating the arrival of Euroamericans) and historic archaeological sites that may or may not be historic properties.

Certain places of traditional, cultural, or religious importance to a living community or cultural group may qualify for consideration as Traditional Cultural Properties (TCPs). TCPs can include:

- Cultural resources entail the traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, such as local indigenous groups, ethnic groups, or the people of the state or nation as a whole. As such, cultural resources can consist of locations associated with the traditional beliefs of native groups, locations where native religious practitioners have historically gone, or go to today, or a location where a community has traditionally carried out the economic, artistic, and other cultural practices important in maintaining its identity (Parker and King 1998).

The term “cultural resources” also includes:

- Cultural landscapes, which are classified either as historic sites, historic designed landscapes, historic vernacular landscapes, or ethnographic landscapes (ACHP 2012a, 2012b; Page et al. 1998).

### **2.10.2 Laws, Regulations, and Policies**

Federal historic preservation laws provide a mandate and procedures for the identification, documentation, evaluation, and protection of cultural resources that may be affected by federal undertakings or actions. The NHPA (54 U.S.C. 300101 et seq. as amended), as outlined in its implementing regulations 36 CFR 800 (“Protection of Historic Properties”), is the primary piece of federal legislation protecting cultural resources in cases where federal undertakings would have an effect. Section 106 of the NHPA requires federal agencies to consider the effects of their “undertakings” on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. “Undertakings” is a NHPA term defined by 36 CFR 800.16 (y) as “a project , activities, or program funded in whole or in part under the jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.”

NEPA requires federal agencies involved in actions to consider the potential effects to the “human environment”—an all-encompassing term that has been interpreted to include historical and archaeological resources. Under NEPA, the term “cultural resources” covers a wider range of resources than the “historic properties” considered under Section 106 of the NHPA, and includes sacred sites, archaeological sites not eligible for the NRHP, and archaeological collections (CEQ and ACHP 2013).

The National Trails System Act (NTSA) (16 U.S.C. Section 1241) addresses management of national recreation, scenic, and historic trails including the Iditarod National Historic Trail (INHT) and connecting or side trails providing access to the INHT. The NTSA directs the Secretary of the Interior or the Secretary of Agriculture to administer and manage designated National Trails. Section 7(c) of the NTSA requires the assessment of potential effects of proposed actions on designated National Trails. While BLM is the federal administrator for the INHT, the INHT traverses federal, State, and private land.

Numerous other laws, regulations, and EOs protect cultural resources. The Antiquities Act of 1906 (16 U.S.C. 431 et seq.) was the first legislation protecting archaeological sites on public lands and establishes penalties for damage and destruction of archaeological sites on federal lands. The Archaeological Resources Protection Act of 1979 (ARPA; 16 U.S.C. 470) establishes a permit process on public and Native American lands and provides penalties for violations and damages to archaeological sites. The American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S.C. 1996) requires that federal agencies consider the effects of their actions on cultural resources that are of religious significance to Native Americans and Alaska Natives. EO 13007 (“Indian Sacred Sites”) directs federal agencies to allow Native Americans to worship at sacred sites located on federal property and to avoid adversely affecting such sites to the extent practicable. EO 13287 “Preserve America” directs federal agencies to build partnerships with local governments, Indian tribes, and the private sector to preserve cultural resources, and improve the stewardship of cultural resources.

The Native American Graves Protection and Repatriation Act (NAGPRA; 25 U.S.C. 3001-3013) addresses the rights of lineal descendants, Indian tribes, and Native organizations to Native American cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony. Alaska’s State laws are also applicable to the discovery of human remains. The State Medical

Examiner has jurisdiction over all human remains in the state, regardless of age. Specifically, AS 11.46.482(a)(3), which applies to all lands in Alaska, makes the “intentional and unauthorized destruction or removal of any human remains or the intentional disturbance of a grave” a class C felony; AS 41.35.200, which applies only to State lands, makes the disturbance of "historic, prehistoric and archaeological resources" (including graves, per definition) a class A misdemeanor. AS 18.50.250, which applies to all lands in Alaska, requires permits for the transport, disinterment, and reinterment of human remains. Regulations found in AS 12.65.5 require the immediate notification of a peace officer of the state (police, Village Public Safety Officer, or Alaska State Trooper) and the State Medical Examiner when death has been caused by unknown means, such as human remains found in archaeological contexts.

Other federal cultural resource protections include: the Historic Sites Act of 1935 (16 U.S.C. 461467); EO 11593, Protection and Enhancement of the Cultural Environment, May 13, 1971 (36 CFR 8921); the Archaeological and Historic Preservation Act of 1974, which amends the Reservoir Salvage Act of 1960 (P.L. 86523; P.L. 93291; 16 U.S.C. 469 et seq.); Curation of Federally Owned and Administered Archaeological Collections (36 CFR 79); 43 CFR, subpart 62, 3622, 3621, 3610, 3802, 3809, 8200, 1610.72, 8364, and 8365.15; and 43 CFR 3809.420(b)(8).

State of Alaska laws and regulations require State agencies to consider the effects of their actions on cultural resources. The Alaska Historic Preservation Act (AS 41.35.070) codifies the State policy to preserve and protect the historic, prehistoric, and archaeological resources of Alaska and asserts the State’s title to all historic, prehistoric, and archaeological resources situated on land owned or controlled by the State, including tideland and submerged land. If a project requires any involvement from the State of Alaska, a review under the Alaska Historic Preservation Act is needed. This includes public construction, public improvement, or any other project undertaken by the state, or governmental agency for the state by a private person under contract with or licensed by the state, or agency for the state.

### **NEPA Definition of Cultural Resources**

Under NEPA, a wider range of cultural resource types are assessed and can include, but are not limited to:

- Historic properties, defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior,” in 33 CFR 325, Appendix C.1 (a) and (b), and as used in Section 106 of the NHPA.
- Native American cultural items such as human remains, funerary items, sacred objects, and objects of cultural patrimony.
- Archaeological resources, which include prehistoric and historic archaeological sites that may or may not be historic properties.
- Cultural uses of the natural environment, such as traditional cultural use of places, plants, animals, and minerals.
- Locations of traditional cultural, ceremonial, spiritual, or religious importance, or sacred sites.

### **Historic Properties**

Section 106 of the NHPA requires federal agencies to consider an undertaking’s effects on “historic properties,” which are defined as cultural resources listed or determined eligible for listing on the NRHP (16 U.S.C. 470, Sec. 301.5). The NRHP is the nation’s inventory of significant cultural resources; it contains a wide range of historic property types such as buildings, structures, sites; groups of structures,

buildings and sites forming historic or archaeological districts or cultural landscapes; and individual objects. Such properties reflect many kinds of significance in architecture, history, archaeology, and culture. In addition to location and site boundaries, the NRHP contains detailed information regarding the property's nature, characteristics, associated elements, integrity, and statements of significance.

The NRHP describes historic resources as standing or collapsed buildings, unique engineering designs, mines, ranches, and railroad grades that are at least 50 years old, or have achieved significance within the past 50 years. Archaeological resources are prehistoric or historic remains of human lifeways or activities that are at least 50 years old, and include artifact concentrations or scatters, whole or fragmentary tools, rock carvings or paintings, and buildings or structures. Resources that incorporate geographic areas, including both cultural and natural features, and that are associated with historic events or other cultural values include Traditional Cultural Properties, cultural landscapes, ethnographic landscapes, rural historic landscapes, and historic mining landscapes (ACHP 2012a, 2012b).

For purposes of Section 106 compliance, resources determined NRHP-eligible through consultation as well as those already listed on the NRHP warrant impact assessment. To qualify as a historic property, a property must generally be at least 50 years old, retain its physical integrity—that is “integrity of location, design, setting, materials, workmanship, feeling and association” (36 CFR 60; NPS 1997), and it must meet the NRHP Criteria for Evaluation (36 CFR 800.4; NPS 1997):

- The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet at least one of the following criteria:
  - **Criterion A** - that are associated with events that have made a significant contribution to the broad patterns of our history;
  - **Criterion B** - that are associated with the lives of persons significant in our past; or
  - **Criterion C** - that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
  - **Criterion D** - that have yielded, or may be likely to yield, information important in prehistory or history.

If significant (i.e., NRHP-eligible) resources are identified, then federal agencies are directed to take prudent and feasible measures to avoid or reduce adverse impacts.

Prehistoric archaeological sites are most often found eligible under Criterion (d), while archaeological sites containing historical deposits as well as some prehistoric sites are also often considered under criteria (a) through (c) when applicable. Likewise, historic buildings and structures (as opposed to archaeological sites) are assessed under a variety of NRHP criteria. While nearly all sites have the potential to yield information useful in addressing a limited number of research questions, this limited potential is not considered sufficient to qualify a site for inclusion on the NRHP under Criterion (d). By establishing guidelines, agencies have clearly set the precedent that not all information is important, and thus, not all sites are important. Federal guidelines encourage the use of a set of research questions that are generally recognized as important research goals as a means of evaluating significance. If a site contains information that is demonstrably useful in answering such questions, it can be considered an

important site. NRHP evaluation guidelines state that a site must retain integrity to be considered eligible under one or more of the criteria.

### Traditional Sites

Cultural resources also include TCPs that are important to a community's practices and beliefs and that maintain a community's cultural identity. In order to be eligible for listing on the NRHP, a traditional property must be associated with the cultural practices or beliefs of a living that are: (1) rooted in that community's history, and (2) are important in maintaining the continuing cultural identity of the community. As with the case of historic properties described above, to qualify for listing on the NRHP TCPs must retain integrity—that is, integrity in terms of both physical characteristics, and also integrity of the relationship between the property and the cultural beliefs or practices that may give it significance. Thus, two crucial questions arise in assessing NRHP eligibility and Section 106 considerations in relation to TCPs: 1) does the property retain an integral relationship to traditional cultural practices or beliefs, and 2) is the condition of the property such that the relevant relationships survive? (Parker and King 1998).

As established under AIRFA, federal agencies are required to consider the effects of their actions on sites, locations, areas, and other resources (e.g., plants) that are of religious significance to Native Americans and Alaska Natives. AIRFA also mandates that federal agencies protect and preserve access to sacred sites. Verifiable Native American and Alaska Native graves, burial grounds, and associated funerary objects are protected by NAGPRA.

### Cultural Landscapes

Section 106 reviews can reveal a large-scale historic property of cultural and religious significance to Indian Tribes or Alaska Native organizations. These large-scale properties are often comprised of multiple, linked features that form a cohesive "landscape" (ACHP 2011). The NPS (Birnbaum 1994) defines a cultural landscape as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person exhibiting other cultural or aesthetic values." The same document describes four general types of cultural landscapes, which are not mutually exclusive (Birnbaum 1994):

- ***Historic Designed Landscape*** comprised of built environment features a landscape that was consciously laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles, or an amateur gardener working in a recognized style. The landscape may be associated with a significant person(s), trend, or event in landscape architecture. Aesthetic values play a significant role in designed landscapes. Examples include parks, campuses, and estates.
- ***Historic Vernacular Landscape*** that has evolved through use by the people whose activities or occupancy shaped that landscape. Through social or cultural attitudes of an individual, family or a community, the landscape reflects the physical, biological, and cultural character of those everyday lives. Function plays a significant role in vernacular landscapes. They can be a single property such as a farm or a collection of properties such as a district of historic farms along a river valley. Examples include rural villages, industrial complexes, and agricultural landscapes.
- ***Historic Sites Landscape***, which is a landscape significant for its association with a historic event, activity, or person. Examples include battlefields and president's house properties.
- ***Ethnographic Landscape***, which contains a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, religious

sacred sites and massive geological structures. Geographic features, plant communities, animals, subsistence and ceremonial grounds are often components.

In order to be NRHP-eligible and afforded Section 106 protections, a cultural landscape must possess significance in at least one of the four aspects of cultural heritage defined by the NRHP criteria (Page et al. 1998). The NPS (2009) states that in order for a landscape to be considered significant, character defining features that convey its significance in history must not only be present, but they must also possess physical, historical and cultural integrity. Location, setting, design, materials, workmanship, feeling and association should be considered in determining whether a landscape and its character-defining features possess integrity. Further, to evaluate significance, the contributing elements and features that give the landscape its historic and cultural character should be documented and reported.

### 2.10.3 Resource Indicators

Cultural resource indicators are based on the presence and density of previously identified archaeological, historic, or traditional properties, the probability for the presence of unidentified properties of these types, and the likelihood of impacts to these resources. Identified indicators include the following:

- Acres with no or limited land use restrictions that server to limit surface disturbance and protect cultural resources
- Acres open to actions that cause surface disturbance
- Acres of BLM-managed lands identified for acquisition, retention, or disposal
- Acres affected by land withdrawals
- Land use restrictions that server to limit surface disturbance and protect cultural resources or result in further resource identification
- VRM classes near known sites, particularly the INHT National Trails Management Corridor (NTMC)
- Acres with no or limited (less restrictive) land use designations regarding development uses

### 2.10.4 Current Conditions

#### Regional Prehistory

Given the vast size and remote nature of this area, its prehistory remains poorly understood and most current knowledge comes from coastal or near coastal sites. Archaeological investigations within interior Western Alaska began in the 1920s and 1930s and have been conducted sporadically since that time, with more recent investigations largely linked to specific projects and along major river corridors. Regional chronological sequences have been developed and refined by Ackerman (1979, 1996), and Dumond (1984), and others, and have been summarized by Potter and Cook (2006). From oldest to most recent, these traditions have been termed Paleoindian, American Paleoarctic, Northern Archaic, Arctic Small Tool Tradition, Western Thule/late prehistoric Inupiaq, and Athabaskan.

#### *Paleoindian and Paleoarctic Tradition (~10,000-7,000 years ago)*

The earliest residents of Southwestern Alaska are believed to have migrated from Siberia along a land bridge, though evidence of Paleoindian sites is scarce. The Paleoindian Tradition, dated 10,000 to 8,000 years ago, is the earliest occupation recognized in the region. Though there is some evidence suggesting

human occupation of Southwest Alaska prior to 10,000 years ago, including cut marks on a 15,000-year-old caribou humerus, the earliest sites with unequivocal artifacts date to approximately 10,000 years ago. The nature of archaeological assemblages associated with these sites implies temporal and cultural connections with early sites in more temperate latitudes such as the Great Plains and the American Southwest; fluted points are believed to have been a plains culture element that diffused northward. This complex is typified by the assemblage at Spein Mountain, radiocarbon dated to 10,050±90 BP, which Ackerman has tied to components at the Mesa and Bedwell sites on the North Slope. Information from the Mesa site, along with others such as the fluted point Putu and Lisburne sites, implies temporal and cultural connections with early sites in more temperate latitudes such as the Great Plains and the American Southwest. Remarkable similarities exist in artifact forms, particularly projectile points, scrapers and spurred graters, site settings, and implied subsistence patterns. Ackerman denotes a “non-microblade complex” in southwest Alaska, consisting of lanceolate and leaf shaped projectile points, bifacial knives, graters, notches, various scrapers, and flake knives. Ackerman notes that the occurrence of microblades at Swan Point (Holmes et al. 1996) dating to over 11,000 BP, indicates that this non-microblade complex and Denali Complex are likely contemporary cultural complexes that derive from rather different cultural traditions (Potter and Cook 2006).

With the exception of these few isolated finds, evidence for Paleoindian occupation in the planning area is rare. More commonly encountered is evidence of microblade technology, characteristic of the American Paleoarctic Tradition and generally thought to date to between about 10,000 and 7,000 years ago (Gaines et al. 2006). Side-notched spear points, large knives, chopping tools, scrapers, net sinkers, and burins are associated with the microblade tradition, which emerged coterminous with the late Paleoindian culture and suggests the arrival of new populations traveling across the land bridge and arriving in Western Alaska. Distinctive artifacts found in American Paleoarctic sites are remarkably similar to stone technologies from Northeast Eurasia, suggesting cultural connections across the Bering Land Bridge. American Paleoarctic tool kits are generally thought to have been oriented toward the production of composite antler and stone projectiles, used to hunt late Pleistocene-early Holocene fauna. This cultural tradition of production of parallel-sided prismatic stone blades and microblades underwent several regional variations and spanned the period from about 10,000 to 2,000 years ago. Lime Hills Cave is an example of a site containing evidence of this archaeological culture (Ackerman 1996).

### ***Northern Archaic (~6,000-2,000 years ago)***

Sometime after 6,000 years ago, side-notched projectile points—the hallmark of the Northern Archaic tradition dated to 6,000 to 2,000 years—begin to appear in interior, northern, and western Alaska archaeological assemblages (Potter and Cook 2006). The broad occurrence of this point type throughout interior and northern Alaska and the Yukon Territory, along with distinctive scraping implements and other lithic tools, is thought to perhaps represent the spread of a new boreal forest-oriented cultural tradition, though this interpretation is in part contradicted by similar sites in tundra environments.

Sites in southwest Alaska attributed to Northern Archaic Tradition have been found along the coast (Security Cove) and the interior (GDN-094 at Kagati Lake). Another site, GDN 069, near Goodnews Lake, contained notched points and core platforms. This tradition is as yet undated in the planning area, but based on similar assemblages in the Alaska Peninsula and Interior Alaska, it probably dates to between 5000 and 3500 BP. The Northern Archaic is also represented on the coast of the North Slope at sites such as Kuparuk Pingo and the Putuligayuk River Delta Overlook Site. Little is known of the coastal Northern Archaic subsistence economy, although it is presumed that caribou hunting was important (Potter and Cook 2006).



### ***Arctic Small Tool Tradition (4,500 to 1,100 years ago)***

Following the Northern Archaic Tradition, beginning roughly 4,500 years ago is a prehistoric culture known as the Arctic Small Tool tradition, known for tiny, finely flaked stone tools (Potter and Cook 2006). The original definition of this culture has been expanded, and now includes later cultures such as Norton and Ipiutak (Gerlach and Hall 1988). The dramatic change in stone tool technology from the earlier Northern Archaic to the later Arctic Small Tool tradition assemblages may mark the introduction of the bow and arrow and is interpreted by many archaeologists as a direct ancestral lineage to modern Inuit and Inupiat people in Alaska and the arctic regions of Canada and Greenland. Shaw theorizes that the first inland inhabitants of the Yukon-Kuskokwim Delta arrived about 2000–1500 Before Present, but few sites have been found to prove this theory. Sites with Norton Phase artifacts have been found in southwest Alaska in Unalakleet and Lake Minchumina, among other sites (Dumond 1984; Potter and Cook 2006).

### ***Western Thule and Late Prehistoric (900-1790 AD)***

Following the gradual decline of the microblade tradition is the transition into prehistoric Athabaskan culture. This shift is associated with the appearance and abundance of side-notched points, along with the absence of microblade technology.

As discussed in the BSWI AMS (BLM 2015a), archaeological, linguistic and ethnographic evidence indicates that the Western Thule people are the direct ancestors of the Yup'ik and Iñupiat people who currently inhabit the planning area. Artifacts associated with the Western Thule include ground slate tools, flaked stone tools, pottery, and birch bark baskets (Dumond 1984). Sites in and around the planning area with Western Thule components include Nunivak Island, Hooper Bay, Togiak, and Platinum. Late prehistoric sites include Kolmakovsky Redoubt and Crow Village. Late Prehistoric sites associated with Athabaskan cultures rather than Yup'ik generally consist of subterranean housepit features, flaked stone tools, ground stone artifacts, and a small number of European goods in the case of protohistoric sites. Sites attributed to the Late Prehistoric Athabaskan culture near the planning area include Anvik Point, Lake Minchumina, and Telida Lake (BLM 2015a).

## **Regional Ethnography**

The planning area is inhabited by three Alaska Native cultural groups, divided into several linguistic dialects (BLM 2015b; Krauss et al. 2011). These are the Yup'ik, Iñupiat, and Athabaskan languages (BLM 2015b).

### ***Yup'ik***

As discussed in the BSWI AMS (BLM 2015a), the western portion of the planning area is inhabited by the Central Yup'ik. The Yup'ik speaking Kuskowagamiut, are believed to have moved from the coastal areas up the Kuskokwim drainage into Interior Alaska about 500 years ago. Others have hypothesized that they moved into the Interior slightly later, following the development of fish nets. The Central Yup'ik culture includes several regional subgroups (BLM 2015a; Spartz and Mishler 1985). A Russian Army lieutenant, Zagoskin, who visited the area in the 1840s, noted that this group subsisted primarily on salmon and lived in relatively permanent settlements. Zagoskin's account is the first detailed ethnographic account of this group. Settlements were located mainly along rivers and could contain as many as 300 people. Houses were made from wooden posts and planks and were dug slightly into the ground. Light and heat came from central hearths and from seal oil lamps. Mattresses and blankets were made from

animal skins and were located on wall benches. Cooking was done with both ceramic and wooden dishes, and food was cooked with boiling stones. Structures included houses for women and their older daughters and young children of both sexes, and the men's house, which housed men and older boys and functioned as a bathhouse and ceremonial space. Families lived together when traveling to fish camps away from the main village. Both skin boats and birch bark canoes were used for travel and hauling cargo. Elder members of the community were valued for their knowledge, and the dead were buried in a flexed position in raised plank coffins (BLM 2015a; Spartz and Mishler 1985).

The seasonal round included leaving winter camps for tundra camps by dogsled, where men hunted birds and fished, while women gathered berries. After breakup, people traveled by boat to prepare for summer fishing. At this time, they lived in river villages or in temporary fish camps and fished using nets, weirs, or fish traps. Women dried the fish to prepare it for winter. In the fall, they moved to tundra camps to hunt and trap animals including birds, small game, fur-bearing animals, and caribou. Midwinter was the ceremonial season. People moved back to winter villages and went ice fishing when possible (BLM 2015a; Spartz and Mishler 1985).

### *Iñupiat*

The Iñupiat are found in the north of the planning area, mostly in Unalakleet and nearby coastal areas. Historically, Iñupiat had an egalitarian social structure, with no specified leader. Prior to European and later American arrival, the Iñupiat of the region participated in an economy that relied on subsistence resources and utilized trade to acquire goods not readily available in their immediate area. They traded widely with interior groups. Cooperation was a hallmark of their culture, as families worked together in subsistence hunting and fishing. Iñupiat were also very dependent upon sharing across the community. Aggregated household units considered themselves related and lived in nearby houses. Iñupiat group territories were maintained based on marriage or trading alliances and were also influenced by military conflict (Ray 1986). Groups were defined by kinship as well as membership in hunting parties and further extensions of partnerships and friendships. Historically, men were responsible for the hunting and fishing portions of subsistence, while women were in charge of preparing food and managing the household (BLM 2015a; Schwede 2005).

Iñupiat settlement patterns were characterized by permanent villages along the coast with outlying minor settlements of both permanent and temporary nature. Each village was a focus for social activity as well as identity (Ray 1986). One reason for the Iñupiat villages' permanence was due to the marine mammal resource base from which community members subsisted. Marine mammals, particularly the bowhead whale, provided large quantities of food and had a fairly predictable migratory pattern. Coastal locations also provided access to a variety of other subsistence resources including anadromous fish, sea ducks, invertebrates, and caribou drawn to the area for insect relief.

Ray (1986) provides an overview of the annual cycle of subsistence activities among the Bering Straits Iñupiat. Spring was a renewal period and marked the beginning of the seasonal round. This was one of the most important harvesting seasons as this was the time when whales were hunted, and various groups came together to cooperate in the spring caribou hunt. In summer, the Iñupiat along the coast would harvest walrus and other marine mammals as well as undertake inland trips to harvest caribou or fish. Interior Iñupiat would begin preparations in the summer for traveling to the trading fairs with interior Athabaskan bands. As late summer turned to fall, the Iñupiat participated in their second annual caribou drive. The winter months were passed through various social activities, creating and repairing tools, and searching for seals through the ice, which was a mainstay of the winter diet.

### ***Athabaskan***

The eastern regions of the planning area are Athabaskan territory. Major Athabaskan groups historically living within the planning area are the Holikachuk, Koyukon, Ingalik, Kolchan, and Dena'ina, (BLM 2015a).

The Holikachuk lived along the Innoko River. They had a culture similar to the Ingalik, but they spoke a distinctive language. Because salmon do not spawn in the Innoko, they traveled to the Yukon to gather fish. They generally participated in the ceremonial rounds of the Ingalik that lived around Anvik and Shageluk (BLM 2015a; Simeone 1985).

The Koyukon inhabit the northeastern portions of the planning area. Their subsistence relied heavily on fishing in the summer and on moose, caribou, and small game during the fall and winter. They traded salmon, furs, and wooden goods for coastal foods with the Yup'ik speaking peoples around Norton Sound. The Koyukon exploited their position along the Unalakleet River, an important trade route, and became a kind of middleman for trade between the Norton Sound Yup'ik and the Athabaskans living on the Yukon and Innoko Rivers. They traveled frequently by sled in winter between the coast and the Yukon, and historically relied heavily on this trade, reportedly having to do very little hunting and fishing themselves (BLM 2015a; Simeone 1985; Spartz and Mishler 1985).

The Ingalik lived primarily in the Yukon River drainage, but also lived on parts of the Kuskokwim, Innoko, and Holitna Rivers. They relied heavily on fishing for subsistence, moving from their winter villages to small lakes to begin to look for fresh fish in spring. Throughout the summer and fall, they caught and dried fish, moving and changing tactics depending on the fish and the time of year. They also hunted or trapped small game and birds throughout the summer, while women gathered berries, plants, and eggs. In the fall, they moved back to their villages and semi-subterranean houses, and they ice-fished after the rivers froze. In the winter, men moved inland and hunted caribou and later went fur trapping, while women stayed in the villages and snared rabbits and ptarmigan. The southernmost populations of Ingalik, between the Kolmakov and Holitna Rivers, were strongly influenced by their Yup'ik-speaking neighbors, the Kuskowagamiut, adopting many of their cultural practices, clothing, and dances. The two groups also intermarried and were consequently speaking primarily Yup'ik in this area at the turn of the twentieth century (BLM 2015a; Simeone 1985; Spartz and Mishler 1985).

The Kolchan lived along the upper Kuskokwim River, in an area including the modern communities of McGrath, Medfra, and Nikolai, and were divided into approximately six bands. They subsisted primarily on caribou rather than fish, using small lakes and streams for limited fishing, and using the Kuskokwim for trade and transportation. In the winter, the Kolchan lived in semi-subterranean houses along streams or rivers, and lived off of small game, caribou, and fish. In the spring, they moved upland to caribou hunting grounds, and worked cooperatively to drive caribou into brush corrals they had constructed. In the summer, the men continued to hunt caribou, as well as sheep and bears, while women gathered berries. Some fishing was conducted downstream in the fall, using nets and weirs. Transportation of people and goods was accomplished using birch bark canoes and toboggans, and by using pack dogs (BLM 2015a; Simeone 1985; Spartz and Mishler 1985).

The Dena'ina inhabited areas of Southcentral and Southwestern Alaska, particularly along Cook Inlet, and shared traits with both Inupiaq and other Athabaskans. At the time of Euroamerican contact with Alaskan Natives in the 1700s, the Upper Cook Inlet region was occupied by the Dena'ina. The ethnographic, ethnohistoric, archaeological, and linguistic evidence for Dena'ina movement from interior Alaska shows that sometime around 1,000 to 1,500 years ago, ancestral Dena'ina moved into Cook Inlet from the Kuskokwim River drainage, displacing the earlier Inupiaq or Alutiiq occupation. The interior

groups along the Kuskokwim fished and hunted along the waterways but resources were less abundant than on the coast. Populations consolidated into Lime Village, Nondalton, and Pedro Bay by the 1970s. Considerable intermarriage occurred between the Stony River Dena'ina and Kuskokwim Deg Hit'an over at least the past 100 years. Although Inland Dena'ina Athabaskan is the dominant cultural heritage of Lime Village, by the mid-1980s most residents were of mixed racial heritage. The Cook Inlet remains the Dena'ina heartland, but Dena'ina territory extends in the eastern portions of the planning area. Historically the Dena'ina were a ranked society with a redistributive economic system. High-ranking individuals or "rich men" took the role as leaders and functioned as a center for redistribution of goods. They were responsible for caring for their kin group and were responsible for widows, orphans, and the infirm. Sharing of meat was typical between hunting partners. A small potlatch would be given by a father when his son killed his first big game (Osgood 1976; Townsend 1981).

## Regional History

As discussed in the AMS (BLM 2015a), Captain James Cook and his crews first mapped and documented the coast of the planning area during their search for the Northwest Passage in 1778. Their attempts to further chart the Yukon-Kuskokwim Delta were thwarted by the large amount of mud and silt; concerns over grounding the ships led to Cook's decision to continue north rather than risk damage to the ships.

Russian exploration of the area and expansion of their bases in the Aleutian Islands, driven by the fur trade, began in the 1790s. Employees of the Lebedev-Lastochkin Company traveled from Lake Iliamna to the Nushagak River and from there to the Kuskokwim and then the Yukon Rivers. Another Russian expedition traveled from Lake Clark on the Alaska Peninsula to the Kuskokwim region in 1818, but it was not until 1830 that the Russians specifically explored the Kuskokwim River watershed. At that time, Ivan Vasilev led a party, hoping to expand the reach of their fur trading operation, from Nushagak Bay in the Bristol Bay area to the Kuskokwim, and then followed the river back to the ocean. An aborted mission attempted to ascend the Stony River in 1833; it is believed that this expedition introduced smallpox to the area, killing an estimated half of the population in the Kuskokwim Basin. As a result of these explorations, the first Russian station was established on the Kuskokwim River near present-day Sleetmute in 1832 and 1833. A second, Lukin's Odinochka, was founded farther downstream in 1833, and a third, Kolmakovsky Redoubt, was established even farther downstream in 1841. This third outpost was the only year-round Russian presence in inland western Alaska, but all three stations allowed the Russian-American Company to greatly expand their fur trading activities. A Russian Orthodox Church was established at Kolmakovsky Redoubt. Most historical information on the area is based upon the records of Zogoskin's travels in the area in 1843 and 1844. Russian activity and settlement within the planning area was limited to a few settlements along the Bering Sea Coast, and later, as sea otter populations decreased, on a small number of trading posts (generally seasonal), along the Yukon and Kuskokwim Rivers (BLM 2015a; Spartz and Mishler 1985).

Russians began withdrawing from Alaska in the mid-1860s before the sale of the territory to the United States. Russian-American Company property was sold to the Alaska Commercial Company after the sale of Alaska in 1867, and the Alaska Commercial Company was operating within the planning area by about 1870. A second company, the Western Fur Trading Company, operated a trading post at the site of Lukin's Odinochka from about 1878–83, but American efforts at the fur trade remained minor (BLM 2015a; Spartz and Mishler 1985).

The Moravian and Roman Catholic churches both built missions, as well as boarding schools and orphanages, along the Yukon and Kuskokwim Rivers starting in the late 1880s. The Moravians also introduced reindeer herding into the area, but the enterprise struggled and finally failed in the mid-

twentieth century. Reindeer herding was more successful around the Norton Sound area, where it was managed by missionaries under the guidance of the BIA, and continues there today, where it is permitted by the BLM. The Organic Act of 1884 created a civilian government for Alaska, which included the establishment and management of schools, but soon after the schools were segregated when Native American education, as well as other services like health care, were taken over by the BIA. The main BIA school and medical facility in the planning area were located in Bethel (BLM 2015a; Spartz and Mishler 1985).

The Gold Rush affected events in the planning area, as it did elsewhere in Alaska. Prospectors were reported in the Kuskokwim River basin as early as 1889. Gold was discovered near Aniak in 1900, but very little was found in the end. In 1906, gold was discovered on Ganes Creek, leading to the establishment of the town of Ophir, which in turn became a supply hub for surrounding mines in the Innoko District. The first gold discoveries in the Iditarod District were made in 1908 and led to the founding of the towns of Flat and Iditarod, which led to one of the last major gold rushes in Alaska. The Flat area contained the richest placer deposits within the planning area, and the Iditarod District is the third largest placer district in Alaska. Gold has also been discovered on the Tuluksak River near Aniak, and near the community of Marshall. Lode gold was discovered on the Nixon Fork of the Kuskokwim River in 1918–1919, and active claims still exist on the Nixon Fork Mine. The region is the largest lode gold producer in the planning area; although copper is also mined here. In addition, lode gold has been found near Ophir and Flat. As discussed in the AMS (BLM 2015a), the planning area contains 11 mining districts, and has made a significant contribution to mining in Alaska. NEPA reviews are currently underway for a proposed lode gold mine near Crooked Creek. Russian explorers reported the presence of cinnabar, an ore for mercury, on the Kuskokwim as early as 1838; Red Devil became the largest mercury producer in the state and operated until the 1970s (BLM 2015a; Kurtak et al. 2010).

A larger gold strike was found near Ophir in 1908, and several contemporary discoveries were made along the Yukon and Kuskokwim Rivers, leading to the establishment and boom of communities like Ophir, Iditarod, Flat, Georgetown, and Sleetmute. Mercury also was discovered near Sleetmute in 1906, leading to the establishment of the Red Devil Mine, which reached the peak of its production in 1939 (BLM 2015a; Spartz and Mishler 1985).

Other explorations and activities in the area included a geological exploration in 1898, an exploration of the Kuskokwim headwaters by the U.S. Army in 1899, an ethnographic project by George Gordon in 1907, anthropological research by Ales Hrdlicka in 1930, and a survey of the Government Trail – now known as the Iditarod Trail – by the Alaska Road Commission in 1908 (BLM 2015a; Spartz and Mishler 1985).

The late nineteenth and early twentieth century gold discoveries described above attracted thousands of people to the area. Trails used for thousands of years by the indigenous inhabitants were reused, and trails were extended, improved, or blazed as needed to access mining areas, to become the network of trails known as the Iditarod trail network. Commercial posts were established along transportation routes and in some places grew into communities. In 1908, the Alaska Road Commission (ARC) surveyed a route that became known as the Iditarod Trail. Subsequently, the ARC and other people blazed trails that connected to the surveyed trail. From ARC's survey of the trail through the 1930s, it was the principal long-distance winter overland corridor linking south central Alaska, including the ice-free port at Seward with west central and western Alaska, ending at Nome. From 1930-1942, the trail was heavily used to move mail and freight to mines, camps and villages, and to ship ore from the mines. With the rise of the Alaska

Railroad, and other changes to the state's economy during WWII, the year 1942 effectively marks the end of the Iditarod Trail as a long-distance winter travel route (Antonson and Lewis 2016).

Bethel was the major port and trading center in the planning area in the twentieth century. Commercial fishing began about 1913 at the mouth of the Kuskokwim and continued to be important to the economy of both coastal communities such as Bethel, and to inland communities on the river as fishing expanded. The area was closed to commercial fishing at various times starting in the mid-1920s to allow overfished areas to recover (Spartz and Mishler 1985). While most commercial fishing in the region was concentrated on marine resources, this focus did spread up the Kuskokwim. This economic focus may have led to some population shifts in the Yukon-Kuskokwim Delta and may have led to changes in the subsistence lifestyle of many Yukon-Kuskokwim Delta residents (BLM 2015a).

The Alaska National Guard was established during World War II in several communities within the planning area and was regionally headquartered at Bethel both before and after the war. Today, the most populated commercial communities in the area are Aniak, Bethel, McGrath, St. Michael, and Unalakleet (BLM 2015a; Spartz and Mishler 1985).

### **Known Sites**

The planning area contains a wide variety of cultural resources, including prehistoric resources, historic resources, and traditional use areas important to contemporary Native peoples. However, at this time, a large proportion— more than 90 percent – of the planning area has not been subjected to cultural resources inventory. Nearly all of the archaeological work in the planning area in the past 30 years has been Section 106 surveys (Potter and Cook 2006) or mitigation excavations (Gaines et al. 2006). Most research has been along the coast, though several surveys and excavations have been conducted in the interior. Given the low amount of survey coverage in the planning area, it is reasonable to assume that there are many unknown cultural resources that have been neither inventoried nor evaluated for eligibility for inclusion in the NRHP (BLM 2015a).

### ***Data Sources***

Information presented herein is based primarily on a review of data on file at the Alaska Heritage Resource Survey (AHRS; ADNR-OHA 2016)—a statewide GIS database of archaeological, historical, and paleontological sites that provides locational information and coordinates, descriptions of site characteristics, features, associated artifacts, chronology and time period, NRHP listing or eligibility status if available, site condition, and other important site information. There are, however, certain limitations to AHRS data. Data reported in the AHRS comes from a variety of sources and can be inconsistent, particularly in the case of reported landowner of site location. Many of the sites were recorded before the advent of GPS technology, so reported locations and site extents are often imprecise. While ongoing efforts are underway to update the database, many of the sites have not been frequently updated and may have been removed or destroyed since being reported, may not resemble provided descriptions, or may not be described accurately or in detail. Despite these limitations, however, the AHRS files, including the GIS and map-based data, archived documents, and reports, represent the best available information for archaeological and historic site locations and extents for the project area. BLM sources (BLM 2015a; BLM 2018b) also provided information on cultural resource sites in the planning area.

### ***Archaeological Sites and Historic Properties***

As of 2017, there are 1,932 known archaeological sites in the AHRS database within the boundaries of the planning area. These include both sites on BLM-managed public lands, and those on lands managed by the State of Alaska, other federal agencies, Native corporations, and private landowners. There is a wide variety of historic, prehistoric, and protohistoric site types including prehistoric villages and artifact scatters, historic cabins, historic mining sites, World War II sites, mid-twentieth century Cold War military sites, and historic trails, many of which were used in pre- and proto-historic times. Twenty-eight of the sites are paleontological sites from Lindsey (1986) described in a separate section. The number of site types in the planning area regardless of land status is provided in Table 2.10.4-1.

**Table 2.10.4-1. AHRS Site Types in Planning Area Regardless of Land Status**

<b>Period</b>	<b>Number</b>
Historic	1,200
Historic/Protohistoric	7
Prehistoric	349
Prehistoric/Historic	110
Protohistoric	11
Unknown	227
<b>Total</b>	<b>1,904</b>

Note: Total does not include 28 paleontological sites listed in AHRS.

There are 135 sites within the planning area that have the BLM listed as landowner on their AHRS site card (BLM 2015a). There are also over 900 sites within the planning area that have no landowner listed on their site card. Additional sites list “U.S. Government” as the owner on their site card without naming the specific agency. Some of these might also be located on BLM-managed public lands.

GIS analyses of AHRS geospatial database identify 101 AHRS sites on BLM-managed public lands within the planning area. The discrepancy between this number (n=101) derived from geospatial analysis and the number of sites with the BLM listed as landowner their site card (n=135) is due to limitations with the current state of AHRS data detailed in the preceding section. Twenty of these are paleontological sites listed in Lindsey (1986) and are discussed in a separate section. Table 2.10.4-2 provides site type, except for paleontological, for AHRS sites on BLM-managed public lands in the planning area.

**Table 2.10.4-2. AHRS Site Types on BLM-Managed Lands**

<b>Period</b>	<b>Number</b>
Historic	41
Historic/Protohistoric	3
Prehistoric	27
Prehistoric/Historic	4
Protohistoric	0
Unknown	6
<b>Total</b>	<b>81</b>

Note: Total does not include 20 paleontological sites listed in AHRS.

The number, nature, and location of known cultural resources present within any given area of the planning area vary depending on numerous factors. Some are due to actual site occurrence from

prehistoric and historic human behavior and activity. Others are due to taphonomy, preservation and visibility. In most cases in the planning area, though, known site distribution is primarily influenced by areas where archaeological research has actually been conducted. Through modeling efforts in Alaska, archaeologists have identified several key factors that influence site locations and types including such factors as elevation, slope, aspect, distance to permanent and/or intermittent water, and presence or absence of resources of interest (e.g., fish or wildlife resources, valuable minerals).

The degree to which these factors influence the type and density of cultural resource sites in a given area also varies depending on the time period—prehistoric or historic—considered. For example, technological advances during the historic period made it possible for people to live and work in areas that would have been less desirable during the prehistoric period. Long-term settlements or habitation sites, particularly during the prehistoric period, were typically located in areas in proximity to water resources—on or near rivers, creeks and streams, or lake and coastal shorelines—that would have provided opportunities to harvest fish and marine resources. Short-term camps, however, related to big-game hunting could be located in all types of environments, but are typically found in areas of higher topographical relief that would have provided viewsheds from which to spot animals. Short-term campsites tend to have smaller numbers of artifacts, such as projectile points for hunting, that are typically associated with acquiring a specific resource and they generally lack permanent features such as living or storage structures. Long-term settlements frequently contain large numbers of artifacts and a wider diversity of artifact types, including items for processing rather than simply obtaining resources, and at least some evidence of structures.

Prehistoric sites in the planning area range from surface or shallowly buried lithic scatters, campsites, resource procurement area, and land large pithouse villages. The majority of known sites are located in more easily accessible areas: along the Bering Sea coast on the Yukon-Kuskokwim Delta, along the Yukon, Kuskokwim, and Unalakleet Rivers, and near communities such as Unalakleet and McGrath. Major sites in the northwest portion of the planning area, near the community of Unalakleet, include Old Fish Camp, near the Yukon River, and Unalaqliq and Tagilgayak on the Unalakleet River (BLM 2015a). Sites on the coast are due to prehistoric exploitations of the Bering Sea's rich marine resources. Prehistoric sites occur locally along rivers, streams, tributaries, lakes that would have provided access to fish resources, and on topographically higher terrain with better drained soils and prominent viewsheds from which to spot game animals.

In both BLM lands and the total planning area, historic sites outnumber prehistoric sites. This is likely due to several reasons. First of all, historic sites are typically surface occurrences. They are collapsed and ruined buildings, structures, equipment and other artifacts and features that are visible on or above the present ground surface. Most are less than 100 years old, which means they are likely not completely eroded or degraded down to the ground and are clearly visible today. Consequently, they are found more readily than buried prehistoric sites, and are more likely to be recorded. Second, two of the main occupations that drew people into the region during the early-mid twentieth century were placer gold mining and trapping, and both focused much of their activities immediately alongside creeks and rivers. This extensive, yet narrow geographic focus of activities, typically within a few dozens of feet of a stream edge, makes finding sites related to these two economic activities relatively easy. Third, due to logistical and funding considerations associated with conducting fieldwork in this remote, isolated region, surveys have tended to focus on areas that are relatively cheaper and easier to get to, such as areas immediately adjacent to roads, trails, and floatable rivers and creeks where historic sites tend to be located.



### ***Historic Trails***

Historic and prehistoric trails, whose use is verified by oral accounts, historic records, and physical evidence, are an important resource in the planning area. The AHRS lists 35 trails in the planning area; six of these are plotted within BLM-managed public lands. These are primarily associated with the INHT, discussed in Section 4.2, National Trails, as well as the Iditarod Trail itself, and the Kaltag Portage. Trails in the planning area were used to transport goods, supplies and mail, and include paths and roads used for foot travel, dog sled travel, and mule and horse-drawn transport. Many remain in use (Antonson and Lewis 2016).

The Iditarod Trail network includes primary routes between communities and connecting trails between camps. The network's trails generally follow natural corridors, such as the Kaltag Portage on the Unalakleet River. They were primarily used in the winter when lowlands area were frozen, and rivers, creeks, lakes and tundra could be more easily crossed. Trails and routes used by Alaska Native peoples in prehistoric and protohistoric times were incorporated into the Iditarod Trail network blazed in 1910–1911. For example, the Kaltag Portage, which is a key segment of the Iditarod Trail, provided a vital link from the rivers of interior Alaska to the Bering Sea coast used for thousands of years by Native peoples, as well as early Euroamerican explorers.

### ***Sites of Traditional Cultural Importance***

Sites of traditional cultural importance are distinguished from archaeological sites in order to discuss places of traditional, religious, sacred, or cultural importance that are not necessarily associated with prehistoric or historic artifact assemblages, collections or structures. These sites are typically identified by tribal representatives during the government-to-government consultation process required of federal agencies. Such sites may qualify as TCPs, or large-scale cultural landscapes, under Section 106 of the NHPA. Some common site types are lakes, rivers and springs, land features, and traditional gathering or collection areas.

The BSWI ACEC Summary Report (BLM 2018b), currently provides the best source of data on locations of traditional importance in the planning area. Six potential ACECs meet the relevance and importance criteria for cultural resources. Five of these six ACECs were associated with historic archaeological sites and the Iditarod and Kaltag portage trail networks. One ACEC qualifies as a traditional use ACEC—the proposed Tagagawik River ACEC, a 301,044-acre area that has importance as the region for trade between the Koyukon Athabaskan and Selawik Iñupiat and may qualify as TCP (BLM 2018b). Eight other areas, while not found to meet ACEC criteria, were identified as having important traditional use areas: the Anvik River; the Anvik River watershed; Egavik Creek; the Bonasila River watershed; Old Anvik Village; the Egavik Creek watershed; the Golsovia River watershed; the Tenmile River watershed; the Holy Cross area; and Ohogamiut (BLM 2018b). Further tribal consultation may reveal TCPs within these regions, or other specific areas of traditional importance. These areas may also be found to qualify as Traditional Cultural Landscapes. Future land use managers should anticipate additional areas of traditional importance in these, or other, locations in the planning area to be identified during further tribal consultation.

#### **2.10.5 Resource Changes: Trends and Forecasts**

Preferred conditions for cultural resources on federal lands is that they remain stabilized and not adversely affected by natural and cultural processes, and that they are used towards increased educational and interpretive use. The current trend for NRHP-eligible or listed sites in the planning area is that those

adjacent to populated areas are subject to greater potential for damage, removal, or alteration from agents caused by people and their equipment. Those resources farther from developed areas are relatively stabilized and are not subject to affects from routine activities.

Large-scale and intense wildland fires can and will occur in interior Alaska. Such fires, if they sweep through specific portions of the planning area, could have a severe effect on the significant cultural resources of that area.

Interest in mining gold and other minerals has also increased in recent years on both private and BLM-managed lands, as the value of these commodities has increased. Current federal law and BLM management, regulations, and policies permit mining wherever it is legally allowable and where it does not adversely affect important resources. As a result, more mining on BLM-managed lands is occurring relative to only a few years ago when commodity prices were much lower. Whether this recent upsurge in mining activity is normal, or whether it forecasts the beginning of a larger trend, is not currently known.

Qualitative observation indicates a downward trend in condition for recorded and unrecorded cultural resources that are not associated with formal surface disturbing management proposals. Illegal removal of artifacts, surface disturbance associated with recreational activity, limited law enforcement, and intensive grazing practices all contribute to the downward trend. Based on current management practices, improved access to BLM-managed lands, and increased development, the forecast would be to continue this downward trend of cultural resource conditions due to the following factors:

- Greater potential for cultural resources being illegally removed or damaged, due to increases in recreational and commercial usage, and limited law enforcement presence;
- A likelihood for continued large-scale wildfires in the planning area resulting in damage;
- Continued activities that result in damage or destruction of cultural resources on private, State, and non-BLM-managed lands; and
- Continued permitting of authorized actions by BLM including mining and energy development that contribute to sites and artifacts being affected.

## 2.11 Paleontological Resources

### 2.11.1 Introduction

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources are defined as any fossilized remains, traces, or imprints of organism, preserved or in the earth's crust, that are of paleontological interest and that provide information about the history of life on earth, with the exception of materials associated with an archaeological resource or any cultural item as defined in the NAGPRA. Paleontological resources are considered finite non-renewable resources because the organisms they represent no longer exist; once destroyed, they can never be replaced.

Paleontological resources include mineralized, partially mineralized, or un-mineralized:

- bones and teeth;
- soft tissue;
- skin or soft tissue impressions;
- shells, and other invertebrate remains;

- flora--wood, leaf or plant impressions;
- footprints, trails, or trackways;
- burrows;
- microscopic remains; and
- fossil amber with insect remains.

As the occurrence of paleontological resources is closely tied to the geologic units (e.g., beds, formations, or members) that contain them, paleontological resources are not just the fossils themselves, but also include host rocks or organic matter and physical characteristics of the fossil-bearing sedimentary matrix.

Paleontological resources are important scientific resources that can be used to:

- document the presence, geographic distribution, and range of now-extinct organisms;
- study the evolutionary relationships among extinct organisms, and their relationships to modern groups;
- reconstruct ancient environments, climate change, and paleoecological relationships;
- provide indices for relative geologic dating;
- provide indices to determine the relationship of stratigraphic units at local, regional, continental and global scales;
- understand tectonic movements of land masses and ocean basins through time;
- study patterns and processes of evolution, extinction, and speciation;
- identify causes and effects of global environmental and climate change; and
- understand faunal and floral responses to global environmental and climate change.

It is important to note that the list above is not all-inclusive of the potential significant scientific contributions of the fossil record. Thorough, detailed documentation of the fossil record has the potential to answer other important contemporary or future scientific research questions.

BLM guidance (IM 2009-011) defines significant paleontological resources as any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces and certain rare or unusual invertebrate and plant fossils. Scientific importance results from resources that are rare or previously unknown species, of high quality and well-preserved, preserve a previously unknown anatomical or other characteristic, provide new information about the history of life on earth, or have identified educational or recreational value. Paleontological resources that may be considered to not have paleontological significance include those that lack provenience or context, lack physical integrity because of decay or natural erosion, or that are overly redundant or are otherwise not useful for research. Vertebrate fossil remains and traces include bone, scales, scutes, skin impressions, burrows, tracks, tail drag marks, vertebrate coprolites (feces), gastroliths (stomach stones), or other physical evidence of past vertebrate life or activities.

### **2.11.2 Laws, Regulations, and Policies**

The Paleontological Resources Preservation Act of 2009 (PRPA; Under Omnibus Public Lands Act of 2009; 16 U.S.C. 470aaa) provides specific direction regarding management of paleontological resources on federal lands, including permitting enforcement, and penalties. The PRPA provides federal agencies

with a consistent paleontological resources management framework and mandates them to “manage and protect paleontological resources on federal lands using scientific principles and expertise.” In passing the PRPA, Congress officially recognized the scientific importance of paleontological resources on federal lands by declaring that fossils from these lands are federal property that must be preserved and protected. The PRPA codifies existing policies of the various federal land management agencies and provides uniform criminal and civil penalties for illegal sale and transport, and theft and vandalism, and destruction of fossils from federal lands, including inadvertent destruction from land use projects or development.

For actions on federal lands, the PRPA establishes that potentially affected paleontological resources and paleontologically sensitive areas must be identified, potential impacts identified and assessed, and proper treatment and mitigation actions implemented to protect significant paleontological resources.

ARPA (P.L. 9695; 16 U.S.C. 470ee) prohibits unauthorized removal of fossils that are in an archaeological context from federal lands. Fossils on federal lands have been interpreted as federal property, and as such receive protection from Damage to Federal Property (18 U.S.C. 1361), which protects fossils from disturbance resulting in damage, and Theft of Government Property (18 U.S.C. 641), which views unauthorized collection of fossils as theft of government property.

Additional federal protections for fossils and/or paleontological resources on public lands include: Federal Cave Resources Protection Act of 1988 (P.L. 94579; 43 U.S.C. 1701 et seq.), which includes protection of fossils contained within caves; 43 CFR 3809.420 (b)(8) prohibits the willful disturbance, alteration, removal or destruction of paleontological resources from mining operations on public lands; 43 CFR 3610, which addresses protection of significant fossils from operations authorized under mining laws; 43 CFR 3622, 3602, and 3604 which addresses the collection of petrified wood for commercial and non-commercial uses; 43 CFR 8200, which covers management of lands that have exceptional natural history values, such as fossils, which are of scientific interest; 43 CFR 1610.7-2, which deals with establishing ACECs for management and protection of significant natural resources, such as paleontological localities; and 43 CFR 8365.15, which prohibits willful disturbance, removal and destruction of scientific resources such as fossils. The CFRs for management of paleontological resources are in draft and will be followed when finalized.

The BLM has also developed general procedural guidelines for the management of paleontological resources—BLM Manual 8270, Handbook 8720-1, IM 2008-009, IM 2009- 011, and IM 2016-124. Paleontological resource management objectives include the evaluation, management, and protection of fossils on BLM-managed public lands. The management policy found in Appendix C of BLM Handbook H-1601-1 (BLM 2005) also includes measures to ensure that proposed land-use projects do not inadvertently damage or destroy significant paleontological resources. The authority for the BLM to issue paleontological resource use permits from lands under its jurisdiction is granted by Secretarial Order 3104. Note that the BLM manual pre-dates the PRPA and IMs discussed here; when updated, it will follow the new CFRs, once finalized.

Paleontological resources are protected on State of Alaska lands under the Alaska Historic Preservation Act (AHPA; AS 41.35.010-41.35.240), which codifies State policy to “preserve and protect the historic, prehistoric, and archaeological resources of Alaska from loss, desecration, and destruction” (AS 41.35.010). Under the regulations implementing the AHPA, prehistoric archaeological resources are explicitly defined to include paleontological resources. The AHPA mandates paleontological surveys, impacts assessment and avoidance or mitigation prior to any public construction or public improvement by the State, a governmental agency of the State, or a private person under contract with or licensed by the State or governmental agency of the State.

## Potential Fossil Yield Classification System

Potential paleontological resource impacts tend to be determined at the geologic unit level (unlike cultural resources, which are managed at the site level). The premise behind determining potential paleontological resource impacts at the geologic unit level is that because fossils are typically encased in bedrock, sediments, or in the case of Alaska, permafrost, field surveys that employ surface inspections or shallow subsurface testing in unconsolidated sediments (such as cultural resource field surveys) have limited utility in determining the presence or absence of paleontological resources. The BLM's Potential Fossil Yield Classification (PFYC) system ranks geologic units by their potential for containing significant paleontological resources. It is the primary means for assessing potential impacts to paleontological resources and is one of the initial criteria to help determine whether field surveys are required for land management decisions.

As discussed in IM 2016-124 (BLM 2016d), which describe the PFYC, occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources. However, it is impossible to predict the specific types of fossils that will be found or their exact locations in a geologic unit.

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment (BLM 2016d).

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis and should be used to assist in determining the need for further mitigation assessment or actions.

The descriptions for the classes below are written to serve as guidelines rather than as strict definitions. Knowledge of the geology and the paleontological potential for individual units or preservational conditions should be considered when determining the appropriate class assignment. PFYC rankings and associated maps are currently being developed for the State of Alaska. BLM paleontologists determine the appropriate PFYC rankings for the state after reviewing PFYC assignment recommendations.

The PFYC system rates geologic units according to their likelihood for containing recognizable fossil remains as follows (from BLM 2016d):

**Class 1 – Very Low:** Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.
- Units that are Precambrian in age or older.

Management concern for paleontological resources in Class 1 units is usually negligible or not applicable. The occurrence of significant fossils is nonexistent or extremely rare. Assessment or mitigation is usually unnecessary. The probability for impacting any fossils is negligible.

**Class 2 – Low:** Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils.

- Field surveys have verified that significant paleontological resources are not present or are very rare.
- Units are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

Management concern for paleontological resources in Class 2 units is generally low (also applies to Class 1). Localities containing important resources may exist but would be rare and would not influence the classification. Assessment or mitigation is usually unnecessary except in rare or isolated circumstances. The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Class 2 localities would be managed on a case-by-case basis. An assignment of Class 2 may not trigger further analysis unless paleontological resources are known or found to exist. However, standard stipulations should be put in place prior to authorizing any land use action in order to accommodate unanticipated discoveries.

**Class 3 – Moderate:** Sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. Units assigned to Class 3 have some of the following characteristics:

- Marine in origin with sporadic known occurrences of paleontological resources.
- Paleontological resources may occur intermittently, but abundance is known to be low.
- Units may contain significant paleontological resources, but these occurrences are widely scattered.
- The potential for an unauthorized land use to impact a significant paleontological resource is known to be low-to-moderate.

Management concerns for paleontological resources are moderate because the existence of significant paleontological resources is known to be low. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for casual collecting. Paleontological mitigation strategies will be proposed based on the nature of the proposed activity.

This classification includes units of moderate or infrequent occurrence of paleontological resources. Management considerations cover a broad range of options that may include record searches, pre-disturbance surveys, monitoring, mitigation, or avoidance. Surface-disturbing activities may require assessment by a qualified and BLM-permitted paleontologist to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources

**Class 4 – High:** Geologic units that are known to contain a high occurrence of significant fossils. Units assigned to Class 4 typically have the following characteristics:

- Significant paleontological resources have been documented but may vary in occurrence and predictability.
- Surface disturbing activities may adversely affect paleontological resources.

- Rare or uncommon fossils, including nonvertebrate (such as soft body preservation) or unusual plant fossils, may be present.
- Illegal collecting activities may impact some areas.

**Class 5 – Very High:** Highly fossiliferous geologic units that consistently and predictably produce significant paleontological resources. Units assigned Class 5 have some or all of the following characteristics:

- Significant paleontological resources have been documented and occur consistently.
- Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities.
- Unit is frequently the focus of illegal collecting activities.

Management concern for paleontological resources in Class 5 areas is high to very high. A field survey by a qualified and BLM-permitted paleontologist is almost always needed. The probability for impacting significant paleontological resources is high. The area should be assessed prior to land tenure adjustments. Pre-work surveys are usually needed and on-site monitoring may be necessary during land use activities. Avoidance or resource preservation through controlled access, designation of areas of avoidance, or special management designations should be considered.

**Class U – Unknown:** Geologic units that cannot receive an informed PFYC assignment. Characteristics of Class U may include:

- Geological units may exhibit features or preservational conditions that suggest significant paleontological resources could be present, but little information about the actual paleontological resources of the unit or area is known.
- Geological units represented on a map are based on lithologic character or basis of origin but have not been studied in detail.
- Scientific literature does not exist or does not reveal the nature of paleontological resources.
- Reports of paleontological resources are anecdotal or have not been verified.
- Area or geologic unit is poorly or under-studied.

Until a provisional assignment is made, geologic units that have an unknown potential have medium to high management concerns. Lacking other information, field surveys are normally necessary, especially prior to authorizing a surface-disturbing activity. An assignment of “Unknown” may indicate the unit or area is poorly studied, and field surveys are needed to verify the presence or absence of paleontological resources. Literature searches or consultation with professional colleagues may allow an unknown unit to be provisionally assigned to another Class, but the geological unit should be formally assigned to a Class after adequate survey and research is performed to make an informed determination.

**Class W – Water:** Includes any surface area that is mapped as water.

**Class I – Ice:** Includes any area that is mapped as ice or snow.

## Planning Area PFYC Assignments

The PFYC of the planning area has been broadly characterized by the BLM regional paleontologist as part of a statewide PFYC study in 2010 (BLM 2015a). PFYC assignments in some areas of the planning area were later refined by the BLM during BSWI RMP planning.

Planning area PFYC assignments are depicted in BSWI Draft RMP/EIS, Map 3.2.11-1. As discussed in the BSWI AMS (BLM 2015a), the overwhelming majority of the planning area falls under Class U “unknown” or Class 3 “moderate” potential for significant fossils. Reports of Quaternary vertebrate fossils from placer mines in the Flat, Ophir, Willow Creek, and Julian mining districts are common. The planning area is also home to the Cretaceous-period Kuskowkim Group deposits that have the potential for dinosaur fossils.

The classification of most the planning area as “unknown” is symptomatic of data gaps resulting from the low number of paleontological studies in the planning area. PFYC assignments in the planning area will be refined and updated as future land use planners follow the guidance in IM 2009-11 (BLM 2008) to assess potential effects to paleontological resources under PRPA, NEPA, and other relevant legislation.

### 2.11.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for paleontological-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres with no land use restrictions that serve to limit surface disturbance and protect paleontological resources
- Acres of BLM-managed lands identified for acquisition, retention, or disposal
- Acres subject to permitting stipulations for land use
- Change in acres with land use restrictions that serve to limit surface disturbance and protect paleontological resources or promote the identification and inventory of fossil locations.

### 2.11.4 Current Conditions

#### Fossil Occurrences

Little work has been done to inventory fossil occurrences on BLM-managed public lands in the planning area. In 1986, the BLM contracted for a collection and synthesis of existing data on paleontological resources on BLM-managed public lands in Alaska, including the planning area (Lindsey 1986). Paleontological resources surveys and inventories conducted as part of the proposed Donlin Gold mine in part occurred on BLM-managed public lands in the planning area (Druckenmiller et al. 2013; Jacobus and Druckenmiller 2013; Reuther et al. 2014). Available data also include the Alaska Paleontology Database (Zhang and Blodgett 2003), a cumulative database of paleontological localities, which is searchable by USGS quadrangle for the entire State of Alaska, regardless of land ownership status. As discussed in the BSWI RMP AMS (BLM 2015a), the Alaska Paleontological Database tends to focus on pre-Quaternary invertebrate fossils. Lindsey includes all fossils reported from his reference sources. Neither database is exhaustive of the fossil localities in the planning area. The absence of known fossil localities in any given region of the planning area could be the result of a lack of investigation, survey and inventory, rather than a true absence of paleontological sites. Further, there is undoubtedly overlap between the two sources,



making an exact count of localities difficult to ascertain. Despite these limitations, however, these databases remain the best sources of information for paleontological localities in the planning area. The following discussion is based primarily on these two sources

The ARCTOS database contains accession records for paleontological materials housed in the Earth Sciences Collection at the University of Alaska Museum of the North. This database provides information on specimens recovered or collected from the planning area. The ARCTOS database is, however, organized by specimen and lists museum curation information. Provenience information, if available, is typically at the level of USGS quadrangle; it is not organized by paleontological “site” or “locale.” Further, as many of the specimens in the ARCTOS database were donated to the museum by early twentieth century miners or avocational collectors, the provenience information is oftentimes imprecise or inaccurate. While these limitations hinder the use of the ARCTOS database for determining fossil localities in the planning area, it does provide information regarding Pleistocene vertebrates from the planning area that augments the information from Lindsey (1986) and the Alaska Paleontological Database.

Table 2.11.4-1 summarizes the known fossil localities with the boundaries of the planning area as reported by Lindsey (1986) and Alaska Paleontological Database (Zhang and Blodgett 2003).

**Table 2.11.4-1. Paleontological Localities in the Planning Area**

<b>USGS Quadrangle Name</b>	<b>Number of Fossil Occurrences (Zhang and Blodgett 2003*)</b>	<b>Number of Fossil Localities on BLM-managed Public Lands (Lindsey 1986)</b>
Baird Inlet	0	0
Bethel	138	4
Black	0	0
Candle	8	1
Holy Cross	4	0
Hooper Bay	1	0
Iditarod	31	4
Kateel River	33	26
Kuskokwim Bay	0	0
Kwiguk	12	0
Lake Clark	28	0
Lime Hills	30	1
Marshall	5	0
McGrath	101	33
Medfra	134	0
Norton Bay	39	2
Nulato	72	28
Nunivak	4	0
Ophir	9	0
Russian Mission	30	2
Sleetmute	61	0
Taylor Mts.	112	0
Unalakleet	38	14

\*Includes all data from USGS quadrangle regardless of land status and is not restricted to BLM-managed public lands.

As discussed in the BSWI AMS (BLM 2015a), and shown in Table 2.11.4-1 above, the most concentrated fossil localities are located in two groups of two adjacent quadrangles: the McGrath and Medfra, and Bethel and Taylor Mountain areas. These areas are both also near important mining localities. Fossil types found include corals, gastropods, ammonites, trilobites, and Mesozoic plants. Marine invertebrates, including bivalves are reported from the McGrath B-2 and B-1 quadrangles. The McGrath B-3 quadrangle has abundant Cenozoic plant macrofossils, contained within volcanoclastic sandstones. McGrath B-4 contains fossiliferous sandstones containing Cenozoic plant fossils and the potential for vertebrate body and trace fossils, such as impressions and casts. The McGrath A-5 quadrangle contains fossiliferous sandstones with Cenozoic flora fossils, as well as a fossiliferous Devonian limestone unit containing Devonian corals, brachiopods and foraminifera. McGrath A-5 also has a micaceous sandstone unit containing Silurian graptolites (Jacobus and Druckenmiller 2013). The McGrath area is also home to the Terra Cotta Mountains that contain a long sequence of rock containing graptolites, which is an important biostratigraphic reference for Silurian and Ordovician zones elsewhere in Alaska. This formation is located on State of Alaska patents, but is within the planning area and is within 31 miles (50 kilometers) of BLM lands (Churkin and Carter 1996).

Within the Iditarod, Russian Mission, Sleetmutes, Bethel and Taylor Mts. quadrangles is the Gemuk Group, which has produced marine invertebrates (pelecypods) from the Upper Jurassic, and the Kuskokwim Group, which has also produced marine invertebrates (pelecypods) from the Middle Jurassic from its lower members. Previous research has shown that the Late Cretaceous Kuskokwim Group is dominated by deep water marine turbidite facies sedimentary rock. Cady et al. (1955) used 38 fossil locations to determine the age of the Kuskokwim Group sedimentary rocks as Late Cretaceous. Most fossils in the area consist of marine invertebrate fossils and are more abundant in the younger (upper strata) of the Kuskokwim Group. Fauna include pelecypod and cephalopod mollusks, as well as annelid worms, brachiopods, and barnacles. Fish fossils occur locally, and where present, are abundant. Flora fossils include terrestrial ferns and flowering plants. Most fossil material is fragmental, which suggests transport from place of origin prior to deposition. Cady et al. (1955), Box and Elder (1992) and Elder and Box (1992) identify 15 Inoceramid bivalves of Late Cretaceous age in the Kuskokwim Group. Quaternary vertebrate fossils have also been reported in overlying sediments in the area (Reuther et al. 2014). There is good potential that these units could also contain evidence of terrestrial vertebrates, especially of dinosaur tracks, but possibly also dinosaur skeletal material (Jacobus and Druckenmiller 2013). Non-marine strata within the Kuskokwim Group are known to contain abundant plant fossils, which are associated with a high potential for dinosaur tracks and skeletal remains based on geologic similarities with other depositional settings of Cretaceous age, such as the Cantwell Formation of Denali National Park and Preserve (Fiorillo et al. 2014; Jacobus and Druckenmiller 2013).

Pleistocene vertebrate fossils are known from exposures on the Yukon River (Lindsey 1986), from the Kuskowkim River (Reuther et al. 2014), from the Kateel River (Lindsey 1986) from the Norton Bay area (Lindsey 1986), from the Unalakleet area (Lindsey 1986), and from placer mines in the planning area (Blanchard 2016).

The University of Alaska Fairbanks Museum of the North Museum ARCTOS database houses 218 Pleistocene vertebrate specimens from the planning area. Nearly all of these (N=213) were found by placer miners on State lands in Colorado Creek. The Colorado Creek material consists of the partial remains of two mammoths (*Mammuthus* sp.) as well as bones of horse (*Equus* sp.), steppe bison (*Bison priscus*), caribou, and wolf, with most of the material dated to between ca. 15,000 and 23,000 14C yr B.P. One Ice-Age bison (*Bison antiquus*) specimen was collected in the Ophir mining district. Two woolly mammoth (*Mammuthus primigenius*) specimens are listed as coming from Cheforak. Of two Pleistocene

horse specimens, one is reportedly from Shageluk, and one is from the lower Yukon. Additional oral reports of BSWI mining district placer deposits yielding abundant Pleistocene vertebrate specimens attest to the presence of Quaternary vertebrates. These reports underscore the potential for these Ice Age mammal remains in Quaternary deposits throughout the planning area. Because of the high potential for these remains to be encountered, field surveys, site inspections, and monitoring should be done as possible at placer mines and other areas where Quaternary vertebrates may be exposed.

### **2.11.5 Resource Changes: Trends and Forecasts**

The current management trend for paleontological resources in the planning area is toward continued scientific research and increased opportunities for environmental education and interpretive use. Resources farther from populated areas are relatively stabilized and are not, in large measure, adversely affected by human activity. However, all areas of fossil-bearing sediments are trending toward increased recreational use, and protection of paleontological resources is subject to the limits to the availability of resource staff and law enforcement monitoring.

Based on current management practices, improved access to BLM-managed lands, and increased urbanization, there is the potential for paleontological resources to be illegally removed or damaged in the future due to increases in recreational and commercial usage, and limited law enforcement presence.

## **2.12 Visual Resources Management**

### **2.12.1 Introduction**

This section discusses existing visual values within the planning area as defined by the BLM's VRM System.

### **2.12.2 Laws, Regulations, and Policy**

The Federal Land Policy and Management Act (FLPMA) establishes authority and guidance for the BLM to "prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including ... scenic values) ..." (43 U.S.C. 1711). The FLPMA, together with regulations in 43 CFR 1600, also sets forth the requirements for the BLM to develop, maintain, and revise RMPs under the principles of multiple use and sustained yield.

NEPA establishes that it is the federal government's responsibility to "assure for all Americans safe, healthy, productive, and aesthetically and culturally pleasing surroundings" and to include consideration of visual resources in environmental assessments, in land use planning decisions, and in the implementation of resource projects.

BLM accomplishes its statutory responsibilities through its VRM program. The VRM program involves inventorying scenic values to create a baseline understanding of the existing condition, establishing management objectives for allowable levels of modification to the visual environment through the RMP process, and evaluating proposed activities to determine whether they conform to the management objectives. BLM policy and guidance for the VRM program is largely found in the 8400 series manuals and handbooks. The VRM program contains the following components:

- **Visual Resource Inventory:** The Visual Resource Inventory (VRI) provides nationally consistent data sets that describe the existing condition and status of public land scenic values. The inventory approach is described in BLM Manual H-8410-1 (1986b). The inventory identifies the visual resources of an area by rating the following components:

- *Scenic Quality Evaluation* – A measure of the visual appeal of a tract of land
- *Sensitivity Level Analysis* – A measure of the public concern for scenic quality
- *Visual Distance Zones* – A measure of the landscape’s relative visibility from travel routes or common observation points

Inventoried lands are placed into one of four VRI classes—Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value—based on the three factors listed above.

- **Visual Resource Management:** During the land use planning process, VRM class objectives are designated within the RMP. VRM class objectives describe the allowable levels of visual modification to the land under the implementation for the RMP. Each VRM class permits a level of noticeability by the public (the “casual observer” or “stakeholder”). VRM classes are established through the RMP process and that process is described in BLM Manual H-1601-1 (BLM 2005). The four VRM Classes are defined as follows:
  - *Class I* – The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
  - *Class II* – The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
  - *Class III* – The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
  - *Class IV* – The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

During the planning process, the VRI serves as the principal consideration when making VRM decisions that may protect or affect the landscape character. The inventory values are considered in combination, as VRI class and independently (individual factors of scenic quality, sensitivity, and distance zones) when evaluating land use plan alternatives and making RMP decisions. Visual values coexist with other resource values on BLM public lands that also have management objectives that may or may not coincide with the protection of visual resources. Decisions on VRM class objectives should result from a coordinated and detailed examination of a range of alternatives that maximize the protection of visual values while also contemplating other resource needs and land use priorities.

VRM class objectives are not the same as VRI classes. VRI classes assign value, while VRM class objectives direct management. VRM class objectives may or may not direct management levels that are commensurate with the VRI value. For example, it may be decided that an area inventoried as VRI Class II be managed as VRM Class III due to other desired resource uses or that an area inventoried as

VRI Class IV be managed as VRM Class III due to public preferences and other resource concerns. An update to the VRI does not affect established VRM classes in an active RMP.

### 2.12.3 Resource Indicators

The conditions that are established in the discussion below provide a baseline for visual resources-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Change in scenic quality
- Change in visual sensitivity
- Change in visual distance zone
- Change in overall VRI class

### 2.12.4 Current Conditions

A visual resource inventory of the planning area was completed in March 2018 according to guidelines in BLM Manual Handbook H-8410-1, Visual Resource Inventory (BLM 1986b, 2018b). The scenic quality, sensitivity, distance zone, and resulting visual resource inventory distribution for the planning area is presented in Table 2.12.4-1, below, and in Maps 3.2.11-1 through 3.2.11-4 I of the BSWI Draft RMP/EIS.

**Table 2.12.4-1. Visual Resource Inventory Values within the Planning Area**

Visual Resource Inventory Component	Acres	Percent of Decision Area
<b>Scenic Quality</b>		
A	3,178,607	4.9% <sup>1</sup>
B	46,444,967	71.5% <sup>1</sup>
C	15,346,944	23.6% <sup>1</sup>
<b>Visual Sensitivity</b>		
High	42,024,047	64.7% <sup>1</sup>
Moderate	12,490,370	19.2% <sup>1</sup>
Low	10456100	16.1% <sup>1</sup>
<b>Visual Distance Zone</b>		
Foreground-Midground	14,938,502	23.0% <sup>1</sup>
Background	4,857,647	7.5% <sup>1</sup>
Seldom Seen	45,174,369	69.5% <sup>1</sup>
<b>Visual Resource Inventory Class</b>		
VRI Class I	52,873	0.4% <sup>2</sup>
VRI Class II	482,459	3.6% <sup>2</sup>
VRI Class III	1,758,017	13.1% <sup>2</sup>
VRI Class IV	11,172,455	83.0% <sup>2</sup>

<sup>1</sup> Percentage based on the acres surveyed in the entire planning area (64,970,518 acres)

<sup>2</sup> Percentage based on BLM-managed land in the planning area (13,465,894 acres)

### 2.12.5 Resource Changes: Trends and Forecasts

Because of the remoteness of the planning area, there is a low potential for change in visual resource values, and landscape character remains stable. BLM-managed lands also include encumbered lands that are selected by, but not yet conveyed to, the State of Alaska and Alaska Native corporations (referred to as State-selected and Native corporation-selected lands, respectively). Once conveyed, the BLM would not control trends for visual values of those areas.

## 2.13 Lands with Wilderness Characteristics

### 2.13.1 Introduction

This section describes the laws, regulations and policies related to lands with wilderness characteristics, as well as the resource indicators that will be used to evaluate impacts to lands with wilderness characteristics. The section also includes a discussion of the current condition of lands with wilderness characteristics and trends in resource uses and conditions that may affect lands with wilderness characteristics in the future.

### 2.13.2 Laws, Regulations, and Policies

Since 1976, Section 201 of FLPMA has required the BLM to continue to maintain an inventory of all public lands and their resources and other values. This inventory requirement includes maintaining information regarding wilderness characteristics. In 2012, the BLM reaffirmed this policy to continue to conduct and maintain inventories regarding the presence or absence of wilderness characteristics, and to consider identified lands with wilderness characteristics in land use plans and when analyzing projects under NEPA (BLM Manual 6320-Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process).

BLM-managed public lands in Alaska are subject to several ANILCA provisions, including exceptions for designated Wilderness in Alaska that include motorized methods of access, cabins, navigation aids, and temporary facilities associated with the take of fish and wildlife.

Section 1320 of -ANILCA states that:

*Notwithstanding any other provision of law, section 603 of the Federal Land Policy and Management Act of 1976 shall not apply to any lands in Alaska. However, in carrying out his duties under section 201 and section 202 of such Act and other applicable laws, the Secretary may identify areas in Alaska which he determines are suitable as wilderness and may, from time to time, make recommendations to the Congress for inclusion of any such areas in the National Wilderness Preservation System, pursuant to the provisions of the Wilderness Act. In the absence of congressional action relating to any such recommendation of the Secretary, the Bureau of Land Management shall manage all such areas which are within its jurisdiction in accordance with the applicable land use plans and applicable provisions of law.*

The BLM must determine which lands within the planning area possess wilderness characteristics to consider planning for this resource. The BLM will consider whether lands identified as having wilderness characteristics will be managed to preserve some or all of their values with other land management tools (e.g., recreation management area designations, OHV designation, limitations on mining and leasing, VRM, travel management planning, management of recreation settings and activities, and so forth).

Existing Alaska policy allows for inventory of wilderness characteristics in areas that have ANILCA-specified uses occurring such as for snowmobiles, airplanes, subsistence cabins, and navigational aids.

### 2.13.3 Resource Indicators

Procedures for conducting inventories for lands with wilderness characteristics are laid out in BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands (BLM 2012a). This manual provides guidance for areas that are not under wilderness study area designation. The inventory process entails the identification of wilderness inventory units, an inventory of roads and wilderness characteristics, and a determination of whether or not the area meets the overall criteria for wilderness character. Units found to possess such character are evaluated during the land use planning process to address future management for wilderness characteristics. Wilderness characteristics considered in this analysis include size (i.e., must be roadless areas larger than 5,000 acres), naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. An area with wilderness characteristics may also contain other values not necessary for the determination of wilderness character; these are known as supplemental values.

- **Size.** An area must be a roadless area of 5,000 acres of contiguous BLM-managed public lands or, if less than 5,000 acres, must be contiguous with BLM-managed public lands that have been formally determined to have wilderness or potential wilderness values (e.g., designated wilderness and Wilderness Study Areas [WSAs]) or any federal lands managed for the protection of wilderness characteristics.
- **Naturalness.** Land and resources exhibit a high degree of naturalness, are affected primarily by the forces of nature, and are areas where the imprint of human activity is substantially unnoticeable. The BLM has authority to inventory, assess, and/or monitor the attributes of the land and resources on public lands, which, taken together, are an indication of an area's naturalness. These attributes may include the presence or absence of roads and trails, fences and other improvements; the nature and extent of landscape modifications; and the appearance of naturalness to the casual observer; the presence of native vegetation communities; and the connectivity of habitats.
- **Outstanding opportunities for solitude or primitive and unconfined types of recreation.**
  - *Solitude:* Visitors may have outstanding opportunities for solitude when the sights, sounds, and evidence of other people are rare or infrequent and where visitors can be isolated, alone, or secluded from others.
  - *Outstanding opportunities for primitive and unconfined types of recreation:* Visitors may have outstanding opportunities for primitive and unconfined types of recreation where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered.
- **Supplemental Values.** The area may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Public lands may be managed to maintain these characteristics, or to minimize impacts to wilderness characteristics while giving priority to other resources/uses. Public lands possessing the above values may be managed to maintain some or all of those characteristics. Wilderness characteristics such as solitude, primitive recreation, and naturalness are a part of the land use planning process and will be evaluated and addressed along with all other resource values and uses. The BLM is authorized to consider this

information when developing the affected environment section and the range of alternatives, or to analyze the environmental impacts to other resources.

In general, wilderness characteristics conditions tend to be more qualitative in nature, measured by the overall visual quality and naturalness of an area that may be affected by changes to levels of recreational activities, development, and surrounding land use. Indicators that can quantitatively be measured include changes to the frequency and number of routes, including the number of unauthorized trails, the number of encounters with other users, and increased requests for use of areas with wilderness characteristics for renewable or non-renewable resource development.

#### **2.13.4 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for land with wilderness characteristics-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres of lands with wilderness characteristics not managed to protect wilderness character as a priority
- Acres of lands with wilderness characteristics land managed as VRM Class III and IV
- Acres of lands with wilderness characteristics that would be open to mineral location and entry in areas of medium or high potential
- Acres of lands with wilderness characteristics that would be open to ROW authorizations
- Acres of lands with wilderness characteristics that would be proposed for disposal
- Acres of lands with wilderness characteristics that would be open to grazing

#### **2.13.5 Current Conditions**

Previous planning documents did not provide special management for areas with wilderness characteristics. During this RMP planning process, the BLM completed a comprehensive review of BLM-managed public lands within the planning area to determine whether they possess wilderness characteristics. Results are documented in the BSWI RMP Wilderness Characteristics Inventory Report (BLM 2018b). This document is a comprehensive evaluation of wilderness characteristics on BLM-managed public lands in the planning area, as directed by Section 603 of FLPMA.

The total acreage of BLM-managed public lands in the planning area is 13,466,118 acres. A total of 13,373,454 acres met the size criteria of at least 5,000 continuous acres. All lands that met the size criteria were also found to contain naturalness, due to the fact that there are substantially unnoticeable human-made features throughout the areas. It has also been determined from the inventory that all areas that met the size criteria were found to possess outstanding opportunities for solitude or a primitive and unconfined type of recreation. The total percentage of lands that contain wilderness characteristics within the planning area is 99.3 percent (BSWI Draft RMP/EIS, Map 3.2.12-1). A summary of inventory findings for the entire planning area is presented in Table 2.13.5-1.



**Table 2.13.5-1. Summary of Findings for Lands with Wilderness Characteristics for Planning Area**

Total Acres BLM-Managed Public Lands	Total Acres That Meet Size Criteria	Total Acres That Meet Criteria For Lands With Wilderness Characteristics	Total Acres That Did Not Meet Criteria For Lands With Wilderness Characteristics
13,466,118	13,373,454	13,373,454	69,828

Source: BLM 2018b

Notes: Lake Minchumina was in the original inventory but is not a parcel of BLM-managed lands identified in the 2016-08-31 GIS data, resulting in an overage in acres and percentage reporting. This data issue may be resolved in a future version of BLM-managed lands data. As a result, 13,466,118 acres is reported here for BLM-managed lands, instead of 13,465,894 acres, which is consistent with other sections.

The original inventory was performed on an earlier version of the BLM-managed lands GIS data. The inventory acreages have been updated to match the BLM-managed lands current as of 2016-08-31 and are constrained to the quality of the data. Since the update, some BLM-managed lands were discovered that were not a part of the original inventory. These have been categorized as "Not Inventoried."

The planning area was broken up into seven inventory subunits (North Nulato Hills, South Nulato Hills, Yukon River Lowlands, Kuskokwim Mountains, Tanana-Kuskokwim Lowlands, Lime Hills, and Ahklun Mountains) based on ecoregions. Findings from the BLM Wilderness Characteristics Inventory by subunit are summarized in Table 2.13.5-2.

**Table 2.13.5-2. Subunits Inventoried for Wilderness Characteristics**

Subunit Inventory Area	Unit Identifier(s)	Ecoregion	Inventoried Acres	Acres With Wilderness Characteristics	Acres Without Wilderness Characteristics
N. Nulato Hills	AK-010-2	N. Nulato Hills	3,550,709	3,550,709	0
S. Nulato Hills	AK-010-1, 3, 4, 5, 6, 7, 50, 51, 52, 53, 54, 55, 56, 57	S. Nulato Hills	3,849,056	3,832,852	16,204
Yukon River Lowlands	AK-010-8, 9, 10, 11, 12, 13, 14, 15, 47, 49, 58	Yukon R. Lowlands	244,748	237,642	7,107
Kuskokwim Mountains	AK-010-16 to AK-010-26, AK-010-39, AK-010-48, AK-010-59, AK-010-60, AK-010-80	Kuskokwim Mountains	2,927,704	2,923,563	4,141
Tanana-Kuskokwim Lowlands	AK-010-27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79	Tanana-Kuskokwim Lowlands	1,661,483	1,622,275	39,208
Lime Hills	AK-010-44, 45, 46	Lime Hills	971,020	971,020	0
Ahklun Mountains	AK-010-40, 41, 42, 43	Ahklun Mountains	238,561	235,393	3,168
<b>Totals</b>			<b>13,443,281</b>	<b>13,373,454</b>	<b>69,828</b>

Source: BLM 2018b

Note: The original inventory was performed on an earlier version of the BLM-managed lands GIS data. The inventory acreages have been updated to match the BLM-managed lands current as of 2016-08-31 and are constrained to the quality of the data. Since the update, some BLM-managed lands were discovered that were not a part of the original inventory. These have been categorized as "Not Inventoried."

The BLM will continue to conduct wilderness characteristics inventories (and update as applicable) under current policy and the direction of Section 201 of FLPMA. The BLM will also consider protection of and analyze impacts to this resource through the land use planning and NEPA process. However, ANILCA section 1320 exempts BLM lands in Alaska from FLPMA Section 603 but does authorize BLM to conduct wilderness studies periodically. Therefore, under both ANILCA and current policy, the BLM will not complete formal wilderness studies as outlined in Section 603 of FLPMA and the BLM will not

designate any new or additional wilderness study areas, nor make recommendations to Congress regarding wilderness suitability. Per current policy, the BLM will continue to conduct wilderness character review on public lands. FLPMA requires the continued inventory of public lands for potential wilderness characteristics even though there is no authority to establish new WSAs, should any be found.

According to BLM RMP guidance found in 43 CFR 1610, BLM RMPs and amendments must be consistent, to the extent practical, with officially approved or adopted resource-related plans of State and local governments, other federal agencies, and tribal governments so long as the guidance and RMPs are also consistent. Because there is no current management direction for wilderness characteristics on BLM-managed public lands within the planning area, there is no basis to determine consistency of BLM wilderness characteristics with neighboring land owners. Therefore, consistency will be accomplished in the RMP by incorporating the wilderness characteristics policies, programs, and provisions of public land laws and regulations as directed by the BLM RMP guidance found in 43 CFR 1610.3-2 (b).

### **2.13.6 Resource Changes: Trends and Forecasts**

The types of permitted and unpermitted/dispersed recreation activities within the planning area include dog sledding, big game guide-outfitting, hunting, snowmobiling, human endurance events, fishing, boating, camping, hiking, wildlife viewing, OHV use, photography, and commercial filming.

The continued popularity of all-terrain vehicles and utility terrain vehicles in the past decades has led to an increase in OHV casual and subsistence use on public lands that can impact the naturalness and solitude of previously undisturbed areas (ADNR 2016; BLM 2015a). Improvements in OHV technology have led to vehicles traveling faster and farther onto public lands. This type of access can potentially further affect the existing primitive and naturalness of BLM-managed public lands found within the planning area, particularly those public lands located near communities within the planning area. Terrain limitations in the planning area have made the use of OHVs difficult and their use is not widespread, but generally limited to areas near villages and long-established airplane landing strips.

Recent interest in bringing high-speed Internet access and wireless telephone communications to various regions of western Alaska has led to the development of communication towers and associated facilities. Some of these communication sites have already been constructed and several more are planned within the next few years, involving remote sections of public lands within the planning area, which can affect the availability of natural areas that provide solitude or unconfined recreation opportunities.

There has also been an increase in interest by small and large production companies in commercial filming operations at locations within the planning area. Examples of recent filming activities include The Discovery Channel and the Iditarod Trail Sled Dog Race and television hunting programs involving big game hunting.

Evidence of climate change trends affecting wilderness characteristics have not been documented in the planning area. The warming trend experienced over the last 50 years has not been shown to be a cause in altering the quality of wilderness character in any regions of the planning area, considering the characteristics of lands with wilderness characteristics as defined.



## ***Section 3. Resource Uses***

### **3.1 Forestry and Woodland Products**

#### **3.1.1 Introduction**

This section discusses the regulations of harvest and current conditions for forest and woodland products, including but not limited to firewood, biomass, house logs, saw logs, berries, and mushrooms for personal or commercial use. Vegetation types are discussed in detail in Section 2.6, Vegetation.

#### **3.1.2 Laws, Regulations, and Policies**

The BLM's Forest and Woodland products program is guided at the national level by 43 CFR 5000. Timber sales are managed under CFR 5400, and free use timber is managed under CFR 5510. Several regulations promote improvement of forest health, including 2003 Healthy Forests Restoration Act and the Protection Act of September 20, 1922 (16 U.S.C. 594), which allows for the protection of timber from fire, disease, or insects. In addition, direction is provided in Section 11 of the Act of May 14, 1898, which was first instituted to promote cutting and use of timber in Alaska by settlers, residents, miners (16 U.S.C. 607a). Today, AS 41.17 (Forest Resources and Practices Act), promotes the sustainable use of forest products.

The BLM responds to requests for forest products through the established permitting system to provide sustained yield of forest products and vegetative materials. The authorities and policies for the sale of forest products from BLM-managed public lands are outlined in BLM Manuals in the 5000 and 9000 series.

Forest products, including berries, firewood, and other products represent an important resource for area communities. Stewardship contracting is managed under the Agricultural Act of 2014 Section 820516 U.S.C 6591. Stewardship contracting includes natural resource management practices seeking to promote a closer working relationship with local communities in a broad range of activities that improve land conditions. These projects shift the focus of federal forest management towards a desired future resource condition. They are also a means for federal agencies to contribute to the development of sustainable rural communities, restore and maintain healthy forest ecosystems, and provide a continuing source of local income and employment. Subsistence continues to represent a significant portion of forest and wood product use in the planning area. Details of the BLM's Alaska Forest Policy for subsistence wood permits are currently outlined in IM AK2012-012 Subsistence wood harvests.

#### **3.1.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for forest and woodland products-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres that are available and accessible for commercial woodland harvest
- Acres that are available and accessible for subsistence and casual use gathering
- Changes to vegetation cover type for species with commercial or subsistence use value

### 3.1.4 Current Conditions

It is estimated that 25 percent of Interior Alaska is covered by non-commercial forest and 7 percent has commercial forest (i.e., forest capable of producing a minimum of 20 cubic feet of industrial wood per acre annually) (BLM 2015a). The tree species with potential commercial value for manufactured wood products in Interior Alaska are: white spruce (*Picea glauca*), paper birch (*Betula neoalaskana*), aspen, and balsam poplar. Most stands of commercial forest are mixtures of the different species. Productivity of these forests is low to moderate, with average annual production ranging from 3 to 18 cubic feet per acre (BLM 2015a). Historically, limited forest inventory data has been available to quantify the extent of commercial timber. However, recently completed inventories have provided forestry data for a portion of the planning area (see BSWI Draft RMP/EIS, Map 3.3.1-1). Spruce beetle (*Dendroctonus rufipennis*) infestations were documented in the late 1990s and early 2000s, and impacted forest cover primarily in the Kenai Peninsula (ADNR 2018; USDA 2018). Current and prior outbreaks have been attributed to warming winters that allow the species to overwinter increasing population size. Prior outbreaks resulted in an increase in the firewood industry from the increase in product resources from diseased trees. Current outbreaks would be expected to have similar effects on forest resources.

### Subsistence

The forest resources within the planning area have provided the essentials of life, food, heat, and shelter since the time of first human habitation. Indigenous peoples have been using the natural forest resources in their surroundings to meet their subsistence needs for centuries. In the planning area, as is true for Alaska's vast rural areas, these uses are passed on through traditions and informal institutions that survive today in the subsistence way of life. These practices are not static, but rather change over time, continually adapting to the changing social, economic and ecological conditions of the time.

Forest resources used by area residents [ANILCA's subsistence provisions apply according to location of residence not Alaska Native status] have included: roots, seeds, cones, mosses, mushrooms, edibles, medicinals, feed, forage, floral, boughs, transplants, ornamentals, burls, saplings, branches, logs, and timbers. The majority of subsistence activity throughout the planning area has been the harvesting of wood for fuel and shelter construction, as well as building materials for fish-drying racks, fish wheels, smoke houses, sweat houses and dog sleds. Firewood (driftwood) has also been collected along the coast and along inland rivers. Berries provide a major staple for the subsistence diet in many communities. Most forest products used for subsistence have come from State- and Native-selected lands near the communities along the major waterways. These lands are more accessible and provide a higher quality forest product than most BLM-managed public lands. Because these lands have now been conveyed, less subsistence gathering occurs on BLM-managed public lands (see Section 3.5, Lands and Realty, for more information on land conveyance).

In the planning area, all forest lands are currently open to subsistence harvest except crucial wildlife habitat and the eight RNAs within the CYRMP decision area. Free-use permits are not currently issued for subsistence use in the planning area. Location and level of use are impacted by accessibility.

Forest products will likely continue to be harvested from productive lands nearest to those communities under conveyance to ANCSA village corporations. While the quantity of unregulated harvest is unknown, it would be reasonable to assume that it is at least equivalent and very likely much greater than the amount harvested under permit (BLM 2015a).

## Commercial

Since the advent of small portable sawmills and the demand for milled lumber products in communities throughout rural Alaska, many sawmills have been purchased and transported for local use. Several small portable sawmills are still located in communities within the planning area and have intermittently produced rough lumber to satisfy the small local demand. Between 1965 and 1968, 19 sales containing 897 thousand board-feet of timber (MBF) occurred in the Kuskokwim drainage (BLM 2015a). During this same period, 14 free-use permits containing 83 MBF were issued in this area. Shortly afterwards, a sale of 311 MBF of white spruce located about 18 miles above Stony River was made by the BLM with a local sawmill operator (Hegg and Sieverding 1979). Nelson Brothers Enterprises, located in the community of Chuathbaluk on the Kuskokwim River, operated a small commercial sawmill serving the local and downriver markets for rough-milled lumber from the 1970s until around 2007. The Chuathbaluk mill was capable of producing a variety of products but relied on air drying to season the lumber and did not have the capacity to grade lumber for construction certification. In 2017, this mill was purchased by the village of Napaimute and moved to a site just west of Lower Kalskag to be reassembled and restarted. It is anticipated that wood for this operation may come from as far away as Stony River and has the potential to include timber from BLM-managed lands.

As for subsistence use, all forest lands are currently open to commercial harvest except crucial wildlife habitat and the eight RNAs within the Central Yukon RMP decision area. Location and level of use are impacted by accessibility and commercial vegetation type availability. There have been limited commercial timber requests over the past 10 years. In 2013, the village of Napaimute requested a timber sale from BLM, but later decided to postpone the purchase until more accessible wood had been removed. The village has a 1,000 cord per year contract to deliver firewood to Bethel to pay for their wood harvesting machinery. With the purchase and restart of the sawmill, Napaimute Logging intends to begin delivering house packages as well as firewood further west in the basin.

### 3.1.5 Resource Changes: Trends and Forecasts

The BLM will continue to permit the harvest of forest products under sustained yields. Limited forest inventory information and lack of access remain significant challenges. Demand for firewood and berries is likely to remain high in local communities. Overall, demand for other forest resources would remain low. To the extent that the State's "Roads to Resources" program provides improved access, demand for small commercial sales for firewood, biomass, or local building use may increase slightly. In addition, local capacity to harvest larger quantities of forest products with mechanized equipment has recently been improved with the acquisition of a mechanical harvester/processor in the Kuskokwim Basin.

The greatest potential for wood utilization and forest management on BLM-managed lands in remote Alaska is biomass. All types of forest stands could be utilized for biomass. The opportunity lies mostly in community-based systems that would provide combined heat and power for one or more large structures within a village. Wood for these systems will come from many sources, of which BLM-managed lands are one component. This material may be salvaged from beetle kill or fire activities, forest thinning, or regular harvesting operations. There is currently more potential than demand for biomass but with rising fossil fuels costs and high unemployment in villages there is a potential for biomass to fill a multifaceted need. There may be opportunities to create plantations of cottonwood, willows or other fast-growing species on selected sites to provide readily available materials at a known cost. Most remote villages are surrounded by Native corporation, village, State, or federal lands with very minimal private lands. Although BLM-managed public lands may not be the most accessible lands to a village for biomass use, there have been inquiries as to the availability of wood from these lands for biomass. BLM-managed

public lands are expected to play some role in the long-term biomass market within the planning area, including in opportunities for involvement at the feasibility discussion level, in long term stewardship contracts, and in assisting communities with the steps required to bring this material on line. BLM will be actively involved with the Alaska Energy Authority (AEA), the Alaska Wood Energy Task Force, regional corporations and local villages to support biomass utilization. The following 13 communities within the planning area have considered biomass heating projects within the past 4 years:

- Koyukuk
- Grayling
- Anvik
- Holy Cross Village
- Lower Kalskag
- Upper Kalskag
- Aniak
- Georgetown
- Sleetmute
- Stony River
- McGrath
- Unalakleet
- Napaimute

The development of biomass facilities within the planning area and the availability of river transport on both the Yukon and Kuskokwim Rivers may result in increased demand for use of BLM forest products for biomass use. However, other factors remain unresolved (e.g., small-diameter logs, high defect rates, infrastructure deficiencies, and long distances to significant markets). Currently, there is no large-scale global demand for wood fiber to attract industry to the boreal regions for large-scale development.

As home heating fuel oil prices remain high throughout the planning area, the demand for wood-generated heat in the form of firewood will remain high. Subsistence use is likely to continue to be the primary use in the area, while biomass for wood energy is one of the few opportunities for future development opportunities of the forest in the planning area, as discussed above.

Climate change is expected to affect timber and other woodland products through further increases in wildfire and potential changes in hydrologic function due to permafrost thawing. Increases in insect outbreaks may also occur, as seen in the continental US, but specific projections of insect outbreaks are difficult to develop, and there is inconsistent research on how climate change will affect insect outbreaks in the planning area. Warmer winter temperatures may make transportation and access to timber harvest sites more difficult.

## 3.2 Grazing

### 3.2.1 Introduction

The BLM manages livestock grazing through permits and leases issued by BLM to public land ranches. Livestock grazing species identified in most BLM RMPs include cattle, sheep, horses, mules, goats, pigs, and turkeys. Potential grazing species in the planning area also include domesticated bison, musk ox, elk and reindeer. Although it is not known if domestic sheep or goats currently graze on BLM-managed lands in the planning area, BLM has recently established policy for the management of domestic sheep and goats (BLM 2016d).

### 3.2.2 Laws, Regulations, and Policies

The 1927 Alaska Livestock Grazing Act (43 U.S.C 316) allowed the government to lease grazing privileges on the grazing districts established in Alaska to qualified applicants under 43 CFR 4200. However, BLM Final Rule 63 FR 51853 (1998) removed 43 CFR 4200 after deeming it obsolete and unnecessary due to lack of public interest. BLM still has the authority to issue grazing permits in accordance with the provisions of the statute, pending future development of regulations. The 1937 Reindeer Industry Act (25 U.S.C 500) further defined and directed the management of the reindeer industry and removed authority to issue leases for reindeer grazing under the 1927 Act. This Act was passed as a means to provide subsistence for Alaska Natives through a self-sustaining reindeer industry. BLM Final Rule 63 FR 55548 (1998) revisited regulations to provide for the administration of permits for grazing reindeer in Alaska under 43 CFR 4300. Reindeer grazing on BLM-managed public lands is currently regulated by 43 CFR 4300 and the 1937 Reindeer Industry Act.

For slaughtering and selling to nationwide markets, current regulations state that reindeer meat must come from a USDA-inspected slaughtering and processing plant. However, reindeer meat in Alaska has exceptions to this rule under Alaska State Regulation 18 AAC 31.820. This exception allows reindeer meat to be sold to local markets if: (1) it is processed under State inspection in a State-approved slaughter facility; or (2) slaughtered and dressed outdoors at temperatures  $\leq 32$  degrees F with adequate snow cover, carcasses are covered prior to moving, carcasses are frozen immediately after slaughter, and are visibly clean (18 AAC 31.820).

### 3.2.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for grazing resource-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS:

- Acres open to grazing; acres open to grazing that are considered suitable habitat.
- Travel management decisions or permitted disturbance to vegetation can be considered qualitatively.
- Suitable grazing habitat acres and percent in areas open to grazing.

### 3.2.4 Current Conditions

Alaska reindeer, also known as Chukotkan reindeer, are simply domesticated Caribou that exist as different subspecies. These reindeer were introduced to Alaska on the Seward Peninsula from Russia in



1891 in order to provide Alaska Natives an animal production system providing predictable red meat supply and economic development (Stern et al. 1980). Through domestication and selective breeding, reindeer and caribou have unique physical and behavioral differences. For example, while both subspecies exhibit seasonal grazing patterns, reindeer movements remain mostly within a well-established home range (UAF RRP 2016).

Reindeer grazing within the planning area is known to have historically occurred; however, locations and extent of the operations are not well known. There are several reindeer herds located outside of BLM-managed public land in the St. Michaels and Stebbins vicinity. An existing reindeer herd in the St. Michael and Stebbins area is estimated to be approximately 6,000 head and grazes primarily on Native corporation land. Reindeer grazing is common in areas adjacent to the planning area on the Seward Peninsula, and on St. Lawrence and Nunivak islands.

Typically, the only fencing involved with reindeer grazing is that for corralling structures; otherwise, the reindeer are normally free roaming, moved by herders on foot or with aircraft and OHVs. It is not known if there are any unauthorized reindeer grazing operations in the planning area.

The only currently permitted grazing range in the planning area is for reindeer in a northern portion of the planning area in the Sagoonick area (see BSWI Draft RMP/EIS, Map 3.3.2-1). However, the herd left the area with caribou migrations in the 1990s, and there are currently no domestic reindeer on the range. The Sagoonick reindeer grazing permit is still valid.

Potential grazing use may be evaluated from a variety of spatial and data indicators. Existing GIS data on land cover type, land use designation, special use or protected areas, informed by existing NRCS grazing evaluations, may be applied to identify areas suitable for grazing use.

Existing NRCS grazing studies include extensive studies conducted for reindeer on the Seward Peninsula, just north of the planning area. These reindeer feed on a variety of vegetation throughout the season. In the spring (April-May), lichens dominate their diet, followed by mosses, sedges, and shrubs. During June reindeer feed more on willows and sedges, although lichens still comprise a substantial amount. Salix, sedges, and lichen dominate their diet in July. Fall and winter mark a notable shift in their diet towards primarily lichen (Finstad 2008).

Lichen species consumed by reindeer include *Cladina rangiferina*, *Cladina mitis*, *Cladina stellaris*, *Cladina arbuscula*, *Cladonia uncialis*, *Cetraria islandica*, *Cetraria nivalis*, and *Cetraria cucullata* (Pegau 1970). These lichen species grow very slowly even under favorable conditions, approximately 5 millimeters per year (Pegau 1970).

Permitted grazing use may be evaluated from specific data gathered from these grazing studies to determine impacts to natural resources, as well as rangeland health assessments developed by NRCS and BLM. Along with spatial data on existing grazing use locations and current travel use (such as OHV travel mileage), assessments may be made to guide management of continued or future grazing resource use. The impacts of climate change may have indirect or direct impacts on resources tied to grazing use, such as impacts of changes in wildland fire frequency, location, timing, or severity; acres of permafrost or snow and ice cover change; or changes in vegetation community composition or increases in NNIS. Future monitoring may include more comprehensive coverage of various land use types or land cover types that may be identified as vulnerable to change.

Ongoing rangeland health is measured by Alaska-specific range utilization checks developed by NRCS and BLM: *A Procedure for Evaluating Lichen Utilization on Reindeer Range* (NRCS 2001). This procedure was originally developed in 1990, specifically for evaluating forage utilization on reindeer

ranges in Alaska and serves as the guideline for making range utilization checks. The procedure uses the Alaska Grazed Class Method to measure lichen cover and lichen utilization. Monitoring, or utilization checks, are important for the development of grazing management plans and maintaining sustained forage production systems for reindeer.

A comprehensive range survey was completed for the Seward Peninsula Reindeer Ranges in 1985 by NRCS. This survey was designed to provide information useful for resource management with special emphasis on reindeer range planning and management. However, the survey included only a small portion of the planning area acreage north of Unalakleet in the permitted Sagoonick reindeer grazing range. Between 2005 and 2014, the NRCS conducted a range survey of ecological sites in the Stebbins and St. Michael area, involving mostly Native corporation and USFWS lands. This survey identified prime reindeer grazing habitat in the Nulato Hills and surrounding area, with rich lichen resources and suitable seasonal habitat. These data can be used in conjunction with the recent *Vegetation Map and Classification for Northern, Western, and Interior Alaska* (Boggs et al. 2016a) as a first step in determining suitable grazing habitat throughout the planning area (BSWI Draft RMP/EIS, Map 3.3.2-2; see Map 3.3.2-3 for suitable grazing habitat range in the Stuart Range in the Stebbins and St. Michael area). Winter lichen ranges usually have lichen cover greater than 20 percent (NRCS 2001).

In addition to the annual grazing monitoring through range utilization checks, BLM is involved with a collaborative effort for monitoring grazing exclosures on BLM-managed public lands within active reindeer ranges of the Seward Peninsula. These monitoring programs determine percent lichen cover and estimate vegetative recovery and changes in community composition (Moore 2011). No such monitoring currently exists in the planning area.

### **3.2.5 Resource Changes: Trends and Forecasts**

Grazing is typically managed on a geographical unit extending across land manager boundaries, often encumbering a watershed(s) or natural land barriers and can occupy up to 1 million acres or more for a viable reindeer herd with seasonal habitat needs. Smaller grazing ranges are feasible pending management objectives and strategies.

Due to range health and limited grazing capacity of St. Michael and Stebbins area lands, reindeer herd owners are seeking public land use for grazing opportunities. An application to graze this herd on BLM-managed public land is being developed by the reindeer herd owners. This proposal will likely involve BLM-managed public lands in the planning area, south and east of the communities of Stebbins and St. Michael. The application process is ongoing.

It is foreseeable that reindeer may occupy the Sagoonick permitted area when conditions are favorable.

There is concern that domesticated reindeer may emigrate with the nearby caribou in the WACH and the MCH. This has occurred for decades with reindeer grazing on BLM-managed public lands on the Seward Peninsula, and is a possibility for reindeer in the planning area (Finstad et al. 2006).

Future interest in reindeer grazing permits is anticipated on BLM-managed public lands as rural communities seek long-term and sustainable industry to support economic welfare and to preserve rural Alaska lifestyle, culture, and tradition. A primary reason that there are not more commercial grazing operations within the planning area is a lack of infrastructure to prepare and ship meat to market and limitations meeting USDA requirements. The lack of roads and utilities within the planning area to support such an operation has posed significant challenges to meeting the need. However, actions to address this are being developed by the University of Alaska Reindeer Research Program, with assistance

from Kawerak Reindeer Herders Association, and the BIA and collaborative support from the Alaska Reindeer Council: A mobile slaughter facility prototype has been designed and in use for a couple years as teaching facility associated with the University of Alaska Fairbanks High Latitude Range Management Curriculum. The Midnite Sun Reindeer Ranch north of Nome obtained one mobile slaughter unit in 2016 to help meet USDA requirements and sell meat to nationwide markets outside the community; they are fundraising for a second unit.

### 3.3 Locatable and Salable Minerals

#### 3.3.1 Introduction

This section describes the regulatory setting along with the baseline conditions of locatable and salable minerals within the planning area. Locatable minerals are minerals for which the right to explore, develop, and extract mineral resources is established by the staking of mining claims, as authorized under the General Mining Law of 1872. Examples of locatable minerals include metallic minerals (gold, silver, platinum, copper, lead and zinc) and non-metallic minerals such as precious stones (e.g., jade, diamonds) and sometimes industrial minerals (e.g., garnet, quartz sands). Salable minerals are those that may be sold under the Material Sale Act of 1947. The primary salable materials are sand and gravel.

#### 3.3.2 Laws, Regulations, and Policies

Several agencies including the State of Alaska, BLM, and multiple Native corporations are involved in the management and use of locatable and salable minerals within the planning area. Specific regulations that these entities utilize for lease management are discussed below.

**The General Mining Act of 1872** authorizes and governs prospecting and mining for economic minerals, such as gold, platinum, and silver, on federal public lands.

**Surface Resources Act of 1955** is an amendment to the Act of July 31, 1947, and provides for multiple uses of the surface of the same tracts of public lands.

**Mining and Minerals Policy Act of 1970** declares that it is the continuing policy of the federal government to foster and encourage private enterprise in the development of a stable domestic minerals industry and the orderly and economic development of domestic mineral resources.

**FLPMA** reiterates that the Mining and Minerals Policy Act of 1970 shall be implemented and directs that public lands be managed in a manner that recognizes the Nation's need for domestic sources of minerals and other resources.

**The National Materials and Minerals Policy, Research and Development Act of 1980** requires the Secretary of the Interior to improve the quality of minerals data in federal land use decision-making.

**ANILCA** specifically provides the State of Alaska with rights to manage all surface waterways, even those that cross through federal lands and maintain access to non-federal areas that may cross through federal lands.

**ANCSA**. Some of the lands in the planning area will be affected by ANCSA due to the fact that some native corporation selected BLM managed lands have current special protections status or subsurface rights that may be retained after ownership is transferred.

**Domestic Minerals Program Extension Act of 1953** states that each department and agency of the federal government charged with responsibilities concerning the discovery, development, production, and

acquisition of strategic or essential minerals and metals shall undertake to decrease further, and to eliminate where possible, the dependency of the United States on overseas sources of supply of each such material.

**APDES.** Wastewater discharge from mining and activities relating to development of resources or industrial activity are governed and enforced according to Senate Bill 110, August 2005 authorization.

**The Anadromous Fish Act (AS 16.05.871- .901)** requires that an individual or government agency provide prior notification and obtain permit approval from ADF&G before altering or affecting “the natural flow or bed” of a specified waterbody, or fish stream. All activities within or across a specified anadromous waterbody require approval from the Division of Habitat, including construction; road crossings; gravel removal; mining; water withdrawals; the use of vehicles or equipment in the waterway; stream realignment or diversion; bank stabilization; blasting; and the placement, excavation, deposition, or removal of any material.

**The Fishway Act (or Fish Passage Act AS 16.05.841)** requires that an individual or government agency notify and obtain authorization from the ADF&G, Division of Habitat for activities within or across a stream used by fish if it is determined that such uses or activities could represent an impediment to the efficient passage of resident or anadromous fish.

**Alaska Dam Safety Act.** Development that require dams for impoundment of water or tailings fall under the jurisdiction of both Alaska Statute 46.17.900 and AAC Title 11, Part 6, Chapter 93, Article 3, Alaska Dam Safety, which dictate safe construction and operation of all dams within Alaska regardless of land ownership status.

**Title 43 CFR.** These include a number of regulations pertinent to locatable and salable minerals, including:

- 3600 - Mineral Materials Disposal
- 3710 - Public Law 167; Act of July 23, 1955
- 3800 - Mining Claims Under the General Mining Laws

**BLM Handbooks.** A number of BLM policy handbooks have been created to guide regulation of locatable and salable minerals on BLM-managed public lands. These include:

- BLM Handbook H-3600-1, Mineral Materials Disposal Handbook
- BLM Handbook H-3809-1, Surface Management
- BLM Handbook H-3830-1, Administration of Mining Claims, Mill Sites, and Tunnel Sites
- BLM Handbook H-3890-3, Validity Mineral Reports

### 3.3.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for locatable and salable minerals-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres of land or river miles withdrawn from the total number of acres or river miles of locatable minerals identified in the planning area, when available

- Acres of land or river miles of salable minerals in the planning area closed to development, when available
- Number of operations able to maintain compliance without the assistance of the Alaska Statewide Bond Pool for reclamation

### 3.3.4 Current Conditions

#### Physiography

The physiography of the planning area is broken up into 12 specific regions described in detail in Section 2.3, Soils.

#### Locatable Minerals

Distribution of locatable mineral occurrences within the planning area is illustrated in BSWI Draft RMP/EIS, Map 3.3.3-1, and is generally concentrated in the upland areas of the planning area and lowlands in the immediate vicinity of these uplands where placer deposits occur.

The most current report used to detail mineral occurrences within the planning area for this document is the *Mineral Occurrence and Development Potential Report - Locatable and Salable Minerals Bering Sea-Western Interior Resource Management Plan* (Kurtak et al. 2010).

#### *History and Development*

The planning area includes all or portions of 11 mining districts (BSWI Draft RMP/EIS, Map 3.3.3-2) as established by Ransome and Kerns (1954). The Ophir, Akiak, and Iditarod districts are classified as some of Alaska's major gold producing areas. The planning area contains 453 documented mineral occurrences (BSWI Draft RMP/EIS, Map 3.3.3-1) and 2,480 mining claims, with 207 of those under federal management. This includes placer gold, gold-bearing quartz veins, copper-gold skarns, and silica-carbonate mercury deposits. As of December 2016, there are four active placer mines, one active lode mine, and two temporary placer mine closures on BLM-managed public lands in the planning area. The number of active and temporarily closed mines changes annually. Documented mineral production in the planning area totals 3.2 million oz. gold, 151,750 oz. silver, and 2.1 million pounds of copper and 41,767 flasks of mercury. The international unit of measurement of elemental mercury is a flask, which weighs 34.5 kg or 76 pounds (USGS 2003). This translates to approximately 3.17 million pounds of elemental mercury.

The history of placer mining within the planning area is dominated by gold mining and began as early as 1889 with reports of prospectors working in the Kuskokwim River basin near Aniak; however, the first significant discovery of gold took place in 1906 resulting in establishment of the community of Ophir. The first placer discoveries in the Iditarod District were made in 1908 resulting in one of the last major gold rushes in Alaska and establishment of the towns of Flat and Iditarod. Gold was found on the Tuluksak River Drainage in 1907 and resulted in one of the longest continuous paystreaks in the planning area. Many of these areas have continued to have placer mining activities through the present time; however, at this time there is little interest in staking claims on unencumbered BLM-managed public land and there are no currently permitted placer mining operations on these unencumbered BLM lands. The BLM does manage three active placer operations on BLM-managed mining claims that were excluded from Native and State land conveyances under ANILCA.

Historic lode mining in the planning area has focused predominantly on gold, copper, and mercury. Lode mining on BLM-managed lands within the planning area has been minimal. However, the BLM manages the only lode mine, Nixon Fork Mine, in the planning area. This lode mine operates on BLM lode claims that were excluded from Native and State land conveyances under ANILCA.

Though there has been no historic mining of Rare Earth Elements (REEs), there is future potential for development of this resource in the planning area; however, little of this would occur on BLM-managed public lands because most occurrences are not on BLM lands.

Areas of high locatable mineral potential (LMP) have been identified within the planning area (BSWI Draft RMP/EIS, Map 3.3.3-3). The mineral potential score is composed of the number and quality of mineral occurrences and claims located within the section and the intersection of areas designated as being significant to mineral potential. A total of 101 areas have been designated as high LMP including several areas that fall within BLM managed lands and are covered by federal mining claims (Kurtak et al. 2010). These include the Nixon Fork Mine area, Flat-Chicken Mountain area, the Ophir Creek drainage (Kilbuck Mountains), and the NYAC (Shamrock Creek) area. Additional areas of interest include the high LMP areas on State-selected lands near Little Creek, Oskawalik, Julian Creek, and the Granite-Willow Creek areas.

Current and future mineral exploration and development of locatable mineral resources within the planning area could have impacts on BLM-managed public lands; however, the potential for development on BLM lands is considered low due to a relative lack of high LMP resources. Exploration and mining on non-BLM managed high LMP areas adjacent to BLM lands will necessitate management to prevent unnecessary disturbance to BLM-managed public lands by ROW corridors, roads and development on these adjacent high LMP lands.

The Alaska Division of Geological & Geophysical Surveys, in the 2014 Mineral Industry Report 70, lists 12 separate companies or individuals (11 open pit placers and one hard rock mine) that are estimated to be producing metals (predominantly gold) in the planning area in 2014 (Freeman et al. 2015). Additionally, the Donlin Gold Mine near Crooked Creek is an advanced stage exploration project that is currently seeking permit approval for initial mine startup.

### ***Placer Gold***

Placer deposits within the planning area (BSWI Draft RMP/EIS, Map 3.3.3-4) have historically been the most productive and the main deposit type mined in the area. Placer gold is the main commodity produced along with lesser amounts of PGE, cinnabar, and scheelite. The planning area contains 162 placer gold occurrences. Records show production from 90 of these placers. Some of the deposits were rich, such as Flat Creek in the Iditarod District, which produced over 650,000 oz. of gold. Source rocks for most of the placers include Cretaceous-aged volcanic-plutonic and felsic dike complexes. These roughly parallel the trend of the Iditarod-Nixon Fork fault in a northeast-southwest trend through the heart of the planning area.

Currently eleven operators are producing gold from placer operations within the planning area and three mines are in temporary shutdown status. However, none of these are operating on BLM-managed land, and either operate wholly on private lands or within historic in-holdings on BLM-managed public lands (Whitlock 2016).

### ***Lode Minerals***

Lode mining potential in the planning area is focused predominantly on gold, copper, silver and, to a much lesser extent, mercury, which was mostly mined historically as it was important in the amalgamation process in gold mining. These lode minerals occur predominantly in quartz veins, copper-gold skarns, and silica-carbonate mercury deposits located within the central and southeastern portion of the planning area.

Currently the Nixon Fork Mine is the only active lode mine in the planning area, and operates on BLM lode claims that were excluded from Native and State land conveyances under ANILCA.

Multiple high LMP lode mineral areas, such as the currently proposed Donlin gold deposit, Independence Mine, and Golden Horn Mine exist within the planning area; however, these sites and most of the remaining current claims and exploration areas, are located on State- or Native-owned lands.

### ***Rare Earth Elements***

There is currently no development or exploration targeting REEs occurring within the planning area, but with demand for these minerals increasing the planning area could see much more exploration and potential development for these resources. A total of seven REE occurrences have been identified in the planning area of which none are located on BLM-managed lands (Kurtak et al. 2010; Szumigala and Werdon 2011). Development of these resources would likely have a secondary impact on BLM-managed public lands due to development of adjacent property and access through BLM lands.

### ***Salable Minerals***

#### ***Sand and Gravel***

The primary mineral material commodities used within the planning area are crushed rock, and sand and gravel. A total of 13 material sites were reported to be active in 2008 in Southwest Alaska, which includes the planning area (USGS 2008). Sand and gravel is used in construction and road maintenance. The local demand for salable materials is generally being met by sand and gravel producers located on private or State-owned lands. This status is unlikely to change in the foreseeable future due to lack of appropriate BLM-managed public lands in the vicinity of population centers that require sand and gravel.

Future demand for additional sand and gravel will be driven by development in the planning area, such as the proposed Donlin Gold Mine. However, because the proposed road and pipeline routes for this project are mostly on State- or Native-held lands, it is foreseeable that most of the sand and gravel for the proposed routes will be met by producers located on those lands.

#### ***Peat***

Currently BLM-managed public land within the planning area does not have any requests to develop peat, and only one feasibility study on large-scale use of peat has been completed in the planning area to date. This study was completed for the proposed Donlin Gold Mine in the central portion of the planning area. It was concluded that due to inadequate drainage and pervasive permafrost that it was uneconomical to mine peat for energy generation. The probability that additional interest in large-scale peat mining is low, due to these factors and the lack of infrastructure and population density that would make peat mining economical.

It is possible that villages and individuals in the planning area could develop peat as a resource for small-scale energy and heat generation. Development of this type is unlikely on BLM-managed public lands, as most villages in the planning area have enough land to harvest peat on their own, or on adjacent State lands with fewer restrictions. Additional discussion of peat resources can be found in Section 3.8, Renewable Energy.

### 3.3.5 Resource Changes: Trends and Forecasts

Management needs for locatable and salable resources on BLM-managed land in the planning area are predicted to be low in the foreseeable future based on the relatively low development potential of locatable minerals and the lack of demand and low economic feasibility of extracting salable materials. Climate change could lead to permafrost thaw, glacial retreat, and altered water availability in the planning area. Permafrost thaw can adversely impact mining activities and overland travel. Retreat of glaciers could expose additional mineral resources. Changes to water availability could impact hazardous materials controls at mine sites, dust abatement activities, and other mine operations.

## 3.4 Leasable Minerals

### 3.4.1 Introduction

This section describes the regulatory setting and summarizes the baseline conditions for leasable resources located within the planning area.

### 3.4.2 Laws, Regulations, and Policies

Several agencies including the BLM, State of Alaska, and Native corporations are involved in the management and use of leasable minerals with the planning area. Specific regulations that these entities utilize for lease management are discussed below.

**Mineral Leasing Act of 1920 (MLA)** authorizes and governs leasing of public lands for developing deposits of coal, petroleum, natural gas and other hydrocarbons, in addition to phosphates, sodium, sulfur, and potassium in the United States. The **Federal Coal Leasing Amendments Act of 1976** (amendment to the MLA) requires that all public lands available for coal leasing be leased competitively.

**Mineral Leasing Act for Acquired Lands of 1947** extends the provisions of the MLA and the authority of the Secretary of the Interior over oil and gas operations to federal "acquired lands."

Additional legislation also governs which lands can be leased for leasable minerals including oil and gas, coal, and geothermal and how they can be developed, including Energy Policy Act of 2005, Mining and Minerals Policy Act of 1970, the Mineral Leasing Act for Acquired Lands of 1947, Domestic Minerals Program Extension Act of 1953, the National Materials and Minerals Policy, and the Research and Development Act of 1980.

**Surface Mining Control and Reclamation Act of 1977 (SMCRA)** is the primary federal law that regulates the environmental effects of coal mining in the U.S. SMCRA created two programs: one for regulating active coal mines and a second for reclaiming abandoned mine lands. It also allows the states to develop State-specific versions of this act, which can be tailored to State-specific conditions. In Alaska, this has resulted in the Alaska SMCRA, which is administered by the ADEC and is designed to address Alaska-specific reclamation issues.



**Geothermal Steam Act of 1970** authorizes the Secretary of the Interior to issue leases for development and utilization of geothermal steam and associated geothermal resources on federal lands.

**ANILCA** specifically provides the State of Alaska with rights to manage all surface waterways, even those that cross through federal lands and maintain access to non-federal areas that may cross through federal lands.

Some of the lands in the planning area will be affected by **ANCSA** due to the fact that some Native corporation-selected BLM-managed lands have current special protections status or subsurface rights that may be retained after ownership is transferred.

**Title 43 CFR.** These include a number of regulations pertinent to leasable minerals, including:

- 3000 - Minerals Management: General
- 3100 - Oil and Gas Leasing
- 3200 - Geothermal Resource Leasing
- 3400 - Coal Management: General
- 3500 - Leasing of Solid Minerals Other Than Coal and Oil Shale

There are a variety of BLM Handbooks that also specifically apply to leasable minerals, including:

- BLM Handbook H-3070-2, Economic Evaluation of Oil and Gas Properties
- BLM Handbook H-3073-1, Coal Evaluation
- BLM Handbook H-3100-1, Oil and Gas Leasing Handbook
- BLM Handbook H-3101-1, Issuance of Leases
- BLM Handbook H-3150-1, Onshore Oil and Gas Geophysical Exploration Surface Management Requirements
- BLM Handbook H-3203-1, Leasing Terms
- BLM Handbook H-3468, Coal Inspection and Enforcement
- BLM Manual 1624, Planning for Fluid Mineral Resources

### 3.4.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for leasable minerals-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres of State- or ANCSA corporation-selected lands
- Acres of land or river miles in the planning area closed to leasable minerals exploration and development

### 3.4.4 Current Conditions

Minerals and materials designated leasable under federal law include coal, natural gas, oil, phosphate, sodium, and geothermal. Leasable mineral potential for resources within the planning area has been defined as low.

## Coal

The areas in the planning area that contain coal within the planning area have been divided into one field and five districts: Farewell (Little Tonzona) Coal Field, and the Windy Fork, Middle Fork, Cheeneetnu, Big River, and Nelson Island Districts (BSWI Draft RMP/EIS, Map 3.3.4-1) in the planning area. The quality of coal is ranked by the amount of metamorphism it has undergone since burial. Coal qualities are divided into four classes or ranks: in decreasing order of carbon content and heat value, these are anthracite, bituminous coal, subbituminous coal, and lignite. Within the bituminous class, coals are further subdivided based on the amount of volatile matter (low, medium, and high volatiles present) and heat value (A, B, and C).

The majority of the coal in the planning area is tertiary-aged and subbituminous and underlies approximately 200 square miles of the Farewell Field, Windy-Middle Forks, Big River, and Cheeneetnu River areas. Potential coal production estimates for all five districts has been defined as low. This estimate is based on the low grade of the coal and the lack of infrastructure in the region.

## Coalbed Natural Gas

Coalbed natural gas is low cost, clean burning, natural gas recovered and produced from coal beds. Unlike conventional gas, it is a nontraditional reservoir in the sense that the coal beds are both the source and reservoir for the methane gas (Tyler et al. 2000). Most coal and coal gas reservoirs (see BSWI Draft RMP/EIS, Map 3.3.4-1) in the planning area have low development potential due to the high initial cost of production and a lack of local infrastructure for storage and distribution.

## Oil and Gas

There are seven potential oil and gas bearing basins in the planning area including the Bethel Basin, Galena Basin, Holitna Basin, Innoko Basin, Minchumina Basin and the Yukon Delta (BSWI Draft RMP/EIS, Map 3.3.4-2).

The planning area has received limited, intermittent interest and activity in oil and gas exploration since the early 1960s due to poor source and reservoir potential in the Cretaceous sedimentary rocks (Kirchner 1994). The presence of sufficiently large commercially valuable accumulations of gas is also presently unknown. Little additional subsurface well or seismic information has been collected in the planning area to date and much of the data collected remains proprietary.

No recent federal oil and gas leasing has taken place in the planning area. Prospective oil and gas basins in the region of the planning area include the Holitna, Bethel, and Minchumina basins, along with the Yukon Delta.

There are 59 oil and gas pending Pre-Reform Act lease offers within the planning area, all within the boundary of the Yukon Delta NWR and, as such, they have been suspended. No additional oil and gas lease offers may be filed until the land selection process that the State and various Alaska Native entities are undertaking is complete.

## Geothermal

There are two confirmed geothermal springs within the planning area: Ophir Hot Springs and Chuilnu Hot Springs (BSWI Draft RMP/EIS, Map 3.3.4-3). The only spring that is currently being used as a source of energy is the hot spring occurrence near Ophir Creek (Bundtzen and Kline 1986). Both

occurrences are located on private inholdings. No significant geothermal reservoirs exist elsewhere in the planning area.

### **Phosphate, Potassium, Sodium, Sulfur, Oil Shale**

No information currently exists for oil shale, phosphate, potassium, sulfur, or sodium resources within the planning area. If any studies have been conducted, the data remains proprietary.

#### **3.4.5 Resource Changes: Trends and Forecasts**

Management needs for leasable resources in the planning area are predicted to be low in the foreseeable future based on the remoteness of the area, lack of infrastructure, and low development potential of the resources. Over time, climate change could affect the accessibility or demand for leasable resources in the planning area; however, the nature and extent of these impacts cannot be confidently predicted with currently available data.

## **3.5 Lands and Realty**

### **3.5.1 Introduction**

This section describes the regulatory setting and baseline conditions of land ownership and land use authorizations in the planning area. Refer to BSWI Draft RMP/EIS, Map 1-2 for land ownership and parcel boundaries for the planning area.

### **3.5.2 Laws, Regulations, and Policies**

The lands and realty program manages *land use* under the authority of multiple statutes, regulations and guidance, such as FLPMA, the Recreation and Public Purposes Act (R&PP), and the MLA. *Land ownership* in the planning area is influenced by three main entitlement Acts: the Native Allotment Act of 1906 (including the Alaska Native Veteran Allotment Act of 1998), the Alaska Statehood Act, and ANCSA. Implementation of these land management laws also have to accommodate, and in some cases, defer to other land management laws, such as the Wild and Scenic Rivers Act, and the NTSA.

The two primary objectives of the BLM's lands and realty program are to implement the actions contained in the FLPMA, MLA and the R&PP, and the second is to facilitate the transfer of lands to the State of Alaska, ANCSA Native corporations, and individuals. Although millions of acres of land have been conveyed to individual Alaska Natives, Native corporations, and the State of Alaska, there is still land that will be conveyed out of federal ownership in the near future.

The BLM can authorize use of public lands through: FLPMA and MLA ROW grants; FLPMA leases and land use permits; R&PP Act leases and/or patents, FLPMA-authorized withdrawals for benefit of federal agencies; and FLPMA land tenure adjustment actions such as sales, exchanges or acquisitions. BLM also addresses realty trespass issues that affect selected and non-selected public lands and provides support to other internal programs that protect or utilize resources. The BLM manages public easements reserved in the conveyance of lands to ANCSA corporations and manages those easements unless BLM has transferred the easement management to another entity. Management actions may include marking, relocating, termination, and acquisition of easements.

Lands that are selected by Native corporations or the State that are within the boundaries of a Conservation System Unit (CSU) are managed in the interim by the federal agency that administers that

CSU. BLM has an adjudicative role in conveying land within CSUs held by other agencies, but not surface management responsibilities.

In addition to those listed above, the lands and realty program operates in accordance with multiple laws, regulations, and guidance. The following laws have a significant influence on BLM lands and realty management in the planning area:

***Alaska Statehood Act (1958).*** Under the Alaska Statehood Act, the State of Alaska is entitled to receive 104 million acres of federal land. Approximately 2.6 million acres of BLM-managed public lands in the planning area are State-selected. Final conveyance priority lists for State selections have been submitted to the BLM. At the present time the State has selected more lands than their remaining entitlement, and is allowed by law to over-select up to 25 percent on a statewide basis. As a result, some of the selected lands will remain in federal ownership over the long-term.

***Native Allotment Act (1906).*** The Native Allotment Act (43 U.S.C. 270–1 through 270–3, 1970) and the Alaska Native Veterans Allotment Act (43 U.S.C. 1629g, as amended) allow for the transfer of up to 160 acres of land to eligible Alaska Natives if they occupied the land on August 31, 1971. These are called Native allotments. There are approximately 5,200 allotments within the planning area (a total of approximately 430,000 acres, or 0.7 percent of the planning area). There remain some Native allotment applications in the planning area that have not been finalized; however, no new applications can be filed.

***ANCSA (1971).*** ANCSA established Alaska regional and village corporations and granted them the right to select approximately 44 million acres of federal land in Alaska. Approximately 144,000 acres of BLM-managed public lands in the planning area are Native-selected. Final conveyance priority lists for Native selections have been submitted to the BLM. At the present time, ANCSA regional and village corporations, as they are allowed, have selected more than what will be their ultimate entitlement under ANCSA. As a result, some of the selected lands will remain in federal ownership over the long-term.

***ANILCA (1980).*** ANILCA established and expanded national parks and preserves, national wildlife refuges, national conservation and recreation areas, WSRs, national monuments, and wilderness areas on federal lands in Alaska. The Unalakleet Wild River Corridor (located in the planning area) was established through ANILCA. Among other provisions, ANILCA provides for general public and subsistence access.

***NHPA (1966).*** Pursuant to the NHPA, a qualified archeologist reviews permits for land use authorizations and realty actions to avoid impacts to cultural resources by project redesign, project abandonment, and/or mitigation of adverse impacts through scientific recovery and analysis. When impacts to cultural resources cannot be avoided, the BLM will complete a Determination of Eligibility to the State Historic Preservation Officer (SHPO) to determine a site's significance and eligibility to the NRHP, and follow prescribed NHPA Section 106 [54 U.S.C. 306108] consultation for all sites determined eligible. If a site is determined eligible, the BLM will develop a memorandum of agreement to mitigate the action.

***Alaska Land Transfer Acceleration Act (2004).*** The act represents an attempt to speed up the State selection process as well as finalize the regional and village corporation selections by establishing sequential deadlines for prioritizing selections [P.L. 108-152, 118 Stat. 3575]. It was an attempt to resolve the conflicting land claims of in time for the fiftieth anniversary of Alaska's statehood in 2009.

***National Wild and Scenic Rivers Act (1968).*** The WSR Act was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations [16 U.S.C. 1271-1287]. Section 5(d)(1) of the National Wild and Scenic

Rivers Act requires that the BLM and other federal agencies inventory streams on public lands to determine their eligibility and suitability to be components of the National System.

***National Trails System Act (1968)***. The NTSA established a network of scenic, historic, and recreation trails that provide for outdoor recreation needs. National historic trails are specifically designated areas in the U.S. containing the route of nationally and historically significant trails and areas adjacent to the trails to be utilized for scenic, historic, natural, cultural, or developmental purposes.

### **3.5.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for lands and realty-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

The primary indicators for lands and realty are as follows:

- Acres of BLM-managed lands identified for acquisition, retention, or disposal
- Acres or river miles affected by land withdrawals
- Acres of BLM-managed surface ownership affected by ROW lease or permit restrictions (i.e., avoidance or exclusion areas, no surface occupancy)
- Acres of BLM-managed lands that would be open to potential mineral entry or oil and gas development
- Acres or river miles open to locatable and leasable minerals
- Total VRM Class Acreages

### **3.5.4 Current Conditions**

#### **Land Tenure/Land Ownership**

Section 1.3.3, roughly 13.5 million acres in the 62.3 million-acre planning area are managed by the BLM, including approximately 10.7 million acres of BLM unencumbered lands, as well as encumbered lands that are selected but not yet conveyed under the Alaska Statehood Act and ANCSA. Land conveyances are ongoing; therefore, the BLM land status acreage frequently changes. BSWI Draft RMP/EIS, Map 1-2, shows the location of the planning area within the Alaska and depicts the varying ownership and conveyance status.

#### ***ANCSA and ANILCA Withdrawals***

A withdrawal is a formal action that sets aside, withholds, or reserves federal lands by administrative order or statute for public purposes. The effect of a withdrawal is to segregate and close federal land to the operation of all or some of the public land laws and/or one or more mineral laws; transfer total or partial jurisdiction of federal land between federal agencies; or dedicate federal land for a specific federal purpose.

A series of public land orders (PLOs) issued from 1972 to 1975 that placed a protective withdrawal on federal lands under a variety of ANCSA authorities including ANCSA 17(d)(1), which gave authority to withdraw land for the purpose of study and review to determine the proper classification and “to insure

that the public interest in these lands is properly protected.” The PLOs often cite more than one authority, including Sections 11 and 14 and sometimes Sections 17(d)(2) of ANCSA.

The intent of the withdrawals based on Section 17(d)(1) was to limit appropriation of the lands to complete inventories of resources and assessment of values that meet public needs within the planning area affected by 17(d)(1) withdrawals. In the 1980s studies and assessments were completed, and opening orders were issued on some lands covered by ANCSA 17(d)(1). Under existing conditions, ANCSA 17(d)(1) withdrawals cover almost all BLM-managed land in the planning area (13,461,531 acres; over 99 percent). Table 3.5.4-1 describes some ANCSA 17(d)(1) withdrawals within the planning area (BLM 2006).

**Table 3.5.4-1. Effect of ANCSA 17(d)(1) Withdrawals on Federal Public Lands**

PLO	Description
PLO 5170	Withdrew lands for selections by village, corporations and regional corporation in Bering Straits region and for classification for lands in withdrawals. Amended by PLO Nos. 5395, 5450 and 5557.
PLO 5172	Withdrew lands for selections by village, corporations and regional corporation in Bering Straits region and for classification for lands in withdrawals. Amended by PLO Nos. 5395, 5450 and 5557.
PLO 5173	Withdrew for selections by village corporations and regional corporation in Tanana region and for classification for lands in withdrawals. Modified and corrected by PLO No. 5191 (37 FR 6089). Amended by PLO Nos. 5213, 5252, 5391; amended and corrected by PLO No. 5321 (37 FR 26595).
PLO 5174	Withdrew lands for village or regional deficiency selections under the authority of Section 11(a)(3) of ANCSA. Each of these PLOs contained a paragraph in which a withdrawal under Section 17(d)(1) was also placed on the same lands. Lands were withdrawn from selection by the State, not open to location and entry under the mining laws, nor leasing under the MLA. Section 906(j) of ANILCA and PLO 6092 opened most 17(d)(1) withdrawals to State Selections.
PLO 5179	Withdrew approximately 80 million acres of land in aid of legislation for creating or adding to CSUs under the authority of Section 17(d)(2) of ANCSA, which had a termination provision. A second paragraph added a 17(d)(1) withdrawal to the same lands and did not have a termination provision. Lands were withdrawn from selection by the State, not open to location and entry under the mining laws, nor leasing under the MLA. PLO 5657 opened many lands to State Selection except in Umiat and portions of Kateel River Meridians.
PLO 5180	Placed a 17(d)(1) withdrawal on approximately 47 million acres including the lands in the transportation and utility corridor withdrawn by PLO 5150. Lands were withdrawn from selection by the State, not open to location and entry under the mining laws (except locations for metalliferous minerals), nor leasing under the MLA. PLO 5180 was amended by PLO 5418, which placed a 17(d)(1) withdrawal on all unreserved land and any lands that may become unreserved in the future. PLO 5657 opened many lands to State Selection.
PLO 5181	Placed a 17(d)(1) withdrawal on lands for classification and study as possible additions to the NWR System. Closed lands to all forms of appropriation under public land laws, including selections by the State of Alaska under the Alaska Statehood Act, 72 Stat. 339 and from location and entry under the mining laws and from leasing under the MLA.
PLO 5184	Placed a 17(d)(1) withdrawal on lands originally withdrawn under section 11 of ANCSA for selection by the village corporations, and all of those lands lying between 58 degrees N. and 64 degrees N. Latitude, and west of 161° W. Longitude that were not withdrawn for any part of the NWR System. These areas are withdrawn from all forms of appropriation under public land laws, (except State Selection) and from location and entry under the mining laws and from leasing under the MLA. All of those lands withdrawn under section 11 lying between 58 degrees N. and 64 degrees N. Latitude, and west of 161° W. Longitude that were not withdrawn for any part of the NWR System are withdrawn from all forms of appropriation including State Selections. Set aside for study and review by the Secretary of the Interior for the purpose of classification or reclassification of any lands not conveyed pursuant to section 14 of said Act.
PLO 5186	Withdrawal for classification and protection of the Public Interest in lands not selected by the State. Lands are not open to location and entry under the mining laws (except locations for metalliferous minerals), nor leasing under the MLA. Lands are available for State Selection.
PLO 5157	Classification and protection of the public interest in military reservations: segregates the land from all forms of appropriation under the public land laws including selection by the State of Alaska.

There are 23 case types dealing with withdrawals within the planning area (see BSWI Draft RMP/EIS, Map 3.3.5-1). In addition, there are administrative, recreation, power site, military, and other withdrawals in place, other than the ANCSA authorities, many of which were created for a specific purpose that may now be obsolete, which make up about 34 percent of the planning area. Many of these withdrawals overlap ANCSA 17(d)(1) withdrawals. Creating, modifying, renewing or revoking withdrawals for other federal agencies is forecast to continue to be a recurring function of BLM. As resource demand increases in the region for economic and social development, or resources within withdrawals are sought by the public, agencies that hold the withdrawals may feel increased pressure to modify existing withdrawals or limit future withdrawals.

While some land use plan decisions become effective with approval of the ROD for the RMP, other programs have specific requirements that must be taken in order to make certain decisions or recommendations effective. Modification or revocations of any administrative withdrawal orders including those under Section 17(d)(1) of ANCSA requires a formal action that includes Secretarial-level review and approval, resulting in a public land order signed by the Secretary of the Interior that will formally revoke or modify the 17(d)(1) withdrawal order(s). After the ROD is signed, BLM will draft and prepare all the required documents for the "PLO package." The package will also include the relevant parts of the BSWI Final EIS and ROD, which will fully cover NEPA adequacy in assessing the impact of revoking the 17(d)(1). This PLO package will be reviewed by the Solicitor for legal sufficiency before being submitted to the Secretary of Interior for approval.

### ***Disposal Actions***

Discretionary disposal actions are usually initiated in response to public requests or application and result in transfer of title and lands from the public domain. These include airport conveyances, R&PP sales, FLPMA sales, and exchanges. Disposals such as airport conveyances and most R&PP sales include revisionary clauses to return the lands to the public domain, if the land is no longer used for the purposes conveyed. FLPMA sales and exchanges do not include reversionary clauses and are generally final. This sub-section will address both new disposal actions under this authority and prior disposals that have returned to the public domain through reversion.

Reserved federal interests in split estate lands anywhere in the planning area may be considered for conveyance out of federal ownership. Non-discretionary disposal actions, such as Native and State conveyances, and Native allotments, are not subject to the BLM planning process.

### **Airport Conveyance**

The Airport and Airway Improvement Act of September 3, 1982, and 43 CFR 2640 authorize and regulate the issuance of conveyance documents for lands under the jurisdiction of the DOI to public agencies for use as airports and airways. Under the regulations those lands proposed for conveyance are segregated from appropriation under the public land laws, including the mining laws. Furthermore, airport patents contain provisions allowing for reversion of the lands to the U.S. under certain circumstances.

### **R&PP Sales**

The R&PP Act authorizes the Secretary of the Interior to convey those public lands other than: 1) lands withdrawn or reserved for national forests, national parks and monuments, and national wildlife refuges; 2) Indian lands and lands set aside for the benefit of Indians, Aleuts, and Eskimos; and 3) lands, which have been acquired for specific purposes, under conditions set forth in 43 CFR 2740. Though minerals

remain reserved to the U.S., there is no provision for mineral entry or development on R&PP patents. R&PP patents contain provisions allowing for reversion of the lands to the U.S. under certain circumstances; in some cases, the reversionary clause is limited to 25 years.

The needs of local communities will be considered and may also be met by lease or sale under the R&PP Act (43 U.S.C. 869 et seq.). Although no exchanges, sales, or R&PP disposals have been made in recent years, there are five existing R&PP leases in the planning area, shown in Table 3.5.4-2, with reversionary clauses that could be identified for disposal under this authority. If these lands become unencumbered within the life of the plan, they could be suitable for disposal, determined on a case-by-case basis. There may be municipal, school, and federal reserves and withdrawals that may be no longer needed by the U.S. for the purposes for which they were reserved. Where this is occurring, the land could potentially be used locally through the R&PP process, or they could be sold or leased.

**Table 3.5.4-2. R&PP Lands in the Planning Area**

Serial Number	Acres	Legal Description
AKF 013187	1.04	S021N070W027
AKF 032313	2.25	S008N071W009 Lot 1
AKF 033548	0.35, 0.46	K023S018W024 Lot 3, 4
AKF 034685	10.54	S008N071W018 Lot 15
AKF 035163	1.72	S021N048W032 Lot 11

### FLPMA Sales

Section 203 of FLPMA establishes criteria under which public lands may be considered for disposal. In general, all such proposals are to be reviewed under the criteria established by FLPMA on a case-by-case basis and will require a site specific environmental assessment.

Finalization of conveyances to the State of Alaska, Native corporations, and individuals (Native allotments) are ongoing. Unselected lands in the planning area are currently retained for public use. Any selected lands which remain after all entitlements are fulfilled, will also generally be retained for public use. There are no pending FLPMA sales within the planning area; however, tenure adjustments, including sale or exchange, may be made in order to meet management needs (such as disposing of isolated parcels). Specifically, BLM-managed public lands that are inholdings of other federal lands, Native corporations, and/or State lands meet the criteria for potential exchange or disposal. Table 3.5.4-3 is a non-inclusive list of BLM land that could be considered for exchange or disposal to meet management needs. There are no pending FLPMA sales, and one sale has occurred.

**Table 3.5.4-3. BLM-Managed Public Lands Considered for Exchange or Disposal in the Planning Area**

Case (If Applicable)	Township/Range	Section(s) and/or Section Range(s)	Acres
AKAA 091175	T24S, R18W	25, 26, 35	1,920
AKAA 091175	T25S, R18W	1 to 2, 11 to 14	3,840
	T25S, R17W	7 to 30, 33 to 36	17,920
	T25S, R16W	25 to 36	7,680
AKFF 085667	T31N, R58W	3 to 10, 17 to 20, 30 to 31	8,960
AKFF 085667	T30N, R59W	1, 12	1,280
AKFF 085667	T30N, R59W	3 to 10	5,120



Case (If Applicable)	Township/Range	Section(s) and/or Section Range(s)	Acres
AKAA 00810305	T31N, R57W	7, 18	1,280
AKAA 00810305	T29S, R7W	2	640
AKFF 085667	T31N, R56W	1 to 3, 10 to 12	3,840
AKFF 085667	T31N, R56W	17 to 36	12,800
AKFF 085667	T30N, R57W	1 to 5, 8 to 36	21,760
AKFF 085667	T29N, R58W	1, 12, 13, 24, 25, 36	3,840
AKAA 00810305	T28N, R60W	2, 11	1,280
	T23S, R6W	25, 36	1,280
	T24S, R6W	1, 12 to 14, 23 to 26, 34 to 36	7,040
AKAA 00810343	T22S, R5W	27, 34	1,280
AKAA 00810349	T26S, R6W	3, 10, 15, 22, 27, 34	3,840
AKAA 00810351	T27S, R6W	3, 10, 15	1,920
AKAA 012873	T27S, R6W	20, 29, 32	1,920
AKAA 00810305	T32N, R54W	4	640
AKAA 00810305	T32N, R54W	15	640
AKAA 00810305	T32N, R54W	28 to 29	1,280
AKFF 085667	T20N, R69W	1 to 4	2,560
AKFF 085667	T20N, R69W	5	640
AKAA 076404	T20N, R68W	1, 12	1,280
AKAA 087834	T20N, R69W	6	640
AKAA 076992	T23N, R58W	13 to 16, 20 to 36	13,440
AKAA 076546	T23N, R56W	13 to 20, 23 to 25, 29 to 33, 36	10,880
AKFF 085667	T24N, R55W	1, 2, 11, 12, 14, 22, 23, 26, 27	5,760
AKAA 00810364	T25N, R54W	34, 35	1,280
AKFF 085667	T25N, R56W	2 to 11, 14 to 18	9,600
AKAA 076578	T25N, R56W	1, 12, 13	1,920
	T33N, R60W	12, 13, 23 to 26, 35, 36	5,120
	T29S, R6E	1, 2, 3	1,920
	T18S, R3W	1, 2, 3, 10 to 15	5,760
AKAA 012892	T17N, R54W	20, 22, 23, 25 to 36	9,600
AKAA 021474	T17N, R53W	21, 22, 23, 25 to 36	9,600
	T18N, R52W	1, 2, 3, 10 to 15, 22 to 27, 34, 35, 36	11,520
AKAA 074571	T18N, R51W	6, 7, 18, 19	2,560
	T19N, R51W	31	640
AKAA 070152	T18N, R51W	25 to 36	7,680
AKAA 076495	T14N, R57W	13, 14	1,280
AKAA 076494	T14N, R56W	18, 19, 20	1,920
AKAA 061005	T14N, R56W	13, 14, 23 to 28, 34, 35, 36	7,040
	T13N, R56W	1, 2, 12	1,920
AKAA 012898	T17N, R50W	1 to 4, 7 to 10, 15 to 18	7,680
AKFF 014900 A	T16N, R51W	19	640
AKAA 00810363	T25N, R53W	19 to 22, 27 to 34	7,680
AKAA 00810365	T24N, R54W	1 to 10	6,400
	T18N, R50W	4 to 9, 16 to 21, 28, 29	8,960
AKAA 021483	T19N, R50W	1 to 4, 9 to 17, 20, 21, 28, 29, 32, 33	12,160
AKAA 074568	T20N, R50W	33 to 36	2,560

Case (If Applicable)	Township/Range	Section(s) and/or Section Range(s)	Acres
	T20N, R49W	8, 9, 16 to 21	5,120
	T21N, R49W	4, 5, 7, 8, 9, 15 to 23, 26 to 33	14,080
	T22N, R46W	22, 23	1,280
AKAA 086371	T19N, R44W	5 to 8	2,560
AKFF 014936 A	T19N, R43W	25 to 29	3,200
AKFF 014936 A	T18N, R44W	36	640
AKFF 014936A2	T18N, R43W	31	640
AKAA 012894	T19N, R40W	18	640
AKFF 014838A2	T18N, R39W	9, 13 to 17, 24	4,480
AKAA 021475	T18N, R38W	18, 19, 20	1,920
AKAA 021475	T18N, R38W	29 to 32	2,560
AKAA 076405	T21N, R38W	2, 11, 14, 15	2,560
AKAA 076405	T21N, R38W	1, 12, 13	1,920
	T21N, R38W	25 to 29, 32	3,840
AKFF 014838A2	T21N, R38W	33 to 36	2,560
AKAA 076405	T20N, R39W	1	640
AKAA 076161	T18N, R34W	25, 26, 27, 31 to 36	5,760
AKAA 076160	T18N, R33W	31, 32	1,280
AKAA 076393	T17N, R34W	3 to 6, 8, 9, 10, 15, 16, 17, 21, 22	7,680
AKAA 00810304	T29S, R15E	2, 3	1,280
AKAA 021571	T34N, R35W	31 to 36	3,840
AKAA 00810303	T33N, R35W	3 to 6	2,560
AKAA 021572	T33N, R36W	11 to 14, 23, 24	3,840
AKAA 076309	T32N, R31W	17, 18	1,280
AKAA 021550	T32N, R33W	25 to 36	7,680
AKAA 021535	T31N, R34W	9	640
AKAA 021535	T31N, R34W	31 to 33	1,920
AKAA 021523	T30N, R35W	5 to 10, 15 to 22, 27 to 34	14,080
AKAA 00810397	T30N, R35W	11	640
AKAA 00810371	T30N, R34W	1, 12, 13, 24, 25, 36	3,840
AKAA 00810372	T29N, R35W	3 to 10, 14 to 23, 26 to 35	17,920
AKFF 014906 A	T27S, R22E	25 to 27, 29, 31 to 36	6,400
AKFF 014906 A	T27S, R24E	9, 10, 15, 16	2,560
AKAA 00810301	T22S, R28E	26	640
AKAA 012630	T23S, R28E	2, 11, 14, 15	2,560
AKAA 00810301	T23S, R29E	28	640
AKAA 021319	T23S, R30E	26 to 29, 32 to 35	5,120
AKAA 012644	T17S, R28W	1 to 12	7,680
AKAA 012644	T17S, R28W	32 to 36	3,200
AKAA 00810309	T24S, R22E	1 to 36	23,040
AKAA 021220	T11S, R23W	19 to 21, 28 to 30	3,840
AKAA 076554	T12S, R23W	28 to 33	3,840
AKFF 015380	T28N, R23W	7	640

Note: Acres are rounded to the nearest whole number.

### ***Withdrawals***

A withdrawal is a formal action that sets aside, withholds, or reserves federal lands for public purposes. Withdrawals accomplish one or more of the following:

- Transfer total or partial jurisdiction of federal land between federal agencies;
- Dedicate federal land to a specific purpose
- Segregate (close) federal land from operation of some or all of the public land laws and (or) mineral laws. All the existing withdrawals segregate from operation of the public land laws, unless the surface estate is in nonfederal ownership.

Table 3.5.4-4 below summarizes the withdrawals in the planning area based on the best available information.

**Table 3.5.4-4. Withdrawals in the Planning Area**

<b>Case File</b>	<b>PLO/ SO/ EO</b>	<b>Purpose and Segregative Effect</b>	<b>Managing Agency</b>
AA-60766	ANILCA 603	Unalakleet River withdrawal: segregates the land from entry, sale, or other disposition under the public land laws of the United States.	BLM
AA-65514	PLO 5172	Withdrew lands for village and regional corporation selections for the Association of Village Council Presidents Region under ANCSA. Also allows the Secretary to grant leases, permits, rights-of-way or easements on lands withdrawn prior to conveyances. The lands are withdrawn, subject to valid existing rights, from all forms of appropriation under the public land laws, including selections by the State of Alaska, location and entry under the mining laws and from leasing under the MLA. Also reserved the lands for the purpose of study and review by the Secretary for classification or reclassification of any lands not conveyed under Section 14 of ANCSA.	BLM
AA-17989	EO 3406	Reserves 168 parcels for lighthouse purposes, subject to valid existing rights.	USCG
AA-87847	FA 12879	Aniak Alaska 31 Project: segregates the land from "entry, location, or other disposal under the laws of the United States unless otherwise directed by the Federal Energy Regulatory Commission or by Congress." 43 CFR 2320.0-3.	FERC
AA-87849	FA 12881	McGrath Alaska 28 Project: segregates the land from "entry, location, or other disposal under the laws of the United States unless otherwise directed by the Federal Energy Regulatory Commission or by Congress." 43 CFR 2320.0-3.	FERC
AA-93287	FA 14369	Chikuminuk Lake Hydro Project-transmission line: segregates the land from "entry, location, or other disposal under the laws of the United States unless otherwise directed by the Federal Energy Regulatory Commission or by Congress." 43 CFR 2320.0-3.	FERC
F-28299	NT19620524 PLO 2745	Unalakleet VORTAC: segregates the land from all forms of appropriation under the public land laws, including mining.	FAA
F-10165	PLO 1142	Stony River Lime Hills: segregates the land from all forms of appropriation under the public land laws, including mining and mineral leasing laws.	DOD-USAF
F-12980	PLO 1472	Mt. Sparrevoohn White Alice Site: segregates the land from all forms of appropriation under the public land laws, including the mining and mineral leasing laws.	DOD-USAF
F-16448	PLO 1700	Tatalina (Takotna) reserve: segregates the land from all forms of appropriation under the public land laws, including mining and the mineral leasing laws (PLO 731), opens the land in PLO 731 to selection for the mental health program, homesteads and home sites by veterans of WWII and the Korean War, non-mineral applications, mining, and mineral leasing.	DOD-USAF

Case File	PLO/ SO/ EO	Purpose and Segregative Effect	Managing Agency
F-12026	PLO 1771	Unalakleet Air Force station: segregates the land from all form of appropriation under the public land laws including the mining and mineral leasing laws and disposals under the act of July 31, 1947. The BLM retains jurisdiction over management of surface and subsurface mineral resources.	BLM/ DOD- USAF
F-11997	PLO 1813	Cape Romanzof: segregates the land from all forms of appropriation under the public land laws including the mining and mineral leasing laws and disposals under the act of July 31, 1947.	DOD-USAF
F-14030	PLO 1862	Unalakleet North River Air Force Station: segregates the land from all forms of appropriation under the public land laws, including mining and mineral leasing laws. It is still subject to the Act of July 31, 1947, which allows for the disposal of materials not covered under existing mining and mineral leasing laws.	DOD-USAF
F-22950	PLO 2020	Akiachak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining. It is still subject mineral leasing laws and to the Act of July 31, 1947, which allows for the disposal of materials not covered under existing mining and mineral leasing laws.	DOD-ARMY
F-22952	PLO 2020	Eek National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F22953	PLO 2020	Kasigluk National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22955	PLO 2020	Kipnuk National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22959	PLO 2020	Kwethluk National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22960	PLO 2020	Napakiak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22961	PLO 2020	Napaskiak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22962	PLO 2020	Newtok National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22963	PLO 2020	Noatak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22964	PLO 2020	St. Michael National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22965	PLO 2020	Shishmaref National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22966	PLO 2020	Shungnak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22967	PLO 2020	Tuluksak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22968	PLO 2020	Tununak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22969	PLO 2020	Tuntutuliak National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining.	DOD-ARMY
F-22686	PLO 2133	McGrath Fire Control Station/Air Navigation Site: segregates the land from all forms of appropriation under the public land laws, including the mining and mineral leasing laws, but not disposals of materials under the Act of July 31, 1947. Some lands would be open to homestead and homesite entry after September 22, 1960.	BLM/ FAA
F-31712	PLO 3413	Bethel Fire Control and Administrative Site: segregates the land from all forms of appropriation under the public land laws, including the mining laws, but not from leasing under the mineral leasing laws.	BLM
F-31751	PLO 3428	Emmonuk & Kwiguk National Guard Site: segregates the land from all forms of appropriation under the public land laws, including mining but not the mineral leasing laws.	DOD-ARMY

Case File	PLO/ SO/ EO	Purpose and Segregative Effect	Managing Agency
F-31675	PLO 3445	Bethel airport: segregates the land from all forms of appropriation under the public land laws, including the mining laws, but still open to mineral leasing.	FAA
AA-61301	PLO 5156	Withdraws lands in former reservations: segregates the land from all forms of appropriation under the public land laws including selection by the State of AK, leasing under the MLA, and location and entry from mining laws. It allowed selection of land by native corporations under the ANCSA, and was set to expire on December 18, 1973 and would then be open to selection by the State of AK.	BLM
FF-85702	PLO 5156	Withdrawal of lands in former reservations: segregates from all forms of appropriation under the public land laws including selection by the State of Alaska, location and entry under the mining laws, and leasing under the MLA. It allowed selection of land by native corporations under the ANCSA, and was set to expire on December 18, 1973 and would then be open to selection by the State of AK.	BLM
AA-61299	PLO 5179	17(d)(1) Aid of legislation for additions or creation of units of National Park, Forest, Wildlife Refuge and Wild and Scenic River Systems and classification: segregates the land from all forms of appropriation under the public land laws including selection by the State of AK, location and entry under the mining laws, leasing under the MLA, and selection by regional corporations under Sec. 12 of ANCSA.	BLM
FF-16301	PLO 5173	17(d)(1) Withdrew lands for village and regional corporation selections for the Tanana Region under ANCSA. Also allows the Secretary to grant leases, permits, rights-of-way or easements on lands withdrawn prior to conveyances. The lands are withdrawn, subject to valid existing rights, from all forms of appropriation under the public lands laws, including selections by the State of Alaska, location and entry under the mining laws and from leasing under the MLA. Also reserved the lands for the purpose of study and review by the Secretary for classification or reclassification of any lands not conveyed under Section 14 of ANCSA.	BLM
FF-16304	PLO 5180	17(d)(1) Classification and protection of public interest lands: segregates the land from all forms of appropriation under the public land laws including Selection by the State of AK, location and entry under the mining laws except for locations for metalliferous minerals, and leasing under the MLA.	BLM
AA-64307	PLO 5181	17(d)(1) Classification and study for possible additions to National Wildlife Refuge: segregates the lands from all forms of appropriation under the public lands laws including selection by the State of AK, location and entry under the mining laws, and leasing under the MLA.	BLM
AA-65512	PLO 5183	Withdrawal for Classification and Aid to legislation: segregates the land from selection by the regional corporations, located within certain national forests, wildlife refuges and wildlife ranges, and lands withdrawn by Sec. 11 of ANCSA that are within the boundaries of the Naval Petroleum Reserve No. 4.	BLM
FF-85667	PLO 5184	17(d)(1) Classification or reclassification of lands withdrawn by Section 11 of ANCSA: segregates the land withdrawn by Sec. 11 of ANCSA from all forms of appropriation under the public land laws, location and entry under the mining laws, leasing under the MLA, and selection by the State of AK until December 18, 1975. Also segregates the land described in paragraph 2, which is "all those lands withdrawn by section 11 of the Act lying between 58° N. and 64° N. latitude, and west of 161° W. longitude not withdrawn for any part of the National Wildlife Refuge System," that are not also conveyed by Sec. 14 of ANCSA, from selection by the State of AK, all forms of appropriation under the public land laws, entry and location under the mining laws, and leasing under the MLA.	BLM
AA-61005	PLO 5186	17(d)(1) Classification and protection for lands not selected by the State of Alaska: segregates the land from all forms of appropriation under the public land laws, location and entry under the mining laws except for locations of metalliferous minerals, and leasing under the MLA.	BLM

Case File	PLO/ SO/ EO	Purpose and Segregative Effect	Managing Agency
FF-86064	PLO 5187	Classification and protection of the public interest in military reservations: segregates the land from all forms of appropriation under the public land laws including selection by the State of AK	DOD
AA-47429	PLO 6098	Minchumina 1008 Opening: modifies certain lands within PLOs 5173, 5180 and 5184 to settlement claims for trade and manufacturing sites, headquarters sites, homesites, and opens certain lands to the operation of the mineral leasing laws, and the operation of the general mining laws.	BLM
FF-81398	PLO 6477	Seward Peninsula Partial revocation & Open Entry for general Mining Laws: opens certain lands for mineral leasing, mining location and entry and allows certain lands to be opened to permit sale or lease under the FLPMA. This PLO does not open lands designated for study as additions to the Wild and Scenic River system, National Preserves, National Monuments, or wildlife refuges.	BLM
AA-53140	PLO 6787	Iditarod/George 1008 Opening: modifies certain lands within PLOs 5180 and 5184 to make them suitable for FLPMA, location and entry under the mining laws, and appropriation under the mineral leasing laws.	BLM
F-30974	SO 19360420 ANS 105	Big Delta, Deering, McGrath, Unalakleet, Valdez Air Navigation Sites: segregates the land from all forms of appropriation under the public land laws, subject to valid existing rights.	BLM
AA-63714	SO 19391103 ANS 131	Rohn/Tatina Airstrip Air Navigation Site: segregates the land from all forms of appropriation under the public-land laws, subject to valid existing rights.	BLM
F-30970	SO 19391103 ANS 131	Takotna & Tatina Rive Air Navigation Site: segregates the land from all forms of appropriation under the public land laws, subject to valid existing rights.	BLM
F-30972	SO 19400417 ANS 140	Bremner, Candle, Ophir, Peters Creek Air Navigation Site: segregates the land from all forms of appropriation under the public land laws, subject to valid existing rights.	BLM
F-30973	SO 19400626 ANS 142	Flat Air Navigation Site: segregates the land from all forms of appropriation under the public land laws, subject to valid existing rights.	BLM
F-28822	SO 19401126 ANS 146	Kuskokwim Air Navigation Site: segregates the land from all forms of appropriation under the public land laws.	BLM
FF-496	SO 19411001 ANS 145	McGrath air navigation: segregate the land from all forms of appropriation under the public land laws.	BLM
F-7195	SO 19411231 ANS 172	Galena Airport: segregates the land from all forms of appropriation under the public land laws.	BLM
FF-677	SO 19420721 AN 183	Aniak Air Navigation Site: segregates the land from all forms of appropriation under the public land laws, also partially revokes ANS146	BLM
F-24672	SO 19420721 ANS 183	Aniak air navigation: segregates the land from all forms of appropriation under the public land laws, partially revokes ANS 146.	BLM
F-9137	SO 19420814 ANS 185	Unalakleet Airport: reduces ANS 105, segregates the land from all forms of appropriation under the public land laws, renamed ANS 185	BLM
F-8649	SO 19420924 ANS 189	Fairwell Airport: segregates the land from all forms of appropriation under the public land laws.	FAA
F-23812	SO 19420924 ANS 190	Minchumina: segregates the land from all forms of appropriation under the public land laws and partially revokes ANS 172.	FAA
F-17903	SO19581024 ANS 146 & 16	Bethel Airport: segregates the land from all forms of appropriation under the public land laws.	FAA

### ***Acquisitions and Exchanges***

FLPMA authorizes the acquisition of real property where it is consistent with the mission of the department and departmental land use plans. No pending acquisitions are being actively pursued by BLM within the planning area. If a private parcel of land is surrounded by BLM land, and the parcel becomes available for sale, the BLM may determine to acquire that land. If a parcel of land along the Unalakleet Wild River Corridor or the INHT becomes available for sale, the BLM may determine to acquire the parcel from willing sellers or acquire an easement for the INHT.

Sec. 1302(h) of ANILCA authorizes the Secretary of Interior to exchange public lands or interests (including Native selection rights) for non-federal lands and interests. No exchanges have been made or are pending within the planning area at this time. Table 3.5.4-5 is a non-inclusive list of State or Native patented or selected parcels that BLM could consider for acquisition via land exchange to meet management needs.

### **Land Use Authorizations**

BLM may authorize various uses through land use permits, leases, and rights-of-way as well as acquire easements on a willing seller basis or reserve easements in ANCSA conveyance. The sections below provide brief descriptions of the various authorizations available to the BLM.

**Table 3.5.4-5. Lands Considered for Acquisition in the Planning Area**

<b>Case (If Applicable)</b>	<b>Township/Range</b>	<b>Section(s) and/or Section Range(s)</b>	<b>Acres</b>
AKAA 076413	T21N, R68W	1 to 4, 9 to 16	7,632
AKAA 076412	T22N, R67W	32, 33	1,274
AKAA 076412	T21N, R67W	4 to 10, 15 to 23, 25 to 34	16,558
AKAA 076532	T20N, R69W	8 to 17, 20 to 24	9,600
AKAA 076404	T20N, R68W	2 to 11, 13 to 20	11,394
AKAA 076411	T20N, R67W	4 ,9, 16, 17, 18	2,842
AKAA 076282	T27N, R65W	28, 29, 31, 32, 33	3,177
AKAA 076259	T26N, R66W	1, 11 to 14, 23 to 26, 34 to 36	7,680
AKAA 076258	T26N, R65W	1 to 36	22,941
AKAA 076257	T26N, R64W	5 to 8, 18, 19, 30	4,393
AKAA 076259	T25N, R66W	2, 3, 4, 9, 10	3,200
AKAA 076241	T25N, R65W	3, 4, 5, 7, 8, 9, 16 to 20,	7,021
AKAA 012880	T28N, R59W	19 to 21, 25 to 36	8,004
AKAA 076432	T27N, R58W	6, 7, 13 to 24, 29 to 31	9,210
AKAA 076273	T27N, R55W	6 to 8, 17 to 20, 29 to 32	5,705
AKAA 076288	T28N, R53W	2 to 23, 26 to 34	19,609
AKAA 076288	T29N, R52W	31, 32	1,279
AKAA 076402	T20N, R59W	26, 32 to 36	3,840
AKAA 076402	T19N, R59W	1 to 5, 8 to 17, 21, 24, 25	11,520
AKAA 076402	T19N, R58W	5 to 8, 17 to 20, 30	5,621
AKAA 076402	T20N, R58W	31, 32	1,247
AKAA 076575	T18N, R58W	1 to 4, 9 to 17, 20 to 24	10,720
AKAA 076575	T18N, R57W	1 to 30	19,065
AKAA 076575	T18N, R56W	5 to 8, 17 to 20, 29, 30	6,315
AKAA 076182	T22N, R55W	31	628

Case (If Applicable)	Township/Range	Section(s) and/or Section Range(s)	Acres
AKAA 076182	T21N, R56W	1, 12, 13, 24, 25, 35, 36	4,480
AKAA 076182	T21N, R55W	6, 7, 18, 19, 30, 31	3,807
AKAA 076182	T20N, R56W	4, 5, 8, 9, 16, 17, 20, 21, 28, 29, 32, 33	7,680
AKAA 076401	T19N, R56W	4, 5, 8, 9, 16, 17, 20, 21, 28, 29, 32, 33, 34	8,320
AKAA 076396	T18N, R56W	3, 4, 9, 10, 15, 22	3,840
	T18N, R56W	16, 21, 27, 28	2,560
AKAA 076191	T21N, R54W	15, 16, 17, 19 to 22, 28 to 33	8,311
AKAA 076191	T21N, R55W	36	640
AKAA 076181	T20N, R55W	2 to 10, 18, 19	6,924
AKAA 076181	T20N, R55W	23 to 26, 33, 34, 35	4,480
AKAA 076400	T19N, R55W	3, 4, 9	1,920
AKAA 076203	T23N, R47W	1, 2, 11 to 15, 22 to 27, 33 to 36	10,880
AKAA 076415	T22N, R47W	1, 11, 12, 13, 24, 25, 26	4,480
AKAA 076415	T22N, R46W	2 to 11, 17 to 21, 27 to 30	12,054
AKAA 074575	T19N, R45W	4 to 9, 18	4,392
AKAA 076172	T19N, R45W	30 to 33	2,514
AKAA 076172, AKAA 074575	T19N, R45W	23 to 26, 34, 35, 36	4,480
AKAA 076172	T19N, R46W	25 to 28, 33 to 36	5,120
AKAA 076165	T18N, R46W	1 to 4, 9 to 13, 24	6,400
AKAA 076172	T18N, R45W	3 to 10, 16 to 21	889
AKAA 012897	T19N, R43W	20 to 24	3,200
AKAA 012896	T19N, R42W	1, 2, 3, 11, 12	3,200
AKAA 012896	T19N, R42W	4, 5, 9, 10	2,560
AKAA 012896	T19N, R42W	6, 7, 8	1,859
AKAA 076413	T21N, R68W	5, 8	1,091
AKAA 076532	T20N, R69W	5	640
AKAA 076532	T20N, R69W	26 to 29	2,560
AKAA 076404	T20N, R68W	1, 12	1,280
AKAA 076404	T20N, R68W	21	640
AKAA 076579	T18N, R56W	2	640
Unknown	T19N, R55W	5, 8	1,275
AKAA 076400	T19N, R55W	20, 29	1,280

Note: Acres are rounded to the nearest whole number

### ***Rights-of-Way***

A ROW grants an applicant the right to use specific public land to build such things as roads, communication facilities and power lines. Generally, ROWs are issued for long-term projects that require significant investment. ROWs are a possessory interest in land. Usually, ROWs are issued for a maximum of 20 year terms with the option to renew. ROWs can be issued under Title V of the FLPMA or Section 28 of the MLA depending upon the purpose of the ROW.

### ***Airport Leases***

The Act of May 24, 1928, as amended, authorizes the Secretary of the Interior to lease for use as a public airport any contiguous unreserved and unappropriated public lands not to exceed 2,560 acres in area. In



accordance with the regulation, those lands leased for airport purposes will not be subject to appropriation under the public land laws, including the mining laws. There are no pending airport lease applications and only one authorized lease within the planning area as of February 2018.

### ***R&PP Leases***

The R&PP Act authorizes the Secretary of the Interior to lease public lands, following the same criteria for sales. Under these regulations, lands leased for R&PP are segregated from entry under the public land laws, including the mining laws (43 CFR 2091.3-2). There is one R&PP sale pending, one lease issued, and five sales that have been authorized within the planning area as of February 2018.

### ***FLPMA Leases and Permits***

Section 302 of FLPMA contemplates a wide variety of land uses for lease and permit including, but not limited to, habitation, cultivation, and the development of small trade or manufacturing concerns. In general, leases are for long-term land uses while permits are used to authorize short-term land uses or uses with little impact. This section of the act is implemented by regulations in 43 CFR 2920 and BLM Manual 2920, which further define these uses to exclude private recreational habitation such as seasonal use cabins. All such proposals are to be reviewed under the criteria established by FLPMA on a case-by-case basis and require a site-specific environmental assessment. Five permits/leases have been authorized in the planning area as of August 2018.

Prior to the passage of FLPMA, rights-of-way for communication sites and transmission lines were issued under the act of March 4, 1911. FLPMA repealed the act and regulations governing ROWs are found at 43 CFR 2800. BLM has 15 ROW applications pending in the planning area, which include seven pending RS2477 ROWs. There are 19 ROWs authorized within the planning area.

Before FLPMA, 44LD 513 (letter of instruction found in Volume 44, Land Decisions, page 513 dated January 13, 1916) was used to recognize telephone lines, roads, trails, bridges, and similar improvements constructed on federal lands with federal monies and being maintained by and for the U.S.

### ***FLPMA Easements***

A FLPMA easement is an authorization for a non-possessory interest in lands that specifies the rights of the holder and the obligations of the BLM to use and manage the lands in a manner consistent with the terms of the easement. For example, easements may be used to ensure that uses of public lands are compatible with non-federal uses occurring on adjacent or nearby land. There are no FLPMA easements authorized or pending in the planning area as of February 2018.

### ***Revised Statute 2477 ROW***

Section 8 of the Mining Act of 1866 provided: “and be it further enacted, that the ROW for the construction of highways over public lands, not reserved for public uses, is hereby granted.” The statute was self-enacting; rights being established by “construction” of a “highway” on unreserved public lands, without any form of acknowledgement or action by the federal government. This section of the statute was later re-codified as Revised Statute 2477 (RS 2477). RS 2477 was repealed by FLPMA on October 21, 1976, with a savings provision for rights established prior.

The BLM does not recognize RS 2477 routes until asserted in a court of competent jurisdiction.

### ***ANCSA 17(b) Easements***

ANCSA 17(b) easements were reserved through the adjudicative processes of land transfers by ANCSA. This type of easement only exists on Native corporation land and is a non-possessory land interest intended to provide access to publicly-owned lands and waterways. BLM retains management authority on these easements; however, BLM has an MOU with the NPS and an MOU with USFWS that transfers the administration of the 17(b) easement that access the CSU managed by these agencies. When lands access non-federal public lands, BLM can also transfer administration to State or local agency with their consent. There are currently no regulations that address easement management. A 17(b) easement management handbook and IM (IM AK 2007-037) provide management guidance. Easements are noted on easement quadrangle maps, which are available to the public. The 17(b) easements are described in the various conveyance documents to the ANCSA corporations, which are also available to the public. Discretionary actions which may be taken on 17(b) easements such as locating, marking, relocating, constructing, maintaining, repairing or compliance monitoring, or terminating 17(b) easements will be addressed outside of this planning effort. ANCSA 17(b) easements are beyond the scope of this planning effort.

### **Unauthorized Use or Trespass**

Unauthorized use and/or unauthorized occupancy of the public lands (trespass) will be addressed and resolved in accordance with the regulations found in 43 CFR 9220.1-2 and the guidance provided by BLM's Realty Trespass Abatement Handbook H-9232-1. Unauthorized uses are activities that are not approved by the BLM and would require a permit, lease, or ROW. Unauthorized occupancies are activities resulting in full or part time human occupancy or use. Unauthorized development issues arise from activities that disturb the earth's surface or physically alter the character of the land or vegetation. Collectively, the above activities are termed "trespass."

It is the responsibility of the BLM to protect the public's best interest in regard to BLM-managed public lands. Over the years, individuals have built structures for various purposes (e.g., occupancy, commercial uses, and recreational uses) on public land without authorization. The BLM attempts to manage this problem through a program of detection, control, and abatement. The size of the planning area makes a complete inventory difficult and a number of trespasses have been identified. Each situation is handled on a case-by-case basis, according to BLM regulations and policies. There are 19 unauthorized occupancies, one unauthorized development, two unauthorized use, and three trespass cases currently pending within the planning area at this time. When presented with a trespass situation, BLM has three options to resolve the situation:

- If the structure is used for allowable purposes as defined by Sec. 302 of FLPMA, and is compatible with other resource management objectives, the trespass can be authorized once the trespass is resolved.
- If the structure is not allowable under FLPMA, but is compatible with other resource objectives, it could be transferred to federal ownership and maintained as a public use cabin or for administrative purposes.
- If the structure is not allowable under FLPMA and is either unsuitable for public use or is incompatible with other management objectives, it is removed.

## **Access Corridors**

There are no legislatively-designated access routes in the planning area, nor are there plans by the BLM to designate one during the life of this plan.

### **3.5.5 Resource Changes: Trends and Forecasts**

Land status changes slowly as lands that are selected by the State or ANCSA corporations are conveyed out of BLM management and to the ownership of the selector. It is anticipated that the current trend will continue, and lands will be conveyed at the current rate until all land conveyances are complete.

Land exchanges, acquisitions, and disposals from all landowning agencies occur occasionally and will continue at the current rate.

## **3.6 Recreation and Visitor Services**

### **3.6.1 Introduction**

This section describes the current conditions related to recreation and visitor services in the planning area.

### **3.6.2 Laws, Regulations, and Policies**

The BLM is the primary agency with jurisdictional authority and relevant regulatory requirements related to recreation and visitor services on BLM-managed public lands in the planning area.

Federal regulations addressing management of recreation and visitor services can be found at 43 CFR 8360 through 8365 – Visitor Services; 43 CFR 2932 – Special Recreation Permits; 43 CFR 2650.1 – Interim Management; 43 CFR 8340 – Off-Road Vehicles; and 43 CFR 36 – ANILCA Title XI implementing regulations, including general public access, applicable to CSUs in Alaska.

BLM policy guiding the consideration of recreation and visitor services in the land use planning process can be found in BLM Manual 8320: Planning for Recreation and Visitor Services (BLM 2014a), and BLM Handbook H-1601-1: Land Use Planning (BLM 2005). These guiding policy documents establish the BLM's recreational planning framework and provide specific procedures and instructions for designating recreation management areas (RMAs) and integrating planning concepts such as Outcomes-Focused Management (OFM) and recreation setting characteristics (RSCs) into the land use planning process.

OFM recognizes that the BLM can manage certain activities, experiences and benefits while protecting the natural and cultural resources. Using OFM helps the BLM to provide direction for recreation planning, budgeting, organization, staffing and training, leading to a more efficient, cost-effective and accountable recreation program. RSCs are derived from the older Recreation Opportunity Spectrum. The RSCs are categorized as physical, social and operational components and are further subdivided into specific characteristics (attributes). These characteristics are categorized across a spectrum of classes that describe a range of qualities and conditions of a recreation setting, such as a physical setting spectrum from primitive to urban. Supporting information is contained in BLM Handbook H-8320-1: Planning for Recreation and Visitor Services.

BLM Manual 2930-1: Recreation Permits and Fees, guides the issuance and management of special recreation permits (SRPs) (BLM 2014b). It also contains policy, direction, and guidance for establishing, modifying and managing recreation fees and for issuing and administering the various recreation permits as a means of authorizing recreational uses of public lands and related waters.

The planning area also includes lands administered by the USFWS, NPS, State of Alaska, and private entities. These entities manage recreation and visitor services consistent with their own regulations, policies, and guidance.

### **Recreation Management Areas**

Since adopting the 1981 SWMFP and 1986 CYRMP, the BLM released updated policy for the identification of RMAs and associated management during the land use planning process (BLM Manual MS-8320). RMAs are a land unit where recreation and visitor services objectives are recognized as a primary resource management consideration and specific management is required to protect the recreation opportunities. The RMA designation is based on recreation demand and issues, recreation setting characteristics, need to resolve user conflicts, compatibility with other resource uses, and resource protection needs. There are two types of RMAs, special recreation management areas (SRMAs) and extensive recreation management areas (ERMAs).

The SRMA is an administrative unit where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and distinctiveness, especially as compared with other areas used for recreation. Management of SRMAs protects and enhances the area's unique recreation opportunities and RSCs. In SRMAs, recreation and visitor services is the BLM's priority management focus, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis. The BLM may divide a SRMA into recreation management zones to provide more focused management of specific recreation opportunities.

ERMA designations provide specific management consideration for recreation use, demand, and program investments. The BLM manages ERMAs to support and sustain the area's principal recreation activities and the associated qualities and conditions of the ERMA in a manner that is commensurate with the management of other resources and resource uses.

Lands not designated as an SRMA or ERMA are managed to meet basic recreation and visitor services and resource stewardship needs. Outside of RMAs, the BLM manages recreation and visitor services to allow recreation uses that are not in conflict with the primary uses of these lands. While recreation activities may occur, they are not emphasized. Lands closed to public use are not available for recreation.

### **3.6.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for recreation and visitor services-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS:

- An increase or decrease in the number of acres managed as SRMAs or ERMAs
- In SRMAs, a change in the desired recreation opportunities and setting characteristics
- In ERMAs, a decrease in the quality, quantity, and conditions of the ERMA or an impediment of users' ability to engage in the principal recreational activities being managed for in the ERMA
- Change in the quality of recreation opportunities resulting from a change in the recreation setting or opportunity based on VRM management, minerals management, and/or lands and realty
- Change in the quantity of recreation opportunities
- A change in the number or types of SRPs issued

- Potential for visitor displacement
- Change in recreation setting due to degradation of resources (e.g., air, permafrost)

### 3.6.4 Current Conditions

Components and characteristics of the physical, social, and operational RSCs in the planning area influence the types, extent, and location of recreational opportunities and the desired outcomes visitors seek from those opportunities. The physical RSCs within the planning area are primitive. The area is remote and does not have recreation facilities (e.g., campgrounds, trailheads, and interpretive signage) typically found in front country and urban areas. The social setting is also largely primitive, with some areas trending toward back country. Contact with other visitors and evidence of use is rare; group sizes tend to be small. Areas along the INHT and popular hunting and fishing areas exhibit slightly less primitive, backcountry social RSCs. Operational RSCs are also largely primitive because there is limited access, management controls, or visitor services. Some areas along the INHT where there is seasonal (wintertime) access and more management controls have less primitive, backcountry operational RSCs.

Primary recreation opportunities in the planning area consist of big game hunting; fishing; wildlife viewing; berry picking; dogsledding, snowmobiling, and OHV use of the INHT; river touring; and sightseeing via airplane or helicopter. Because of the planning area's remoteness and lack of recreation facilities or road-based access points, recreation typically takes place as part of a specially permitted event or guided tour. For example, big game hunting occurs in Guide Use Areas that are established by the State of Alaska Big Game Commercial Services Board. There are 19 Guide Use Areas within the planning area (ADCCED 2009). Isolated subsistence fishing by Alaska residents takes place throughout the planning area. Guided recreational fishing takes place along the Unalakleet, Yukon, and Kuskokwim Rivers. Popular fish species for recreational and subsistence anglers include all five species of Pacific salmon, Dolly Varden, arctic char, and arctic grayling. The ADF&G regulates subsistence, sport, and commercial fishing. A State license is required to participate in commercial and sport fishing, and in some cases for certain types of subsistence fishing (ADF&G 2016a,b). There are abundant opportunities to view moose, bears, bald eagles, ospreys, wolves, fox, beaver, and other wildlife. Dogsledding and snowmobiling are popular along the INHT and connecting trails that are used for competitive events and transportation. River touring, primarily via commercial float trips, take place on the Unalakleet and Kuskokwim Rivers.

There are few roads, trails, airstrips, or other means to access the planning area. In the winter, snow conditions require that visitors access the planning area by air, snowmobile, snowshoeing, or similar over-snow means. There are 126 miles of roads and approximately 260 miles of State-managed winter trails in the planning area and. Motorized and pedestrian-based recreation occurs in the winter, especially along the INHT, when snow conditions permit. There are 424 miles of trail on the INHT primary trail, and an additional 791 miles of connecting and side trails to the INHT. Snow storms, frigid temperatures, and little to no sunlight influence the types of outdoor recreation opportunities available to non-residents from November through January. From February to April, there is typically an influx of non-residents to participate in winter trail-based recreation opportunities. A lack of roads and trails combined with wet ground conditions in the late-spring, summer, and early fall often preclude overland OHV, mechanized, and pedestrian recreation opportunities throughout much of the planning area. Year-round access is primarily by air and waterways. Rivers and bays serve as primary travel corridors and provide access to recreation and subsistence resources. When the waterways are not frozen, motorboats are the primary mode of travel. In the winter when the waterways are frozen, waterways act as travel surfaces for other travel modes, such as snowmobiles, and in some cases, autos. Transportation and access, including the

methods of accessing different recreational opportunities, is described in more detail in Section 3.7, Travel and Transportation Management.

The BLM manages five public safety shelters in the planning area, all of which are along the INHT (BLM 2015a). There are also non-BLM managed hunting and fishing lodges within the planning area that are popular destinations for commercial hunting and fishing tours. These lodges are mostly accessible by air or boat and are typically open during the summer only.

Visitors to BLM-managed public lands within the planning area include Alaska residents and those traveling from outside the state or country. Alaska's statewide population is approximately 736,000, approximately 54 percent of which reside in the Anchorage and the Mat Su economic region, located southeast of the planning area (ADNR 2016). For Alaska residents, high gas prices and air travel costs limit recreation opportunities in rural areas, such as the planning area (ADNR 2016). More accessible recreation options, such as Denali and Kenai Fjords national parks, near Anchorage, are more practical and affordable outdoor recreation options for many Alaska residents. In a recent statewide survey of Alaska's youth, responses to an open-ended question indicated Denali National Park and Preserve as the most popular park or outdoor recreation area in Alaska. None of the respondents identified a location or recreation activity in the planning area (ADNR 2016).

Tourism is a major component of the Alaskan economy. In 2008, more than 1.7 million people visited Alaska and spent nearly \$1.6 billion within the state. The largest and fastest growing source of tourism revenue for Alaska is the cruise industry, which brings visitors to port cities outside the planning area (ADNR 2009). Wildland tourism is a smaller, but essential part of Alaska's tourism economy. Out-of-state visitors are attracted to the planning area's remoteness and opportunities to experience competitive events along the INHT. Most out-of-state visitors to the planning area participate in some form of guided fishing or big game hunting or are involved with a competitive event on the INHT. Some visitors plan their own trips and pay for a chartered aircraft or other means of transportation, but most use the services provided by commercial outfitter guides (BLM 2015a).

### **Iditarod National Historic Trail**

Congress established the INHT in 1978; it is the only national historic trail to commemorate winter use. Originally consisting of 2,300 miles of winter trails that connected Alaska's rural villages and provided access during the Alaskan gold rush, there are now 1,500 miles of the historic trail open for public use, including over 700 miles within the planning area. Of that, the BLM manages approximately 200 miles of the trail, including 70 miles of Congressionally-designated Primary Route, along with five public shelter cabins adjacent to the trail. While the INHT Comprehensive Management Plan (BLM 1986c) guides BLM's management of the trail, the plan does not establish a management corridor. Without a defined management corridor it is difficult to evaluate the potential effects of management actions surrounding the trail.

Most wintertime trail use takes place from February to April, although winter use begins when sufficiently cold weather and snow coverage enable overland travel. Winter overland travel is mostly via snowmobile and dogsled. Alaska residents and those visiting from outside the state and country use the trail for competitive events, such as the Iditarod Sled Dog Race, the Iron Dog snowmobile race, and various human powered (foot, bicycle, and ski) endurance races.

The annual Iditarod Sled Dog Race is a nearly 1,000-mile endurance race that takes place in early March. The race route annually uses the Farewell Bend and Kaltag Portage segments of the INHT managed by the BLM. In 2017, the race start was moved from Anchorage to Fairbanks and the race route bypassed all

the planning area, except for the Kaltag Portage segment of the INHT along the Unalakleet River (Iditarod 2017).

The Iron Dog snowmobile race is an approximately 2,000-mile snowmobile race that takes place each year in February. The race route uses the Farewell Burn and Kaltag Portage segments of the INHT managed by the BLM (Iron Dog Snowmachine Race 2017).

The various human powered endurance races The Iditarod Trail Invitational also takes place on the INHT annually in late February. The 1,000-mile race typically follows the route used by the Iditarod Sled Dog Race, and usually crosses the Farewell Burn and Kaltag Portage segments of the INHT managed by the BLM. When the Iditarod Sled Dog Race is relocated to a Fairbanks start, the Iditarod Trail Invitational follows the route of the Iron Dog race north from Ophir to Ruby (Iditarod Trail Invitational 2017).

Competitive events are scheduled in late-February and early-March due to the greater amount of daylight, milder temperatures and maximum, end-of-season, snow conditions. Observed warmer wintertime temperatures since the late 1970s, in response to factors such as climate change, are decreasing snow coverage and shortening the winter season (ACRC 2018). Warmer temperatures can also preclude the freezing of rivers, wetlands, and tundra required for winter trail use. Since 2014, for example, the Iditarod Sled Dog Race has been rerouted or experienced uncharacteristically mild temperatures and lower than average little snow coverage.

Summer use of the INHT is less frequent compared with winter because surface conditions make access difficult. Summer use primarily occurs on segments near Anchorage and Nome outside of the planning area. Much of the interior portion of the trail is not accessible in the summer due to the predominance of wetlands and lack of airplane or floatplane access. Summer recreation on the INHT could increase with the expected lengthening of the summer season and warmer summer temperatures, while winter users would be competing for use during a shorter season, primarily January through March. Additional details regarding the INHT are provided in Section 4.2, National Trails.

The Rohn Air Navigation Site is a culturally and historically important feature along the INHT. It includes a 1,200-foot unmaintained gravel airstrip, a segment of the INHT's Connecting Trail, and the historic Rohn Public Shelter Cabin. The cabin is accessible by air year-round and has been the only habitable public shelter along the INHT between Rainy Pass Lodge (25 air miles to the east) and Nikolai (60 air miles to the north) for the past century. The cabin is typically a checkpoint for the Iditarod Sled Dog Race and the Iron Dog Snowmachine Race. Big game hunters use the cabin as a base camp during all seasons.

Additional details regarding the INHT can be found in Section 4.2, National Trails.

### **Unalakleet Wild River**

The Unalakleet River is 90 miles long, 83 miles of which are managed by the BLM as a nationally recognized Wild River (BLM 1983). There are no established campsites or public facilities along the river and the Unalakleet's remoteness results in lower recreational use and visitation compared with other designated rivers in Alaska. Because the river's classification is "wild," BLM's primary management focus is to maintain the river's free flowing condition, primitive recreation opportunities, wildlife/wildlands-oriented use, primitive RSCs, and historical and archeological values. Access to recreational opportunities in the river corridor is by snowmobile in the winter months and by boat and plane in the summer months. Commercial float trips occur from June through mid-September and provide visitors with opportunities to engage in boating, fishing and primitive camping in a pristine, wild setting.

In the winter, visitors also use the Unalakleet Wild River Corridor segment for snowmobiling, dog mushing, ice fishing, hunting, and trapping. The INHT parallels or passes over portions of the Wild River segment and is a popular segment of the INHT for winter recreation when the river is frozen.

Additional details regarding management of the Unalakleet River can be found in Section 4.3, Wild and Scenic Rivers.

### Special Recreation Permits

Consistent with BLM Manual 2930-1: Recreation Permit and Fee Administration, the BLM issues SRPs to guides, outfitters, and event coordinators (BLM 2017b). As of February 2017, there were 24 active SRP operations occurring on BLM-managed public lands within the planning area (see Table 3.6.4-1).

**Table 3.6.4-1. Special Recreation Permits in the Planning Area by Type**

Special Recreation Permit (SRP) Type	Number of Permits
Big Game Hunting Guides	18
Snowmobile Races	1
Dog Mushing Races	2
Human powered endurance events	2
Adventure touring	1
<b>Total</b>	<b>24</b>

The BLM requires each permit holder to provide an annual report summarizing the number of trips, visitors, and other metrics from the previous year. The BLM also requests that permit holders report on social factors, which can include participant survey results and observed encounters with other guides and outfitters while in the field. These reports indicate that the presence of other groups and noise from firearms increasingly influences opportunities for visitors to experience a complete sense of solitude in a wildland setting.

The economic conditions and trends related to recreation tourism, including commercial guides and outfitters, are discussed in Section 5.1, Socioeconomics, Environmental Justice, and BLM Support for BSWI Communities.

### 3.6.5 Resource Changes: Trends and Forecasts

While overall recreation use in the planning area is expected to remain relatively low compared with other locations outside the planning area, the types, locations, and intensity of use are expected to change throughout the life of the plan, especially in response to climate change, growing popularity of the INHT, new technology, and new forms of recreation. The anticipated lengthening of the summer season is expected to compress the winter recreation season, which would decrease winter recreation opportunities, such as dogsledding and snowmobiling, along the INHT and other winter recreation activities throughout the planning area. There are segments of the INHT that are not used for recreation or special events. The management plan for the INHT only covers the designated sections, and consequently provides no guidance on the non-designated portions of the trail. With an increasing trend for recreation and general transportation use along the route, there will continue to be a need for recreation and historic preservation planning.



The number of permitted events and tours along the INHT and elsewhere in the planning area has been increasing over the past ten years, which requires careful scheduling to avoid conflicts between permittees and participants. The increase in requests for SRPs, such as a permit request in 2017 to allow a private dog mushing adventure with helicopter support, appears to be a trend, which may require management controls to prevent recreation conflict. The BLM is collaborating with ADNR to identify ways reduce competition and conflict among recreation uses and improve overall user experiences to address the emerging issue of crowding along the INHT.

New vehicle technology may also improve access and increase associated recreational use. More frequent use of eight-wheel-drive semi-amphibious OHVs instead of typical four-wheel drive OHVs is expected to extend summertime access into areas previously inaccessible because of saturated soil conditions. The use of unmanned aerial systems (UAS), or drones, could gain popularity in the planning area, especially in association with commercial recreation activities. Outfitters may request the use of UAS to capture aerial footage of individual tours for purchase by users or for marketing purposes. Guides and outfitters will continue to provide opportunities for big game hunting and commercial fishing, which may increase demand for OHV and UAS uses.

## **3.7 Travel and Transportation Management**

### **3.7.1 Introduction**

This section describes the laws, regulations and policies related to travel and transportation management, as well as the resource indicators that will be used to evaluate impacts to travel and transportation management. The section also includes a discussion of the current condition of travel and transportation within the project area and trends in resource conditions that may affect travel and transportation management in the future.

### **3.7.2 Laws, Regulations, and Policies**

Travel and transportation management is a comprehensive approach to on-the-ground management and administration of travel and transportation networks of roads, primitive roads, primitive routes, trails, and areas associated with the use of BLM-managed public lands (BSWI Draft RMP/EIS, Map 3.3.7-1). Travel and transportation management also includes the management of vehicle types and classes. Additionally, travel and transportation management broadly refers to planning decisions, route inventory and mapping, signing area and route designations, education and interpretation, law enforcement, easement acquisition, monitoring activities, and other measures necessary for providing access to and across BLM-managed public lands. Travel and transportation management is applicable to a wide variety of uses, including recreational, traditional, authorized, commercial, educational, and for other travel and transportation purposes. It pertains to all forms of motorized and non-motorized access or use, such as foot, pack stock or animal-assisted travel, mountain bike, OHV, and other forms of transportation.

BLM Handbook H-8342, Travel and Transportation (BLM 2012b) and BLM Manual 1626, Travel and Transportation Management (BLM 2016g) provide specific guidance for preparing, amending, revising, maintaining, implementing, monitoring, and evaluating BLM land use and travel management plans.

Land use planning decisions contained within this document are those that provide direction for land management actions and subsequent site-specific travel and transportation implementation plans. Travel and trails management decisions for this document would include OHV area designations and identification of TMAs.

BLM regulation 43 CFR Part 8340 recognizes recreational OHV use as an “acceptable use of public land wherever it is compatible with established resource management objectives.” The regulation also establishes the criteria for designating public motorized access under three possible categories based on BLM land use planning decisions that consider resource protection and public safety. The options for public lands OHV access as (1) open, which allows for unlimited travel, including cross-country, (2) limited, where motorized use is restricted to meet specific resource management objectives, and (3) closed to motorized use. It also defines “off-road vehicle,” an older term that has been replaced by the term “off-highway vehicle,” or OHV. Subpart 8342 prohibits recreational OHV areas or trails in officially designated wilderness areas or primitive areas.

Through the RMP planning effort, the BLM designates lands in the decision area as open, limited, and closed for public motorized access and identifies areas in limited designations where future implementation-travel management planning would occur. The BLM would complete implementation travel management planning within areas in limited designations within 5 years after the completion of the RMP. Although the land use planning-level designations of open, limited, or closed address only public motorized access, subsequent implementation-level travel management planning would address all modes of public travel, including non-motorized travel.

The RMP also establishes TMAs to address area-specific travel issues and identify where unique travel management circumstances require a particular focus, specific management prescriptions, or additional analysis. The TMAs identify discrete areas within the larger planning area for consideration of special resource characteristics and manageability of the area.

ANILCA section 811 provides that rural residents engaged in subsistence uses shall have reasonable access to subsistence resources on the public lands and provides for use of snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulation. ANILCA section 1110 provides for the use of snowmobiles, motorboats, airplanes, and non-motorized surface transportation methods for traditional activities and for travel to and from villages and homesites within CSUs, National Recreation Areas, National Conservation Areas, and WSAs, subject to reasonable regulation to protect the natural and other values of the area.

Under ANCSA, 43 U.S.C. 1616(b) and 43 CFR 2650.4-7, the BLM reserves and manages transportation easements (Section 17(b) easements) when the BLM conveys land to a Native corporation to allow the public to cross private property to reach public lands and major waterways.

### 3.7.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for travel and transportation management, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS:

- Change in ability to access existing routes, areas, or BLM lands in general
- Change in ability of users with various types of vehicles to access areas
- Change in aircraft landing accessibility
- Change in airspace that aircraft are allowed to access over BLM lands
- Acres of an alternative that would be designated as an ACEC
- Acres of land where ANCSA 17(d)(1) withdrawals would be retained

- Acres of land where FLPMA withdrawals would be pursued
- Acres of land within ROW exclusion and avoidance areas
- Acres that would be excluded from wind energy development
- Change in the size of the transportation network
- Increase or decrease in opportunities for unauthorized use of routes
- Increase or decrease in the potential locations where routes may be placed
- Physical degradation or expansion of route
- Increase or decrease in ability to access emergency services/facilities
- Change in the number of private transporters
- Assistance or hindrance of implementing travel and transportation management actions

### 3.7.4 Current Conditions

#### Area Profile

The following profile of the planning area, including summer and winter uses, is summarized from the BSWI AMS (BLM 2015a).

The planning area encompasses one of the most remote, roadless areas in the U.S. Travel in the planning area is restricted seasonally and by weather to an extent largely inconceivable to residents of the contiguous 48 states. The planning area is virtually roadless, with only a handful of short roads serving local communities, or remaining from past human activities. Additionally, the planning area is not connected by road to the remainder of Alaska. Almost all of the existing roads in the planning area are located on lands managed by entities other than the BLM.

Year-round transportation for travel, postal service, and freight hauling depends on commercial air service. The State maintains airfields at most inhabited communities. Larger communities (e.g., Bethel, Aniak, McGrath, and Unalakleet) are served by daily commuter air service originating from Anchorage. In turn, these communities are the hub for small plane transport to smaller outlying villages (e.g., Holy Cross, Grayling, and Sleetmute). Some communities have less-than-daily air service or no air service at all (e.g., Nikolai and Takotna).

Most bulk freight (fuel, dry goods, building materials, vehicles) are shipped by ocean and river-going barges from Anchorage or Seattle, Washington, in summer months. As a portion of the total quantity of freight hauled, only a small percentage is hauled by air, due to high prices.

Community road systems typically consist of a crisscross grid within the built-up portion of the community, and to community infrastructure such as the local airstrip, riverside boat landing site, landfill, telecommunication sites, community water intake or gravel pits. Except for the largest communities, snow is not removed from roads in the winter and these community roads become impassable to automobiles in winter (November through May), with residents instead relying primarily on snowmobiles or walking for transportation and access.

The few extended road systems found in the planning area are historic remnants of mining and military infrastructure, such as found near the towns of Takotna, McGrath, Unalakleet, or the ghost towns of Flat and Ophir.

In general, many planning area residents rely on “four-wheelers” (quad-type OHVs with a straddle-type seat, also commonly known as all-terrain vehicles [ATVs]), multi-person utility terrain vehicles with side-by-side seating, or snowmobiles for in-town transportation throughout the year. This is partially due to the high cost of shipping and maintaining an automobile in these communities (vehicles have to be barged or flown in to the local community), as well as the high cost of fuel.

Current surface uses and use areas or use routes can be categorized as summer-related or winter-related.

### ***Summer-related Use***

The season of summer-related use for the purpose of this document is defined as the period during which lands and waterways are not frozen. The demand for non-mechanized and non-motorized overland summer use is almost non-existent; therefore, the discussion of overland summer travel pertains to motorized use only.

The favored motorized/mechanized vehicles within the planning area are small one and two person OHVs with four-, six- or eight-wheel drive. Most OHVs are untracked and rely on wheels and low pressure tires for traction, although a few do exist with after-market track units. Eight-wheel-drive ARGO semi-amphibious submersible OHVs are a favorite for hunters in areas with wet bogs, but have less utility in towns and, therefore, are used mostly for hunting and gathering. Remote BLM-managed lands within the planning area are accessed by both commercial air charter operations and non-commercial pilots using single engine “bush” aircraft, mostly for non-subsistence hunting of large wildlife (e.g., bear, moose, muskox). These “Cub” strips (named for the Cessna Supercub aircraft often used for access) are undeveloped, unmaintained areas found on river sand and gravel bars, or upland areas, suitable for small aircraft lands, and are unrestricted on BLM-managed lands. In a few cases, due to proximity to local communities and large numbers of target species, some strips see significant use during local hunting seasons.

Motorboats are commonly used throughout the planning area for subsistence and recreational purposes and to access remotes sites, including those lands managed by the BLM. In addition, jet boat and airboat use is becoming more common in Alaska to access lands (ADNR 2016). In some cases motorboats are used to transport OHVs to remote areas in Alaska.

On BLM-managed public lands in the planning area, there are no designated summer trails or travel routes, and no designated primitive roads.<sup>2</sup> Almost all overland summer trails evident today within the planning area are the result of OHV use in the past two to three decades for subsistence and recreation uses. While the INHT is still used today, it is considered to be a winter trail and not suitable for summer motorized use.

User objectives largely determine where use occurs and what type of equipment is used for access, in combination with limitations imposed by terrain. Summer overland travel is largely oriented to harvesting of subsistence resources, including wildlife, fish, berries, and firewood, with limited amounts of use for guided hunting, and casual individual use. Summer overland travel is rarely undertaken for inter-village transportation, and summer overland travel to private cabins and/or inholdings is virtually non-existent on BLM-managed public lands as most inholdings are accessed by motorboat. Summer overland

---

<sup>2</sup> “Primitive roads” refers to a class of BLM transportation route based on the type of use, the other classes including roads and trails. Roads are passable by automobiles, primitive roads by high clearance vehicles, and trails by off-road vehicles, foot, or stock only.

transportation by “cat trains” (bulldozer pulling a trailer with fuel, equipment and crew quarters) for purposes of mineral exploration is nearly non-existent due to impracticality. OHV use for installation of infrastructure does occur, and is usually localized to small project areas, with equipment usually airlifted or barged to the work site, and use limitations emplaced as part of the permit for the facility

Generally throughout the planning area, route use patterns typically start at a community or an access point along a community road, river-boat landing site, or airstrip, and radiate outward as terrain permits, with routes leading to the location of potential subsistence resources. Most summer overland routes in the planning area are located in terrain that is treeless due to climatic conditions, presence of permafrost, soil types, wetlands, and/or elevation. The majority of current routes on BLM-managed public lands are located in alpine settings, although the beaches lining Norton Sound are also used as they provide ready access from watercraft to hunting, fishing, berry and firewood resources in nearby uplands.

Almost all routes have been established casually, and without regard to surface soil and vegetation conditions or the viability of repeated use of the route. Trail improvements or construction outside of communities are rare, except improvements for immediate passage (e.g., brush cutting, temporary bridges). Few if any routes meet the guidelines for “sustainable trail design” as commonly described as best management practices in technical publications (Meyer 2013). As a result, route braiding (the widening of a route or the establishment of a new parallel route), rutting, and waterway interception frequently occurs where users pass over wetlands and disturb the wet soils. Impact area can extend to dozens or hundreds of feet or more in width, and miles in length. In contrast, the rocky soils found in alpine areas are more resilient to OHV passage, and usually show limited signs of route braiding (Leung and Marion 1996; Wiedmer 2002).

Impacts of OHV use on the natural landscape are documented and recognized in Alaska (Arp and Simmons 2012; Jubenville and O’Sullivan 1987; Racine and Ahlstrand 1991; Slaughter et al. 1990; Sparrow et al 1978). The biological effects of OHV use can include the interception and redirection of watercourses, alteration of fish spawning and rearing habitat via siltation or dewatering, the physical alteration and destruction of fish and bird habitat, along with changes to vegetation species composition. OHV use may also diminish the viewsheds of otherwise unaltered landscapes, and impede non-motorized use of travel routes, both historic and new (Ahlstrand and Racine 1993; Wilkinson 2001; Rinella and Bogan 2003; Arp and Simmons 2012; Slaughter et al. 1990).

### ***Winter-related Use***

The season of winter use is defined as the period during which lands and waterways are frozen. Most on-land winter travel routes are modern-day adaptations of historic routes that crossed the planning area and linked communities within the planning area. The most-recognized winter overland trail on BLM lands in the planning area is the congressionally designated INHT. Approximately 67 miles of the Primary Route of the INHT exist on BLM-managed public lands within the planning area, and another 15 miles of side/connecting trails that are considered part of the trail system.

Winter overland travel is undertaken for inter-village travel, subsistence, sport-hunting, trapping, ice fishing, firewood collection, casual recreation, guided tours, and medium and long-distance trail-based competitive events, such as the Iditarod Trail Sled Dog Race and Irondog (snowmobile) Race.

Occasionally a “cat train” consisting of a bulldozer pulling sledge-mounted fuel, equipment, and crew quarters will traverse a route within the planning area that passes over BLM-managed lands, typically between a community and a mining area.

A system of ice roads is usually established in winter on the Kuskokwim River from Bethel to nearby communities, allowing residents to drive automobiles between communities, although these routes are located wholly on State of Alaska navigable waters and distant from BLM-managed public lands.

Within the planning area, there are no single winter use designated trails, such as “ski-only” trails. Virtually all winter trail use is shared between motorized and non-motorized users.

While the majority of winter overland travel is motorized via snowmobile, there is a significant amount of non-mechanized / non-motorized travel by dogsled on the INHT as part of the Iditarod Sled Dog Race and other regional qualifying dog sled races. Additionally, there is a small amount of non-mechanized travel that includes cross-country skiing, snowshoeing, and foot travel, both casually and as part of organized events. Also, a small amount of mechanized/non-motorized travel occurs using the newly developed class of fat-tire bikes (i.e., mountain bikes with large, oversize, low pressure tires built for over-snow travel) as part of muscle-powered long-distance endurance races.

Given frozen and snow-covered terrain and advances made in snowmobile technology, almost all of the planning area is physically accessible to snowmobiles, although most use is found on inter-village travel routes, near communities for casual riding, and to and from remote areas for the harvest of wildland resources. An estimate of the total mileage of winter travel routes within the planning areas is not available.

For ease of passage, many routes follow frozen waterways for much of their length, including both large rivers and small waterways. Because most of the travel is point-to-point between communities and the straightest alignment is preferred, sinuous river alignments are often shortcut, with travel routes passing through intervening segments of forest or tundra. Brush and vegetation removal along non-Iditarod Trail segments is usually undertaken by local users. Along the INHT, a combination of race volunteers and BLM-supported efforts have attended to both trail brushing and trail route marking over the past three decades.

The effects of snowmobile trail use are highly variable, depending on the typical winter conditions found at a particular site. Narrow (4 feet to 6 feet wide) corridors cleared of major vegetation have been established extensively through closed canopy mixed deciduous/conifer forest (e.g., paper birch/white spruce, or willow/cottonwood) and open canopy conifer forest (e.g., black spruce).

The annual amount of snow (or ice) at any given site is a major determinant of the effect of motorized winter trail use on native vegetation, local waterways, and other biota of concern (along with pre-existing permafrost conditions). Areas with deep snow typically show lesser changes to vegetation from overland travel than areas with a shallower snowpack. Areas with a typically shallow snowpack are prone to a deeper below-ground freeze due to snow compaction and reduction of the insulating effects of snow. This can ultimately result in a change in vegetation species composition along the travel-way, as the ground under the travel-way remains colder longer than the surrounding, uncompacted lands, ultimately delaying budding and growth of plants. Additionally, the frozen subsurface often impedes water drainage and captures or ponds water in locations that may not otherwise have such conditions present (Pers. obs., Keeler 2012, 2013).

### **Existing Travel and Transportation Management**

To comply with BLM regulation 43 CFR 8342.1, all BLM-managed public lands must be categorized with one of the following designations:

- **Open:** OHVs may travel anywhere; cross-country travel is permitted.

- **Limited:** OHVs are restricted to certain areas or specific trails, with restrictions that can include number of vehicles, vehicle weight, type of vehicle, seasonal limitations, or travel restricted to designated trails.
- **Closed:** No OHV activity is allowed in these areas.

ANILCA section 811 ensures that rural residents shall have reasonable access to subsistence resources on public lands. Currently, all BLM-managed public lands within the planning area are undesignated and allow ATV and snowmobile cross-country use. This allowed use does not pertain to large cat-trains, which are authorized through a permit (such as overland moves or mineral exploration) and are subject to applicable use stipulations under NEPA. The undesignated status in the planning area includes BLM-managed lands with Congressional designations (primarily the INHT and the Unalakleet Wild River Corridor) that are potentially vulnerable to impacts from OHV use; subject to ANILCA access provisions (see Sections 4.2, National Trails, and 4.3, Wild and Scenic Rivers). Similarly, ACECs and HVWs are undesignated without limit to OHV and snowmobile use. To date, these areas have been largely protected due to their remote location and a lack of demand for uses that could result in resource impacts.

Consistent, interagency management of OHV routes that cross in and out of BLM-managed public lands is an issue both within the planning area and statewide. One such issue is the implementation of consistent vehicle weight limitations between State and BLM lands; another is the management of ANCSA Section 17(b) transportation easements.

The generally allowable uses on neighboring State lands for using a recreation-type vehicle off-road or ATV allows a curb weight of up to 1,500 pounds. The State defines curb weight as the weight of a vehicle with a full tank of fuel and all fluids topped off, but with no one sitting inside or on the vehicle and no cargo loaded. Curb weight is much more difficult to determine and enforce, especially in remote areas. BLM currently does not have any OHV weight restrictions in place within the planning area, but in other areas around the state, BLM has established a gross vehicle weight rating that enables use of most classes of small OHVs, and is consistent with existing State of Alaska weight restrictions.

ANCSA Section 17(b) transportation easements are found extensively within the planning area, and play a significant role in providing public access across private native corporation lands. Around 70 Section 17(b) easements are found within the planning area. OHV use on ANCSA Section 17(b) easements are subject to a variety of limitations determined at the time of easement establishment, including common allowable uses, and seasonal and vehicle weight restrictions, and easement type (i.e., trail, road, or site). Many ANCSA Section 17(b) easements within the planning area are limited to winter use only. BLM represents the federal government regarding to realty issues associated with individual easements, particularly petitions for easement vacations and/or relocations. The de facto federal policy for determining the federal agency responsible for marking of a particular easement is based on the destination of the easement. That is, the federal land unit (and associated manager) to which a particular easement provides access is expected to provide necessary marking of that easement, in order to prevent trespass onto adjacent private lands. The extent and type of marking is assumed to be determined by each respective federal land manager accessed by the easement. Federal law specifies that trespassing and use conflict issues associated with ANCSA Section 17(b) easements is to be handled by local law enforcement and does not provided any funding for such actions. BLM has published outreach materials to inform the public about their rights and responsibilities related to ANCSA Section 17(b) easements; outside of these informational materials, this document will not make recommendations for the management of 17(b) easements.

In terms of managed BLM land uses that could generate demand for overland transportation, the disposal of public BLM lands for private cabins or homesteads was discontinued three decades ago and is not expected to be continued any time in the future. The development of commercial lodges or structures associated with commercial ventures is possible, via a prescribed BLM permitting process. Temporary commercial land use for commercial ventures such as guided hunts and hunting camps are regulated through BLM's SRP process. This includes route monitoring and agency review of overland OHV use, along with use stipulations.

Motorboats, inboard jet motorboats, airboats, and hovercraft access to BLM-managed public lands within the planning area is unrestricted, subject to future management decisions.

Fixed-wing aircraft and helicopter access to BLM-managed public lands within the planning area is also unrestricted. Minimal hand clearing of airstrips is allowed to move small obstacles and brush. Any other surface-disturbing improvements such as vegetation removal or site leveling require a permit from the BLM.

### **3.7.5 Resource Changes: Trends and Forecasts**

Potential transportation corridors are under review by the State of Alaska and include two road and ROW corridors: the Western Alaska Access Planning Study (DOWL HKM 2010), also known as "the road to Nome," and the Yukon-Kuskokwim Energy Corridor Plan, both of which would cross BLM-managed public lands within the planning area. The Western Alaska Access Planning Study has evaluated three routes, including the preferred Yukon River Corridor, to connect the Nome-Council Road to the existing road system in the Fairbanks area. The proposed final stage of the Yukon River Corridor is between the villages of Koyuk and Nulato, and would cross BLM-managed public lands in the Nulato Hills region of the planning area. The Yukon-Kuskokwim Energy Corridor Plan evaluated overland transport routes in the Portage Mountains area to connect the Yukon and Kuskokwim Rivers for fuel and freight transport purposes. The assessed routes would cross BLM-managed lands to the northeast of Upper and Lower Kalskag.

Specific evidence of climate change affecting travel and transportation management has not been recorded in the planning area. However, impacts by a warming atmosphere evidenced by: increases in frequency and extent of wildfire (Chapin et al. 2008); increases in frequency and extent of insect outbreaks; warmer growing season temperatures (Hinzman et al. 2005); and permafrost thaw and deepening of the soil active layer. Due to these impacts, travelers are now faced with unreliable conditions during the summer months and periods before and after freeze up.

Atmospheric warming has primarily occurred during winter months in the past several decades (see Section 2.2, Climate Change), affecting winter travel via snowmobile. The lengthening of the summer season has likely reduced the functional time period for winter travel. Anecdotal reports from residents of the planning area indicate the annual season for winter travel has been shortening over the past half-century. Delayed freeze-up, diminished snowfall, and rain/warm weather episodes have become more common in early winter (November-December), and where winter travel was once possible for much of the month of April, travelers are now faced with unreliable conditions starting in early April. If extremely dry, low-snowfall, and anomalously warm winters similar to that experienced in 2013–14 and 2014–15 continue to occur again in future years, winter travel season within the planning area may be shortening by one to two months. Additionally, in addition to shortened travel seasons, winter travel may be more difficult and/or dangerous due to unreliable ice conditions on riverine routes and crossings.



## 3.8 Renewable Energy

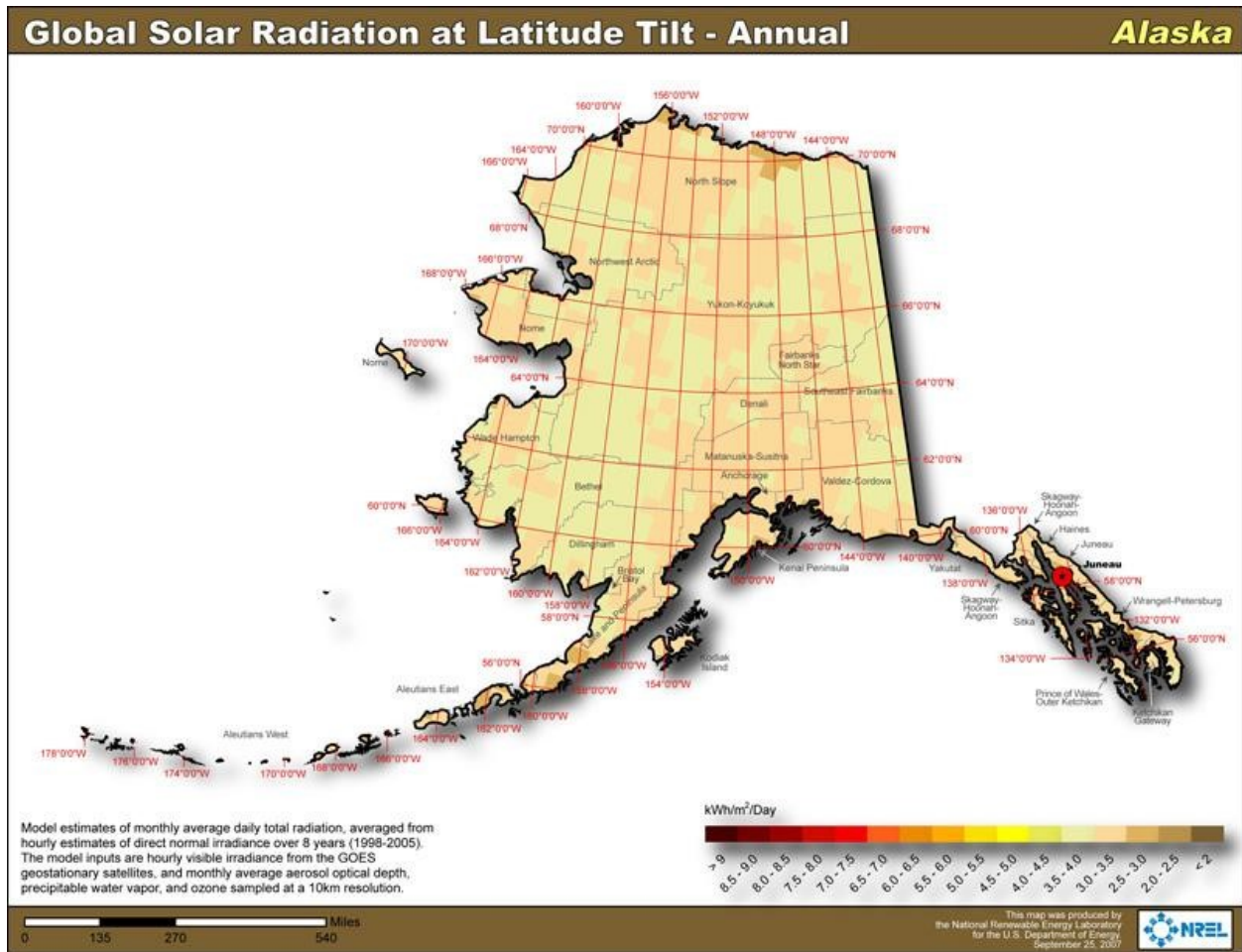
### 3.8.1 Introduction

This section describes the laws, regulations and policies related to renewable energy, as well as the resource indicators that will be used to evaluate impacts to renewable energy. The section also includes a discussion of the current condition of renewable energy resources within the project area and forecasts related to potential renewable energy opportunities within the project area in the future.

The BLM Land Use Planning Handbook (BLM 2005) requires that plans address existing and potential development areas for renewable energy projects consistent with the goals and objectives for natural resources in the planning area. The BLM describes criteria that must be met for economically feasible utility-scale solar, wind, and biomass development in *Assessing the Potential for Renewable Energy on Public Lands* (BLM-DOE 2003). The assessment reviewed the potential for concentrated solar power, wind, biomass, and geothermal on BLM lands in the west. Alaska was not included in this report. However, some of the site screening criteria outlined in this report were used to determine potential for renewable energy development in the planning area.

Some renewable energy resources in the planning area are considered to be very low potential for development:

- Tidal and wave power are not present, and has not been demonstrated to work yet anywhere in Alaska, and in only a few places in the world.
- Only sites with a solar resource of 6 kWh/m<sup>2</sup>/day or greater would likely be commercially developed (BLM-DOE 2003). Figure 3.8.1-1 (National Renewable Energy Laboratory 2007) shows that the planning area only has 3-4 kWh/m<sup>2</sup>/day, which is consistent with the rest of the state with the exception of a few areas along the northern Arctic coast, which are between 2.5 and 3 kWh/m<sup>2</sup>/day. To date, BLM has not authorized any photovoltaic facilities for commercial power production, nor has any interest been expressed by industry in developing such facilities on BLM-managed public lands within the planning area (see BSWI Draft RMP/EIS, Map 3.3.8-4).
- Geothermal power is considered to be renewable power; however, it is a leasable resource, much like oil, gas, and coal. It is discussed in more detail under Section 3.4 of this document. It should be noted that there are few identified geothermal resources in the planning area.
- Biomass heat has the potential to supply up to 80 percent of village energy requirements through individual and community biomass heat projects. Biomass is readily available on lands adjacent to the villages and will potentially come from BLM lands in the future. At least 12 villages within the planning area have completed biomass feasibility studies for one or more community buildings and are awaiting funding to complete the projects.



**Figure 3.8.1-1. Average Solar Irradiance for Alaska**

These forms of renewable energy are considered to have very low potential for development in the planning area, and therefore will not be discussed further in this section. The remaining potential renewable resources that will be considered in this planning document are wind, hydropower, biomass (harvested plant material), and peat.

Due to the isolated nature of the planning area, the low population, lack of roads or transmission lines, it is felt that renewable power projects, if constructed, are likely to be small, and located in the immediate vicinity of the local communities. In such an instance, it is unlikely that these facilities would impact BLM-managed public lands in the planning area. Land around the local communities has been largely selected under ANILCA, and very little BLM-managed land exists within 30 miles of the communities (Table 3.8.1-1). In addition, the markets for energy in this area are relatively small, meaning such developments are likely to have limited impact.

**Table 3.8.1-1. Distribution of BLM-Managed Public Land in Relation to Local Communities**

Local Communities	Distance from BLM Lands (miles)	Local Communities	Distance from BLM Lands (miles)
Akiachak	44.0	Mertarvik	102.7
Akiak	37.6	Mountain Village	61.9

Local Communities	Distance from BLM Lands (miles)	Local Communities	Distance from BLM Lands (miles)
Alakanuk	91.2	Napakiak	64.8
Aniak	2.5	Napaskiak	57.4
Anvik	4.0	Newtok	102.5
Atmautluak	53.9	Nightmute	126.5
Bethe	57.1	Nikolai	6.9
Chefornak	128.6	Nunam Iqua	105.1
Chevak	121.6	Nunapitchuk	54.2
Chuathbaluk	3.8	Oscarville	58.5
Crooked Creek	0.6	Pilot Station	33.2
Eek	76.0	Pitkas Point	46.9
Emmonak	86.2	Red Devil	0.6
Flat	4.3	Russian Mission	1.8
Grayling	2.3	St. Mary's	46.9
Holy Cross	4.6	St. Michael	5.4
Hooper Bay	138.8	Scammon Bay	120.1
Kasigluk	56.2	Shageluk	2.3
Kipnuk	137.3	Sleetmute	2.9
Kongiganak	110.0	Stebbins	6.3
Kotlik c	50.0	Stony River	1.1
Kwethluk c	45.7	Takotna	1.6
Kwigillingok	121.3	Toksook Bay	130.8
Lake Minchumina	8.9	Tuluksak	30.1
Lime Village	1.6	Tuntutuliak	87.3
Lower Kalskag	11.3	Tununak	128.1
McGrath	6.7	Unalakleet	4.0
Marshall	6.2	Upper Kalskag	10.3

### 3.8.2 Laws, Regulations, and Policies

The following laws, regulations and policies are relevant to the consideration of renewable power resources in the planning area.

#### Secretarial Order No. 3285

Secretarial Order No. 3285, issued on March 11, 2009, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources," made production and transmission of renewable energy on public lands a priority for the DOI. This Order establishes a DOI-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the DOI manages.

#### Energy Policy Act of 2005

The Energy Policy Act of 2005 (P.L. 109–58) changed U.S. energy policy by providing tax incentives and loan guarantees for renewable energy production. Provisions relevant to the document include tax

credits for wind and other alternative energy producers; grants for biomass projects; studies of renewable energy resources by the Department of Energy; designation of National Interest Electric Transmission Corridors where there are significant transmission limitations adversely affecting the public.

### **The Energy Independence and Security Act of 2007**

This Act was designed to move the U.S. toward greater energy independence, to increase the production of clean renewable fuels, and support modernization of the nation's electricity transmission and distribution system.

### **The BLM Energy and Mineral Policy (2008)**

The policy has several requirements directly impacting development of renewable power projects. These include the following:

- The BLM land use planning and multiple-use management decisions will recognize that energy and mineral development can occur concurrently or sequentially with other resource uses, providing that appropriate stipulations or conditions of approval are incorporated into authorizations to prevent unnecessary or undue degradation, reduce environmental impacts, and prevent a jeopardy opinion.
- Land use plans will incorporate and consider energy and geological assessments as well as energy and mineral potential on public lands through existing energy, geology and mineral resource data, and to the extent feasible, through new mineral assessments to determine mineral potential. Partnerships with the National Renewable Energy Laboratory, federal and State agencies, such as the USGS and State geologists, to obtain existing and new data will be considered.
- Withdrawals and other closures of the public land must be justified in accordance with the DOI Land Withdrawal Manual 603 DM 1 and the BLM regulations at 43 CFR 2310. Petitions to the Secretary of the Interior for revocation of land withdrawals in favor of energy and mineral development will be evaluated through the land use planning process.
- The BLM endorses sustainable development that encourages social, environmental, and economic considerations before decisions are made on energy and mineral operations. The BLM actively encourages private industry development of public land energy and mineral resources, and promotes practices and technology that least impact natural and human resources.
- The BLM will adjudicate and process energy and mineral applications, permits, operating plans, leases, rights-of-ways, and other land use authorizations for public lands in a timely and efficient manner and in a manner to prevent unnecessary or undue degradation. The BLM will require financial assurances, including long-term trusts, to provide for reclamation of the land and for other purposes authorized by law. Prior to mine closure, reclamation considerations should include partnerships to utilize the existing mine infrastructure for future economic opportunities such as landfills, wind farms, biomass facilities, and other industrial uses.
- Energy and mineral-related permit applications will be reviewed consistent with the requirements of NEPA and other environmental laws. The BLM will work closely with federal, State, and tribal governments to reduce duplication of effort while processing energy and mineral-related permit applications.
- The BLM will monitor locatable, salable and leasable mineral operations and energy operations to ensure proper resource recovery and evaluation, production verification, diligence, and enforcement of terms and conditions as applicable. The U.S. will receive market value for its

energy and mineral resources unless otherwise provided by statute, and royalty rates will be monitored and evaluated to protect the public interest.

### **ANILCA Title XI, Rights-of-way for Transportation or Utility Systems**

Should a Title XI application be received by the BLM for large-scale utility or energy project in the planning area, the BLM will consider alternative locations consistent with the Title XI process. Notwithstanding any decision in this document and in accordance with ANILCA Title XI, ROWs for transportation or utility systems will be considered throughout the National System, CSUs, and National Landscape Conservation System (NLCS) units are excluded from wind energy uses. Any approval or disapproval of these ROWs will be consistent with the provisions of ANILCA.

### **FERC Permitting Requirements**

The Energy Policy Act of 2005 gave the Federal Energy Regulatory Commission (FERC) permitting responsibilities that are applicable to renewable power, including reviews of electric transmission projects under limited circumstances; and licenses and inspects private, municipal, and State hydroelectric projects.

### **NEPA**

NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. The range of actions covered by NEPA is broad and includes making decisions on permit applications, adopting federal land management actions, and constructing highways and other publicly-owned facilities. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. Agencies also provide opportunities for public review and comment on those evaluations. This act would apply to any large-scale renewable energy development.

### **Alaska Energy Authority Rural and Statewide Energy Programs (AS 42.45)**

This regulation established the power cost equalization and rural electric capitalization fund for equalizing power cost per kilowatt-hour statewide. It also makes grants to eligible utilities under AS 42.45.180 to improve the performance of the utility.

### **Alaska Energy Authority Regulations (3 AAC 105.010 - 3 AAC 109.900)**

These regulations created the AEA as an independent corporation with the mission to “reduce the cost of energy in Alaska.” AEA is the State's energy office and lead agency for statewide energy policy and program development. AEA’s core programs work to diversify energy Alaska’s energy portfolio, lead energy planning and policy, invest in Alaska’s energy infrastructure and provide rural Alaska with technical and community assistance. AEA also manages the Renewable Energy Fund, the Emerging Energy Technology Fund, the Power Cost Equalization Program and various Energy Efficiency and Conservation Programs.

### **Alaska Renewable Energy Fund/Task Force/Assistance Act**

The Alaska Renewable Energy Fund (REF) provides benefits to Alaskans by assisting communities across the state to reduce and stabilize the cost of energy. The program is designed to produce cost-effective renewable energy for heat and power to benefit Alaskans statewide. The REF was established by the Alaska State Legislature in 2008, and extended 10 years in 2012. The REF is managed by the AEA

and provides public funding for the development of qualifying and competitively selected renewable energy projects in Alaska.

### **Alaska Sustainable Energy Act**

The Alaska Sustainable Energy Act stipulates that Alaska will meet 50 percent of its energy needs via renewable power by 2025. It contains provisions for renewable tax production credits, and emerging technology fund, a renewable energy fund, and alternative energy loans.

#### **3.8.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for renewable energy-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acreage available for development of renewable resources and access to that acreage
- Acreage available for transmission of energy from sources to the users
- Additional development cost for renewable energy projects

#### **3.8.4 Current Conditions**

##### **Wind Resources**

The AEA, through the REF, is developing wind energy projects in Alaska's western and southwestern areas (AEA 2014). The potential to use wind as a supplemental energy source for local communities within the planning area is high. Communities in the planning area rely almost exclusively on costly diesel-powered generating stations. Supplementing the diesel generation with wind energy can save significant amounts of fuel, and significantly reduce energy costs.

Several communities in the planning area including Unalakleet, Toksook Bay, and Kwigillingok already use wind energy to supplement diesel-powered generating stations.

The BLM encourages the development of wind energy within acceptable areas, consistent with the Energy Policy Act of 2005 and the BLM 2008 Energy and Mineral Policy. However, for several reasons, large-scale wind projects are unlikely to be built on BLM-managed public land in the planning area for the foreseeable future. The primary criteria for utility-scale wind development (BLM-DOE 2003) include:

- A wind power Class 4 and above for short-term, and Class 3 and above for long-term;
- Transmission access within 25 miles; and
- Road access within 50 miles.

Wind speed in Alaska has been estimated at 50 meters above the ground and depicts the resource that could be used for utility-scale wind development (BSWI Draft RMP/EIS, Map 3.3.8-1). As a renewable resource, wind is classified according to wind power classes, which are based on typical wind speeds. These classes range from Class 1 (the lowest) to Class 7 (the highest). In general, wind power Class 4 or higher can be useful for generating wind power with large turbines and are considered good resources. Given the advances in technology, some locations in Class 3 areas may be suitable for utility-scale wind development.

Within the planning area, wind potential is generally poor to fair (Class 1-3) (AEA 2010). This class of wind resource is unlikely to ever be developed. Given that many of the areas with Class 4 or higher wind potential are excluded from potential development by policy, no lands with high potential for utility-scale wind development have been identified in the planning area. Most of the area with high potential is located near the coast and is not on BLM-managed public lands within the planning area (see BSWI Draft RMP/EIS, Map 3.3.8-1).

The population in the planning area is low (with correspondingly low energy demand), particularly in areas near BLM-managed public lands, infrastructure to transport electricity to regional population centers is extremely limited. Transmission is costly to build, and typically, a large demand is necessary to warrant long distance transmission lines.

### **Biomass**

Woody biomass is commonly defined as the by-product of forest management, restoration, and hazardous fuel reduction treatments, and includes whole trees, woody plants, stems, branches, limbs, tops, needles, leaves and all other woody parts grown in a forest, woodland, or rangeland environment. In Alaska biomass will include standing timber both dead and green as well.

In 2005, a group of federal and State agencies formed the Alaska Wood Energy Development Task Force, and began distributing federal dollars to perform pre-feasibility studies for wood energy projects across the state. To date, projects in 57 communities have received funding to analyze wood energy feasibility, while 26 of those projects have received additional funding, primarily from the AEA, to design, construct and operate new community wood heating systems. At least 14 communities within the planning area have requested such assistance and several of these are actively pursuing biomass systems for heating. Combined Heat and Power systems may follow at a later date.

More than 100,000 cords of wood per year are used for residential space heating statewide (AEA 2016a). Small wood-fired boilers are present in Tok, Coffman Cove, Craig, Gulkana, Elim, Thorne Bay, Haines, and Tanana (AEA 2016a). These facilities are often being fueled by locally harvested wood or mill by-products. Some have proposed the use of imported pellets created from timber harvest elsewhere.

There are relatively few pellet manufacturers in the state. Superior Pellets in North Pole, Alaska is an industrial producer of pellets, it initially struggled to secure proper feed stocks to produce quality pellets. It is capable of producing an estimated 30,000 tons of pellets per year. However, the current dilemma has been the lack of a strong market for their product. The Native Village of Gulkana in Copper River, a small plant in Ketchikan, and Logging and Milling in Dry Creek are the only other known producers of pellets in Alaska. All three producers use woody biomass from State and Native lands, in conjunction with a local sawmill. The Village of Napiamuit has a contract to deliver 1,000 cords of wood from the Middle Kuskokwim river area to Bethel to meet annual heating needs.

There are no existing biomass projects using woody biomass from BLM-managed public lands in the planning area. This type of biomass development in the planning area is anticipated, however, because the pellets are likely to originate outside the planning area, these types of operations are not considered to have any significant impact.

Primary criteria for commercial biomass projects include a biomass power plant and a population center with a skilled labor force within 50 miles of the source of the biomass. These criteria are not met inside the planning area because BLM-managed public lands are typically too far away and inaccessible to local communities (Table 3.8.1-1).

Normalized difference vegetation index (NDVI) is derived from the hyperspectral reflectance data, and is considered indicative of the abundance of photosynthetically active vegetation. This is a rough measure of the amount of biomass available on the land, and can be derived from aerial and satellite imagery. The BLM Land Use Planning Handbook (BLM 2005) describes areas that may be likely to have biomass harvesting in the future to be those with an NDVI of 4 or greater, communities at risk from fire, and those in proximity to Forest Service lands (less than 100 miles). Very little of the planning area has a NDVI >4, and none of the land is in proximity to BLM-managed public lands, making large-scale biomass projects unlikely (BSWI Draft RMP/EIS, Map 3.3.8-2). The recent forest inventory of BLM lands also provided information on The Kuskokwim Corporation (TKC) lands and includes estimates of standing and dead material that could be considered for use in a biomass operation.

In accordance with direction from the BLM-Washington Office, the BLM will continue to encourage biomass utilization to promote the use of renewable energy. With the recent inventory of forested lands around communities completed, it may be possible to promote further utilization of forest resources locally.

## **Peat**

Peat is partially decayed and compacted vegetable matter accumulated over decades, where soil is wet enough to minimize oxidation. In its natural state, peat is around 95 percent water by weight and frequently contains some sand, clay, or other minerals. The energy content per pound is similar to wood, and half of most coal. Peat is soft, easily compressed, and once the water has been removed, can be used as a source of fuel. The planning area contains large amounts of peat (BSWI Draft RMP/EIS, Map 3.3.8-3); however, according to the American Society for Testing and Materials (ASTM) fuel grade peat must have a minimum thickness of 5 feet, have an energy value of 8,300 British thermal unit (Btu) per pound, and have an ash content of less than 25 percent (Lukens 1981).

Production costs (on a large scale) are therefore high when compared to other fossil fuels, and long-distance transportation of the material is usually economically impractical. Peat is best viewed as a significant resource only if the resource is located immediately adjacent to the existing infrastructure in need of energy resources (Bundtzen and Kline 1986).

Interest in developing the use of peat for energy purposes has been relatively low in the U.S. A small (23-megawatt) power plant was constructed in 1990 in Maine, to be fueled by local peat; however, for several reasons, the boilers are now mainly fueled by wood chips (IPS 2016). Only in some areas in the midlands of Canada is peat used today on a minor scale as a local fuel.

Until the 1950s, peat was still regarded as an important fuel in many countries in Europe, and large development programs were being undertaken in Ireland, Sweden, Germany, Denmark, Finland and in the member states of the then Soviet Union (IPS 2016). In the 1960s, the availability of cheap oil and coal started to affect the competitiveness of peat as fuel and the role of energy peat began to decrease in these countries, except for Ireland and the Soviet Union, where peat continued to play an important role as a fuel in power generation and also in small local consumption.

Major environmental concerns regarding the use of energy peat are principally the same as those for other fuels. This includes damage to the natural land, and air emissions from the burning of peat resources. Peat typically has relatively low sulfur concentrations, and therefore low sulfur dioxide emissions.



Drainage is a significant issue because the peat needs to be drained before harvesting. Typically this is done by creating ditches to carry water to streams and rivers. This draining process can discharge solid substances and nutrients to surface water.

Peat is classified as a fossil fuel and CO<sub>2</sub> emissions released during its combustion are taken into account in the calculations of the International Panel for Climate Change. This classification has been strongly criticized, especially in Finland and Sweden, because it does not take into account annual growth of peat (IPS 2016). In some countries, peat is now being classified as biomass and is considered to be a renewable energy source.

Mining of peat in the lower 48 is commonly associated with its use for making topsoil, and therefore it is typically considered a salable commodity, much like sand and gravel. It is recognized that the mining of peat in the planning area may have an entirely different usage, and that there has been some community interest in utilizing this resource for power generation. For that reason, it is discussed in both sections.

In 1995, the total area of the U.S covered by peat soils (known as histosols) was some 214 000 km<sup>2</sup>, of which Alaska accounted for just over 50 percent (WEC 2001). The total volume likely exceeds 100 billion tons. Peat production in Alaska was estimated to be 30,600 cubic meters in 2000 (Szumigala and Swainbank 2001). There are no known updates to this estimate.

Barrick Gold conducted the Donlin Creek Peat Resource Evaluation to assess the feasibility of using peat-fired power plants to operate the proposed Donlin Gold Mine. This study included testing and sampling peat deposits on two currently unencumbered parcels of BLM-managed public lands and State-selected land near the proposed mine (BLM 2007b). The work was done in the Kolmakof and the Tango Area (BSWI Draft RMP/EIS, Map 3.3.8-3). It was determined that the use of peat to fuel peat-fired power plants was not feasible because all of the peat drilled and sampled existed in permafrost, and excavation of the peat resource was likely to be costly and damaging to the permafrost conditions. Based on this study, it is unlikely that most of the peat resources in the planning area could be considered economically viable.

In 2012, the community of McGrath solicited some funding from AEA to develop a renewable power peat processing plant (AEA 2012). The plan was to create a self-sustaining system to produce 3,600 tons (60 billion Btu) of peat pellets per season. A projected retail price of \$300/T (\$17/ one million Btus (mBtu) was estimated as compared to local fuel oil prices at \$53/mBtu and wood at \$19/mBtu. The project would replace 400 cords of wood (a resource becoming ever more depleted) and 25,000 gallons of fuel oil, for space heating in McGrath and four other villages of similar size. Such a system could easily supply smaller villages in Alaska with sufficient peat from lands outside of BLM-managed public lands. This application was not selected for further investigation by AEA (AEA 2016b).

## Hydropower

Hydroelectric plant configurations include conventional dam reservoir projects, which regulate flows through the drawing down of reservoir levels, and smaller capacity run-of-the-river projects, which rely upon the rate and fall of natural streamflow to produce power. Though time consuming to permit and expensive to construct, hydropower is a mature technology with the capability of locking in power rates for 50 to 100 plus years.

There are currently at least 52 operating hydroelectric projects in Alaska. Most are owned by the utilities they serve. Alaska has a significant amount of untapped hydroelectric potential. The majority of Alaska's

hydroelectric energy resources are located mainly in southeast and southcentral Alaska, with some resource opportunities in the interior, southwest and the Aleutians.

For a hydropower resource to be capable of economically viable power production, a number of attributes must be present: (1) flowing water of sufficient quantity, (2) sufficient elevation drop in the river or stream (head), (3) typically, the further the power source is from the market, the larger that source needs to be to justify transmission costs.

In the case of the planning area, there are relatively limited resources located on BLM lands. Three FERC hydropower withdrawals have been made within the planning area (Table 3.8.4-1), but none have resulted in project initiation. The Aniak and McGrath permits are still in place. The Chikuminuk Lake Hydroelectric Project proposed a 13.4-megawatt project in southwest Alaska that would raise the level of Chikuminuk Lake by 60 feet in order to generate year-round hydropower. The project (by Nuvista Light & Electric Cooperative, Inc.) went through the preliminary stages of permitting. The preliminary permit for this project was surrendered by the applicant in September 2014. Per FERC notice, the permit for the project was terminated effective October 18, 2014 (FERC 2014).

### 3.8.5 Resource Changes: Trends and Forecasts

It is possible that small, localized wind development may occur in the vicinity of the communities in the planning area. However, most BLM lands are not within 25 miles of a major transmission line or local community (Table 3.8.5-1). It is possible that some small-scale facilities may be developed for BLM administrative use, or that the BLM may authorize small-scale facilities to promote energy to rural areas (Figure 3.8.5-1).

**Table 3.8.5-1. FERC Withdrawals Affecting BLM Land in Planning Area**

Case File Number	PLO/ SO/ EO	Acres	Header
AA-87847	FA 12879	1	Aniak Alaska 31 Project: segregates the land from "entry, location, or other disposal under the laws of the United States unless otherwise directed by the Federal Energy Regulatory Commission or by Congress." 43 CFR 2320.0-3.
AA-87849	FA 12881	5	McGrath Alaska 28 Project: segregates the land from "entry, location, or other disposal under the laws of the United States unless otherwise directed by the Federal Energy Regulatory Commission or by Congress." 43 CFR 2320.0-3.
AA-93287	FA 14369	5,0352.5	Chikuminuk Lake Hydro Project-transmission line: segregates the land from "entry, location, or other disposal under the laws of the United States unless otherwise directed by the Federal Energy Regulatory Commission or by Congress." 43 CFR. 2320.0-3.



**Figure 3.8.5-1. FAA aircraft navigation beacon at Chandalar Lake in the Brooks Range of northeast Alaska. This is the type and scale of renewable energy development that could occur in the planning area.**

There is a small potential for high value wind resources to require transmission corridors across BLM lands to population centers. BLM policy is not to issue ROW authorizations for wind energy development for areas where such development is incompatible with specific resource values. Specific lands excluded from wind energy site monitoring and testing and wind energy development include designated areas that are part of the NLCS (I.M. 2009-043).

As with other renewable resources, most of BLM lands in the planning areas are far from population centers making the large-scale use of biomass economically unlikely in the near future. The Village of Napaimute requested permits to harvest biomass from BLM land in 2013, but ultimately chose to utilize other sources first. The probability of future requests on BLM lands in this area is considered to be low initially, but may grow if additional biomass facilities come on line. However, small community-based heat or combined heat and power projects may eventually need to reach out to BLM-managed public lands to meet their future needs if they continue to expand the scope of biomass projects within the region.

Because of the low demand, potential for permafrost, and availability of alternate peat sources not on BLM-managed public lands, the potential for large-scale development and use of peat in the planning area is considered to be low.

Overall, there appears to be limited potential for significant hydropower development on BLM-managed public lands within the planning area, and most hydropower projects are likely to be small and located close to existing communities.

## ***Section 4. Special Designations***

### **4.1 Areas of Critical Environmental Concern**

#### **4.1.1 Introduction**

This section describes the ACECs in the planning area. An ACEC is defined in FLPMA (Public Law 94-579, Section 103(a)) as an area within BLM-managed public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, geologic, paleontological, or scenic values, to fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.

#### **4.1.2 Laws, Regulations, and Policies**

Regulations for implementing the ACEC provisions of FLPMA are found at 43 CFR 1610.7-2. The ACEC is a BLM-specific administrative designation that is accomplished through the land use planning process. ACECs differ from other special designations in that the designation by itself does not automatically prohibit or restrict other concurrent use within the area. Restrictions that arise from an ACEC designation are determined and applied at the time of designation and are designed to protect the identified values within the ACEC or serve the purposes for which the designation was made. Special management attention is designed specifically for the relevant and important (R&I) values found within the specific ACEC. Therefore, management decisions and actions may vary between ACECs. The BLM identifies goals, standards, and objectives for each proposed ACEC, as well as general management practices and uses, including necessary constraints and mitigation measures. This EIS identifies a reasonable range of alternatives that includes current management of existing ACECs, as well as management for proposed ACECs. In addition, ACECs are subject to the provisions of 43 CFR 3809.14(b)(3), which require an approved plan of operations for activities resulting in more than 5 acres of disturbance.

Nominations for the establishment of an ACEC can be made at any time; nominations are suggested either internally by the BLM or externally through the public, special interest groups, Tribes, or federal, State, or local agencies. Only BLM-managed public lands are included in ACEC boundaries. During the planning process, the BLM interdisciplinary team evaluates nominated ACECs to determine if the area specifically meets the relevance and importance criteria, as defined by 43 CFR 1610-7-2(a)(1-2), and as defined in the BLM Manual 1613, Areas of Critical Environmental Concern (BLM 1988). Areas determined to meet the relevance and importance criteria are provided temporary management to protect human life and safety or significant resource values from degradation until the area is fully evaluated through the RMP process.

#### **4.1.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline ACECs that the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- For ACECs with cultural resources value:
  - Acres closed to mineral entry in medium-high potential mineral areas
  - Acres managed as limited for travel

- Acres open to commercial woodland harvest and demand for this use
- Designation of ROW exclusion or avoidance areas
- Acres designated NTMC
- Acres managed as VRM class I or II
- Acres managed for ACEC
- Acres managed for WSR
- Increased understanding and documentation of cultural resources
- For ACECs with fisheries value:
  - Acres affected by land withdrawals and level of mineral potential
  - Acres open to commercial woodland harvest and grazing, and demand for this use
  - Size and route restrictions for summer travel
  - Designation of ROW exclusion or avoidance areas
  - Acres affected by land withdrawals and level of mineral potential

#### **4.1.4 Current Conditions**

Within the planning area, there are 11 existing ACECs totaling 1,884,376 acres of BLM-managed land (BSWI Draft RMP/EIS, Map 3.4.1-1). To date, no activity-level management plans for any existing ACEC has been completed. During the BSWI RMP planning process, 19 additional areas were nominated as ACECs either internally by the BLM or externally. Some existing ACECs and nominated areas overlap. In total, 30 separate areas totaling 11,279,369 acres were evaluated to determine if they meet the relevance and importance criteria.

As described in the ACEC Summary Report (BLM 2018b), the BLM evaluated existing and nominated ACECs for relevance and importance of significant historic, cultural, or scenic values; fisheries and wildlife resource values; natural processes or system values; and areas of natural hazards. Some existing ACECs were found to no longer meet the relevance and importance criteria for the values for which they were designated.

Of 30 areas that were evaluated, 17 areas meet both the relevance and importance criteria for at least one of these values. Of these 17 potential ACECs, six are existing ACECs; the remaining are nominated areas, some of which overlap with existing ACECs (BSWI Draft RMP/EIS, Map 3.4.1-2). All existing ACECs would remain ACECs under the No Action Alternative. Existing ACECs that were found to still meet both the relevance and importance criteria for at least one value are proposed as an ACEC in an action alternative if their relevant and important values would be protected by another proposed ACEC with overlapping boundaries. Table 4.1.4-1 identifies the 11 existing ACECs, 23 nominated ACECs, and 17 potential ACECs found to contain relevant and important values.

**Table 4.1.4-1. Acres of Existing, Nominated, and Potential ACECs in Planning Area**

ACEC Name	Existing Acres	Nominated Acres	Potential ACEC Acres <sup>a</sup>	Relevant and Important Value(s)
<b>Existing</b>				
Anvik River ACEC	115,106	0	115,106	Fish. Largest single wild stock producer of summer chum salmon in the Yukon River drainage.
Box River Treeline RNA ACEC	13,592	0	0	None identified
Drainages of the Unalakleet River ACEC	415,184	0	415,184	Fish, Cultural. Crucial anadromous spawning areas; significant cultural resources, including the Kaltag Portage.
Inglutalik ACEC	71,716	0	71,716	Fish. Critical spawning and rearing habitat for a variety of salmon and other species of fish.
Kuskokwim River Raptor Nesting Habitat ACEC	6,072	0	0	None identified
North River ACEC	137,349	0	137,349	Fish. Significant critical spawning and rearing habitat for salmon species.
Peregrine Falcon Nesting Habitat ACEC	8,096	0	0	None identified
Shaktoolik River ACEC	192,591	0	192,591	Fish. Salmon produced here contribute to the availability and abundance of subsistence fish resources in Norton Sound and contribute to the overall genetic health of salmon stocks.
Ungalik River ACEC	112,719	0	112,719	Fish. Highly productive aquatic environment that provides critical spawning and rearing habitat for a variety of salmon and other species of fish.
<b>Existing and Nominated</b>				
Gisasa River ACEC (existing and externally nominated)	278,057	278,057	278,057	Fish. Highly productive aquatic environment that provides critical spawning and rearing habitat for a variety of salmon and other species of fish.
Kateel River ACEC (existing)	568,083	0	568,083 <sup>b</sup>	Fish. Highly productive aquatic environment that provides critical spawning and rearing habitat for a variety of salmon and other species of fish.
ACEC externally nominated by the USFWS that includes portions of the existing Kateel River ACEC	0	675,627	675,627 <sup>b</sup>	Same as existing Kateel River ACEC.
ACEC externally nominated by Koyukuk Tribal Council that includes portions of the existing Kateel River ACEC	0	311,658	311,658 <sup>b</sup>	Same as existing Kateel River ACEC.

ACEC Name	Existing Acres	Nominated Acres	Potential ACEC Acres <sup>a</sup>	Relevant and Important Value(s)
ACEC internally nominated by the BLM: 308,361 acres of lands not included in the existing Kateel River ACEC; nominated area includes the two externally nominated areas (see above), as well as additional lands that are not within the existing ACEC or externally nominated areas	0	308,361	308,361	Same as existing Kateel River ACEC.
<b>Nominated</b>				
Anvik River Watershed ACEC (externally nominated; nominated area includes some of the existing Anvik River ACEC)	0	249,607	249,607	Fish. The summer chum salmon that spawn in the Anvik River is considered the largest single wild stock producer of summer chum salmon in the Yukon River drainage.
Anvik Traditional Trapping Area ACEC (externally nominated)	0	21,699	21,699	Cultural. The Iditarod National Historic Trail is of national significance, as is indicated by its designation by Congress as a National Historic Trail.
Bonasila River Watershed ACEC (externally nominated)	0	291,136	0	None identified
Egavik Creek Watershed ACEC (externally nominated)	0	60,052	0	None identified
Golsovia River Watershed ACEC (externally nominated)	0	21,771	0	None identified
Grayling Area Habitat ACEC (externally nominated)	0	98,682	0	None identified
Holy Cross ACEC (externally nominated)	0	1,702,030	0	None identified
Honhosa River ACEC (externally nominated)	0	93,412	0	None identified
Huslia ACEC (externally nominated)	0	170,763	0	None identified
Nulato River ACEC (externally nominated)	0	342,824	342,824	Fish. Highly productive aquatic environment that provides critical spawning and rearing habitat to a variety of salmon and other species of fish.
Ohogamiut ACEC (externally nominated)	0	1,634,358	0	None identified
Old Anvik Village Area ACEC (externally nominated)	0	60,259	0	None identified
Sheefish ACEC (internally and externally nominated)	0	698,260	698,260	Fish, Cultural. The only identified sheefish spawning area on entire Kuskokwim; contains known sites associated with the INHT.
Swift River Whitefish Spawning ACEC (internally nominated)	0	220,032	220,032	Fish. Includes one of the most important of only four known humpback whitefish spawning areas.

<b>ACEC Name</b>	<b>Existing Acres</b>	<b>Nominated Acres</b>	<b>Potential ACEC Acres<sup>a</sup></b>	<b>Relevant and Important Value(s)</b>
Tagagawik River ACEC (externally nominated)	0	301,044	301,044	Cultural. The area would likely be found eligible as a TCP of regional importance because of the historical importance of the region for trade between the Athabascan (Koyukuk) and Inupiat (Selawik).
Tenmile River Watershed ACEC (externally nominated)	0	36,278	0	Fish. Important Chinook and coho salmon spawning area.
Unalakleet ACEC (externally nominated; nominated area includes some of the existing Drainages of the Unalakleet River ACEC and some of the nominated Unalakleet River Watershed ACEC)	0	1,520,015	0	Cultural. The Kaltag Portage, as a part of the INHT, is of national significance. It was also a prehistorically important route for Alaska Natives to travel between the coast and the Yukon River.
Unalakleet River Watershed ACEC (externally nominated; nominated area includes some of the existing Drainages of the Unalakleet River ACEC)	0	251,978	251,978	Fish, Cultural. Presence of spawning areas for all five species of Pacific Salmon; the Kaltag Portage, as a part of the INHT, is of national significance.
Whitefish Spawning ACEC (externally nominated)	0	290,958	0	None identified
<b>Total</b>	<b>1,640,508</b>	<b>9,638,861<sup>b</sup></b>	<b>4,284,610<sup>b</sup></b>	

Source: BLM 2018b

<sup>a</sup> Potential ACECs are those that meet the relevance and importance criteria and will be analyzed under one or more alternatives, which may be limited to the current management alternative, in the Draft RMP.

<sup>b</sup> Total acres may not be the sum of each separate ACEC due to overlapping acres.



Two potential ACECs, Tenmile River Watershed ACEC and the Unalakleet ACEC, are not considered for ACEC designation under any alternative. This is because the relevant and important values for these two nominated ACECs would be adequately protected by the potential Unalakleet River Watershed ACEC; therefore, their designation would be redundant. Therefore, 15 of the 17 potential ACECs are considered for ACEC designation in at least one alternative.

The proposed management for each ACEC was developed to provide protection and focused management for relevant values beyond that provided through general planning area management. A comprehensive description and evaluation of all existing and nominated ACECs can be found in the ACEC Summary Report (BLM 2018b).

#### **4.1.5 Resource Changes: Trends and Forecasts**

The relevant and important values of the Anvik River, Drainages of the Unalakleet River, Inglutalik, North River, Shaktoolik River, and Ungalik River ACECs have been protected. The values would continue to be protected if their ACEC designation continues, and would not be protected without continued ACEC designation.

The values of the Box River Treeline RNA, Kuskokwim River Raptor Nesting Habitat, and Peregrine Falcon Nesting Habitat ACECs are no longer relevant and important, as described in the ACEC Summary Report (BLM 2018b).

## **4.2 National Trails**

### **4.2.1 Introduction**

This section describes the national trail found within the planning area.

### **4.2.2 Laws, Regulations, and Policies**

#### **National Trails System Act of 1968**

The National Trails System is the network of scenic, historic, and recreation trails created by the NTSA of 1968. These trails provide for outdoor recreation needs; promote the enjoyment, appreciation, and preservation of outdoor areas, cultural, and historic resources; and encourage public access and citizen involvement. Throughout the U.S. are 30 long-distance routes, 19 of which are National Historic Trails and 11 of which are National Scenic Trails that, combined with more than 1,000 National Recreation Trails, comprise the National Trail System (AmericanTrails.org 2016).

National Historic Trails are extended trails that closely follow a historic trail or route of travel of national significance. Designation identifies and protects historic routes, historic remnants, and artifacts for public use and enjoyment. Trails must meet the following three criteria listed in Section 5(b)(11) of the NTSA to be designated a National Historic Trail:

- The trail must follow an actual documented route of historic use.
- The trail must be of national significance.
- The trail must possess significant potential for public recreation or interpretation.

National Historic Trails are specifically designated areas in the U.S. containing the route of nationally and historically significant trails and areas adjacent to the trails to be utilized for scenic, historic, natural,

cultural, or developmental purposes. Only Congress can designate new National Historic Trails or National Scenic Trails. National Recreation Trails are designated by the U.S. Departments of Interior or Agriculture.

The INHT is the only National Trail within the planning area. The INHT is one of 30 long-distance historic routes that comprise the National Trail System. The INHT celebrates the historic 2,300-mile winter trail system, including side and connecting trails, from Seward to Nome (BLM 1986c; BSWI Draft RMP/EIS, Map 3.4.2-1). It is the only congressionally designated National Trail in Alaska and the only National Historic Trail established to commemorate winter trail use. Over 1,500 miles of the historic winter trail system are open for public use across State and federal lands (BLM 2018d). The trail originally served as a trade route connector for Alaska Native Villages, then as a portage during the Alaskan gold rush, and now as a travel and recreation route in contemporary Alaska.

## ANILCA

Congressionally designated segments of national trails are part of the BLM's National Landscape Conservation System. National Trails are designated CSUs under the ANILCA, and ANILCA Title 11 access provisions apply.

### **BLM Manual 6280 – Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation**

BLM Manual 6280 (BLM 2012c) requires the establishment of an NTMC that provides for land management measures that safeguard the nature and character of the corridor to meet the legislative goals of the special designation. Note that the establishment of the NTMC pertains only to the primary route of the INHT and not to the side/connecting trails (BLM 2015a). BLM Manual 6280 (BLM 2012c) also requires inventorying National Trail resources, qualities, values, and associated settings and the primary use or uses of the trail, as well as the identification of management goals, objectives, and actions for each National Trail.

#### **4.2.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for National Trails-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Acres of the NTMC with direct and/or indirect impacts resulting in the loss of integrity (e.g., setting, feeling, and association) or destruction of physical remnants of a trail, including rutting and trail braiding resulting from OHV compaction during periods of insufficient snow depth
- Acres of the INHT directly or indirectly affected by change in the cultural landscape (e.g., visual, pollution, or audible elements) that diminish the integrity of the trail's historic character (e.g., setting and feeling)
- Acres of the NTMC with direct and/or indirect impacts resulting in "substantial interference" with the nature and purpose of the INHT, as defined by the minutes of the Senate Committee on Energy and Natural Resources (May 17, 1978)
- Total acres of the INHT directly or indirectly affected by climate change. Examples of impacts related to climate change could include change in vegetation community composition (as defined by the REA)

- Adverse effects on the INHT per the NHPA

#### 4.2.4 Current Conditions

##### Current Management Framework

The initial version of the NTSA was approved on October 2, 1968, for the purpose of establishing a national system of recreational and scenic trails. It directed that 14 routes be studied to determine the desirability of designation as National Scenic Trails. “Gold Rush Trails in Alaska” were identified in the Act as a route named for study, with the U.S. Bureau of Outdoor Recreation later leading this study.

In September 1977, the U.S. Bureau of Outdoor Recreation study team released a report on Alaskan Gold Rush Trails and recommended that an Iditarod Trail system be designated as a National Trail. Concurrently, race organizers and volunteers for the Iditarod Trail Sled Dog Race lobbied Congress for the inclusion of the trail in the National Trail System.

In November 1978, Public Law 95-625 (National Parks and Recreation Act) amended the NTSA by adding a new category called “National Historic Trails” and added four new historic trails to the system: the Lewis and Clark Trail, the Oregon Trail, the Mormon Pioneer Trail, and the Iditarod Trail. The NTSA set forth the goal of National Historic Trail designation, stating, “National historic trails shall have as their purpose the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment.”

The Act stated that, unlike National Scenic Trails, which are managed by one federal agency from end to end, the level of public access and development for any part of a National Historic Trail would be at the discretion of each individual (nonfederal) landowner over which the trail passes. Federal land manager participation is mandated by law. Inclusion of a non-federal segment or site as part of the National Trail System is achieved through cooperative agreements between the landowner and the federal trail administrator. The BLM is the federal trail administrator for the INHT.

Congressional intent with regard to the “nature and purposes” of the INHT is articulated in the minutes of the Senate Committee on Energy and Natural Resources (May 17, 1978). This statement of intent is an important yardstick to determine the suitability of various management options that could affect the trail, including those management alternatives analyzed in this document. In the report, the Senate Committee described the nature of the INHT as “offering a rich diversity of climate, terrain, scenery, wildlife, recreation, and resources in an environment largely unchanged since the days of the stampede...the isolated, primitive quality...makes the National Historic Iditarod Trail...unique.” The nature of the INHT is further elaborated with a comparison of magnitude to other units in the National Trail System: “nowhere in the National Trail System is there such an extensive landscape...during...winter season of travel.”

The purposes of the trail are to provide an opportunity for contemporary users to experience the natural primitive settings and challenges experienced by gold stampedeurs a century ago, and to test the mettle of users, stated in terms relative to other units of the National Trail System: “Nowhere in the National Trail System is...so demanding of durability and skill during its winter season of travel. On the Iditarod, today’s adventurer can duplicate the experience and challenge of yesteryear.” Implicit in this statement is the retracement or the “re-creation” of the historic route to experience challenge.

Pursuant to the National Trails Act (as amended in November 1978), the U.S. Department of Interior assigned the BLM Alaska to assemble an interagency planning team and a Federal Advisory Council to

develop a comprehensive management plan (CMP) for the trail, which the Secretary of the Interior would submit to Congress. The goals of the plan were as follows:

- Identify all significant national, historical, and cultural resources to be preserved, specific trail management objectives and practices, and anticipated cooperative agreements with other government agencies or parties.
- Identify high-potential historic sites and route segments for outdoor recreation or historic interpretation.
- Identify acquisition needs for high-potential sites.
- Identify the trail ROW.
- Identify the process for marking the trail.
- Identify important side or connecting trails to complement and complete the trail system.
- Devise a uniform marker for the trail.
- Issue regulations necessary for the use, protection, management, development, and administration of the trail.

Portions of the INHT within the planning area are not currently managed under any provisions contained within the SWMFP (BLM 1981). That plan states, “The Iditarod National Historic Trail Management Plan is in the final stages. Therefore, the Iditarod Trail is not addressed directly in the Southwest [Management Framework Plan]. Decisions in the Management Framework Plan must be consistent with the Iditarod plan” (BLM 1981).

The ANILCA of 1980 designated National Historic Trails on federal lands within Alaska (i.e., the INHT) as a conservation system unit (Sec. 102[4]). Based on subsequent policy development, this refers to the Primary Route only of the INHT system. As a result, the Primary Route of the INHT on federal lands is affected by several special ANILCA-only provisions for subsistence use, adjacent landowners right of access, snowmobile use, adjacent State and private lands access for survey, exploration, and installation of air and water navigation aids, research sites, and transportation and utility systems.

In September 1981, the BLM published the INHT CMP Volume I, which was effectively a draft of the CMP until it was ultimately adopted. During development of the CMP, the Federal Advisory Council, with the BLM’s concurrence, recommended to the Secretary of Interior that the BLM be appointed the permanent administrator of the INHT. About the same time, the BLM, with the State of Alaska Division of Parks and Outdoor Recreation, opened a Joint Federal State Trail Office to continue mandated planning work on the trail. Interagency work on the trail included a baseline inventory of re-locatable historic roadhouses and communities along the trail, most of which had been abandoned in the previous 50 years.

In July 1982, the BLM published the CMP Resource Inventory (BLM 1982) for the trail as a companion document to Volume I of the CMP. The resource inventory included an inventory and naming convention of all routes to be included in the INHT System, identified high-potential segments and historic sites, provided detailed information on all historic sites along the trail from field visits, provided an inventory and rating of the scenic resources visible from the entire trail, provided land status, and provided a use classification system by trail segment.

The INHT CMP was revised and adopted by the Secretary of Interior on July 3, 1986, and submitted to Congress. With the adoption of the CMP (BLM 1986c), the BLM became the federal administrator for the

entire trail system and was charged with working to facilitate the implementation of the CMP among multiple parties, along with managing a couple hundred miles of the trail on BLM-managed public lands.

As an interagency concept plan, the CMP did not apply trail or land management regulations or protection measures on behalf of other agencies; those decisions are made at the discretion of relevant land management agencies, consistent with the intention of the NTSA.

To meet the requirements of the NTSA, the interagency CMP (BLM 1986c) for the trail identified two categories of trails comprising the INHT system. The Primary Route<sup>3</sup> of the INHT is the “most important travelway of the Trail system [between Seward and Nome] during the Iditarod Gold Rush... Connecting Trails were important components of this gold rush trail system...branching from the INHT primary route....” The CMP further classified the Primary Route and Connecting Trails as active or inactive depending on their contemporary use. The CMP also distinguished between segments for active management (approximately 1,500 miles) and minimal management (approximately 900 miles). The CMP defined segment names and recommended the width of trail management corridors, improvements, and applying for listing on the NRHP for numerous sites and segments.

Within the planning area, the INHT crosses lands managed by the BLM, the U.S. Fish and Wildlife Service (within the boundaries of Innoko NWR), and general State of Alaska lands. These parties (and other entities outside of the planning area) entered into an agreement with BLM in 1988 to implement the recommendations of the adopted CMP, within the limits of available funding. Management objectives established by the INHT CMP (BLM 1986c) include the following:

- Trail segments identified for active management should be managed to protect their historic values and identified by uniform markers.
- Public use of trail segments should be encouraged, and the trail should be protected and managed to the extent that such use does not impact the historic values of the INHT. Rights-of-way, easements, management corridors, cooperative agreements, and access improvements will be used to meet this objective.
- Motorized use is authorized pursuant to the INHT CMP and ANILCA sections 811 and 1110.
- Encourage nonfederal sites and segments to be included in the INHT through cooperative agreements.
- Maps, publications, and interpretation materials concerning the INHT should be made publicly available to increase appreciation and understanding of the INHT system.
- Identified historic sites along the INHT should be further evaluated for possible nomination to the NRHP.

Numerous historic sites have been identified along the INHT management corridor, with a number of sites being eligible for listing on the NRHP. Completions of applications for register listing have been limited. These sites are managed through active and passive preservation strategies to mitigate and protect against disturbance or destruction. The BLM works in conjunction with the Alaska SHPO to continue to identify and inventory historic sites along the INHT to be nominated to the NRHP (BLM 2014c). Since the INHT CMP (BLM 1986c), several associated sites and connecting trails have been documented and

---

<sup>3</sup> The terms “trail” and “route” were used interchangeably in the INHT CMP in regards to the description of the “Primary” travelway and are used in this document in the same manner.

listed in the Alaska SHPO's Alaska Heritage Resource Survey database as contributing elements associated with the INHT, or have been determined eligible for listing on the NRHP.

The INHT CMP (BLM 1986c) recommends a corridor in the Farewell Bend segment of 100 feet (for non-BLM-managed public lands) to 1,000 feet (for BLM-managed public lands), and on the Kaltag Portage segment a minimum of 1,000 feet. Formal rulemaking or implementation of a policy on BLM-managed public lands within the planning area for the withdrawal and/or delineation of a management corridor specifically for the INHT has not occurred to date (BLM 2015a).

The INHT retraces a winter Gold Rush trail network connecting Seward in southcentral Alaska to Nome in northwestern Alaska via the Iditarod gold mining district. The 938-mile main winter trail between Seward, Iditarod, and Nome was established in the early 1900s by users and the Alaska Road Commission on existing Alaska Native trails and newly pioneered routes. Branching from the main route are hundreds of miles of parallel, connecting, and side trails that also played an important role in the historic Gold Rush, and are included as part of the INHT System.

Historically, overland travel on the INHT was limited to winter months. Many users walked over the snow on the trail, and an extensive array of dog teams carried passengers, freight, mail, and gold to and from the Iditarod area, with attendant infrastructure built up to serve the needs of the dog teams. Trail users relied largely on private roadhouses and, later, public shelter cabins for overnight refuge during their journey. With the introduction of aircraft and decrease in mining activity, sections of the trail, mostly outside the planning area, fell into disuse by World War II.

With the concurrent developments of reliable snowmobile technology and annual long-distance, winter trail-based competitions in the 1970s (e.g., the Iditarod Sled Dog Race, the Gold Rush Classic/Iron Dog [snowmobile] Race, and the Iditabike), sections of the historic route were reestablished as the primary winter overland travel route between otherwise isolated communities in the upper Kuskokwim River drainage and the middle Yukon River in the planning area.

The majority of current trail use occurs between February and April, although use begins when sufficiently cold weather and snowfall enables overland travel (historically in late fall). Residents travel the INHT by snowmobile between villages to visit relatives, shop for groceries and goods, hunt, and attend sports tournaments and community events. Trail users rely on a single, snowpacked trail travel way that is approximately 48 inches wide (although it may be cleared to a wider width through forested areas).

Additionally, some residents use the trail for fur trapping 'lines,' to access firewood cutting areas, or to participate in other subsistence activities. Also, a modest number of non-planning area residents travel by snowmobile from southcentral Alaska to participate in an annual bison hunt in the area between the Alaska Range and Nikolai, or to follow the Iditarod Sled Dog Race.

The biggest influx of non-planning area resident winter trail users is in February and March, associated with the internationally recognized long-distance trail-based races (e.g., the Iditarod Sled Dog Race, the Iron Dog [snowmobile] Race, the Iditarod Invitational Ultramarathon [a long-distance running, biking, and skiing race], and the Iditasport). These events include not only the passage of hundreds of motor- and muscle-powered competitors over the trail system, but also rely on extensive trail-based volunteer support from local, statewide, national, and international persons for trail maintenance, materials staging, and shelter preparation and operations. Additionally, the events generate thousands of hours of vicarious use of the historic trail system via worldwide-available video and social media coverage.

## **INHT Segments**

Collectively, the historic trail segments and associated historic sites on federal lands and the lands of non-federal cooperators make up the INHT System. Of the 2,400-mile system, approximately 1,600 miles have been identified for active, modern-day use, and a user could travel the entire route between Seward and Nome on public lands and public ROWs.

Of the actively used segments, slightly over 700 miles are within the planning area. Approximately 77 miles of the INHT are located on BLM-managed lands within the planning area. Approximately 62 miles are part of BLM's National Conservation Lands. The INHT is also a designated CSU under the ANILCA. The 62 miles of trail that are designated as a CSU and National Conservation Lands are composed of three segments located in geographically distinct areas within the planning area. The three segments are part of the Primary Route. The boundaries of the two largest segments (Farewell Burn and Kaltag Portage) are located 10 and 35 trail miles, respectively, from the nearest community.

### ***Farewell Burn Segment***

The first segment, located southeast of McGrath, traverses a nearly straight 20-mile alignment laid out by Alaska Road Commission surveyors in 1911. The segment was named the "Farewell Lake to Big River Roadhouse Primary Trail" in the CMP (BLM 1986c). The Farewell Burn Segment is a contributing segment of the Rainy Pass to Big River Roadhouse Primary Trail (AHRS MCG-124).

The Resource Inventory for the CMP (BLM 1982) describes the physiographic province crossed by this segment as the Kuskokwim Lowlands. The trail generally parallels the South Fork of the Kuskokwim River and is located on a nearly level plain with occasional river, creek, bog, and lake crossings. A large wildland fire burned over much of this area in 1977, and the segment is commonly known as the Farewell Burn.

Almost all of the area traversed by the trail has shallow soils or permafrost. Winter precipitation levels and the amount of snow on the ground typically increase from the south to the north. Vegetation is made up of mosses, shrubs, wetland/bog plants, black spruce, and paper birch interspersed in a mosaic pattern in the area traversed by the trail. Much of the growth is relatively small, representing sub-Arctic regrowth since the 1977 wildfire in the area.

With little significant adjacent topography, views from the trail are generally of changes in vegetation in the foreground to middleground. Crossings of large frozen lakes and bogs on the north end of this trail segment provide the most expansive views.

The Farewell Burn trail segment, a contributing segment of MCG-124, is eligible for the NRHP under Criteria A, for its significant associations with events that have made a significant contribution to the settlement history of Alaska and broader patterns of American history, and under Criteria C, for important construction and design features that distinguish it from other gold-rush era winter trails. The period of significance is 1900-1942. The remaining length of MCG-124 has not yet been evaluated for NRHP eligibility (BLM 2017c).

One historic roadhouse site is located on BLM-managed public lands on this segment. Otherwise, the Farewell Burn segment, along with adjoining segments outside of BLM-managed public lands, is uninhabited. The nearest community is Nikolai, approximately 10 trail miles from the north boundary of this segment. The nearest community to the south is Knik and is approximately 200 trail miles distant.

The trail in the Farewell Burn is cleared of vegetation to an approximate width of 5 feet. Vegetation in the treadway is made up of low-growing shrubs that are “mechanically pruned” annually by the passage of winter traffic on the trail. The summer trail surface is otherwise undisturbed, grows between knee and waist high, and does not show any signs (such as rutting and erosion) of the passage of summer OHVs. In the winter, most of the vegetation disappears into the snow-packed trail treadway.

Other than the cleared corridor for the Iditarod Trail, there are no manmade features (e.g., power lines, transportation corridors, buildings, or cleared areas) along, visible from, or near the Farewell Burn segment. There are no sources of artificial light along this segment, making this segment an outstanding ‘dark sky’ resource area.

In the early 1990s, the BLM established a new public shelter cabin near the east end of this segment (Bear Creek) and installed a steel trail bridge over the year-round ice-free crossing at the Sullivan River.

The Farewell Burn trail segment is adjoined by State lands and State trail easement on the south end and Native corporation lands with a public transportation (ANCSA Section 17[b]) easement for the trail on the north end.

Most use of the Farewell Burn segment is associated with trail-based competitive events, such as the Iditarod Sled Dog Race, Iron Dog, Iditarod Invitational Ultramarathon, and Iditasport, with lesser amounts occurring for trapping, subsistence, permitted bison hunts, and casual winter recreation. Virtually no use occurs during the summer, as the predominance of wetlands and lack of airstrips or large lakes prevent overland access and airborne and floatplane visits.

### ***Kaltag Portage Segment***

The other Primary Route segment managed by the BLM in the planning area is part of the prehistoric and historic overland route between the Yukon River at Kaltag and Norton Sound at Unalakleet. This segment was named the Kaltag to Unalakleet Primary Trail in the CMP (BLM 1986c) and is sometimes referred to as the “Kaltag Portage.” The BLM manages approximately 35 miles of this 77-mile segment. The Kaltag Portage comprises three discrete AHRS sites (UKT-044, NPB-057, and NUL-065) that are recognized together as a component of the INHT.

The physiographic province crossed by the Kaltag Portage segment is the Nulato Hills. Moderately steep, rounded mountains form a broad, U-shaped valley through which the route passes. Winter precipitation decreases from east to west, with the most snow falling between Tripod Flat and Old Woman Creek. Soils are shallow throughout the area and in many cases are underlain by permafrost. Due to the flat topography, in the valley bottom outside of mountainous areas, the area is poorly drained and often characterized as wetlands.

Between Tripod Flat (the eastern edge of this segment) to Old Woman Creek, the route is mostly forested by black spruce and some tamarack, along with occasional bog and tussock-tundra grasses and sedges. Much of this segment of the trail was burnt over in the 2015 Old Woman Fire, which, as a low- to medium-intensity fire, appears to have killed most of the black spruce within the fire perimeter but did not significantly affect the ground cover.

The trail between Tripod Flat and Old Woman is cleared of vegetation to an approximate width of 7 feet. Vegetation in the treadway is made up of low-growing shrubs and sedges that are “pruned” annually by the passage of winter traffic on the trail. The summer trail surface is otherwise undisturbed, growing between ankle and knee height, and does not show any signs (such as rutting and erosion) of the passage of summer OHVs. In the winter, most of the vegetation disappears into the snow-packed trail treadway.



From Old Woman Creek to the Chirokey River (the west end of BLM's Kaltag Portage segment), the width of the Unalakleet River valley increases significantly. The trail crosses broad, flat tundra and bogs of low-growing shrubs and tussocks, and intermittently makes perpendicular crossings of taller vegetation, such as black and white spruce, tamarack, and willow along bands of riparian areas.

The distance between these riparian crossings and the intervening tundra is usually between two and five miles. This area is significantly affected by wind, with the snowpack typically transported and redeposited by the frequent winds.

Where the trail crosses the tussock tundra west of Old Woman, repeated use of the trail has altered the vegetation within the treadway. Repeated snowmobile passage on a single alignment has resulted in a slight linear depression or rut along the trail, which is typically "in-filled" by wind-transported snow. Although providing some protection to underlying vegetation, the resulting snowpack and altered thermal and moisture regimes are accompanied by subtle changes in vegetation. The summer trail alignment is otherwise undisturbed and does not show any signs (such as rutting and erosion) of the passage of summer OHVs, with vegetation growing between ankle and knee height. The effects of trail use through the riparian vegetation in the western half of this segment are similar to the effects described for the eastern half (Tripod Flats to Old Woman Creek).

Views from along the trail are broad and expansive. Tree line on the low mountains along the route, especially on the western half, is barely above the valley floor; therefore, outstanding views are found throughout the segment.

The Kaltag Portage trail segment is eligible for the NRHP under Criterion A for its significant association as a winter transportation and mail delivery route and for association with the Serum Run of 1925. The trail segment is also eligible under Criterion C for its important construction and design features that distinguish it as a gold-rush era winter trail. The period of significance is 1900-1942 (BLM 2017c). A number of NRHP-eligible prehistoric and historic sites and landforms are found on BLM-managed public lands in this segment, including Old Woman Mountain, which is one of the most well-known landforms on the entire INHT. Old Woman Mountain was used historically as an observation post for hunters, as its central location in the Unalakleet Valley provides outstanding views of the adjacent mountain highlands and river bottoms. On clear winter days, ridges located 30 miles distant are plainly visible from the peak. The summit of Old Woman Mountain is easily accessed both in summer from Old Woman Creek and in winter from the INHT, which passes directly below the north side of the peak.

The Ten Mile Cabin Site (NOB-033) is the remains of a former log shelter cabin site developed by the Alaska Road Commission along the Kaltag Portage, approximately 40 miles from Unalakleet and 31 miles from Kaltag. The cabin served as a rest stop for gold miners and mail carriers passing between the Alaskan interior and western coast. The site is eligible for the NRHP under Criterion A for its significance as a functional component of the INHT, and for its association with the Alaska Road Commission and Territorial Board of Road Commissioners to establish and maintain infrastructure in the Alaska Territory. The site is also eligible under Criterion D as a preserved archaeological site (BLM 2017c).

The Kaltag Portage segment is uninhabited, although a number of small private fishing cabins located on Native allotments dot the Unalakleet Wild and Scenic River to the north and west of the segment (outside of BLM-managed public lands). These cabins are not visible from the trail and are not connected by visibly marked side trails. These cabins are used mainly in the summer for subsistence purposes, with summer access provided by river boat (rather than overland).

Other than the cleared corridor for the Iditarod Trail, there are no manmade features (e.g., power lines, transportation corridors, buildings, or cleared areas) along, visible from, or near the Kaltag Portage segment, including from the summit of Old Woman Mountain. There are no sources of artificial light along this segment of trail, making this segment an outstanding ‘dark sky’ resource area.

Native corporation lands and State lands adjoin the trail at both ends, with the trail located on public transportation easements on these adjacent lands. The eastern portion of the segment between Tripod Flat and Old Woman Creek is mostly located within the boundaries of the Unalakleet Wild and Scenic River, which the BLM also manages.

In the 1980s and 1990s, the BLM established two public shelter cabins on this segment and a short steel bridge across the creek near the Tripod Flat shelter cabin, and in the past decade, marked treeless segments of the trail (west of Old Woman Mountain) with tripods, reflectors, and waymarking distance signs. The nearest community to the Tripod Flat shelter cabin is Kaltag at 26 trail miles. The nearest community to the Old Woman shelter cabin is Unalakleet at 35 trail miles.

Trail use on the Kaltag Portage segment is split between local and regional use for transportation, subsistence, trapping and casual recreation, and trail-based competitive events. Among regional resident trail users, the BLM public shelter cabins are very heavily used, with three quarters of all reported trail users for this segment visiting one or more cabin (Fix 2011).

Virtually no trail use occurs on the Kaltag Portage segment during the summer due to lack of overland surface transportation improvements, although hearty Arctic adventurers occasionally traverse the route by foot in summer. Some river boat travelers may travel upriver beyond Old Woman Creek and incidentally use short segments of the trail along the Unalakleet Wild River Corridor. Log jams and low water frequently prevent access above Old Woman Creek.

### ***Bonanza Creek Segment***

A 7-mile segment of the Takotna-Flat Primary Trail is currently managed by the BLM, is a CSU, and is eligible as National Conservation Lands, but is selected by the State of Alaska for conveyance under the statehood act. The segment is approximately 15 air miles east of the ghost-town of Flat, is in the northeast-southwest upper Bonanza Creek, and includes the confluence of Ruby Creek. This segment is referred to as the “Bonanza Creek segment” in this document.

Four historic roadhouses and safety cabins were in this area, all of which had collapsed at the time of inventory for the 1986 CMP. The area is extremely remote by contemporary standards, is not accessible except overland in the winter or by helicopter in the summer and sees little human use of any kind. The only visible human features on the landscape are faint traces of narrow cleared corridors for the overland winter trail between Takotna and Flat.

### ***Anvik-Shageluk-Iditarod Segment***

The next major BLM-managed segment of the INHT within the planning area is 13 miles of the uninhabited 65-mile Connecting Trail alignment between Anvik and Shageluk and the abandoned Iditarod townsite. This segment leads to the 120-mile uninhabited trail to Takotna and McGrath. In 1987, the Secretary of the Interior added the Anvik-Shageluk-Iditarod segment to the INHT System. Use of the segment is very light, except in odd-numbered years, when the Iditarod Sled Dog Race and the Iditarod Invitational Ultramarathon traverse this segment. Due to a lack of snow and concern for participant safety, this route was not used by the Iditarod Sled Dog Race between 2013 and 2018. In 2009, the BLM

partnered with a variety of local and State stakeholders and built a new shelter cabin on State lands approximately 10 miles east of BLM-managed lands at the trail crossing of the Big Yetna River.

### **Rohn Site**

Another INHT-related site managed by the BLM within the planning area is Rohn Air Navigation Site. For the past century, Rohn has been the site of the only habitable public shelter between Rainy Pass Lodge, 25 air miles to the east, and Nikolai, 60 air miles to the north. The site consists of 400 acres of upland forest at the confluence of the South Fork Kuskokwim River and the Tatina River. Built facilities include a 1,200-foot unmaintained gravel airstrip, the Primary Trail of the INHT and a segment of Connecting Trail, and the historic Rohn Public Shelter Cabin. The public shelter cabin is the oldest historically intact structure open for public use and managed by the BLM on the entire trail.

The first roadhouse was established at Rohn in 1910. It was used throughout the Iditarod gold rush until it burned down in 1924. Subsequently, a new cabin was built and survived until it was washed away by the Tatina River in 1984. In the late 1930s, the 400-acre site was withdrawn for public use by the U.S. Department of Interior for the development of an emergency airstrip and shelter cabin by the Civil Aeronautical Administration. At that time, the Civilian Conservation Corps built what is today known as the Rohn Public Shelter Cabin.

Today, the Rohn Public Shelter Cabin is one of the most well-known cabins on the INHT, having been used for over 40 years as the first checkpoint for Iditarod Sled Dog Racers north of the Alaska Range. The shelter cabin and airstrip are also used as a checkpoint on the Irondog Race and frequently as a base camp in late summer for sheep hunters. The 400-acre site also houses a set of automatic, Internet-based weather monitoring cameras, installed and maintained by the Federal Aviation Administration, which provide real-time images of weather conditions over the adjacent Alaska Range. Due to the historic significance of Rohn, the site is eligible for and managed (per BLM policy) as if it were listed on the NRHP, in order to protect its historic values.

### **Flat (Abandoned Townsite)**

As one of the largest intact ghost towns in Alaska, the Flat mining town and area, 80 miles southwest of McGrath, is one of the most significant historic areas associated with the entire INHT System. Flat was the source of almost all of the gold carried on the historic Iditarod Trail and was the reason both the town and the trail of the same name were established and used in the early 1900s.

Per BLM Alaska Technical Report 60 (Kurtak et al. 2010), the Flat area (including Chicken Mountain) has high locatable mineral potential. Historically, the Flat area ranks as the fourth-highest gold-producing area in Alaska, and Flat Creek is the highest-producing drainage (650,000 ounces gold) in the planning area.

Dredge mining began in the Flat area in 1914 and continued until 1966. Since then, the population dwindled until there were no year-round residents by the end of the twentieth century. Active mining still takes place on a few unpatented, active claims with operators accessing the area seasonally by the 6,000-foot runway in the Flat valley. (The Flat airstrip, built on mining tailings, is the only airfield within hundreds of square miles capable of handling large, multi-engine fixed-wing freight aircraft.)

Four rectangular survey townships encompassing 144 square miles have been transferred to Doyon, Ltd., a regional Native corporation, as part of their entitlement under the ANCSA. Doyon, Ltd. owns all surface and subsurface lands in this block, except for the active, unpatented federal mining claims in the area. On

active, unpatented federal mining claims, the mining claimant has the right of use of the subsurface estate, with the BLM in the role as the manager of the surface estate during the time of active mining claimant occupancy.

When an active federal mining claim is abandoned and voided, it becomes the responsibility of the BLM to transfer the claim and complete the surrounding conveyance and, if necessary, remove any contamination before the transfer is made. The segments of the INHT located on active, unpatented federal mining claims are managed by the BLM. The amount of contamination in the historic town site has never been assessed and is unknown.

Twenty-nine miles of road are found in the area, with many of the segments co-located with the INHT route. A number of segments are located on lands currently managed by the BLM. Altogether, 13.3 miles of the INHT Primary Trail and 33.6 miles of INHT Side/Connecting Trail are located within the townships in the Flat area transferred to Doyon, Ltd. Almost 5 miles of the INHT system are located on active, unpatented federal mining claims (3 miles of Primary Trail and 1.82 miles of Connecting Trail), meaning that these segments are managed by the BLM.

The entire historic town site, which comprises approximately 180 acres, is eligible for the NRHP. The over 100 structures and two intact dredges located in the area are significantly deteriorating due to weathering. The structures are approaching the point of not being suitable for the most minimal of historic preservation, historic stabilization in place (which makes minor improvements that allow a structure to withstand weathering). As is, the town's historic resources are subject to pilferage, as has been documented in the past decade at the historic Iditarod townsite.

If the site was stabilized and ownership, public access, and maintenance issues were resolved, the area could provide outstanding public education and historic research opportunities, such as has provided for at stabilized historic abandoned towns such as Rhyolite, Nevada, and Bodie, California.

#### **4.2.5 Resource Changes: Trends and Forecasts**

##### **Natural Processes Affecting Trail Resources**

The primary natural phenomena directly affecting trail resources are erosion, wildfire, and changes to the length and intensity of winter weather. A number of historic roadhouses and shelter cabins originally located near waterways are either vulnerable to, or have been washed away by, shifting river and creek beds.

Wildfire is a natural part of the biologic regime for the area crossed by the trail. As a result, historic structures, historic trail landforms, and contemporary public facilities are vulnerable to loss from wildfire. The season, frequency, and intensity of wildfires in the planning area appear to be increasing (BLM GIS 2016; Chapin et al. 2010), exacerbated by record-setting low precipitation winters in the past ten years (Hinzman et al. 2006).

Within the past seven years, a number of large, intense wildfires have threatened some of the trail's most significant resources, and, in one case, destroyed a historic roadhouse. It is now not unheard of for fires to start in the winter and/or overwinter due to dry conditions. The 2009 Post River Fire started in March of that year (possibly human caused), burnt over 10 miles of trail, and likely overwintered into 2010. Renamed as the Turquoise Lake Fire in 2010, 27 miles of the trail and the historic Pioneer Roadhouse site were burnt over by an extremely hot fire that destroyed both surface vegetation and soil and created

dangerous trail use conditions. As a result, expensive trail clearing efforts by trail supporters were undertaken to make the route usable and safe.

In 2015, 20 miles of the trail were burnt over by the Iditarod River Fire, and, without active fire suppression response by the Alaska Fire Service and Alaska Division of Forestry, both the historic towns of Iditarod and Flat would have been destroyed. The same year, 15 miles of trail were burnt over by the Old Woman Fire on the Kaltag Portage segment in an area that previously had rarely seen lightning-caused wildfire. In the Old Woman Fire, active fire suppression was required to save the BLM Tripod Flat Public Shelter Cabin. In 2016, the BLM's Bear Creek Public Shelter Cabin on the Farewell Burn segment would have been lost to a lightning-caused wildfire burning within 1,400 feet of the cabin if not for the response of the Alaska Division of Forestry.

A significant shortening of the winter travel season on the trail appears to have occurred in the last 15 years. Typically, the trail travel season (with enough below-freezing days to freeze waterways for snowmobile use and to provide precipitation in the form of snow) could be expected to begin usually by December of each winter and extend through mid-April. Frozen waterways provide solid winter bridges and routes through country that requires a boat or is otherwise impassable. In addition, a number of on-land segments of the INHT in the planning area are "bridged" by and rely on frozen waterways to provide a continuous trail.

In recent years, late freeze-ups have become more common, with larger rivers in the planning area (i.e., Yukon and Kuskokwim) freezing and then thawing late in the year or remaining unfrozen in some places throughout the winter. In response, trails have been rerouted onto land routes, and a number of trail-dependent sled dog and snowmobile races have been postponed, rerouted, or canceled. While detailed records are not available to indicate trends, deaths and near-death experiences to winter waterway travelers are a regular occurrence within the planning area.

Mid-winter rain events have also become more common, along with significant decreases in precipitation in the form of snow. The diminished snowpack melts quicker than typical snowpacks in the lengthening days of spring. Unalakleet receives 13.5 hours of daylight, not including twilight, on March 30. As a result, the winter trail travel season has been ending by late March, compared with the more typical break-up of winter conditions in mid-April.

### **Human Effects on Trail Resources**

The BLM-managed segments of the INHT in the planning area, including adjacent viewsheds, are almost entirely unaffected by human-induced land uses, such as resource extraction, energy generation, transmission, forestry, or transportation projects. The existing (public) structures and land uses found along the trail and its viewshed were developed for the purposes of, and are consistent with the scale and history of human use of, the INHT.

The continued modification of vegetation in the form of an actively used and cleared trail travelway is consistent with the historic human use of the trail. While experiencing some modification to species type, contemporary Iditarod Trail tread vegetation is undisturbed and does not show any signs (such as rutting and erosion) of summer OHV passage. In the winter, most of the vegetation disappears into the snow-packed trail treadway.

Casual public use along the trail usually coexists with competitive events and permitted events. This has the effect of increasing public observation of events and also reducing the wilderness-like setting along

the trail during these events. The BLM Rohn Public Shelter Cabin is used as an event checkpoint for a number of trail-based events.

On an intermittent basis, the BLM receives requests to run modified highway vehicles on BLM-managed segments of the trail, often as part of a media-driven “stunts” to cross some part of the winter north country in a particular vehicle. Such use would require significant widening of existing trail corridors, and could result in rutting of the winter snowpack in a manner that could present a significant hazard to other trail users. (The inner tire width of typical highway vehicles is slightly less than average width of a snowmobile or dogsled. Attempting to drive a snowmobile or dogsled on top of the “snow median strip” between the two ruts is dangerous, as it is easy to fall into one of the ruts, and in the case of the snowmobile, have it roll on top of the driver.) For these reasons, the BLM does not approve of such uses along the trail.

With diminishing annual snow, local planning area residents are increasingly using OHVs year-round to drive on frozen tundra or waterways, as well as community roads. The OHVs used are either unmodified or have after-market attachments such as ‘track-sets’ for each drive wheel. Such OHVs also have the potential to create a significant hazard via the creation of parallel ruts to other trail users who rely on a single-lane packed treadway. Because almost all segments of the BLM-managed trail are located far from local communities, this use has not presented a problem to date, but will be monitored.

The introduction of nonnative, invasive vegetation along the trail is another documented effect of human use of the trail. Starting in the late 1980s, the use of straw as dog bedding became a common practice at Iditarod Sleddog Race checkpoints, including at the BLM’s Rohn Public Shelter Cabin. With the hundreds of bales of straw imported to Rohn annually came invasive weed seeds. The invasive weeds established at Rohn and a few other shelter cabins. The BLM has inventoried the extent of invasive colonization along the BLM segments of the INHT, undertaken control efforts, and is monitoring the effectiveness of such efforts (Flagstad and Cortes-Burns 2010; Greenstein 2013). The BLM now requires the use of certified weed-free straw as part of permit requirements for use of BLM facilities and immediate removal or destruction (by fire) after its use.

## **Trail Management**

Approximately 62 miles of the congressionally designated primary trail is located on BLM-managed lands within the planning area, including 20 miles in the area known as the Farewell Burn, 35 miles between Unalakleet and Kaltag, and 7 miles in the Bonanza Creek area. The contemporary and the historic alignment of the trail are closely co-located in the Farewell Burn segment.

On the Kaltag Portage segment between Unalakleet and Kaltag, the contemporary alignment of the trail wanders on and off of the historic alignment, reflecting contemporary overland trail routing decisions, but the two alignments are generally located within one-quarter mile or less from each other and are usually co-located at terrain “pinch points” or the location of now-historic structures.

No attempt has been made to conclusively identify the location of the historic alignment on BLM-managed lands on the Kaltag Portage, as the NTSA provides for the use of contemporary alignments in the place of historic alignments when advantageous to contemporary circumstances.

To deal with the issue of the wandering trail alignment relative to the historic and contemporary alignment issue and year-to-year differences, the CMP (BLM 1986c) recommended the designation of management corridors for both Primary and Connecting/Side Trails. The purpose is to provide adequate space for route variations, while maintaining the values of the lands for which the trail was established

and preventing incompatible land uses from impacting the values of the trail. Since the 1986 CMP, conditions in the area have changed and those discussed in the CMP are out of date.

The CMP (BLM 1986c) recommends a corridor in the Farewell Burn segment of 100 feet (for non-BLM-managed lands) to 1,000 feet (for BLM-managed lands), and on the Kaltag Portage segment a minimum of 1,000 feet. (The width of the corridor is centered on the contemporary trail treadway, with 500 feet on either side of centerline.)

Formal rulemaking or implementation of a policy on BLM-managed lands within the planning area for the withdrawal and/or delineation of a management corridor specifically for the INHT has not occurred to date.

Of the 35 miles of the Kaltag Portage segment on BLM-managed lands, approximately 20 miles are located within the boundaries of lands withdrawn under ANILCA for the Unalakleet Wild and Scenic River. The WSR designation protects a river's outstandingly remarkable values and free-flowing character, protects existing uses of the river, prohibits federally licensed dams, and establishes a one-quarter-mile protected corridor on both sides of the river. It is within these corridor boundaries that 20 miles of the Kaltag Portage segment of the INHT is located (although portions of the recommended 1,000-foot plus trail corridor are outside of the boundaries of the river corridor).

The entire INHT Kaltag Portage segment centerline is located within the proposed Unalakleet River ACEC (BLM 2018b). Portions of the recommended 1,000-foot plus trail corridor are outside of the ACEC.

The BLM-managed public lands at the Farewell Burn segment are closed to mineral entry, with the exception of metalliferous metals, under PLO 5180, stemming from Section 17(d)(1) of ANCSA. Lands within the Unalakleet Wild River Corridor are closed to all mineral entry. BLM-managed lands to the south of the Unalakleet Wild River Corridor (PLO 5184 and 5173) are also closed to mineral entry (BSWI Draft RMP/EIS, Map 3.3.5-1).

Section 207 of the Alaska Land Transfer Acceleration Act (P.L. 108-452) directed a review and report to Congress of withdrawal orders made pursuant to Section 17(d)(1) of the ANCSA. The report recommended that approximately 95 percent of the Section 17(d)(1) withdrawals be lifted but recommended acreage of withdrawals overlapping WSRs and the Trans-Alaska Pipeline be retained. This analysis did not include the INHT, a conservation system unit under ANILCA similar to WSRs.

The INHT Primary Trail on BLM-managed lands (both inside and outside the planning area) is a unit of BLM's National Conservation Lands throughout the country. Established administratively in 2000 and then by law in the Federal Omnibus Public Lands Management Act of 2009, National Conservation Lands encompass 26 million acres of the BLM's most spectacular lands and waters.

The boundaries of National Trail National Conservation Lands units have not been established. In September 2012, the BLM issued a new policy requiring establishment of a NTMC for each National Trail managed by the agency. Per BLM Manual 6280 (BLM 2012c), delineation of a NTMC is a land allocation established through the BLM's land use planning process (e.g., this document), pursuant to Section 202 of FLPMA, and Section 7(a)(2) of the NTSA ("rights-of-way"), for a BLM public land area of sufficient width within which to encompass National Trail resources, qualities, values, and associated settings and the primary use or uses that are present or to be restored, and to achieve and maintain the nature and purpose for which the trail was designated.

For the INHT Primary Trail segments on BLM-managed lands, the CMP (BLM 1986c) recommended a minimum of a 1,000-foot-wide management corridor. A 1,000-foot wide corridor would be inadequate to meet the BLM's policy for the NTMC. This is because the NTMC should be based on the presence of the "resources, qualities, values and... settings" for which the trail was designated and should be based on "associated natural or manmade physical features in the following order of precedence: ridgelines, rivers, washes, and toe-of-the-slope, turning points such as peaks, buttes and geologic features; roads, primitive roads or routes, railroads, and lines of the Public Land Survey System. Measures such as footage, mileage and contour intervals shall be discouraged. If certainty in location of a corridor boundary may be an issue (e.g., in a case of flat or ill-defined ridgeline bordering an incompatible land status or usage), then lines of the Public Land Survey System shall be considered" (BLM 2012c).

All BLM-managed lands within the planning area are undesignated for OHV use, meaning the entire planning area is open to OHV use. (This designation does not pertain to large cat-trains, which require pre-use permitting.) To date, BLM-managed segments of the INHT are largely unaltered by OHV use due to the INHT's remoteness and a user preference for winter travel by snowmobile rather than OHV. OHV use is neither a traditional use nor a historic use of the INHT.

### **4.3 Wild and Scenic Rivers**

#### **4.3.1 Introduction**

This section describes laws, regulation, and policy and existing conditions for designated and eligible WSRs within the planning area.

#### **4.3.2 Laws, Regulations, and Policies**

The National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. Section 5(d) (1) of the National Wild and Scenic Rivers Act requires that the BLM and other federal agencies inventory streams on public lands to determine their eligibility and suitability to be components of the National System.

ANILCA (P.L. 96-487) classified and designated 65 miles of the upper portion of the Unalakleet River as a "wild" river and, subsequently, a component of the National System. In addition to river management provisions provided by the National Wild and Scenic Rivers Act, ANILCA provides for a 0.5-mile boundary on both sides of the river quarter-mile (average of 640 areas per river mile) protected corridor.

BLM's Manual 6400: Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management (BLM 2012d) replaces Manual 8351 (Release 8-61) to provide policy, direction, and guidance for the identification, evaluation, planning, and management of eligible and suitable WSRs and the management of designated components of the National System (BLM 2012d).

#### **4.3.3 Resource Indicators**

The conditions that are established in the discussion below provide a baseline for WSRs, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

The primary indicators of change to WSRs are as follows:

- Impact to identified Outstandingly Remarkable Values (ORVs)



- Change in tentative or designated classification (wild, scenic, or recreational)
- Change in water quality and free-flowing nature of the river corridor

Land management decisions that could affect ORVs identified for the designated or eligible river and its tentative classification pertain to the following:

- Land disposal
- Locatable or salable minerals
- ROW avoidance or exclusion areas
- VRM designations
- Grazing
- Special-status species management
- Special designations, such as ACECs or HVWs
- Fire suppression
- Commercial Woodland harvest
- Overland summer or winter trails and other areas open to casual and/or subsistence OHV use
- Subsistence use
- State-regulated game management units

#### **4.3.4 Current Conditions**

##### **Current Management Direction**

Current management of river resources is currently through the SWMFP. The SWMFP identifies the Unalakleet as a WSR and excludes the WSR corridor from oil and gas leasing and other types of entries (BLM 1981). Management direction for the Unalakleet Wild River Corridor is provided in the ANILCA and Unalakleet National Wild River Management Plan (BLM 1983); management actions are specified in that plan for subsistence, facilities, visitor management, surface transportation, publicity, private lands (native allotments), fisheries habitat management, local involvement, navigability, fire management, and cultural resources. See BSWI Draft RMP/EIS, Map 3.4.3-1 for WSRs in the planning area.

##### **Designated Rivers**

The upper 83 river miles of the Unalakleet Wild River Corridor are designated as “wild” and managed by the BLM per the Unalakleet Wild and Scenic River Management Plan (BLM 1983). This wild river is free of impoundments, inaccessible by trail in the summer months and accessible in the winter by snowmobile, with primitive watersheds and shorelines, and unpolluted waters. Twelve Native allotments are located along the shoreline within the lower limits of the designated corridor, which are mainly used as subsistence fish camps. No ORVs were identified for the Unalakleet Wild River Corridor; however, the BLM manages the Unalakleet Wild River Corridor to preserve the environment and the ecosystems of the river, protect free-flowing character and water quality, provide high-quality primitive recreation opportunities, maintain wildlife/wildlands-oriented use, and protect historic and archaeological values (BLM 1983).

Three organized and permitted dogsled races occur on the INHT, where the trail parallels the river within the designated WSR corridor. Other winter casual use activities within the river corridor include snowmobiling, dog mushing, ice fishing, hunting, and trapping. The Unalakleet Wild River Corridor supports such summer activities as fishing, boating, and camping. Typical visitation occurs July through mid-September; however, summer visitation on the river is low compared to other more accessible designated WSRs in Alaska. One fishing lodge is located downstream of the BLM-managed WSR corridor; however, outboard fishing boats associated with the fishing lodge do not typically travel upstream to the WSR corridor (BLM 2015a).

The Unalakleet's smooth waters can be easily traversed by raft or canoe, providing visitors an opportunity for solitude. Float trips from the confluence of the Unalakleet and the Old Woman Rivers to the mouth (approximately 62 river miles) require an average of five days. Visitors use the many gravel bars along the way for camping, fishing, and spotting wildlife. Due to its remote location, upriver access is difficult without a motorized boat (BLM 2015a).

The Unalakleet Wild River Corridor contains all five species of Pacific salmon, Dolly Varden, char, and arctic grayling. The ADF&G regulates sport fishing within the WSR corridor. Unalakleet River Chinook salmon were listed as a stock of yield concern in 2004 (Kent and Bergstrom 2009). Currently, Unalakleet River Chinook salmon are also considered to be in a period of low productivity, and the Alaska Board of Fisheries has designated Unalakleet River Chinook salmon a stock of yield concern (Kent and Bergstrom 2009). Additionally, Arctic grayling populations in the Unalakleet River are particularly susceptible to fishing pressure due to their proximity to communities (BLM 2015a).

Alaska Natives rely upon the resources of the Unalakleet Wild River Corridor to support their subsistence lifestyle. FM2201 permits are issued by the BLM to federally qualified subsistence users in Unalakleet. For FM2201, federal public lands are closed to the harvest of moose except by residents of Unalakleet. Moose are an important subsistence species for the residents of local villages, particularly the Village of Unalakleet, and are managed under ANILCA on federal lands, and for sustained yields by ADF&G (BLM 2018b). Cooperation and coordination with the ADF&G is needed to manage the concurrent and collocated State hunt (RM841). The BLM Anchorage Field Office has the authority to close the season in consultation with ADF&G (BLM 2015a).

### **Eligible Rivers**

The BSWI WSR Eligibility Study (BLM 2018e) summarizes the eligibility determinations for 255 waterways within the planning area. A total of 237 waterways were found ineligible and dropped from further study. Eighteen waterways were found eligible and were assigned a tentative classification of wild, scenic, or recreational by the BLM. Rivers identified as eligible would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012d). These guidelines would protect free-flowing condition, water quality, wild river classification, and ORVs. Table 4.3.4-1 summarizes the eligibility determinations and tentative classifications for these rivers. The Yukon River is also included within the National Rivers Inventory list.

**Table 4.3.4-1. Eligibility Determinations of 18 Rivers Located in the Planning Area**

<b>Watercourse</b>	<b>Approximate Total Length (miles)</b>	<b>Approximate Length on BLM Lands (miles)</b>	<b>Outstandingly Remarkable Value(s)</b>	<b>Region of Comparison</b>
Anvik River	150	119	Fish, Cultural	Yukon River
Bear Creek (Nikolai)	51	41	Fish, Historic	Kuskokwim River
Big River	137	35	Fish	Kuskokwim River
Blackwater Creek	67	12	Fish	Kuskokwim River
Canyon Creek	16	16	Fish	Yukon River
Middle Fork Kuskokwim River	131	52	Fish	Yukon River
North Fork Unalakleet River	48	48	Fish	Unalakleet River
Otter Creek (Anvik)	35	35	Fish	Yukon River
Otter Creek (Tuluksak)	27	5	Fish	Yukon River
Pitka Fork Middle Fork Kuskokwim River	92	62	Fish, Historic	Kuskokwim River watershed
Salmon River (Nikolai)	35	21	Fish, Historic	Regional. INHT; Kuskokwim River
Sheep Creek	61	36	Fish	Kuskokwim River
Sullivan Creek	22	22	Fish; Historic	Regional. INHT; Kuskokwim River
Swift River (Anvik)	32	31	Fish	Kuskokwim River
Tatlawiksuk River	81	17	Fish	Kuskokwim River
Theodore Creek	15	15	Fish	Yukon River
Yellow River	72	70	Fish	Yukon River
Yukon River	1291	13	Cultural	Yukon River

### 4.3.5 Resource Changes: Trends and Forecasts

Because of the remoteness of the planning area, the designated wild Unalakleet Wild River Corridor remains stable, with no existing plans or pressure for increased access to the WSR that could affect its classification as a wild river. Likewise, the corridor continues to be used for primitive recreation opportunities, including recreation boating and the Iditarod Race. Historic and archeological values, wildlife/wildlands use and water quality remains stable, again largely due to the remoteness of the WSR corridor.

Regarding the environment and ecosystems, Unalakleet River Chinook salmon were listed as a stock of yield concern in 2004 (Kent and Bergstrom 2009). Moose populations within the Unalakleet watershed are at historically low levels, however, slowly increasing with intensive population management coordinated by State and federal agencies (BLM 2015a).

## ***Section 5. Social and Economic Conditions***

### **5.1 Socioeconomics, Environmental Justice, and BLM Support for BSWI Communities**

#### **5.1.1 Laws, Regulations, and Policies**

Multiple statutes, regulations, executive orders, and agency direction identify the general requirement for the application of economic and social evaluation in support of BLM planning and decision making. These include, but are not limited to, NEPA (83 Stat. 852; 42 USC 4321, 4331-4335, 4341-4347), FLPMA (P.L. 94-579; 90 Stat. 2744; 43 USC 1701), and ANILCA (P.L. 96-487; 94 Stat. 2371; 16 USC). These laws are described elsewhere in this document and are not repeated here.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, requires that federal agencies identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The BLM's IM No. 2013-131 describes when and how to consider nonmarket values when preparing NEPA analyses for BLM resource management planning and other decision-making. The IM directs BLM managers to use estimates of nonmarket environmental values in NEPA analysis supporting planning and other decision-making where relevant and feasible, and to include at least a qualitative description of the most relevant nonmarket values for the affected environment and the impacts of alternatives in NEPA analyses.

Guidance for evaluating environmental justice issues in land use planning is included in Appendix D of the BLM planning handbook (BLM 2005). Environmental justice involves the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socio-economic group should bear a disproportionate share of the adverse environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, State, local, and tribal programs and policies.

In addition to determining if its proposed actions will adversely and disproportionately impact minority populations, low-income communities, and tribes, the BLM has established environmental justice principles that include promoting and providing opportunities for full involvement of minority populations, low-income communities, and tribes in BLM decisions that affect their lives, livelihoods, and health. Where disproportionately high adverse impacts are anticipated, the BLM will work with local community groups/associations, governments, and tribal leaders to determine if land disposition and/or acquisition policies affect real estate values and real income of minority and low income communities, and Tribes.

CEQ guidelines for evaluating the potential environmental effects of projects require specific identification of minority populations when either: (1) a minority population exceeds 50 percent of the population of the affected area; or (2) a minority population represents a meaningfully greater increment of the affected population than of the population of some other appropriate geographic unit as a whole. Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Alaska Native, Aleut, and other non-White persons are defined as minority populations.

### 5.1.2 Resource Indicators for Economic Conditions

The baseline conditions that are established in the discussions below provide a baseline for social and economic conditions-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

#### Non-Market Values

- Acres of HVWs, WSR corridors, and ACECs
- Acres of caribou corridor management
- Acres of Innoko Bottoms Priority Wildlife Habitat Area management
- Acres of land managed to preserve wilderness characteristics
- Acres of land within 15 miles of villages closed to commercial hunting
- SRP allocation limitations for guide-outfitter hunting
- Authorization of commercial use of shelters/cabins
- Acres of motorized travel by season and vehicle type for subsistence purposes

#### Market Values

- SRP evaluation of guide-outfitters permittees consideration of community relationships
- Acres of land within 15 miles of villages closed to commercial hunting
- Acres of land withdrawn from locatable minerals or closed to leasable or salable mineral development
- Acres of land available for subsistence woodland harvest, and permit requirements

### 5.1.3 Resource Indicators for Social Conditions

The conditions that are established in the discussions below provide a baseline for social conditions-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS.

- Level of protection for subsistence species and habitats (i.e., greater, less, or the same). This overall rating was developed using the impact analyses from Water Resources, Lands with Wilderness Characteristics, and ACECs.
- Level of access to subsistence resources (i.e., greater, less, or the same). This overall rating was developed using the impact analyses from Travel and Transportation and Forestry and Woodland Products.
- Level of potential conflict with sport hunters and other users (i.e., greater, less, or the same). This overall rating was developed using the impact analyses from Recreation and Visitor Services and Travel and Transportation.
- Level of coordination and collaboration with communities (i.e., greater, less, or the same). This overall rating was developed using the descriptions in the BSWI Draft RMP/EIS section on Support for BSWI Communities, including level of coordination with BSWI communities, level

of monitoring of coordination efforts, and level of information to be collected about community subsistence uses and landscape meanings.

- The global rating for economic effects, both market and non-market, based on the Economic Conditions analysis above. Effects on market opportunities, which provide potential for jobs, income, or reduced expenses, are a major component of life in bush villages. Effects on non-market resource values are also crucial to subsistence and village lifestyles.
- The rating for effects on environmental justice populations (i.e., greater, less, or the same) was developed using information from the other Economic Conditions and Social Conditions indicators and effects analyses.

#### 5.1.4 Current Conditions for Socioeconomics

This section describes associated social and economic conditions, first at a broader Census Area scale and then at the community scale. Alaska does not have counties but is divided into boroughs. Where there are no boroughs, data are referenced from federally designated Census Areas. The planning area contains portions of five Census Areas: Bethel, Nome, Kusilvak (formerly Wade Hampton), Yukon-Koyukuk, and Dillingham. For the purposes of socioeconomic analyses, the Dillingham Census Area is excluded; the northern portion of the Dillingham Census Area overlaps with the planning area, but there are no communities or BLM-managed lands in that overlap area. While BLM-managed public lands are often located relatively far from communities, they provide resources, travel corridors, and subsistence and livelihood opportunities for nearly all the main villages. Socioeconomic regions are shown in BSWI Draft RMP/EIS, Map 3.5.1-1.

The four Census Areas contain many communities that are well outside the planning area and not connected to BLM-managed lands. For example, the Yukon-Koyukuk Census Area extends to the Canadian border. For that reason, it is important to focus on the communities that are more directly tied to the RMP planning area. Of the approximately 60 rural communities within the planning area, Lingle and others (2011) identified 25 villages and census-designated places in the vicinity of BLM-managed public land within or near the planning area, grouping them into six regions: Bering Sea, Yukon Delta, Lower Yukon, Lower Kuskokwim, Upper Kuskokwim, and Western Interior. These areas also correspond well with Game Management Units designated by ADF&G, which will be used for some analyses. To describe socioeconomic conditions in communities, Bethel is added because it is a major hub within the planning area, and Lime Village is added because it is adjacent to BLM-managed lands in the southwestern part of the planning area (see BSWI Draft RMP/EIS, Map 1-2).

Fifteen of these 27 communities are in the area served by the Calista Corporation, one of the 13 regional corporations established under the ANCSA in 1971. Four are served by Bering Straits Native Corporation, and eight by Doyon, Ltd.

Social and economic conditions in Alaska are dynamic and may have changed since the data presented in the analysis were compiled and could change again. For example, a University of Alaska Anchorage economist in late 2016 suggested that Alaska may be entering or near a recession due to declines in oil prices and drops in Alaska development, and as reflected by indicators such as two straight months of declining employment, the state's first population drop since the recession in 1987-88, and a \$1.9 billion drop in State capital spending over the past three years (*Anchorage Daily News* 2016). The State of Alaska Department of Labor and Workforce Development reported that average monthly employment in the first six months of 2016 was down 1.6 percent, compared to those months in 2015 (ADLWD 2016).

## Demographic Characteristics

**Planning Area.** A socioeconomic overview of the four Census Areas produced from the Economic Profile System (Headwaters Economics 2013<sup>4</sup>) provides a snapshot of this broad swath of Alaska and illustrates some differences between this area and the state as a whole. For these descriptions, the numbers presented are for all four Census Areas combined.

From 2001 to 2011, population in the four Census Areas increased from 38,754 to 40,590. The increase was due to natural change (births minus deaths) rather than in-migration (people moving into the Census Areas). Although the rate of change was not the same every year, the average annual increase due to natural change was 722 people a year, compared to the average annual out-migration of 506 people per year, resulting in a net population increase of about 212 people a year. The population increase of about 5 percent from 2000 to 2011 was lower than for the State of Alaska's population during the same period (15 percent).

Alaska Department of Labor and Workforce Development (2012) population projections for the 2015-2035 period estimate that the population will increase in three of the Census Areas, although at different rates (Bethel Census Area just over a 1 percent increase every 5 years, Nome Census Area just under 1 percent every five years, and Kusilvak about 1.5 percent every 5 years) while the Yukon-Koyukuk Census Area population will decrease by about 1 percent every 5 years over the 2015-2035 period. In all four Census Areas, net migration is projected to be negative (more people moving out than moving in) and any population increase is due to natural change (an increased ratio of births to deaths). As is the case nationally, the number of deaths in Alaska is expected to increase greatly over the projection period due to the aging of the "baby boom" generation (ADLWD 2012).

The proportion of Alaska Natives in the four Census Areas was just under 80 percent, compared to less than 1 percent nationally for all Native Americans combined. Population projections are also made separately for Alaska Natives but only at the statewide level (ADLWD 2012). Alaska Natives have much higher mortality rates than other races in the United States, but also much higher than average fertility rates. The Alaska Native population statewide is expected to increase steadily through 2035, from 122,480 in 2010 to 159,633 in 2035, and the proportion of Alaska Natives in the general population is expected to increase slightly, from 17.1 percent (2010) to 17.4 percent in 2035. As is the case with the general population, the proportion of the Alaska Native population over 65 is projected to increase, nearly doubling from 6.5 percent in 2010 to 12.2 percent in 2035.

About 80 percent of the people living in the four Census Areas age 25 or over had high school degrees, only slightly lower than the 85 percent nationally. However, the proportion of people with bachelor's degrees or higher level of education was 12 percent in the four Census Areas, compared to 28 percent nationally.

**Communities.** Select demographic and social characteristics of the 27 communities are described in Table 5.1.4-1. Most are second class cities, with seven unincorporated villages (which the U.S. Bureau of the Census refers to as Census-Designated Places) and one first class city (St. Mary's).<sup>5</sup> Nine are in the

---

<sup>4</sup> This system uses data from the 2010 U.S. Census and the American Community Survey, conducted between 2007-2011.

<sup>5</sup> Alaska has three different classifications of city governments: home-rule; first-class; and second-class cities. A community must have at least 400 permanent residents to form a home-rule or first-class city; 115 of Alaska's 144 cities are defined as second-class. Each category of city has duties and powers defined by state law. For example, second-class cities are allowed, but not required, to exercise planning, platting, and land use regulation duties, but they are not allowed to provide public education. For

Bethel Census Area, eight in Yukon-Koyukuk, six in Kusilvak, and four in Nome. The communities range in size from 23 (Red Devil) to 6,080 (Bethel), with eight having a 2010 population under 100, 12 between 100 and 500, and seven over 500. Between 1990 and 2010, 11 communities increased in population, 11 decreased, and five stayed roughly the same size.

Nearly all of the communities are predominantly Alaska Native, with 15 having a population in 2010 that was over 90 percent Alaska Native and another seven over 80 percent. These data are for people who reported in the census that they were one race, which in most cases was the vast majority of the population. When adding in the number of people who reported they were two or more races, one of which was Alaska Native, the total proportion of Alaska Natives increased by more than 5 percent in only three communities (McGrath, Takotna, and Red Devil).

In 16 of the communities, 75 percent of the population over age 25 had a high school degree, and in 10 communities, 10 percent or more of the population had a bachelor's degree or higher.

The number of housing units is generally related to population size, and the percentage of vacant units is generally low. Some of the housing units are vacant because they are only seasonally occupied. The proportion of houses that have complete plumbing facilities (hot and cold piped water, a bathtub or shower, and a flush toilet) ranges from zero in Lime Village and Shageluk to 98 percent in Unalakleet, with an average of 62 percent. These compare to the Alaska average of about 88 percent and the national average of 97 percent.

As reported by the Department of Community and Regional Affairs, the other municipal facilities and utilities vary widely, with the larger communities providing more facilities; this information was not reported for the unincorporated communities. All the communities had schools, but in three the schools were inactive in 2010, including in the two smallest planning area communities. School districts, which also add to sustained employment, are located in several of the larger communities: Aniak, Bethel, Mountain Village, Unalakleet, Saint Mary's, and McGrath.

In 2009–2010, the Lower Yukon School District, which has schools in several communities within the planning area, conducted a community dynamics survey to gain information that would help foster and maintain effective school-community relations (BLM 2015a).

The response rate was low and about two-thirds of those responding were school district staff members and one-quarter were parents of school-age children. Results suggested that respondents believe that community leaders occasionally seek opportunities to collaborate with community members, and occasionally respond to and seek resources that support the social, emotional, and physical health of the community, although leaders are perceived as frequently or extensively providing and maintaining services such as running water and sewage disposal to and from homes. Community members were seen as frequently encouraging participation in community cultural events and seasonal activities and emphasizing cultural awareness to promote a positive community climate. Schools were viewed as frequently establishing effective means of communication between homes and schools, while family support for children as life-long learners was viewed as occasional.

---

additional information, see:

<https://www.commerce.alaska.gov/web/Portals/4/pub/2015%20%20LOCAL%20GOVERNMENT%20IN%20ALASKA.pdf>



## Employment and Income

**Planning Area.** The planning area supports just over 15,000 jobs in the private and government sectors (Headwaters Economics 2013). Within the 7,566 private sector jobs, most (6,170) were services-related jobs, which include a wide range of sectors such as trade, transportation and utilities; information; financial activities; professional and business services; education and health services; and leisure and hospitality. Average annual wages across these service sectors varied widely, from a low of about \$15,000 in leisure and hospitality jobs to a high of about \$51,000 in education and health services and information, with an overall annual average of about \$40,000. A smaller number of jobs (646) were in non-services-related sectors such as natural resources and mining, construction, and manufacturing. The non-service sector jobs varied in average wage by sector but averaged about \$71,000 a year.

In 2012, government provided about 7,800 jobs in the four Census Areas, the vast majority (6,800) being local government jobs that averaged about \$31,000 in annual salary; of the remainder, about 75 percent were state jobs paying about \$68,000 a year, and 25 percent were federal jobs paying about \$50,000 a year. The percentage of government jobs in the four Census Areas (40 percent) was higher than the proportion statewide (24 percent), showing the reliance on local government jobs in particular in communities in those areas. In the four Census Areas, average earnings per job, per capita income, and average annual wages for service, non-service, and government jobs are all considerably lower than they are for the state as a whole.

These 15,000+ private and government sector jobs do not include proprietors (self-employed). In comparison, in 2011, an estimated 4,700 individuals were self-employed in the four Census Areas. Although there are still fewer proprietors than wage and salary employees, the proprietor component of employment is growing at a faster rate.

The proportion of households receiving public assistance in the 27 communities ranged from 0 to 100 percent, with an average of 63 percent. The percent of persons living in poverty in the communities ranged from 8 percent in Bethel and 10 percent in Red Devil up to 80 percent in Stony River and 81 percent in Nikolai, with an average of 27 percent across all 27 communities.

Unemployment rates in the four Census Areas have been consistently high, increasing from 10 percent in 2000 to 15.3 percent in 2012. This is considerably higher than the 7 percent unemployment rate in Alaska as a whole in 2011. Even these relatively high rates may be conservative because the Alaska Department of Labor's definition of unemployment excludes people who have not looked for work in the previous four-week period. In rural, remote areas, high rates of discouraged workers may not result from people not seeking work, but because no work is available during much of the year. This "discouraged worker" effect is apparent in many rural Alaskan villages (Association of Village Council Presidents 2014). Another characteristic of the planning area is the seasonality and part-time nature of many work activities; of labor; only 30 percent of the workers in the planning area worked 50-52 weeks per year (Headwaters Economics 2013, using American Community Survey data from 2007-2011), compared to 55 percent of the workers nationally.

Poverty levels within the four Census Areas are higher than for the United States as a whole. The proportion of people below poverty is 23 percent for the area compared to 14 percent for the United States, and the comparable numbers for families below poverty are 20 percent for the area and 10 percent for the United States (Headwaters Economics 2013). A much higher proportion of households received cash public assistance as part of their income (17 percent) than the U.S. average (3 percent) and the same was true for the proportion of households receiving Supplemental Nutrition Assistance Program (food stamps), 33 percent in the four Census Areas compared to 10 percent nationally.

**Table 5.1.4-1. Social Conditions in Planning Area Communities**

Region <sup>1</sup>	City/ Village	Type <sup>2</sup>	Census Area <sup>2</sup>	Population 1990 <sup>2</sup>	Population 2000 <sup>2</sup>	Population 2010 <sup>2</sup>	Percent Alaska Native <sup>2</sup>	Percent of People 25 and over High School Graduate <sup>3</sup>	Percent of People 25 and Over with Bachelor's Degree or Higher <sup>3</sup>	Housing Units <sup>2</sup>	Number Housing Units Vacant <sup>2</sup>	Percent Occupied Housing Units with Complete Plumbing Facilities <sup>4</sup>	Municipal Facilities and Utilities <sup>2</sup>	Schools, number of students <sup>2</sup>
Bering Sea	Kaltag	2nd class city	Yukon-Koyukuk	240	230	190	92	87	12	87	17	65	Piped Water, Piped Sewer, Washeteria, Electric (AVEC), Landfill, Health Clinic, Volunteer Fire, Fire Hall, Takathlee Tondin Kuskino Community Hall, Roads, Boat Haul, Sawmill, Gravel Sales, Equipment Rental	P-12, 28
	Shaktolik	2nd class city	Nome	178	230	251	96	88	6	70	6	88	Piped Water (summer), Watering Points (winter), Piped Sewer, Washeteria, Electric (AVEC), Landfill/Incinerator, Health Clinic, Police, Volunteer Fire, Teen Center, Roads, Building Rental, Equipment Rental	P-12, 83
	Stebbins	2nd class city	Nome	400	547	556	95	76	8	153	19	12	Washeteria, Electric (AVEC), Refuse Plywood Bins, Landfill, Health Clinic, Police, Airport (State Contract), City Hall, Roads, Pull Tabs, Building Rentals, Equipment Rentals, Honeybucket Bins, Watering Point at the Washeteria	P-12, 195
	Unalakleet	2nd class city	Nome	714	747	681	77	84	17	268	43	98	Piped Water, Piped Sewer, Refuse Collection, Baler, Landfill, Police and State-funded Public Safety Officer (VPSO), Volunteer Fire, Dock, Boat Haul-out, Ticasuk Library, Bingo/Pull Tabs, Alcohol/Drug Hotline	P-12, 175
	Saint Michael	2nd class city	Nome	295	368	401	92	91	11	117	21	84	Piped Water, Piped Sewer, Honeybucket Hauling, Washeteria, Electric (AVEC), Health Clinic, Police, Volunteer Fire, Search and Rescue, Roads, Bingo, Dock, Equipment and Truck Rentals	P-12, 179
Lower Kuskokwim	Aniak	2nd class city	Bethel	540	572	501	69	91	10	214	48	84	Piped Sewer, Landfill, Library, Aniak Volunteer Fire Dept., Animal Control, Roads, Bingo, Pull Tabs, State-funded Public Safety Officer (VPSO), Search and Rescue	P-6, 96; 7-12, 59
	Lower Kalskag	2nd class city	Bethel	291	267	282	92	74	15	82	7	55	Piped Water and Sewer, Volunteer Fire, Community Hall, Roads, Bingo, Landfill	1-8, 33; 6-12, 62
	Kalskag	2nd class city	Bethel	172	230	210	81	83	8	74	14	80	Watering Point, Piped Sewer, (YKHC RUC), Electric (AVEC), Health Clinic, Public Safety Office (Currently not funded), Dock, Roads (Currently not funded), Bulk Fuel Facility and Operation, AVEC Operators.	Elementary, 46
	Bethel	2nd class city	Bethel	4,674	5,471	6,080	65	90	23	2,364	468	96	Piped Water, Water Delivery, Piped Sewer, Tank Haul, Refuse Collection, Landfill, Recycling Center, Dock/Port, Police, Fire/EMS/Ambulance, Roads, Ice Roads, Teen/Youth Center, Senior Center (Adult Day Care), Senior Transportation, Library, Bingo/Gaming, Parks and Recreation, Planning, Animal Control, Business Licenses, Braund Building, Job Training, Motor Vehicle Registration (State DMV contract), Cultural Center with an Art Guild, Regional Dispatch Center, Cemetery, Skate Park, Baseball Fields, Harbor/Port, Transit; Remove: Recycling, Senior Center, Bingo/Gaming, Animal Control, Job Training, Motor Vehicle Registration	6 schools, 1,383

Region <sup>1</sup>	City/ Village	Type <sup>2</sup>	Census Area <sup>2</sup>	Population 1990 <sup>2</sup>	Population 2000 <sup>2</sup>	Population 2010 <sup>2</sup>	Percent Alaska Native <sup>2</sup>	Percent of People 25 and over High School Graduate <sup>3</sup>	Percent of People 25 and Over with Bachelor's Degree or Higher <sup>3</sup>	Housing Units <sup>2</sup>	Number Housing Units Vacant <sup>2</sup>	Percent Occupied Housing Units with Complete Plumbing Facilities <sup>4</sup>	Municipal Facilities and Utilities <sup>2</sup>	Schools, number of students <sup>2</sup>
Yukon Delta	Marshall	2nd class city	Kusilvak	273	349	414	95	74	9	108	8	76	Piped Water, Watering Point, Piped Sewer, Electric (AVEC), Health Clinic, Refuse Collection, Landfill, Police and State-funded Public Safety Officer (VPSO), Volunteer Fire, Public Safety Building, Post Office (federal contract), Roads, Bingo/Pull Tabs, Head Start, Equipment Rental	P-12, 144
	Mountain Village	2nd class city	Kusilvak	674	755	815	92	71	9	211	27	77	Water/Sewer, Bingo/Pull Tabs, Community Hall, Equipment Rental, AVEC, Teen Center, ATCO Unit - Nightly Rental Unit	P-12, 253
	Pilot Station	2nd class city	Kusilvak	463	550	568	98	75	5	137	16	83	Piped Water, Piped Sewer, Refuse Collection, Landfill, Electric (AVEC), Dock, Volunteer Fire, Public Safety Facility, Library, Fuel Sales and Delivery, Gravel Sales, Cable TV, Bingo	P-12, 177
	Pitkas Point	Unincorporated	Kusilvak	135	125	109	97	71	4	37	6	8	N/A	P-12 (inactive), 10
	Russian Mission	2nd class city	Kusilvak	246	296	312	96	80	8	74	1	81	Piped Water, Piped Sewer, Electric, Health Clinic, Public Safety Building, Volunteer Fire, Bingo, and Dock.	P-12, 117
	Saint Mary's	1st class city	Kusilvak	441	500	507	92	85	20	209	58	88	Piped Water, Watering Point, Piped Sewer, Honeybucket Hauling, Electric (AVEC), Refuse Collection, Landfill, Police, Volunteer Fire, Search and Rescue, Port/Dock, Gravel Sales, Roads, Parks and Recreation, Kumeluvik Building, Equipment Rental, Schools	P-12, 196
Upper Kuskokwim	Crooked Creek	Unincorporated	Bethel	136	107	105	84	58	0	47	9	19%	N/A	P-12, 19
	Red Devil	Unincorporated	Bethel	53	48	23	43 (58 in combination with one or more other races)	64	0	23	11	50%	N/A	P-12, inactive
	Sleetmute	Unincorporated	Bethel	106	100	86	77	65	16	49	13	61	N/A	P-12, 22
	Stony River	Unincorporated	Bethel	51	61	54	83	69	0	26	6	23	N/A	K-12, 9

Region <sup>1</sup>	City/ Village	Type <sup>2</sup>	Census Area <sup>2</sup>	Population 1990 <sup>2</sup>	Population 2000 <sup>2</sup>	Population 2010 <sup>2</sup>	Percent Alaska Native <sup>2</sup>	Percent of People 25 and over High School Graduate <sup>3</sup>	Percent of People 25 and Over with Bachelor's Degree or Higher <sup>3</sup>	Housing Units <sup>2</sup>	Number Housing Units Vacant <sup>2</sup>	Percent Occupied Housing Units with Complete Plumbing Facilities <sup>4</sup>	Municipal Facilities and Utilities <sup>2</sup>	Schools, number of students <sup>2</sup>
Lower Yukon	Anvik	2nd class city	Yukon-Koyukuk	82	104	85	93	70	6	46	13	92	Watering Point, Piped Sewage, Washeteria, Electric (AVEC), Landfill, Health Clinic, Volunteer Fire Department, Fire Station, Roads, Equipment Rental, Building Rental.	P-12, 24
	Grayling	2nd class city	Yukon-Koyukuk	208	194	194	87	57	3	63	8	72	Piped Water, Piped Sewer, Washeteria, Electric (AVEC), Landfill, Health Clinic, Post Office (federal contract), Volunteer Fire, Dock, Bingo, Roads	P-12, 38
	Holy Cross	2nd class city	Yukon-Koyukuk	277	227	178	92	80	0	86	22	74	Piped Water, Watering Point, Piped Sewer, Washeteria, Electric (AVEC), Landfill, Health Clinic, Volunteer Fire, Dock, Community Hall, Roads, Bingo/Pull Tabs	P-12, 43
	Shageluk	2nd class city	Yukon-Koyukuk	139	129	83	90	75	5	53	17	0	Watering Point, Washeteria, Electric (AVEC), Landfill, Volunteer Fire, Post Office (federal contract), City Hall, Clinic, City Housing	P-12, 13
Western Interior	McGrath	2nd class city	Yukon-Koyukuk	528	401	346	37 (46 in combination with one or more other races)	97	27	195	48	87	Piped Water, Piped Sewer, Washeteria, Public Showers and Rest Facility, Landfill, Volunteer Fire, Roads, Log Haul-Out, Boat Launch, Captain Snow Center, UAF Interior Aleutians/McGrath Center, State-funded Public Safety Officer (VPSO), Fish and Wildlife Protection Officer (State Troopers), Anderson Park, Volunteer Ambulance, and Search and Rescue.	Correspondence K-12, 33; P-12, 49
	Nikolai	2nd class city	Yukon-Koyukuk	109	100	94	81	73	11	48	11	48	Sewer, Landfill, Fuel Sales, Electric	P-12, 16
	Takotna	Unincorporated	Yukon-Koyukuk	38	50	52	23 (38 in combination with one or more other races)	79	0	41	19	62	N/A	P-12, 11
	Lime Village	Unincorporated	Bethel	42	46	29	93	47	13	27	16	0	N/A	P-12, inactive

Sources:

- 1 Lingle et al. 2011 (Bethel and Lime Village added)
- 2 ADCCED 2012
- 3 Headwaters Economics 2013
- 4 ADLWD 2011a

Notes: For data reported as percentages, consider the total number of people included; for example, in a small village, 4 percent of the employed workers could be just one person.

This page intentionally left blank

The proportion of school-aged children in families receiving public assistance through Temporary Assistance, Medicaid, or Supplemental Nutrition Assistance Program (food stamps), is 70 percent or higher in most school districts overlapping the planning area, compared to about 33 percent of the students in Anchorage schools (Institute for Social and Economic Research 2012).

**Communities.** Per capita income varies from \$4,320 in Stony River and \$6,798 in Nikolai to \$36,000 in Red Devil and \$33,671 in McGrath. The average per capita income across all communities was \$15,410. Another measure of income is median household income, the number at which half of the household incomes fall above and half fall below. Median household income varies from \$14,643 in Anvik to \$91,302 in Bethel, with an average of \$40,306.

Table 5.1.4-2 shows the number of people employed in the community, and the number of people who filed for unemployment insurance. The ratio of these two numbers ranged from 0.17 in Bethel to 0.57 in Sleetmute, with an average across communities of 0.34. These compare to a statewide average of 0.11 in 2015.

The proportion of households receiving public assistance in the 27 communities ranged from 0 to 100 percent, with an average of 63 percent. The percent of persons living in poverty in the communities ranged from 8 percent in Bethel and 10 percent in Red Devil up to 80 percent in Stony River and 81 percent in Nikolai, with an average of 27 percent across all 27 communities.

Most of the communities rely on local government as a major source of jobs; the percent of workers employed by local government ranged from 20 percent in Bethel to 73 percent in Pitkas Point, with an average of 55 percent across all communities. A very small proportion of workers in the communities were employed in: natural resources and mining; construction; leisure and hospitality; or State government. The percentage employed in trade, transportation and utilities varied widely, from 2 percent in Lower Kalskag to 62 percent in Red Devil. The percentage employed in educational and health services also varied widely, from less than 5 percent in several communities to 29 percent in Bethel and 33 percent in Holy Cross. Note that these percentages are based on the number of workers in the community; in a small village, 4 percent of the employed workers could be just one person.

The role of commercial fishing as an industry and employer also varies across the communities but is a crucial component in many, as reflected by the number of people having a commercial fishing license or crew permit (Table 5.1.4-2). Six of the communities are in the Western Alaska Community Development Quota program established in 1992 by the North Pacific Fishery Management Council. The Community Development Quota program was developed to ensure that the isolated and economically depressed Bering Sea and Aleutian Island communities could participate in the Bering Sea fisheries. A recent review of this program (BLM 2015a) concluded that the Yukon Delta Fisheries Development Association “experienced positive growth in most decennial review measurement items including socioeconomic conditions, financial performance, workforce development, and implementation of community development plans.” A number of the communities have few or no residents who hold either a commercial fishing license or crew permit.

Economic contributions to communities from subsistence activities is discussed in Section 5.2, Subsistence.

### **Cost of Living**

Cost of living in the planning area is higher than averages for other places in Alaska and much higher than for the United States as a whole (ADCCED 2017; Association of Village Council Presidents 2014).

The Cooperative Extension Service Food Cost Survey conducted regularly by the University of Alaska Fairbanks found that in March 2012, food costs for a family of four in Bethel were 192 percent of what they would be in Anchorage (<https://www.uaf.edu/ces/hhfd/fcs/>). Costs were comparably high in Grayling (193 percent) and even higher in Anvik (206 percent), and McGrath (224 percent).

High fuel cost is another key factor that has socioeconomic effects throughout the planning area. Higher fuel prices ripple through village lifestyles many ways, including increasing the cost of store-bought foods through transportation costs and storage costs. The high cost of heating schools can affect the financial feasibility of continuing to offer educational programs in remote communities (Association of Village Council Presidents 2014). Subsistence activity gets more expensive because of higher fuel costs for snowmobiles, four wheelers, and motorboats, while high food prices have increased the need for subsistence as a food source. The increased reliance on subsistence as a source of food, coupled with greatly increased costs of getting to the fish, moose, or caribou, and a poor commercial fishing season, are problems in many villages.

Although average Alaska heating fuel and gasoline prices are slightly lower than their peak in the summer of 2008, the statewide average cost of heating fuel has increased 65 percent and the statewide average cost of gasoline has increased 59 percent since 2005. In July 2013, retail prices for heating fuel #1 and gasoline were collected from 100 select communities across Alaska (ADCCED 2013).

Communities were selected from throughout the eight Department of Commerce, Community, and Economic Development Alaska regions (Northern, Gulf Coast, Interior, Northwest, Southwest, Western, South Central, and Southeast). The planning area overlaps with portions of the northern and southwestern regions, but more so with the western region, which reported the highest average retail costs for both heating fuel (\$6.58 per gallon, compared to a statewide price of \$5.74) and gasoline (\$6.94 per gallon, compared to the statewide average of \$6.09). All of these prices were considerably higher than the national averages of \$4.01 for heating fuel and \$3.63 for gasoline.

The price for a gallon of #1 heating oil in July 2013, ranged from a low of \$5.00 in Grayling to a high of \$7.46 in McGrath. Retail price for a gallon of gasoline ranged from \$5.81 in St. Michael to \$8.03 in Pilot Station. Note that numbers were not available for some of the communities because they were not included in the 100 surveyed at the time.

All communities in the planning area rely on diesel for power and are serviced by nine utility companies. The residential electrical rate ranges from 0.17 per kilowatt-hour in Bethel to 0.90 per kilowatt-hour in Lime Village. Many villages are served by the Alaska Village Electric Coop at a rate of 0.22 per kilowatt-hour, and several by Middle Kuskokwim Electric at 0.48 per kilowatt-hour (kwh). These effective residential rates are much lower than they would be without the Alaska Energy Authority's Power Cost Equalization program, which provides economic assistance to customers in rural areas of Alaska to compensate for the high kwh charges for electricity. Rates in 2012 for Anchorage were about 0.11/kwh.

**Table 5.1.4-2. Economic Characteristics in Planning Area Communities**

Region <sup>1</sup>	City/Village	Population (2010)	Per capita income <sup>2</sup>	Median household income <sup>2</sup>	Percent households with public assistance income <sup>3</sup>	Percent persons in poverty <sup>2</sup>	Effective residential electrical rate per kwh <sup>8</sup>	2013 retail price/gallon, heating oil #1 <sup>7</sup>	2013 retail price/gallon gasoline <sup>7</sup>	Number of residents employed <sup>5</sup>	Unemployment insurance claimants <sup>5</sup>	Ratio of # residents with unemployment claims to # employed	Percent employed in Natural Resources and Mining <sup>5</sup>	Percent employed in Construction <sup>5</sup>	Percent employed in Trade, Transportation and Utilities <sup>5</sup>	Percent employed in Professional and Business Services <sup>5</sup>	Percent employed in Educational and Health Services <sup>5</sup>	Percent employed in Leisure and Hospitality <sup>5</sup>	Percent employed in State Government <sup>5</sup>	Percent employed in Local Government <sup>5</sup>	Percent employed in Other <sup>5</sup>	Number with commercial fishing permits, crew licenses in 2010 <sup>6</sup>	Community Development Quota participant <sup>2</sup>
Bering Sea	Kaltag	190	14,103	23,000	60	25	0.22	5.74	6	99	31	0.31	3	5	12	1	11	1		66	1	9,12	No
	Shaktolik	250	12,803	26,667	43	28	0.22	NA	NA	108	38	0.35	2	2	14	2	14	NA	1	66	NA	42,32	Yes
	Stebbins	556	8,938	33,462	100	28	0.22	7.22	7.47	244	88	0.36	NA	3	6	2 (financial activities)	9	1	NA	64	15	20,9	Yes
	Unalakleet	681	19,919	47,500	33	15	0.2	6.3	6.3	383	86	0.36	1	3	26	2 (includes financial	6	NA	3	58	0.5	101,62	Yes
	Saint Michael	401	13,348	34,821	55	29	0.22	6.95	5.81	179	66	0.37	0	3 (plus 2 in manufacturing)	10	1 (financial)	14	2	1	68	NA	14,9	Yes
Lower Kuskokwim	Aniak	501	22,010	60,673	38	12	0.28	NA	NA	280	82	0.29	1	3 (plus 1 in manufacturing)	23	7 (plus 5 in financial and 5 in information)	11	NA	5	34	5	9,1	No
	Lower Kalskag	282	11,637	44,643	74	17	0.22	NA	NA	130	46	0.35	2	NA	2	3 (plus 2 in financial)	5	1	NA	70	13	0,1	No
	Kalskag	210	15,655	45,938	76	22	0.22	6.75	6.75	98	43	0.44	1	4 (plus 1 in manufacturing)	3	2 (plus 2 information and 13 financial)	7	1	NA	54	11	1,0	No
	Bethel	6,080	29,261	91,302	22	8	0.17	6.02	6.85	2,718	466	0.17	1	1 (plus 1 in manufacturing)	19	2 (plus 7 in financial and 1 in information)	29	2	10	20	6	189,127	No
Yukon Delta	Marshall	414	12,183	38,333	98	12	0.22	5.74	6.94	177	84	0.47	NA	3 (plus 1 manufacturing)	9	6 financial, 1 information	3	NA	6	65	7	39,45	No
	Mountain Village	815	12,650	47,000	95	21	0.22	7.31	6.21	380	150	0.39	1	3 (plus 9 in manufacturing)	12	1 in and information financial	7	1	1	62	4	76,71	Yes
	Pilot Station	568	13,762	41,250	75	18	0.22	7.32	8.03	258	98	0.38	1	1 (manufacturing)	10	2 (plus 6 in financial)	5	1	1	64	9	54,62	No
	Pitkas Point	109	10,671	41,563	85	33	0.22	NA	NA	44	19	0.43	NA	4 (manufacturing)	11	2 (financial)	1	1	NA	73	4	0,0	No
	Russian Mission	312	11,225	43,750	100	30	0.22	5.75	6.2	173	60	0.35	1	1	13	5 (plus 13 financial and 1 information)	6	12	1	44	5	15,17	No
	Saint Mary's	507	15,307	38,162	50	15	0.22	NA	NA	285	119	0.42	1	1 (plus 3 in manufacturing)	19	1 (plus 16 in financial and 1 information)	8	4	3	39	6	72,81	No



Region <sup>1</sup>	City/Village	Population (2010)	Per capita income <sup>2</sup>	Median household income <sup>2</sup>	Percent households with public assistance income <sup>3</sup>	Percent persons in poverty <sup>2</sup>	Effective residential electrical rate per kwh <sup>8</sup>	2013 retail price/gallon, heating oil #1 <sup>7</sup>	2013 retail price/gallon gasoline <sup>7</sup>	Number of residents employed <sup>5</sup>	Unemployment insurance claimants <sup>5</sup>	Ratio of # residents with unemployment claims to # employed	Percent employed in Natural Resources and Mining <sup>5</sup>	Percent employed in Construction <sup>5</sup>	Percent employed in Trade, Transportation and Utilities <sup>5</sup>	Percent employed in Professional and Business Services <sup>5</sup>	Percent employed in Educational and Health Services <sup>5</sup>	Percent employed in Leisure and Hospitality <sup>5</sup>	Percent employed in State Government <sup>5</sup>	Percent employed in Local Government <sup>5</sup>	Percent employed in Other <sup>5</sup>	Number with commercial fishing permits, crew licenses in 2010 <sup>6</sup>	Community Development Quota participant <sup>2</sup>
Upper Kuskokwim	Crooked Creek	105	11,540	29,688	100	20	0.48	NA	NA	72	21	0.29	NA	NA	4	11 (plus 12 in financial)	7	NA	NA	64	1	0,3	No
	Red Devil	23	36,000	28,333	0	10	0.48	NA	NA	8	0	NA	NA	12 (manufacturing)	62	25 (financial)	NA	NA	NA	NA	NA	0,0	No
	Sleetmute	86	22,259	24,750	65	19	0.48	7.25	7.9	47	27	0.57	NA	NA	17	4 (2 financial)	6	4	NA	66	NA	1,0	No
	Stony River	54	4,320	17,679	38	80	0.48	NA	NA	24	2	0.08	NA	2 (manufacturing)	4	12 (plus 4 financial)	4	NA	NA	58	8	0,0	No
Lower Yukon	Anvik	85	10,981	14,643	69	29	0.22	6	6.5	49	13	0.27	6	NA	14	1 (information)	18	2	NA	57	NA	11,0	No
	Grayling	194	8,619	27,500	100	24	0.22	5	6	90	33	0.37	1	2 (manufacturing)	9	1 (financial)	22	NA	1	56	8 (unknown)	31,1	Yes
	Holy Cross	178	16,014	35,500	86	32	0.22	7.15	7.35	94	27	0.29	6	1 (plus 1 manufacturing)	4	3 (financial)	33	3	NA	47	1	9,0	No
	Shageluk	83	12,415	31,250	77	14	0.22	NA	NA	39	12	0.31	5	NA	5	3 (plus 10 financial)	15	NA	NA	61	NA	1,1	No
Western Interior	McGrath	346	33,671	69,821	12	13	0.17	7.46	7.45	176	34	0.19	6	4	13	3 (plus 1 financial and 1 information)	10	10	14	37	1	1,0	No
	Nikolai	94	6,798	17,708	86	81	0.25	NA	NA	44	14	0.32	14	2	4	2 (information)	18	NA	NA	57	2 (unknown)	0,0	No
	Takotna	52	8,765	60,833	75	58	0.44	NA	NA	26	12	0.46	NA	23	31	4 (plus 8 information)	8	4	NA	23	NA	0,0	No
	Lime Village	29	21,214	72,500	0	32	0.9	NA	NA	10	2	0.2	NA	NA	10	10 (plus 10 financial)	NA	NA	NA	70	NA	0,0	No

1 Lingle et al. 2011 (Bethel and Lime Village added)

2 ADCCED 2012

3 Headwaters Economics 2013

4 ADLWD 2011a

5 ADLWD 2011b

6 ACFEC 2010

7 ADCCED 2013

8 AEA 2016c

Notes: For data reported as percentages, consider the total number of people included; for example, in a small village, 4 percent of the employed workers could be just one person.

### **5.1.5 Current Conditions for Environmental Justice**

#### **Low-Income Populations**

Low-income populations in an affected area are identified using the statistical poverty thresholds from the Bureau of the Census data, per CEQ guidelines. In the United States as a whole, a total of 14.3 percent of the population lives below the poverty level; the comparable estimate for Alaska was lower, at 9.5 percent (<http://quickfacts.census.gov/qfd/states/02000.html>). For the BSWI RMP, any community that is greater than the national average of 14.3 percent in terms of the number of individuals below the poverty rate will be considered a low-income community. As a result, 21 of the 27 communities within the planning area are considered low-income.

#### **Minority Populations**

Nearly every community in the planning area has a population that is more than 50 percent Alaska Native, for the people who, in the 2010 Census, reported that they were one race. Only Red Devil, McGrath, and Takotna do not reach the 50 percent level. However, when adding in the number of people who reported they were two or more races, one of which was Alaska Native, then Red Devil reaches 58 percent Native, adding it to the list of communities where environmental justice is a concern. Takotna has a poverty level (58 percent) that far exceeds the national average, so it is already a community where environmental justice is a concern. That leaves McGrath, which reaches 46 percent Native when adding in the number of people who reported they were two or more races, one of which was Alaska Native. McGrath's poverty level (13 percent) is just a percentage point below the national average, so in combination with its substantial Native population, it does not make sense to exclude it from environmental justice considerations. In summary, all of the 27 communities will be considered subject to environmental justice guidance and analysis.

### **5.1.6 BLM Support for Planning Area Communities**

The primary way that the BLM supports communities in the planning area is through its management of subsistence resources, habitat, and access (see Section 5.2, Subsistence). While much of this management direction is common to all alternatives because it is required by ANILCA and other laws, policies, and regulations, BLM management also contributes through the actions and directions contained in the resource management plans. These actions support communities a variety of ways, and also contribute to community resiliency, an important function especially across the arctic, which faces multiple and simultaneous social and environmental stressors (Arctic Council 2013).

Section 5.2 of this document describes sociocultural systems and the contribution of resources and uses on BLM-managed public lands to subsistence lifestyles. The discussion to follow below does not repeat these findings. Instead, this section describes the other ways that management of resources and opportunities on BLM-managed public lands help to support BSWI communities, focusing on the role of BLM management in commercial activity and the cash economy in the planning area. The planning area is remote, with limited opportunities for commercial development.

Each of the following subsections describes a resource area and includes relevant quotes or summaries of community resident comments received during scoping or community review of the preliminary alternatives. These comments should not be viewed as a community consensus; as pointed out at the Russian Mission scoping meeting, "There are 12 of us here at this meeting and what we share with you may not represent how everyone in our community feels." However, these comments illustrate the range

of community residents' values and how they relate to BLM-managed lands and desired future conditions. The complete disclosure of comments received on the BSWI RMP/EIS process are found in the Bering Sea – Western Interior Resource Management Plan Scoping Summary Report (BLM 2014d) and the Bering Sea – Western Interior Resource Management Plan Preliminary Alternatives Comment Summary Report (BLM 2015c).

## Recreation

The remoteness of the planning area limits opportunities for outdoor recreation on BLM-managed public lands. The lack of transportation infrastructure and developed recreation facilities limit tourism and its associated economic activity. However, as of 2016, there are 18 special recreation permitted operations on BLM-managed public lands in the planning area, including guided hunting, competitive events, and tour groups.

Guided hunting is estimated to support approximately 2,200 jobs and \$35 million in labor income in Alaska (McDowell Group 2014a). The vast majority of the estimated 3,200 annual guided hunters are not Alaska residents (McDowell Group 2014a). Their expenditures introduce “new money” to the Alaska economy – money that would be unlikely to be spent in the state in the absence of big game hunting opportunities.

However, much of the money spent on guided hunts on BLM-managed public lands contributes to economic activity in towns and cities outside of the planning area. Guided hunts typically originate outside the planning area, with supplies for the trips purchased in Anchorage or other commercial centers. Fuel will sometimes be purchased in villages within the planning area. Additionally, assistant guides and other staff are sometimes hired from small communities (McDowell Group 2014a). Local hiring of guides and support staff provides one of few opportunities to engage in commerce in the villages. Aside from direct economic contributions, guided hunters often donate game meat to rural communities (McDowell Group 2014a).

Special recreation permits also allow for competitive events in the planning area, including the Iditarod Trail Sled Dog Race. The Iditarod race draws more than 14,000 people each year. The race contributes to economic activity in communities along the Iditarod race route. Race organizers, competitors, spectators, volunteers, and members of the media spend money at Alaska businesses for flights, lodging, food, and fuel. However, many of these expenditures occur outside the planning area. Precise estimates of the economic contributions of the Iditarod Trail Sled Dog Race and other competitive events (e.g., Iron Dog, Norton Sound 450, Ultra Sport, and Iditarod International) are not available given existing information.

During scoping, community members in Lower Kalskag expressed interest in offering guided tours to visitors/tourists to visit a village and learn about rural village life, offer tours of the surroundings, to see wildlife and birds, possibly developing some type of ecotourism that would likely occur on lands close to the village (Native corporation-owned or USFWS-owned). Residents in Aniak said that currently, outfitters and guides who operate in the area take from the communities and compete for resources but do not return to the communities or utilize local hire, and a written comment received requested that the BLM stop sport fishermen from operating jetboats over spawning habitat. A Russian Mission resident said, “We see Supercubs land in town with big moose racks tied to the plane and no meat to pass to the village.” A comment from Grayling suggested a lack of desire in getting meat from trophy hunters “because they don’t take good care of their meat and it usually hangs for too long.”

At the meeting on preliminary alternatives in Holy Cross, the BLM heard that increases in hunting from sport hunters (guided or independent) are causing impacts to limited subsistence resources. The

community would like to see a broad exclusion zone, not around the community, but buffering around the corporation lands surrounding the community. At the Kaltag preliminary alternatives meeting, it was pointed out that one resident is a registered sport hunting guide, providing a source of local employment. Nulato residents reported seeing a lot of guide activity in their area. They are concerned about unpermitted guides on nearby refuge lands and impacts to subsistence hunting. Unalakleet residents expressed concern over guiding activities during king salmon season and conflicts with subsistence.

## **Mining**

The history of mining in Alaska dates to the 1800s (ADCCED 2017). Mineral production continues to contribute to economic activity throughout the state. The planning area produces gold, silver, copper, and mercury. Much of the production of locatable minerals occur off BLM-managed public lands in the planning area. There are three active placer mines and one active lode mine within the planning area on BLM-managed public lands.

Placer mines are typically small-scale employers, with an average of four workers per active placer mine (McDowell Group 2014b). Consequently, the three active placer mines on BLM-managed public lands in the planning area are estimated to directly employ about 12 workers, which is one percent of Alaska's estimated placer industry (McDowell Group 2014b). In addition to direct employment, placer mine operators spend money on fuel, equipment, and supplies. However, given limited infrastructure and the high cost of goods in the planning area, many of these expenditures likely occur outside of the planning area (i.e., in Anchorage).

Due to the low value of mineral materials and high transportation costs, mineral materials (e.g., sand and gravel) are in highest demand near villages and along transportation corridors. Most lands that meet these criteria have been previously conveyed. Therefore, the majority of mineral material sales in the planning area occur on State and Native lands.

No leasable minerals occur in economic quantities in the planning area.

During scoping and preliminary alternative development meetings, planning area residents expressed a wide range of sentiments associated with mining activity. Aniak residents mentioned that granite/hard-rock potential north of or near-to Aniak could be used for river rip-rap, roads, dikes, and other purposes; residents of Russian Mission and other villages also expressed a need for gravel and rock. At the Aniak, Chuathbaluk, and Russian Mission meetings, concern was expressed over impacts of past mining, including toxic substances entering the waterways. It was hoped that lessons learned from the Red Devil and other mines would inform stipulations, terms, and conditions on future mining activities.

A Bethel resident noted that the proposed Donlin Gold Mine is increasing interest in mining in the area; another comment suggested that withdrawals should be left as they are until more user groups are heard from. Residents in Bethel and other communities had questions about existing withdrawal locations and about the BLM's ability to attach stipulations to future mining activity to avoid impacts to subsistence resources. At Unalakleet and other meetings, there was concern over private companies obtaining the benefits from mining development, while local residents are subject to the adverse impacts.

An elder in Chuathbaluk noted that there are mixed feelings on mining, "leaning more towards development; if done right, watched and monitored. The young people today do not have access to the same resources we used to have and they need the income more." Another Chuathbaluk resident expressed "concern for when the mining resource runs out and we no longer get money or jobs from the mining company. I don't want to be left with nothing in the long term." At Crooked Creek, the proposed

Donlin Gold Mine was supported by some because it would bring jobs and hope for the future, in particular for the young men in the community; this was coupled with concern that mining could impact waterways and that increased plane and boat traffic could disrupt wildlife.

At several meetings, residents noted that locally important (but not commercial scale) resources were present that were not on maps; although some of these were not in BLM-managed public lands they could be required for access. At the McGrath meeting on preliminary alternatives, a resident noted that energy supply and energy costs are of concern to the community, which had investigated commercial peat in the area years ago, but concluded it was not economical to develop. At a Kaltag meeting, two areas of coal near Kaltag were described, one an outcropping at 9-Mile near Nulato and the other about 25 miles south of Nulato. A community member described how he gathered a few buckets of this coal and tried to burn it in his stove, without success. At the Kalskag and Lower Kalskag meetings, residents expressed concern over the impacts of placer mining and other activities that would affect spawning areas, and said that reclamation was essential if any disruption was allowed.

### **Timber and Forest Products**

Limited infrastructure and low timber quality mean that forestry is not an economic driver in the planning area. A commercial timber harvest has not occurred on BLM-managed public lands in the planning area since the early 2000s (BLM 2015a). Additionally, demand for “free use” permits for wood products in the planning area is also weak. Wood products removed from the planning area are mostly to satisfy local demand, particularly for home heating (BLM 2015a). Therefore, wood product removal from BLM-managed public lands in the planning area does not currently measurably contribute to economic activity in the communities.

Woody biomass has the potential to contribute to the development of biomass heating projects in the planning area. Biomass heating projects are being implemented across Alaska. However, most BLM-managed public lands in the planning area are not immediately adjacent to communities. As a result, woody biomass to support heating projects is more likely to be removed from State and Native lands closer to communities.

During scoping and preliminary alternative development meetings, nearly every community provided comments on this resource area, reflecting the importance of timber and forest products to communities. Aniak residents said that BLM-managed public lands on either side of the Kuskokwim at Stony River are important sources of dimensional wood and firewood, as are areas up the Holitna River and the Stony River, which are sufficient quality for milling dimensional lumber. Bethel residents value BLM-managed public lands between Marshall and Russian Mission along the Yukon as important sources of firewood, but recognize that logging has potential to affect spawning grounds (i.e., the runoff from cleared areas). Chuathbaluk residents noted there is an existing mill across the river from Chuathbaluk that used to operate with wood harvested from upriver. The operator supplied all the villages between Stony River and Kalskag with lumber, including slabs for all smokehouses on the river.

During scoping, Grayling residents said there are about seven sawmills in town, which get all of their logs/wood from the river and river banks, which is not BLM-managed land. However, they are interested in any logging opportunities on BLM lands close to the river, and also are one of many communities interested in biomass production, although they likely would not get wood from BLM lands. Russian Mission residents use BLM-managed public lands west of Russian Mission for berry picking and wood cutting, among other uses. McGrath residents suggested that the block of BLM land southeast of McGrath does not have much firewood.

Residents of Holy Cross, and many other villages, asked about the \$10 charge by the BLM for commercial firewood use, and about the BLM permits required for personal use. The BLM prefers the permit system to help track how the lands are being used by local residents. Residents are not used to getting permits for non-commercial levels of wood, so some may not even know they need to, and it is difficult to know where exactly whose land you are on and the associated regulations. At Grayling, Bethel, and other communities, there was concern over how permits for house logs would be obtained and monitored. Kalskag residents wondered what the point of getting a permit is if they do not know where BLM-managed lands are, and how and where to get the permit.

Lower Kalskag residents added that permits would be burdensome for the people that live off the land and normally go to get wood. However, residents would only have to pay for firewood permits only if they were taking it to sell, and only if they were cutting greater than 10 cords. Russian Mission suggested that there could be a map attached to the permit so people know whose lands they are on. Crooked Creek residents expressed opposition to the idea of requiring a permit (including TKC permits), saying it would lead to harassment and tickets. Kaltag residents said the community is interested in biomass energy and there are sawmills in Kaltag, but most trees on nearby BLM-managed public lands are black spruce that is not marketable or suitable for biomass.

BLM-managed public land across the river from Chuathbaluk/south and east of Chuathbaluk was described by residents as very important for wood gathering: “100 percent of Chuathbaluk gets wood in this area, dead standing swamp kill.” A Chuathbaluk resident expressed concern over permitting for berry picking: “We have adapted to permits for moose hunting, and we could adapt for berry picking. I believe that the tribe can have a strong voice with corporation lands. We could say we are not willing to adapt to the permitting process within our area. I think about my son who may have to apply for a permit to go berry picking if he has to go farther out to BLM lands in the future.” Grayling residents said the BLM-managed public lands north and northwest of Grayling were important for berry picking (and for future potential caribou hunting if the caribou ever migrate back this way).

Nulato residents were less concerned, saying they harvest most of their wood from the river corridor, and it would be a couple tanks of gas and more burdensome to gather wood on BLM-managed public land. Among Unalakleet residents present at the review of preliminary alternatives, discussion regarding firewood permits was mixed, with some people in favor of the idea and others opposed. If permits were to be required, several residents advocated for local staffing, in cooperation with the tribe or corporation.

## **Grazing**

Reindeer are the only livestock that may be grazed on BLM-managed public lands in the planning area. In the past, reindeer grazing has occurred in the northwestern portions of the planning area on the Seward Peninsula. However, as of 2016, there are no active domestic reindeer herds on BLM-managed public lands in the planning area. Reindeer grazing can serve as both a subsistence and entrepreneurial activity. Cash income from the sale of reindeer meat and velvet antler can supplement a herder’s subsistence activities. A 2005 study estimated that reindeer grazing across the Seward Peninsula produced approximately \$395,000 from 198,000 pounds of meat sales and \$387,000 from 23,000 pounds of velvet antler sales in 2000 (Carlson 2005; all prices 2000 U.S. dollars).

In many communities, opportunities for reindeer grazing were not raised as an issue; in Grayling and Aniak, for example it was suggested there is no local interest. Kaltag residents suggested they do not have a big interest in reindeer grazing, partly because the Western Arctic Caribou Herd inhabits this area; residents have not seen them for a few years, but they have been there. One resident wanted to “leave the

door open: We do not know of anyone here interested in reindeer herding, but it may be a good thing to consider.” Lower Kalskag residents said reindeer herding occurred historically in the area and there is interest in future opportunities; similarly, in Unalakleet, people were considering herding reindeer for a meat supply. Chuathbaluk residents said that many reindeer herds/herders were in the region before but herders just stopped, and domestic animals left to mingle in with wild herds. Residents did not know of anyone interested in reindeer herding, but thought it should be open for consideration.

## **Infrastructure**

The planning area is largely roadless and the villages within it are isolated (Association of Village Council Presidents 2014). BLM-managed public lands in the planning area support limited infrastructure development through ROWs, leases, permits, and easements. Infrastructure is essential for economic activity – the movement of goods and people, communications, energy transmission, and recreational enjoyment of public lands. The planning area’s lack of infrastructure is an impediment to economic development. BLM land use authorizations in the planning area include an airport lease, recreation leases, and ROWs for roads, power transmission, pipelines, and communication sites. BLM-managed public lands in the planning area are typically distant from human settlement and the existing roads in the planning area are almost exclusively on lands other than those managed by the BLM. As described in the Travel and Transportation Management section, the Western Alaska Access Planning Study (i.e., the road to Nome) and the Yukon-Kuskokwim Energy Corridor Plan (which would provide road access between the two rivers and allow freight to be shipped down Yukon from Fairbanks) are potential transportation corridors under review by the State of Alaska that could cross BLM-managed public lands within the planning area. Scoping comments received about the Y-K corridor project demonstrated both support because it could allow cheaper heating fuel to be shipped from Fairbanks and concern about increased competition for subsistence resources.

Some trail systems on BLM-managed public lands link up with trails on lands closer to communities. Many communities expressed concern over possible roads being planned for the area and encouraged the BLM to carefully consider effects on subsistence activities. For example, in Holy Cross opposition was expressed to the proposed development of a road from Paimiut Slough to the Kalskag area, due to potential increases in access to important subsistence use areas. Nearly every community had many comments on trails and travel management, with most oriented toward protection of subsistence access and opportunities.

At the Aniak meeting on preliminary alternatives, a commenter said that it is good to teach younger generations skills. It was described how Chuathbaluk is trying to start something similar to the cultural camp in Kalskag, but they do not have a camp site identified, and that perhaps the camp site could be on BLM-managed public lands. It was also suggested at the Aniak meeting that communications sites, towers, and turbines typically do not interfere with access to historical trails. Several communities said they were interested in constructing shelter cabins for safety and support of subsistence activities. At Holy Cross and Crooked Creek, residents supported the placement of cell towers on BLM-managed public land (if needed) because they enhance public safety.

## **BLM Operations**

The BLM Anchorage Field Office spends money on employee salaries, equipment, supplies, and contracts. BLM operational expenditures contribute to businesses in natural resource-related sectors. Additionally, BLM employees spend their salaries on a variety of goods and services, including housing, fuel, transportation, and food. While much of this money is spent on goods and services in the Anchorage

area, some of the BLM's budget expenditures contribute to economic activity in BSWI communities. For example, wildland firefighting crews provide summer employment opportunities for people who live in villages/communities in the planning area. Village/community members have expressed the importance of wildland firefighting crews to summer employment opportunities in BSWI communities.

### **Nonmarket Values**

The BLM IM No. 2013-131 describes when and how to consider nonmarket values when preparing NEPA analyses for BLM resource management planning and other decision-making. The IM directs BLM managers and to use estimates of nonmarket environmental values in NEPA analysis supporting planning and other decision-making where relevant and feasible, and to include at least a qualitative description of the most relevant nonmarket values for the affected environment and the impacts of alternatives in NEPA analyses.

Nonmarket values reflect the benefits individuals attribute to uses (both active and passive) of natural resources or to the existence of particular ecological conditions, including the full range of ecosystem goods and services that do not involve market transactions and therefore lack prices.

Examples of nonmarket benefits people receive from BLM-managed public lands include recreation experiences, subsistence opportunities, free-flowing rivers, open space, and the value to non-users of simply knowing that vast areas of Alaska exist in a natural state. It is desirable to describe nonmarket values so that resource management considers all relevant economic values, not merely those that are easy to quantify. Utilizing nonmarket values provides a more complete picture of the consequences of a proposed activity than market data alone would allow.

One way the BLM protects nonmarket resources crucial to BSWI communities is through the designation and management of ACECs, which are "areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards."

As part of the BSWI RMP planning process, the BLM solicited proposals for new ACECs from the public. As part of the BSWI RMP planning process, the BLM solicited proposals for new ACECs from the public. The BLM evaluated 30 areas, including 11 existing and 19 nominated ACECs. Of the 30 areas that were evaluated, 17 areas met both the relevance and importance criteria for further consideration. Eleven of these 17 were nominated areas. New ACECs were nominated by many area communities and residents, including the Georgetown Tribal Council, a McGrath resident, Grayling IRA Tribal Council, Anvik Tribal Council, Native Village of Unalakleet, Koyukuk Tribal Council, and Nulato Tribal Council (BLM 2018b).

Subsistence, food security, and public welfare were common reasons for people living in BSWI communities to propose ACECs and the associated special protections accorded to fish, cultural, and wildlife resources. These values reflect not only planning area sociocultural systems but the primary way in which residents believe that BLM-managed public lands can help support their communities.

For example, the proposed Sheefish Spawning Area ACEC (BLM 2018b) was nominated to protect the only identified sheefish spawning area on the entire Kuskokwim River. As described in the ACEC nomination, "Sheefish are a culturally significant fish species along the Kuskokwim River; they are harvested for subsistence use by many, especially in the middle and upper river. Sheefish are often caught before salmon in the spring, and offer an opportunity for fresh fish early in the season." Sheefish also are



targeted by sport fishers in streams and tributaries within the Kuskokwim River drainage. The ACEC would encompass an area where over 80 percent of the sheefish spawning in the Kuskokwim River spawn, including a 15.5 mile section of the Big River near BLM-managed public lands.

As another example, the Grayling IRA Tribal Council-nominated the proposed Grayling Area Habitat ACEC because it is “essential for maintaining species diversity for subsistence resources... (and) provides important habitat supporting subsistence resources crucial to the people of the Grayling community.”

### **Community Coordination**

A Kalskag resident said, “Your vision statement is very urban. Wilderness is our home. We are the fourth world. We are not rural; we are in bush Alaska. People in urban areas make [resource management plans] without living out here. Agencies that come out here that tell us how to live. If you really want to understand our subsistence way of life, you have to live out here, and use those experiences for the rest of your life.” Residents of Bethel felt that not enough time was provided for scoping and preparing scoping comments, and that communities had not been asked what works best for them (timing-wise). They noted that March through May, before breakup, are “ideal” for public meetings.

Residents of Unalakleet said “We need to identify indigenous traditional use for subsistence to be mapped for each community, showing historic and customary indigenous use. We need to keep this context for the next 20 years, the life of this plan... We need to have consultation as a policy for any programs that are enforced, consultation with the tribe and corporation to develop working relationships, to make sure the land is able to support the living creatures. We are custodians of the land. Make sure we pass on this land to the next generation, it is what we have.”

Unalakleet meeting attendees wanted the BLM to “consider local organizations, in addition to ADF&G and the USFWS, for population inventory monitoring or fish monitoring. There are local organizations that do projects within our river already. Norton Sound Economic Development Corporation (NSEDC) is very active in monitoring fish populations. More and more, the state is pulling out of rivers because they do not have the money to monitor rivers. BLM should work with tribe or Native Corporation. Within Norton Sound and the whole Seward Peninsula, NSEDC spends equivalent to the state on fisheries management.”

When performing fieldwork in the planning area, BLM staff typically overnight in local communities and pay visits to tribal and village council offices, often to discuss upcoming subsistence hunts, or to talk with residents while in town about field activities in the area. BLM also travels annually to Aniak and Unalakleet to issue federal subsistence moose hunting permits, typically staying two to three days. When field projects involve boats, snowmobiles, or aircraft, BLM frequently coordinates with tribal offices to determine the availability and purchase of fuel and determine payment methods before staff arrives in the village. This is typical for projects along the Kuskokwim River for example when boat fuel is needed in several village locations, or when a project involving aircraft is based in a village and arrangements have to be made to set up a remote fuel site if commercial fuel is unavailable. While in the communities, BLM staff occasionally receives questions about cleanup of abandoned mines, such as Kolmakof and Red Devil, related to potential contamination of subsistence food resources (e.g., fish in the Kuskokwim River).

## 5.2 Subsistence

### 5.2.1 Introduction

Subsistence in Alaska is the traditional way of life for many residents of the state and is central to the customs and traditions of many cultural groups. Subsistence resources are the fish, wildlife and plant species used by Alaskans to provide food, clothing, shelter, and fuel, and for producing artwork and other customary uses. A subsistence lifestyle is the harvest of wild resources in a traditional way that includes seasonal timing, use areas and processing, distribution and consumption of the harvests. ANILCA §803 states: “*As used in this Act, the term "subsistence uses" means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption, for barter, or sharing for personal or family consumption; and for customary trade. For the purposes of this section, the term--*

- (1) "family" means all persons related by blood, marriage, or adoption, or any person living within the household on a permanent basis; and*
- (2) "barter" means the exchange of fish or wildlife or their parts, taken for subsistence uses--*
  - (A) for other fish or game or their parts; or*
  - (B) for other food or for nonedible items other than money if the exchange is of a limited and noncommercial nature.”*

Subsistence is an integral part of the rural mixed economic system. The combination of subsistence and commercial wage activities provides the economic basis for rural community life. Analysis conducted by Wolfe and Walker (1987) indicates that subsistence harvests are a prominent part of the economy and social welfare of most rural Alaska regions. Federally qualified subsistence users are residents of the State of Alaska, as defined in 50 CFR 100.4, and whose primary, permanent home is within an area determined to be rural by the Federal Subsistence Board through the process in 50 CFR 100.15 (BLM 2015a).

Indigenous peoples have been using the natural resources in their surroundings to meet their subsistence needs for centuries. In the planning area, as is true for Alaska’s vast rural areas, these uses are passed on through traditions and informal institutions that survive today in the subsistence way of life. These practices are not static, but rather, they change over time, continually adapting to the changing social and ecological conditions of the present (BLM 2015a).

Subsistence resources are highly valued and are central to the economies, customs, and traditions of many families and communities in Alaska. Customs and traditions include sharing and distribution networks, ceremonial activities, the handing down of traditional knowledge, cooperative hunting, fishing, gathering, handling, preparation, and preservation of harvested resources. Subsistence fishing, hunting, and gathering activities are also important methods for achieving food security in all of the rural communities in the planning area. The planning area’s residents participate in a mixed subsistence-cash economy (Kurtak et al. 2010). With little cash available for store-bought items, subsistence hunting, fishing, and gathering is a major part of life in rural Alaska, often governed by both State and federal institutions, and yet informed by informal institutions and local traditions (BLM 2015a).

There are three Alaska Native cultural groups in the planning area divided into several linguistic groups. These Alaska Native groups are the Yup’ik, Athabaskan (or Dené), and Inupiat. The Athabaskan territory within the planning area encompasses the Deg Xinag, Holikachuk, Koyukon, Upper Kuskokwim, and

Dena'ina linguistic reach (BLM 2015a). The Yup'ik people comprise the western half of the planning area. The Athabaskans comprise the eastern half of the planning area. There are four distinct linguistic subgroups within the planning area: the Deg Xinag, Holikachuk, Koyukon, Upper Kuskokwim, and Dena'ina. Historically the Dena'ina were a ranked society with a redistributive economic system. The Inupiat are found in the north of the planning area, mostly in Unalakleet and nearby coastal areas (BLM 2015a).

### 5.2.2 Laws, Regulations, and Policies

Modern formal institutions such as the Federal Subsistence Board and the Alaska Boards of Game and Fish have generally superseded the traditional hunting and fishing institutions. The Federal Subsistence Board oversees the Federal Subsistence Management Program, which operates under Title VIII of the ANILCA (P.L. 96-487) and codified in 50 CFR 100. ANILCA section 804 states, “the taking on public lands of fish and wildlife for non-wasteful subsistence uses shall be accorded priority over the taking on such lands of fish and wildlife for other purposes.” 50 CFR 100.19 states that “The Board may restrict, close, or reopen the taking of fish and wildlife for non-subsistence uses on public lands when necessary to assure the continued viability of a particular fish or wildlife population, to continue subsistence uses of a fish and wildlife population, or for reasons of public safety or administration.” ANILCA section 803 defines “subsistence uses” as “the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade.”

The State of Alaska differs from the federal government in their interpretation of subsistence uses and rural priority. Under State law, subsistence use means: “the noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption, such as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible by-products of the fish and wildlife resources taken for personal or family consumption; and for customary trade, barter, or sharing for personal or family consumption” (AS 16,05.940[32]). Although several attempts were made to align the State and federal rural element to subsistence preference, the Alaska Supreme Court concluded that the preferential allocation of subsistence resources to rural user groups was unconstitutional (*McDowell v. State*, 785 P.2d 1, 9 [Alaska 1989]). Consequently, there are two separate regulatory regimes (State and federal) for hunting and fishing in Alaska.

The planning area encompasses, wholly or in part, Units 18, 19A, 19B, 19C, 19D, 20C, 21A, 21D, 21E, and 22A (BSWI Draft RMP/EIS, Map 3.5.2-1). The BLM Anchorage Field Office currently manages several federal subsistence hunts in the planning area (BSWI Draft RMP/EIS, Map 3.5.2-1). Each year, the USFWS Office of Subsistence Management publishes a set of federal hunting/trapping and fishing regulations in the CFR. If there is a positive customary and traditional use determination for a subsistence resource by specific communities or areas, those communities and areas have a federal subsistence priority for that specific species in that unit. If the Federal Subsistence Board has not determined any customary or traditional use for a wildlife or fish population in a unit, then all rural residents of Alaska may harvest fish or wildlife from that population.

Federal hunting seasons are open for several important wildlife species. Federally qualified subsistence users can also hunt with a State hunting permit on federal lands. However, where there is a need to prioritize the use of a subsistence resource among rural residents, the Federal Subsistence Board conducts

a Section 804 analysis of ANILCA. The result of the analysis identifies to whom a subsistence priority should be provided, typically with a list of the included rural villages. Federal lands can be closed to the harvest of subsistence resources except by federally qualified rural residents identified in the Section 804 analysis result.

Current federal subsistence hunting and fishing regulations can be found in 50 CFR 100.25-28 and at the DOI Federal Subsistence Management Program website. Current State hunting and fishing regulations can be found in Title 5, AAC and on the ADF&G website.

One of the most important things to villages in the planning area is the preservation of hunting and fishing for future generations (Lingle et al. 2011). To this end, the BLM is required to provide adequate access to subsistence resources in the planning area. One way that the BLM provides adequate access to subsistence resources in the planning area is via the required ANILCA section 810 analysis for proposed land use actions on BLM-managed public lands that undergo the NEPA process. Current management supports the continued subsistence effects analysis of proposed actions on BLM lands.

The BLM also cooperates with other federal agencies in the management of federal subsistence hunts on USFWS lands within the planning area. Additionally, the BLM cooperates with the activities of the ADF&G within the planning area; because, as mentioned above, federally qualified subsistence users can and do regularly obtain State hunting permits in addition to federal subsistence permits. The BLM Anchorage Field Office issues federal subsistence moose hunting permits for hunts FM2201 (GMU 22A) and assists the Innoko NWR for the federal subsistence moose hunt FM2104 in the Paimute Slough portion of Unit 21E (BLM 2015a).

FM2104 permits are issued to federally qualified subsistence users in Aniak, Chuathbaluk, Kalskag, Lower Kalskag, and Russian Mission in early February for this hunt that is open February 15 to March 15. A BLM employee travels to the villages to issue these permits. Cooperation and coordination with the Innoko NWR is needed because a concurrent hunt, FM2105, occurs to the north of FM2104 hunt area. These two hunts share a common harvest quota from which a certain portion is allotted for harvest in FM2104 (BLM 2015a). Although BLM assists the USFWS with issuing federal permits, the Innoko NWR has in-season authority for moose hunts in GMU 21E.

FM2201 permits are issued to federally qualified subsistence users in Unalakleet in early August for this hunt that is open August 15 to September 14. A BLM employee travels to Unalakleet to issue these permits. Cooperation and coordination with the ADF&G is needed because a State hunt, RM841, occurs in the same unit (Unit 22A) with an overlapping season. For FM2201, federal public lands are closed to the harvest of moose except by residents of Unalakleet. The BLM Anchorage Field Office has the authority to close the season in consultation with ADF&G (BLM 2015a).

FM1901 permits are issued to federally qualified subsistence users in Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Upper Kalskag, and Tuluksak for GMU 19A. The Yukon Delta NWR manager, in cooperation with the BLM, issues federal subsistence hunting permits for this hunt that is open September 1 to September 20. The federal permits for this hunt are issued in coordination with the State Tier I hunt, TM680 (BLM 2015a).

The BLM supports continued protection of access for federally qualified subsistence users to resources including those requiring federal subsistence permits. The BLM administers ANILCA subsistence processes and participates in formal subsistence management meetings as discussed in the following paragraphs (BLM 2015a).

The BLM also continues to conduct ANILCA section 810 analysis of all proposed actions on BLM-managed public lands. When a project is proposed on BLM lands, the project is analyzed under the NEPA process. In Alaska, each NEPA analysis is required to have a separate analysis under ANILCA section 810. ANILCA section 810 stipulates that federal agencies “shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives, which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.” Those projects with potentially large or controversial effects on subsistence uses and needs may be subject to public subsistence hearings (BLM 2015a).

The NWRs and NPS units in the planning area that were created or expanded by ANILCA (16 U.S.C. 410hh–3233, 43 U.S.C. 1602–1784) are managed by the USFWS and NPS, respectively, and these lands will not be covered by the Draft BSWI RMP. Management of subsurface estate within USFWS lands is managed by the BLM under the MLA (30 U.S.C. 201(a)).

ANILCA Section 304(c) is addressed in *Mineral Occurrence and Development Potential Report for Leasable Minerals within the Bering Sea – Western Interior Planning Area* (BLM 2015), will be addressed a case-by-case basis, and will not be covered by the Draft BSWI RMP. Similarly, any prior existing mining claims administered by the BLM in USFWS or NPS lands will be addressed on a case-by-case basis and will not be covered by the Draft BSWI RMP. A BLM subsistence biologist often attends Federal Subsistence Regional Advisory Council (RAC) meetings. These RACs include the Western Interior RAC, the Seward Peninsula RAC, the Yukon-Kuskokwim Delta RAC and the Northwest Arctic RAC. The councils are briefed and their comments solicited on BLM projects within and adjacent to the planning area as well as on projects on BLM-managed public lands that undergo the NEPA analysis (BLM 2015a). A recent paper by Brooks and Bartley (2016) describes an interpretive analysis of qualitative interviews with Yup’ik residents on the Yukon-Kuskokwim Delta. The authors suggest how understanding and improvements in cultural awareness could be made between stakeholders and agencies representatives by “more frequent and higher quality interactions and relationships.” The authors conclude that this would lead to a process that is more culturally appropriate and more meaningful collaborative management between different cultures (Brooks and Bartley 2016).

### **5.2.3 Resource Indicators**

The conditions that are established in the discussions below provide a baseline for subsistence-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS:

- Distribution and abundance of subsistence resources within the planning area
- Current and past use of resources within the planning area
- Subsistence closures

### **5.2.4 Current Conditions**

#### **Resources Harvested and Subsistence Harvest Levels**

Major subsistence activities throughout the planning area include the hunting of birds, caribou, and moose; fishing; trapping; harvesting of plants and berries; and logging for firewood and housing. A subsistence resource may be used for a number of different purposes. For example, the moose meat is

often preserved for consumption, while the skins are made into ceremonial drums and other handicrafts that may be sold for supplemental income (BLM 2015a).

The range and density of fish and wildlife populations vary across the planning area. Therefore, hunting effort varies across the region. A more detailed discussion of fish and wildlife populations in the planning area is covered in the wildlife and fisheries sections. Data in this section has been compiled largely from reports by ADF&G Division of Subsistence and ADF&G Community Profile Database. This is considered the best available data on subsistence at the community level and describes subsistence resources, levels of participation in subsistence activities, harvest levels and data on the sharing of these resources. It is important to remember that the types of data collected vary according to the study and years that the studies occurred. Data presented in Table 5.2.4-1 and Table 5.2.4-2 describe the harvest information by community that is available for the planning area.

### **Subsistence Use Patterns**

Communities within the planning area use large portions of the area and subunits to harvest resources for subsistence uses, with overlapping use areas between communities. Map 3.5.2-1 of the BSWI Draft RMP/EIS shows approximate Subsistence Use Areas for Yukon River Communities, and Kuskokwim River Communities, and the Norton Sound/Unalakleet Wild River Area communities in the planning area. Hunting and gathering of subsistence resources, including land and marine mammals, fish, birds, and vegetation/berries follows a seasonal round that varies from year to year and from community to community based on local traditional knowledge and observations of resources, river and weather conditions, and migratory patterns. Harvesting of subsistence resources tends to follow a general pattern of recurring use during specific seasons annually. State and federal hunting regulations have contributed to further changes in seasonal rounds by creating open and closed seasons for harvest of fish and wildlife resources. Rural residents continue to harvest fish, wildlife, and vegetation resources as a major part of their diet (BLM 2016b).

The river communities within the planning area tend to harvest larger numbers of fish (primarily salmon), whereas other communities harvest more moose, caribou and non-salmon fish. The communities along the Kuskokwim and Yukon Rivers tend to report higher levels of fish and moose as comprising a larger part of the overall subsistence harvest. Over the last decade, the weak salmon runs in the Yukon River have led communities to increase the harvest of non-salmon fish (Harkness et al. 2012).

Residents in the Upper Kuskokwim River regional communities (e.g., Takotna, McGrath, Nikolai, Telida) of the planning area share a natural similar environment and resource base in terms of harvest and have a long tradition of using a pattern of multiple species of salmon, non-salmon fish, large and small land mammals, birds, edible and medicinal plants and firewood for heating (Ikuta et al. 2014). In the Upper Kuskokwim River communities, a large percentage of the wild food harvest is from large land mammals instead of fish (Ikuta et al. 2014). Use patterns of the Lower Kuskokwim River Communities (Akiak, Napakiak, Napaskiak) tend to have higher rates of edible pounds per capita harvest of salmon and non-salmon fish in terms of subregional averages (Ikuta et al. 2014).

Data collected for three Yukon River communities (Anvik, Grayling, Russian Mission) by Ikuta et al. (2014) describes the differences and the interconnectedness in the use patterns and relationships between the two river drainages. Differences in harvest patterns were noted by their defined geographic subregions.

**Table 5.2.4-1. Yukon River Area Communities, Pounds of Resources Harvested by Community**

Community	Reference Year	All resources in Pounds	Salmon**	Non-Salmon Fish	Large Land Mammals	Small Land Mammals	Marine Mammals	Birds and Eggs	Vegetation
Anvik	2011	390.92	231.78	34.79	90.00	19.32	0.0	12.81	2.2
Grayling	2011	245.78	121.86	37.36	58.73	15.38	0	7.89	4.55
Holy Cross	1990	633.68	121.18	80.93	0	68.57	0	28.51	12.65
Kaltag	1985	ND	665.4	ND	ND	ND	ND	ND	ND
Marshall	2010	393.23	194.32	93.32	71.95	5.80	5.90	13.72	8.23
Nulato	2012	238.67	108.35	25.71	85.51	9.30	0.0	2.43	7.34
Russian Mission	2011	329.18	110.41	89.4	107.46	4.42	3.23	9.47	4.70
Shageluk	1990	445.25	157.87	141.43	126.06	8.22	0.0	9.08	2.58

Source: ADF&G 2016k  
 ND = No data

**Table 5.2.4-2. Kuskokwim River Area Communities Villages, Pounds of Resources Harvested by Community**

Community	Reference Year	All Resources in Pounds	Salmon**	Non-Salmon Fish	Large Land Mammals	Small Land Mammals	Marine Mammals	Birds and Eggs	Vegetation
Aniak	2009	306.3	190.04	49.58	41.18	3.16	2.10	0.0	5.76
Bethel	2012	168	68.75	33.34	43.34	1.09	3.22	9.66	8.68
Crooked Creek	2009	245.41	171.06	29.18	25.47	6.78	0.0	0.0	10.86
Chuathbaluk	2009	244	158.98	20.01	40.89	7.96	0.0	2.53	13.68
Lime Village	2007	935.5	555.80	49.88	259.97	17.15	0.0	0.0	48.2
Lower Kalskag	2009	186.72	98.63	0.0	35.35	3.28	0.0	0.0	12.6
Kalskag (Upper Kalskag)	2009	345.08	198.80	48.30	46.36	7.86	0.0	0.0	36.24
McGrath	2011	236.45	66.0	25.62	115.0	11.26	0.0	9.08	14.2
Nikolai	2011	499.35	131.0	75.90	247.2	14.60	0.0	24.4	9.8
Sleetmute	2009	405.23	277.10	53.90	43.90	15.08	0.0	5.35	10.53
Stony River	2009	532.51	365.99	92.43	20.26	38.68	0.0	0.0	9.79

Source: ADF&G 2016j

Russian Mission is a mostly Central Yu'pik community and the most upriver village on the Lower Yukon Drainage whereas Anvik and Grayling are Deg Hit'an and Holikachuk Athabascan communities that are located in the Lower Middle Yukon River in an area that is referred to as the "GASH" and is a subregion that borders the Lower Yukon Subregion. While these communities differ culturally their harvest patterns are similar and comparable to Kuskokwim River communities with a heavy reliance on large land mammals (primarily moose) and salmon.

Extensive sharing networks between the Kuskokwim and Yukon River communities have been observed (Ikuta et al. 2014). Sharing among the communities within the planning area of subsistence resources has been reported at high rates through food exchange networks. The community of McGrath reported (Ikuta et al. 2014) that sharing relationships occur with at least five other communities. Households in Aniak were reported to share with six Lower and lower Middle Yukon communities. The sharing of resources between the communities of the two river drainages connects and interconnects the communities, and the use areas overlap. Overlap in the area at Russian Mission and Paimuit Slough includes the lower reaches of Unit 21E and is likely influenced by the harvest of moose and non-salmon fish. Moose population declines in the Central Kuskokwim area in Unit 19A have led to an increase in harvest use in the Unit 21E area by Kuskokwim River residents (Ikuta et al. 2014).

### **Subsistence Use Areas**

There is limited data available for places or areas significant to and for subsistence use in the planning area. Studies investigating patterns of use; such as seasonal cycles, use areas, and resources harvested have been conducted by ADF&G Division of Subsistence and other agencies and organizations. Available data are mainly included in technical reports by ADF&G Division of Subsistence but are limited in scope and may be reflective only of use areas during a specific time or may represent historic use areas. The lack of data for a community is not an indication that subsistence harvests lack importance in the area. Not all species are included in the ADF&G surveys and only a few communities in the state are surveyed each year. The discussion of harvest information in the following sections is supplemented by information available from more recent ADF&G technical papers and publicly available information. Because resource distribution and subsistence use areas change over time information on subsistence use areas gathered during the scoping period, alternatives outreach and ACEC nominations are important supplements. Information from the ACEC Summary Report (BLM 2018b) regarding harvest use areas has been incorporated where available. Where appropriate the use of place names are those used by local people and these may not be consistent.

The following sections discuss subsistence use areas for communities within the planning area. The discussion is organized by river drainage within the planning area. It is important to note that the lack of data for a community is not an indication that subsistence harvests lack importance in the area.

### ***Yukon River Drainage Area Communities***

#### **Anvik**

Anvik is located on the Yukon River with a population of approximately 85 people. In March of 2012 researchers surveyed 24 of 32 eligible households in this community. The data was expanded for eight unsurveyed households and the estimated total harvest of wild food for the year 2011 was 34,001 edible pounds with an average household harvest of 1,075 pounds at 391 pounds per capita (Ikuta et al. 2014). Salmon (Chinook, summer chum, coho and fall chum) represented 59 percent of the total wild food harvest for the year 2011 with Chinook salmon being the most harvested species in the total community



harvest. Moose were the main large land mammals harvested (23 percent) and then other resources reported were beaver, whitefish, Northern Pike and sheefish. As noted by BLM in the ACEC Summary Report (BLM 2018b), rural residents along the Yukon River benefit from chum salmon spawned and reared in the Anvik River. As Chinook salmon numbers have declined in recent years, the significance of chum salmon from the Anvik River for food security has increased. These recent 2013 harvest numbers identify the importance of summer chum salmon, supported largely by the Anvik River, and the benefits to the subsistence and commercial fisheries of the lower Yukon River communities. The Anvik River watershed also supports moose habitat; habitat for all species of whitefish and cisco that spawn in the river; major sheefish spawning; and spawning and rearing habitat for all species of salmon. These food resources provide food security and public welfare to the Anvik community. The Anvik River is considered the largest single wild stock producer of summer chum salmon in the Yukon River drainage (Bergstrom et al. 1999). The Anvik watershed provides habitat for black bear, brown bear, caribou, wolf, wolverine and moose. Wood bison were introduced into the nearby Innoko Bottoms in March 2015. These species are important to subsistence users from the villages of Grayling Anvik, Shageluk, and Holy Cross, and are found throughout the region.

Residents and subsistence hunters reported that they used an area of 302 square miles for harvesting. They reported that the majority of the harvest are was west of Anvik near the Anvik and Bonasila Rivers and rely on the Yukon River to travel to other resource harvest areas. Residents reported traveling to hunt for moose roughly 15 miles from the town and as far as 30 miles up the Anvik and Bonasila Rivers. It was also reported that hunting for moose and birds occurs on the Yukon River. Non-salmon fishing for burbot, Northern pike, sheefish and whitefish occurs in the areas close to the community. Trapping was reported to occur for small land mammals on both sides the Anvik (west of the community and along the north end of Garden Island and inland from the Yukon River (Ikuta et al. 2014). The Anvik Traditional Trapping Area also provides important caribou, moose, and furbearing animal habitat that support trapping that many people rely upon in the region (BLM 2018b).

### **Grayling**

Grayling is located on the Yukon River. In 2012; the population was estimated at 212 people. Researchers from the ADF&G surveyed 41 of 55 households in the winter of 2012. Grayling residents harvested and estimated 52,094 pounds of wild foods, with an average household harvest of 947 pounds. The most widely used subsistence resources were salmon (Chinook and summer chum), land mammals (moose), non-salmon fish species, vegetation, and birds and eggs. More households reported using (98 percent) and harvesting (66 percent) Chinook salmon than any other fish species. Important fish subsistence species include coho, Chinook, pink, and chum salmon. These populations are relevant to the local subsistence users from the villages of Grayling Anvik, Shageluk, and Holy Cross. Moose were the most widely used (98 percent) and harvested (39 percent) of all land mammals The top ten resources harvested, in terms of edible weight, were Chinook salmon, summer chum salmon, fall chum salmon, moose, beaver, broad whitefish, sheefish, coho salmon, humpback whitefish, and northern pike Other species harvested by Grayling residents were several species of whitefish, vegetation, and black bear (Ikuta et al. 2014). Local plants and vegetation harvested and used for subsistence include wood (for heating and smoking fish) and berries and edible plants.

Grayling residents have reported a harvest area of 1,164 square miles in the Yukon River drainage in 2011. Much of the subsistence harvest activities pursued by Grayling residents occur along the river corridors and to the west of the community (Ikuta et al. 2014). The harvest areas for salmon, non-salmon fish and vegetation are located upriver from Grayling on the Yukon River, along the Innoko River, and

Shageluk Slough. Moose are reported as hunted up and down the Yukon from the village and along the Innoko River.

### **Holy Cross**

Holy Cross is located on the Yukon River with an estimated population in 2011 of 176 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 1990 being the most recent data set. Subsistence harvests were reported at 634 pounds (all resources) per person in Holy Cross with 63 households reporting data. Important subsistence fish species include coho, Chinook, pink, and chum salmon and whitefish. Black bear, brown bear, caribou, wolf, wolverine, lynx and moose are important land mammal resources.

As described in the ACEC Summary Report (BLM 2018b), the Anvik watershed, the Bonasila River watershed, Anvik Traditional Trapping Area, provide habitat for black bear, brown bear, caribou, wolf, wolverine and moose. These species are important to subsistence users from the villages of Grayling Anvik, Shageluk, and Holy Cross, and are found throughout the region. Important fish subsistence species include coho, Chinook, pink, and chum salmon. Holy Cross Village noted in the ACEC Summary Report that community harvest watersheds included: Pike Lake for fishing, Ranger Lake to Reindeer Lake, Paimuit Slough for hunting, fishing, trapping. Moose and ducks are also hunted along the Innoko River.

### **Kaltag**

Kaltag is located on the Yukon River with an estimated population in 2011 of 205 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 1985 being the representative year. Subsistence harvests were reported at 597 pounds (all resources) per person in Kaltag with 63 households reporting data. Important subsistence fish species included coho, Chinook and chum salmon. Black bear, brown bear, caribou, wolf, wolverine, lynx and moose are likely important land mammal resources for this village. The Kaltag Portage between Kaltag and Unalakleet has been an important travel and trade route for Alaska Natives for thousands of years as described in the ACEC Summary Report (BLM 2018b).

### **Marshall**

Marshall is located on the Yukon River with an estimated population in 2011 of 407 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 2010 being the representative year. Subsistence harvests were reported at 393.23 pounds per person (all resources). Salmon was the primary reported fish harvested with 194.31 estimated pounds per capita, and non-salmon fish harvests were 93.31 per capita. Salmon harvest mainly consisted of summer and fall chum, coho, and Chinook salmon. Non-salmon fish included burbot, northern pike, sheefish, whitefish, and humpback whitefish. Large land mammals harvested were mostly moose, caribou and black bear. Small land mammals harvested were primarily beaver (ADF&G 2016j). Marine mammal harvests were bearded and spotted seal.

Use Areas are mainly on the Yukon River. The Ohogamiut ACEC (BLM 2018b) area near Marshall was noted to have cultural and historic relevance to the community of Marshall. Traditional use of animals, fish, plants and wood from accessible lands and waters has been practiced by the indigenous people of Marshall in this region for thousands of years. The area provides habitat for black bear, brown bear, caribou, wolf, wolverine, lynx, and moose and more recently the reintroduced wood bison. These species

are important to subsistence users from the villages of Grayling, Anvik, Shageluk, and Holy Cross, and are found throughout the region.

### **Nulato**

Nulato is located on the Yukon River with an estimated population in 2011 of 275 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 2010 being the representative year. Subsistence harvests were reported at 239 pounds per person (all resources) Salmon was the primary reported fish harvested with 28,210 estimated pounds, mainly consisting of chum, coho, and Chinook salmon. Non-salmon fish included burbot, char, Dolly Varden, grayling, northern pike, sheefish, whitefish, cisco and least cisco, and humpback whitefish. Large land mammals harvested were mostly moose, caribou and black bear. Small land mammals harvested include snowshoe hare, beaver, lynx, muskrat, and porcupine (ADF&G 2016j). Use Areas are mainly on the Yukon River between the Koyukuk and Nowitna Rivers. During the preliminary alternatives public meeting in Nulato in 2015, one commenter noted that use areas included an area on the back side of the village closer to BLM-managed public land, where residents may pick berries, set a few trap lines, and harvest moose, caribou, ducks, beaver, wolves, and marten (BLM 2015c). The nearby Nulato River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik (BLM 2018b).

### **Russian Mission**

Russian Mission is located on the west bank of the Yukon River and in 2011 it was reported that Russian Mission had an estimated population of 402 people (Ikuta et al. 2014). In the winter of 2012, researchers from ADF&G surveyed 46 of 79 households in this community. Russian Mission's estimated total harvest of wild foods was 132,289 pounds. This was reported as an average of 1,675 pounds per household. Fish composed over half of the community's total harvest with 61 percent coming from both salmon and non-salmon species. Chinook salmon represented the main the fish harvest (22 percent) and moose composed just over 31 percent of the total followed by Arctic lamprey (8 percent), Northern Pike (7 percent), summer chum salmon (7 percent) and other resources (25 percent) (Ikuta et al. 2014). Other resources harvested included various species of whitefish, coho and chum salmon, and burbot. Moose and black bear are the main large land mammal species harvested and represent 34 percent and 3 percent respectively of the estimated harvest (Ikuta et al. 2014).

Harvest areas for Russian Mission reported a harvest area of 987 square miles in 2011 with the majority of salmon harvested on the mainstem of the Yukon River. Specific areas fished included an area of 20 continuous miles on the main stem of the Yukon River with drift activity occurring from Roosevelt Island 12 miles downstream from Russian Mission to Johnson Island 6 miles upstream from Russian Mission. Respondents in the 2011 study reported that their harvest areas are located away from the community both downstream and upstream and in areas that are distant from the community near Mountain Village in the Kuskokwim drainage. Harvest areas for non-salmon fish species and vegetation largely overlapped those of salmon along the Yukon River. Harvest areas for large land mammals (including moose and black bear) overlapped in a 62 mile area along the mainstem of the Yukon River. Harvest search areas were also reported as being along Mountain Creek north of the Yukon River and in the area new Portage Slough and Kulik Lake. Black bear were also hunted along Portage and Paimuit Sloughs (Ikuta et al. 2014).

### **Shageluk**

Shageluk is located on the Innoko River with an estimated population in 2011 of 83 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 1990 being the representative year. Subsistence harvests were reported at 445.24 pounds per person (all resources). Salmon (Chinook, chum salmon and summer chum) was the primary reported fish harvested with 157.86 estimated pounds per capita. Non-salmon fish harvests were 141.43 per capita, mainly consisting of pike, whitefish and sheefish. Harvests of all whitefish species for Shageluk was reported in Brown et al. (2011) based of off household survey data by ADF&G in 2003 observing that 15,783 pounds of were harvests at Shageluk. Whitefish are now considered to be the most heavily harvested non-salmon fish by residents (Brown et al. 2011). Large land mammals harvested were moose at 126.06 estimated pounds per capita and small land mammals harvested were primarily beaver and hare at 8.22 estimated pounds per capita (ADF&G 2016j). Birds and egg harvests were 9.07 estimated pounds per capita and vegetation was 2.58 estimated pounds per capita.

Brown et al. (2011) describes the main harvest areas as along the Innoko River area, which is used primarily by residents of Shageluk and also Grayling, who have ties to the Innoko through their residence in the historical village of Holikachuk upriver from Shageluk (Brown et al. 2005). Rates of sharing between Holy Cross, Grayling, Anvik and Shageluk are considered to be high. The proposed Grayling ACEC is considered an important subsistence fishery for species including coho, Chinook, pink, and chum salmon. These populations are relevant to the local subsistence users from the villages of Grayling Anvik, Shageluk, and Holy Cross. The proposed Holy Cross ACEC, Anvik Traditional Trapping Area ACEC, Bonasila River Watershed ACEC, and Anvik River Watershed ACEC are also considered areas that provided wildlife habitat for subsistence uses for black bear, brown bear, caribou, wolf, wolverine, lynx and moose. These species are important to subsistence users from the villages of Grayling, Anvik, Shageluk, Holy Cross, and Kuskokwim River area communities.

### ***Kuskokwim River Drainage Area Communities***

#### **Aniak**

Aniak is located on the Kuskokwim River with the population (reported in 2009) at 501 people. In 2009, ADF&G researchers surveyed 141 of 170 households in Aniak and the data was expanded for the 29 unsurveyed households. Survey data reported that the estimated total wild food harvest was 147,316 pounds. The average household harvest was reported at 1,498 pounds. The species harvested and reported as used were fish (92 percent), vegetation (80 percent) and land mammals (76 percent). Forty-eight percent of households reported that they used birds and eggs. The largest percentage (82 percent) of the Aniak subsistence harvest in 2009 was salmon and non-salmon species. Fish species harvested included Chinook, chum, coho, and sockeye salmon; burbot; humpback whitefish; sheefish; unknown whitefish; and northern pike. Important fish subsistence species include coho, Chinook, pink, and chum salmon. Land mammals that were reported as harvested were moose and black bears, which contributed to 15 percent to the total harvest, while vegetation contributed another 2 percent and marine mammals, birds and eggs supplied less than 1 percent (Brown et al. 2012).

Harvest areas for Aniak that were noted in the 2009 survey were reported as using an area of 3,396 square miles. It should be noted that both the Kuskokwim and Aniak Rivers figure prominently in subsistence activities in terms of both harvest locations and transportation corridors. The households surveyed reported that they traveled up the Kuskokwim River as far as the mouth of the George River. The community reported that they traveled on the Aniak River, past the confluence of the Aniak, Salmon, and

Kipchuk Rivers. The areas to the south and west of the community were reportedly used for hunting and fishing in the vicinity of Whitefish Lake and the Buckstock Mountains. Salmon were harvested in the mainstem of the Kuskokwim River in the areas east and west of the community. Other areas that are fished were along the Aniak River. Non-salmon fish species were reported as harvested along the Aniak River and Whitefish Lake. Moose, caribou and black bear are hunted over a wide area. Residents reported hunting moose to the north in Units 21A and 21E in the area towards Paimiut Slough and the Iditarod River drainage (Brown et al. 2012).

### **Bethel**

Bethel is located on the Kuskokwim River, and in 2012, the population was reported as 6,113 people. As reported in 2012, the average per capita harvest was 168 pounds of wild food or 580 pounds per household. Available ADF&G data for household surveys that was reported in 2012 describes the harvests of 466 of 1,645 households in Bethel (ADF&G 2016j). The main species harvested and used included berries, moose, Chinook salmon, coho salmon, sockeye salmon, caribou, and chum salmon. ADF&G reported that over 50 percent of the households fished for salmon and non-salmon fish species and 30 percent harvested land mammals, 43 percent harvested birds and eggs, and 77 percent harvested vegetation such as berries or greens (Fall 2013). Salmon comprised 40 percent of the total harvest while 26 percent was made up of land mammals, 20 percent non-salmon fish species, 6 percent birds and eggs, 5 percent wild plants, 2 percent marine mammals, and less than 1 percent marine invertebrates. ADF&G reported that the harvest for salmon in 2012 were low because of the regulatory closures caused by poor returns. They noted that the data on total harvests collected in 2012 may not be representative when compared to years where there were no restrictions.

Harvest areas reported by Bethel residents from data that was collected from harvest tickets and permits shows where Bethel residents have hunted for large land mammals. Residents have hunted primarily in Unit 18 for moose, caribou, and muskoxen. They reported that in Unit 19, 20, and 21, they mainly hunted moose. The Kuskokwim River is the main fishing area for subsistence salmon fishing. While mapping of Bethel's subsistence use area is very limited, Bethel residents have been reported to share food with other Kuskokwim River communities (Brown et al. 2012) and contribute to wild food harvesting and processing networks in central Kuskokwim River communities.

### **Crooked Creek**

Crooked Creek is located on the Kuskokwim River and in 2010 had a reported population of 90. In April of 2010, ADF&G researchers surveyed 33 of 40 households, reporting from harvest during 2009. When they expanded the data for the 7 unsurveyed households, they determined that the estimated total harvest in 2009 was approximately 28,259 pounds and the average household harvest was reported at 706 pounds (Brown et al. 2012). Chinook, chum, coho, sheefish, and sockeye salmon accounted for 78 percent of the total subsistence harvest in 2009 (Brown et al. 2012) and the remaining 22 percent was comprised of moose (7 percent), black bear (3 percent) and beaver (3 percent). There were a variety of berries and other resources, such as birds, marine mammals, and marine invertebrates that were reported harvested by residents.

The Crooked Creek harvest areas were reported as using a total of 1,245 square miles for harvest activities in 2009 (Brown et al. 2012) It should be noted that for this year (2009), residents reported that this area was not representative of their entire traditional harvest territory. They noted that their entire use area was broader but harvest use areas had been affected by regulations, environmental changes and local animal populations, as well as the price of gasoline. Residents reported that the closure of Unit 19A had

affected moose hunts in the areas above the George River and the Holitna and Hoholitna basins (Brown et al. 2012). They reported hunting moose instead further down river and in the Bonanza flats and Donlin Creek areas (Brown et al. 2012).

Land mammals that were hunted included moose, caribou, bears, and small furbearers harvested over a large area that included the mainstem of the Kuskokwim River and its tributaries both downstream and upstream from the village of Crooked Creek. It was observed that the hunting areas for many land mammal species overlapped. Crooked Creek hunters said that they hunted for moose on the mainstem of the Kuskokwim River to as far as Lower Kalskag. They also reported hunting in areas far upriver at the George River. The Kuskokwim River tributaries used for moose hunting were the Holitna, Hoholitna and George Rivers. Black bear was hunted and harvested primarily along Crooked Creek and in the Oskawalik River drainage (Brown et al. 2012).

Salmon were harvested mainly in the mainstem of the Kuskokwim River from just below the mouth of the Oskawalik River upstream to the mouth of George River. The heaviest fishing was reported to take place along the Great Bend. Non-salmon fish species were reported as harvested in the mainstem of the Kuskokwim River. Arctic Grayling were reported as harvested in the George River and in Crooked Creek, near the confluence of Crooked Creek itself and the Kuskokwim River. Sheefish were harvested in the spring primarily in the Great Bend in front of the village (Brown et al. 2012). Harvest areas for berries and plants took place both near the community and in areas within a day's travel by boat. There were harvest locations reported in the Canoe Hills area and in the hills directly across the Kuskokwim River from the community of Crooked Creek. Residents reported traveling by boat downstream to an area between the Oskawalik River and Napaimute, and then also as far upstream as midway between the George River and the community of Red Devil (Brown et al. 2012). Trapping areas at the George River Area and the Oskawalik River were reported as popular use areas as well.

### **Chuathbaluk**

Chuathbaluk is located on the Kuskokwim River. In 2009, the estimated population was 122 people. In 2010, ADF&G researchers surveyed 30 of the 36 households in Chuathbaluk. They then expanded the data set for the six unsurveyed households Chuathbaluk's estimated total harvest was reported as 29,874 pounds. The average household harvest was determined to be 829 pounds. Fish were reported as the most widely used resource category (97 percent) followed by vegetation (87 percent), land mammals (80 percent), and birds and eggs (57 percent). It was reported that over 60 percent of the total harvest was composed salmon with Chinook being the main species harvested and also sockeye, coho, and chum salmon. Moose represented 13 percent of the total harvest but was used by over 70 percent of households as reported in the survey. Additional resources harvested included beaver, smelt, sheefish, black bear, and caribou. Caribou harvests were very low in the survey year, with only four total harvested.

Harvest areas for Chuathbaluk were reported to be in an area of 982 square miles. The land use areas were reported to be primarily at the mainstem of the Kuskokwim, Aniak and Holokuk Rivers, as well as Victoria and Suter creeks (Brown et al. 2012). Salmon fishing was reported as in a location that was limited to an area 5 miles upriver of Chuathbaluk and to 6 miles below on the mainstem of the Kuskokwim River. Salmon fishing also occurred near Napaimute and in Aniak Slough. Whitefish, rainbow/steelhead trout harvest locations were reported as similar to those harvest areas used for salmon. Chuathbaluk residents reported that harvest areas extended over a wide area for hunting of moose, caribou, and black bear. Caribou were harvested to the southwest of Aniak and to the east of Whitefish Lake. Black bear were reported as being hunted on the north and south banks of the Kuskokwim River in an area that was upriver of Napaimute. Moose hunting occurred along the river corridor in Unit 19A and s

in the Holokuk River drainage, the Russian Mountains, Suter Creek and the Kolamokof (Brown et al. 2012).

### **Kalskag**

Kalskag is located on the Kuskokwim River with an estimated population in 2011 of 219 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 2009 being the representative year. Subsistence harvests were reported at 345 pounds per person (all resources) in Kalskag. Important subsistence fish species included coho, Chinook and chum salmon, and whitefish. Moose are the primary land mammal resource harvested for this village.

### **Lime Village**

Lime Village is located on the Stony River with an estimated population in 2011 of 22 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 2007 being the representative year. Subsistence harvests were reported at 935 pounds per person (all resources) in Lime Village. Important subsistence fish species included coho, Chinook, sockeye and chum salmon, and non-salmon fish included pike, whitefish, and grayling. Black bear, caribou, and moose are important land mammal resources for this village.

### **Lower Kalskag**

Lower Kalskag is located on the Kuskokwim River with an estimated population in 2011 of 287 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 2009 being the representative year. Subsistence harvests were reported at 187 pounds per person (all resources) in Lower Kalskag. Important subsistence fish species included coho, Chinook and chum salmon, and whitefish. Moose are important land mammal resources that are harvested and used by this village.

### **McGrath**

McGrath is located on the Kuskokwim River with an estimated population in 2011 of 341 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System with 2011 being the representative year. Subsistence harvests were reported at 236 pounds per person (all resources) in McGrath. Important subsistence fish species were coho, Chinook, coho, and chum salmon, non-salmon fish included pike and sheefish. Moose are the most important land mammal resource for this village. Black bear, brown bear, plains bison, caribou, moose Dall sheep, wolf and wolverine are species, which are important to rural subsistence users from the villages of McGrath, Takotna and Nikolai (BLM 2018b).

Use areas that were described in 2011 by McGrath residents reported using an area of 3,857 square miles for subsistence. The harvest areas were reported along the Kuskokwim River from the mouth of the Swift Fork roughly 80 miles upstream from the community to the community of Stony Rover (Ikuta et al. 2014). Residents also reported that they used the areas near the community and the tributaries including the Takotna Rover, Fourth of July Creek, Nixon Fork, Carl Creek, and the Stony River as harvest areas. Drift gillnets sites were on the lower portions of the Big River and Pitka Fork, which are tributaries of the Middle Fork located about 25 miles upriver from McGrath. Drift net fishing occurred 10 miles up each of these rivers and drift gillnet fishing was occurring near the village of Stony Rover (Ikuta et al. 2014).

Large land mammal hunting for moose, black bear, brown bear and caribou occurs over a large portion of lands with hunting areas for species overlapping. Users in McGrath reported that they hunted along the Kuskokwim from Stony River to upstream of the mouth of the Swift Fork River, which is 88 miles from McGrath. They also reported traveling more than 50 river miles up the Nixon Fork and on the Takotna River from McGrath to roughly 50 miles upstream from the community of Takotna itself. Overland travel by snowmobile to the upper tributaries of the Yukon River occurred to the northwest of McGrath (Ikuta et al. 2014). Some hunting also occurs near the Innoko River 60 miles northeast of McGrath and towards the South Fork of the Kuskokwim River, which is 70 miles southwest of McGrath. Small mammal hunting occurs within a 60 mile diameter of the community. Bird hunting is reported to occur on the Kuskokwim River for roughly 25 miles downstream and upstream for about 80 miles to the mouth of the Swift Fork. Berry harvest occurs mainly on the road near McGrath and along the river.

The sheefish spawning area near McGrath was noted to be an important area for McGrath harvesters (BLM 2018b). A 2012 ADF&G report on sheefish spawning grounds on the Kuskokwim River provides detailed information about spawning areas documented on the Kuskokwim River (Stuby 2012). The report shows three spawning locations on the Kuskokwim River for sheefish, located on the Tonzona, Middle Fork and Big River, all located in the upper Kuskokwim River and of these locations; there are BLM-managed public lands near the Big River. The greatest use of sheefish in the Kuskokwim River drainage has been for subsistence (Stuby 2012).

### **Nikolai**

Nikolai is an Athabascan community located on the south fork of the Kuskokwim River. In 2011, the estimated population was 117 people. In January 2012, researchers from the ADF&G surveyed 26 of 39 households in Nikolai with questions on the survey pertained to harvests obtained in 2011. Expanding for the 13 unsurveyed households, Nikolai's estimated total harvest in 2011 was approximately 58,416 pounds with an average household harvest of 1,498 pounds and the average harvest per person reported at 499 pounds (Ikuta et al. 2014). The main species harvested and used were large land mammals (moose at 47 percent) Chinook salmon, Northern pike (5 percent), coho salmon (4 percent) and sheefish (4 percent) with other resources being chum salmon, whitefish, black bear, beaver, and Bering cisco (Ikuta et al. 2014.) Fish species reported to make up that largest percentage of the wild foods harvest. All households in the survey reported using moose, while 73 percent reported using Chinook salmon, 80 percent reported using berries and 73 percent reported using a fresh water fish species. Some 65 percent of households surveyed said they harvested a large land mammal and 58 percent said they harvested a moose. All of the households participating in the study reported harvesting vegetation and 65 percent reported harvesting fish.

Use Areas that were described in 2011 by Nikolai residents reported using an area of 757 square miles for subsistence. Residents reported that harvest areas for most subsistence resources overlapped and their traditional territory and includes a very large area encompassing most of the major tributaries of the Upper Kuskokwim drainage. The Upper Kuskokwim River and its tributaries were the main search and harvest locations and transportation corridors used to reach harvest areas (Ikuta et al. 2014). Non-salmon fishing occurred in areas similar to salmon fishing on the South Fork of the Kuskokwim downstream from the community and on the tributaries of the Big River. Households reported searching for moose primarily around the village, along the South Fork of the Kuskokwim River downstream from Nikolai, the Salmon River, and the North Fork of the Kuskokwim almost to Telida. Caribou, moose, as well as black and brown bear were also hunted along the South Fork of the Kuskokwim River and the upper reaches of Windy Fork of the Kuskokwim into the foothills of the Alaska Range (Ikuta et al. 2014).



Most Nikolai residents fished for Chinook salmon along the Salmon River, Pitka's Fork near Medfra, the North Fork of the Kuskokwim, and Blackwater Creek. Whitefish harvest locations are almost limitless in the area around Nikolai and residents spoke of harvesting whitefish in numerous locations almost year around. Pike are another important resource that was widely available throughout the area (Ikuta et al. 2014).

### **Sleetmute**

Sleetmute is located on the Kuskokwim River and in 2010; the population was reported as 86 people. In 2010, ADF&G conducted household surveys and 32 of 37 households participated and reported on their harvest activities during 2009 (Brown et al. 2012). The data was then expanded for five unsurveyed households. Survey data from 2009 estimated a total harvest in 2009 with approximately 36,547 pounds with an average per household harvest of 988 pounds. Species harvested and reported used included salmon (used by 91 percent of households); whitefish (84 percent); and large land mammals (63 percent), including moose (56 percent) (Brown et al. 2012). Residents reported that their harvest and use of moose was higher than in the past and several residents reported that prior to moose hunting being closed in Unit 19A, moose were the primary subsistence resource in the village (Brown et al. 2012). Moose accounted for an additional 9 percent of the total harvest and other land mammals harvested were beaver and black bear. Sleetmute residents reported that beaver were harvested mainly for their meat instead of their pelts. Salmon accounted for an estimated 68 percent of the total harvest. Other non-salmon fish resources harvested included sheefish, northern pike, and Arctic grayling (Brown et al. 2012). Edible plants that were harvested included blueberries, high bush cranberries, currants, wild rhubarb, rose hips, and Hudson's Bay tea (Brown et al. 2012).

The harvest areas as reported in 2009 by Sleetmute residents comprised of a total of 1,712 square miles. Residents reported that the majority of resources were harvested within a 20-mile radius of the community. Some residents noted that they also traveled up to 100 miles or more in search of wild food. The hunting areas for moose, black bear, and caribou were reported in areas that overlapped and included the Kuskokwim River corridor and tributaries that were the Holitna, Hoholitna, and Swift river corridors, the drainage of Titnuk Creek, and the area near the Door Mountains near the upper reaches of the Hoholitna River. Fishing areas are reported as being close to the community and driftnet and set net fishing sites are in the direct vicinity of the town (Brown et al. 2012). Residents reported that their driftnets and setnets were used downriver from the village whereas setnets were used at the mouth of the Holitna River, and slightly upriver from the village. Residents also reported fishing up the Holitna and Stony Rivers.

### **Stony River**

Stony River is located on the Kuskokwim River, with a reported population of 42 in 2010. In March 2010, ADF&G researchers surveyed 12 of 20 households in Stony River. They expanded the data for eight unsurveyed households. The estimated total harvest in 2009 was approximately 33,726 pounds. An average per household harvest of 1,686 pounds was reported. Fish was the main species that was harvested. Survey data indicated that ninety-two percent of households said they used land mammals and edible plants, and 75 percent of households reported that they harvested birds and eggs. Fifty eight percent of households said they harvested fish, 50 percent reported harvesting land mammals, 83 percent harvested vegetation, and 67 percent reported that they had harvested birds (Brown et al. 2012). Chinook salmon was the main salmon species harvested and salmon comprised 68 percent of the total community

harvest. Fish were the largest category of wild resource harvested in terms of edible pounds (86 percent of the total community harvest), followed by land mammals, edible plants, and birds (Brown et al. 2012).

Harvest areas that were reported as used by residents of Stony River included an area of 487 square miles. Residents reported that moose were hunted along the eastern border of Unit 19A and in the western portion of Unit 19D covering a small area that is down river from the community and portions of the Swift River, Tatlawiksuk River, and Kuskokwim River. Small land mammals harvest areas for beaver and marten were north of Stony River and upriver from the village (Brown et al. 2012). Salmon fishing areas are concentrated along the main stem of the Kuskokwim River with some families reporting that they travel up the Stony River to fish. Non-salmon fishing areas are down river from Stony River village and near the junction of the Kuskokwim and Stony Rivers (Brown et al. 2012).

### ***Norton Sound/Unalakleet Wild River Area***

#### **Unalakleet**

The community of Unalakleet is located on the Unalakleet River, with an estimated population in 2011 of 692 people (ADF&G 2016j). Limited data are available for this community in the ADF&G Community Subsistence Information System, with 1995 being the representative year and only migratory bird harvest data available reported at 9 pounds per person.

The Unalakleet River watershed provides habitat for moose, caribou, brown bear, wolf, wolverine, which are species that are important to local subsistence users. This is an area where the people of Unalakleet have traditionally fished and hunted; it has cultural significance. The proposed Unalakleet River Watershed ACEC contains several significant cultural resources. The Kaltag Portage has been an important travel and trade route for Alaska Natives for thousands of years. Moose populations within the Unalakleet watershed are at historically low levels but are slowly increasing with intensive population management coordinated by State and federal agencies, including BLM. Moose are an important subsistence species for the residents of local villages, particularly the Village of Unalakleet, and are managed under ANILCA on federal lands, and for sustained yields by ADF&G (BLM 2018b).

Chinook and coho salmon returning to the Unalakleet River constitute the bulk of the Unalakleet subsistence harvest and ADF&G has quantified Chinook and coho salmon subsistence harvests in the area since 1961 (Soong et al. 2008). The Unalakleet River watershed is actively fished and hunted for subsistence uses and needs by federally qualified rural residents. The decline of Chinook salmon population in recent years has elevated the significance of other salmon species for subsistence uses and needs.

The North River supports important subsistence and sport fishing for non-residents and residents of the village of Unalakleet. Resident fish are also present including Dolly Varden, Arctic char, and whitefish. High quality salmon spawning beds have been identified in the North River (BLM 2018b). The North River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik. The Nulato River watershed provides habitat for moose, caribou, brown bear, wolf, and wolverine. These species are important to local subsistence users, as well as local guides and outfitters that provide services to resident and non-resident sport hunters, providing benefit to the local economy as well as providing opportunity for qualified subsistence users from Unalakleet and Shaktoolik (BLM 2018b).

Egavik Creek and its watershed provides important caribou and moose habitat; all species of whitefish and cisco spawn in this river; the river is also a major spawning area for whitefish; and an important spawning area for all species of salmon. This is an area where the people of Unalakleet have traditionally fished and hunted; it has cultural significance. The proposed Egavik Creek Watershed ACEC has relevant values for an important spawning area for four species of Pacific Salmon and whitefish. These species have important subsistence value to the people of Unalakleet identifying them as a relevant value. This watershed provides habitat for black bear, brown bear, caribou, wolf, wolverine lynx and moose important to users from the villages of Unalakleet and Shaktoolik and are found throughout the region. The surrounding land is important for subsistence access, hunting, and calving/wintering grounds for moose and caribou. The Golsovia River watershed provides important caribou and moose habitat; all species of whitefish and cisco spawn in this river; the river is also a major spawning area for whitefish; and an important spawning area for all species of salmon. Extend the existing ACEC to include all areas of the Unalakleet River watershed (BLM 2018b).

### **5.2.5 Non-Market Values of Subsistence Resources and Activities**

Hunting and gathering of fish, wildlife, and vegetative resources have values that extend beyond economic worth. For many communities, hunting and gathering have shaped the culture and tradition of the people and the customs have been shared through generations. Customary trade and sharing within and between families is important to the ongoing relationships with neighbors inside and outside of the planning areas. Movements and timing of activities occur on seasonal rounds, dictated by availability of resources; and more recently by hunting, fishing, and trapping regulations, and employment and school schedules (Case 1986 in BLM 2018b).

The customs and traditions within and between the planning subunits are rich and varied. These customs and traditions have been passed from generation to generation, yet they continue to change in response to technology, resource availability, and regulations.

### **5.2.6 Resource Changes: Trends and Forecasts**

Climate change and associated effects such as accelerated spread of invasive species, changes in habitat character and quality, and changes in plant and animal species distribution and abundance are likely to affect the availability of subsistence resources. However, currently available research cannot confidently predict how individual species will respond to projected climatic changes in the planning area. Additionally, climate change will affect travel access to subsistence species populations in a manner similar to its effects on trails and roads.

## **5.3 Hazardous Materials and Health and Human Safety**

### **5.3.1 Introduction**

This section describes the laws, regulations and policies related to hazardous materials and health and human safety, as well as the resource indicators that will be used to evaluate impacts to hazardous materials and health and human safety. The section also includes a discussion of the current condition of abandoned mines, hazardous materials, and public safety within the project area and trends in resource uses and conditions that may affect hazardous materials and public safety within the project area in the future.

### 5.3.2 Laws, Regulations, and Policies

Numerous regulations and laws govern environmental protection, including but not limited to the following legislation. The Resource Conservation and Recovery Act (RCRA), Title 40 of the CFR, parts 239 through 282 and the CERCLA–Superfund govern how toxic substances that have been released into the environment are managed and remediated.

The CWA (40 CFR, Subchapters D, N, and O) is designed to manage discharge of hazardous substances into all waters and eliminate potential threats to the environment from those releases. Governance of toxic substances not included under RCRA or CERCLA are covered by the CWA Toxic Substance Control Act (TSCA; 15 U.S.C. 53); Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 6); Department of Transportation (49 CFR), and the National Contingency Plan.

Asbestos clean-up and disposal management on BLM-managed public lands is managed by the Asbestos Hazard Emergency Act and the Asbestos School Hazard Abatement Reauthorization Act and are intended to minimize impacts to those that live in the vicinity of possible asbestos containing structures.

Several pieces of legislation are in place to monitor air quality and ensure that industry and other potential large-scale polluters follow policy. These are the NESHAP, Section 112 of the CAA, 40 CFR Subchapter C.

The following BLM mandates are designed to provide guidance: the BLM Handbook H-1703-1, CERCLA Response Actions Handbook; BLM Handbook H-2000-1, Pre-Acquisition Environmental Site Assessments; and BLM Handbook H-2000-2, Environmental Site Assessments for Disposal of Real Property.

Additionally, the following CFR and AAC chapters govern worker safety and waste management protocols: the Occupational Health and Safety Administration (29 CFR) and Title 18 AAC Chapters 60 – Solid Waste Management, 70 – Water Quality Standards, 72 – Waste Water Disposal, 75 – Oil and Hazardous Substances Pollution Control, 78 – Underground Storage Tanks, 80 – Drinking Water and 90 – Pesticide Control.

### 5.3.3 Resource Indicators

The conditions that are established in the discussions below provide a baseline for hazardous materials and health and human safety-related values, which the impact analysis will be based on. The following indicators, along with qualitative discussions, will be used to evaluate impacts associated with management decisions in the BSWI Draft RMP/EIS:

- Permit application, monitoring, and closeout
- Amount of land that is publicly accessible from transportation channels and methods such as trails and OHV and snowmobile routes
- Areas, including location and size, that have been identified and managed as being subject to surface-disturbing activities
- Number of ROW authorizations, grants, and leases that have been issued

### 5.3.4 Current Conditions

#### Abandoned Mines

The planning area has a few areas of concern generated by historic mining activities and current placer mining. Past mining operations included the use of numerous hazardous substances, which were improperly stored and disposed of. A variety of petroleum, oil and lubricants, waste drums, explosive materials, acids, caustics, equipment parts, possible military surplus items, and household trash can be found on some of the known sites. Chemical hazards are not the only concern with Abandoned Mine Land (AML) sites; physical hazards may also exist.

A list of known AML sites has been compiled. These sites consist of current claims on BLM-managed public lands and historic sites of concern. Upon discovery of physical or environmental hazards at mine sites, temporary safety measures are implemented to warn the public of the risks associated with the site. A site assessment is performed to determine the extent of the hazards and the remediation required. Hazardous Management Resource and Restoration program and the AML program work together to remediate sites of concern. The Hazardous Management Resource and Restoration program covers the cleanup of hazardous materials and the AML program covers the remaining site cleanup (BLM 2018f).

#### *Abandoned Mines on BLM-Managed Public Lands*

The following two abandoned mines within the planning area occur on BLM-managed public lands (BLM 2018f):

#### **Red Devil Mine**

Red Devil Mine is located on the south bank of the Kuskokwim River, 1.5 miles upstream from the village of Red Devil and 8 miles downstream from Sleetmute. The mine is accessed from the Kuskokwim River or by aircraft via Red Devil airstrip. The lands encompassing Red Devil Mine are selected for conveyance to TKC (surface estate) and the Calista Corporation (subsurface estate) as part of the Sleetmute Village Townsite selection under ANCSA (BLM 2018g).

Mining occurred at the site from 1933 until 1971, yielding approximately 35,000 2.5-quart flasks of mercury. Operating under the 1872 mining laws, mine operators conducted extensive underground and surface mining, and disposed of mine tailings and processing wastes at the site. By the mid-1980s, the mine's block of unpatented federal mine claims were declared "Abandoned and Void" and the site had fallen into ruin (BLM 2018g).

The BLM began addressing hazardous materials and physical safety hazards at the site in 1987. Initial efforts focused on removing the remaining processing chemicals, PCBs in transformers, and backfilling open mine shafts and adits. In 2002, the derelict mine buildings and mercury production facilities were demolished and buried in onsite landfills. Beginning in 2003, BLM has addressed multiple fuel spills discovered around the site. Cleanup of spilled fuel from the mine's aboveground fuel storage tanks was completed as a project under the American Recovery and Reinvestment Act. BLM continues to investigate and cleanup additional old fuel spills around the property as they are discovered. This site is also listed on the ADEC Contaminated Sites Database and is listed in the "Contaminated Sites of Concern" section below as it is located on BLM-managed public lands.

### **Kolmakof Mine Site**

The Kolmakof Mine Site (KMS) is an abandoned cinnabar mine on the north bank of the Kuskokwim River. The site is located approximately 19.5 miles east of Aniak and approximately 10 miles west of Napaimute, Alaska. It is thought that the Kolmakof cinnabar deposit was first discovered by Russian explorers in about 1838, making it one of Alaska's earliest mineral discoveries. A distinguishing characteristic of the deposit is that it is located within a high bluff overlooking the Kuskokwim River; natural erosion action of the river causes cinnabar to become exposed to view by travelers on the river and pieces of fresh cinnabar can be easily collected from the river bank (BLM 2018h).

All of the buildings and equipment found at the KMS by the time the claims were closed date from the 1940s and later, most being property of the R&H Mining Company, which operated the KMS mining claims from 1965 until closure. The most aggressive mining at the KMS occurred during R&H's time; they brought in a large bulldozer and used explosives to blast away rock at the top of the bluff to expose and break free cinnabar. The miners hand-sorted cinnabar pieces from the rubble, and then cleared the debris from the open pit by pushing it over the bluff. A ball mill was employed to crush the ore and a flotation circuit was brought in to further concentrate/purify the cinnabar. R&H conducted some testing of retorting mercury on-site, but because the price of mercury was in steep decline retorting on-site did not get past small-scale testing. The last known production of cinnabar occurred in 1970, and the last claims were abandoned and void by 1993 (BLM 2018h).

BLM conducted a CERCLA Environmental Engineering and Cost Analysis for the site from 2008 through 2012, with a Removal Action Memorandum (RAM) signed in May 2013. Since then, BLM has achieved all cleanup/removal objectives of the RAM except at the former mercury retorting area. Cinnabar impacted soil there will continue to be removed and properly disposed of off-site as the annual federal budget process makes funding available.

### **Hazardous Materials**

Hazardous materials are used throughout the planning area. Every community, every commercial activity, and nearly all recreational and casual use activities use hazardous materials to some degree. Petroleum oil is the most common hazardous material present, although mining wastes, asbestos, lead-based paint, and chemicals such as solvents are also present. Tens to hundreds of thousands gallons of oil are stored and used at every community and large commercial enterprise. Smaller amounts (i.e., 50–250 gallons typically) are stored and used at nearly every residence. Recreational and casual users almost always use oil in amounts ranging from less than a gallon to hundreds of gallons to power outboard engines, chainsaws, small aircraft, camp stoves, and lanterns. The BLM expends a large amount of resources requiring users of public land to properly manage hazardous materials, with a significant portion of that going to characterization and cleanup of improperly managed oil; abandoned or orphan leaking drums consume considerable management resources.

The BLM's Hazard Management and Resource Restoration program provides a framework for hazardous materials management. Federal and State environmental laws and regulations govern the storage, handling, disposal and release of hazardous materials.

The goals of the BLM's Hazard Management and Resource Restoration program are:

- To protect public health, safety and environmental resources by minimizing environmental contamination and hazards on public land and BLM facilities.
- To comply with federal and State hazardous materials management laws and regulations.

- To maintain the health of ecosystems through assessment, cleanup, correction, and restoration of contaminated sites and other hazards.
- To manage hazards and hazardous materials-related risks, costs and liabilities.
- To integrate environmental protection and compliance with all environmental statutes into all BLM activities (BLM 2018i).

### ***Contaminated Sites of Concern***

According to the ADEC Contaminated Sites Database (Nov 2016), there are 289 contaminated sites listed within the entire planning area. This includes listings predominantly for fuels, but also includes, on a much more limited basis, PCBs, pesticides, solvents and abandoned mines and their associated wastes. Of the 289 listed sites, 140 are considered Active, 96 are considered Clean up Complete, 41 sites are considered Clean-up Complete with Institutional Controls, and the remaining 12 are considered Informational only (ADEC 2016e). A total of two of these sites exist on BLM-managed public lands within the planning area and both are considered Active. The two sites occurring on BLM lands are described below:

**Red Devil Mine** – File Number 2442.38.001, EPA CERCLIS ID AKD980495618): Mercury and arsenic are present in tailings piles, and free mercury is present in site soils associated with a large mercury processing (retorting) operation that ceased operation in the early 1970s. Petroleum hydrocarbons are present in various locations associated with maintenance shops. Other contaminants associated with mercury mining are also present. The approximately 10-acre main processing area is managed by BLM and has been a focus of remedial efforts for several years. This site is also described above in the “Abandoned Mine” section.

**Kolmakof Mine Site** – (File Number 2404.38.014, EPA CERCLIS ID AKN001002949): Tailings, ore, soil, and sediment contain mercury above soil cleanup levels. Surface water in a creek that runs adjacent to the site did not contain detectable levels of mercury, but sediment samples from the creek bed contained mercury up to 89 ppm. The tailings pile was dumped on the bank of the Kuskokwim River. Groundwater and river sediment have not been characterized (ADEC 2016e). This site is also described above in the “Abandoned Mine” section.

### ***Remediation of Contaminated Sites***

The BLM's policy regarding remediation of contaminated sites begins with identifying potentially responsible parties (PRPs) who may be liable for hazardous substance releases affecting BLM-managed public lands and resources. If PRPs have not been identified, or are unable to assist with remediation, the BLM evaluates the effects to the environment and creates a priority list for remediation. The nature and amount of suspected contamination determines the regulatory requirements, involvement of federal and/or State regulatory agencies, and other requirements for the site investigation and potential cleanup actions. The BLM Manual Handbook H-2000-1 discusses pre-acquisition Environmental Site Assessments. The main purpose of this process is to allow BLM to qualify for protection from CERCLA liability when acquiring an ownership interest in real property. The Pre-Acquisition Environmental Site Assessment breakdown is as follows:

1. **Level 1 – Pre-Acquisition Liability Survey** – This screening level analysis is the basis for determining whether a full Phase I Environmental Site Assessment will be required for a particular parcel. This step is used when the likelihood of contamination is low.

2. **Level 2 – Phase I Environmental Site Assessment** – In the event that Level 1 analysis indicates that there is the potential for contamination or RECs being present onsite, a Phase I Environmental Site Assessment is completed to applicable standards (ASTM E1527 or ASTM E2247-08). This stage also identifies other wastes onsite, such as solid wastes, hazards, and any other issues not readily obtained in realty documentation.
3. **Level 3 – Phase II Site Investigation** – In the event that significant potential for RECs is apparent, a site investigation will be performed. During this stage, analytical sampling is conducted and delineation work is completed to determine the nature and extent of onsite contamination. The Phase II investigation follows the ASTM E1903 Standard Guide for Environmental Site Assessments.
4. **Level 4 – Phase III Cleanup** – In the event that contamination identified during Phase II work occurs above applicable cleanup criteria, a cleanup action will be taken, with proper approvals. This stage involves full site characterization and cleanup.

Note that this process primarily involves CERCLA sites. Remediation of contaminated sites that are under state primacy are handled at that level.

### Public Safety

The planning area is extremely remote and difficult to access. BLM-managed public lands within the planning area are generally far from villages and reached by the public mainly by snowmobile, dogsled, or boat. The BLM currently employs one ranger to oversee the entirety of the Anchorage Field Office, which includes the BSWI, Bay, Kobuk-Seward, and Ring of Fire planning areas.

The mission of the Anchorage Field Office Law Enforcement program is to ensure the protection of the visiting public and BLM employees, and to prevent and investigate damage to and unauthorized use of public lands and resources, and to ensure compliance with federal laws and regulation on public land in keeping with the agency-wide mission of sustaining the health, diversity, and productivity of our public lands for the use and enjoyment of present and future generations.

The Anchorage Field Office's primary law enforcement priorities within the planning area are:

- Public safety;
- Prevention of irreversible damage to public lands and resources;
- Discovery and investigation of unauthorized use and occupancy on BLM-managed public lands (particularly when conveyance is delayed as a result of the occupancy); and
- Establishment of a routine BLM law enforcement presence in rural villages that neighbor public lands.

To access most of the BLM-managed public lands in the planning area, the ranger pilots a Cessna 206 maintained by the DOI Aviation Directorate. The degree to which the ranger flies this airplane is made on a flight-by-flight basis considering management, budget, and law enforcement parameters. Risk management analysis is continuously conducted to evaluate each law enforcement mission, particularly aerial patrols.

The major public safety issue for the BLM within the planning area is search and rescue for members of the public who become lost, disoriented, or disabled on public lands. The BLM has taken efforts to protect public safety during harsh winter conditions through building safety cabins along the Iditarod Trail and visibly marking the extent of the trail.



Major law enforcement issues throughout the planning area include the illegal transportation of alcohol, drunk driving, assault, sexual abuse, unauthorized dumping, and unauthorized commercial uses. These crimes are prevalent in villages throughout the planning area because of the lack of employment and opportunity available in many rural villages.

Alaska State Troopers have primary law enforcement responsibility within the planning area. The BLM's jurisdiction is limited to the public lands. One State Trooper may be responsible for as many as ten villages. Village Police Officers may be located in large towns within the planning area. Village Public Safety Officers are funded by Alaskan Native Tribes and are given limited law enforcement authority; however, they are not allowed to carry firearms. The State Troopers' role within these villages is to oversee the Village Police Officers and the Village Public Safety Officers, and to respond to crimes that are beyond the Village Police Officers' or Village Public Safety Officers' capability.

### **5.3.5 Resource Changes: Trends and Forecasts**

Upon discovery of physical or environmental hazards or hazardous materials, temporary safety measures are implemented to warn the public of the risks associated with the site. A site assessment is performed to determine the extent of the hazards and the remediation required.

If areas within the planning area sustain higher levels of visitation, or recreation activities or resource uses change, public safety issues may also change and would be assessed as new trends in safety emerge.

## ***Section 6. Reference List***

- ACCS (Alaska Center for Conservation Science). 2015. Monitoring & controlling invasive plants at Rohn Cabin: 2014 update. Alaska Natural Heritage Program, University of Alaska Anchorage. Anchorage, AK. 20 p.
- ACFEC (Alaska Commercial Fisheries Entry Commission). 2010. Permit database for 2010. Available at <http://www.cfec.state.ak.us/cpbycen/2010/Mnu.htm>.
- ACHP (Advisory Council on Historic Preservation). 2011. Native American Traditional Cultural Landscapes Action Plan. Washington, D.C.
- ACHP. 2012a. Traditional Cultural Landscapes in the Section 106 Review Process. Washington, D.C.
- ACHP. 2012b. Native Traditional Cultural Landscapes and the Section 106 Review Process: Questions and Answers. Washington D.C.
- ACIA (Arctic Climate Impact Assessment). 2005. Arctic Climate Impact Assessment Scientific Report. Cambridge University Press, MA. <https://www.amap.no/documents/doc/arctic-arctic-climate-impact-assessment/796>
- Ackerman, R.A. 1979. Southwestern Alaska Archeological Survey: Akhlun-Kuskokwim Mountains. A final research report to the National Geographic Society. Grant No. 80749.
- Ackerman, R.A. 1996. Cave 1, Lime Hills. In: American Beginnings, edited by F.H. West. University of Chicago Press, Chicago.
- ACRC (Alaska Climate Research Center). 2016. University of Alaska, Fairbanks. Available at: <http://akclimate.org/ClimTrends/Change/TempChange.html> (accessed November 2016).
- ACRC. 2018. Temperature Changes in Alaska. University of Alaska, Fairbanks. Available at: <http://akclimate.org/ClimTrends/Change/TempChange.html>.
- ADCCED (Alaska Department of Commerce, Community, and Economic Development). 2009. State of Alaska General Land Status with Guide Use Areas, Northern Alaska. Available at: [https://www.commerce.alaska.gov/web/portals/5/pub/GUA\\_02012010\\_N1mil.pdf](https://www.commerce.alaska.gov/web/portals/5/pub/GUA_02012010_N1mil.pdf).
- ADCCED. 2012. Community and Regional Alaska Community Database Online (CDO). Data <https://www.commerce.alaska.gov/web/dcra/ResearchAnalysis.aspx>.
- ADCCED. 2013. Alaska Fuel Price Report: Current community conditions, July 2013.
- ADCCED. 2017. Northern Opportunity: Alaska's Economic Development Strategy. Available at: <https://northernopportunity.com/>.
- ADEC (Alaska Department of Environmental Conservation). 1972. Alaska Department of Environmental Conservation, State of Alaska Air Quality Control Plan, Volume I, Plan, April 21. Available at: <http://dec.alaska.gov/air/anpms/sip/contents/> (accessed October 16, 2018).
- ADEC. 2008. Groundwater in Alaska fact sheet. Available (via search) at: <https://dec.alaska.gov/> (accessed October 16, 2016).
- ADEC. 2012a. State of Alaska 2010 Ambient Air Quality Network Assessment. Available at: <https://dec.alaska.gov/air/air-monitoring/network-assessments/> (accessed October 16, 2018).
- ADEC. 2012b. Air Quality Monitoring at Denali National Park & Preserve, Alaska 2000-2003, March 8. Available at: <https://dec.alaska.gov/air/air-monitoring/data-summaries> (accessed October 16, 2018).

- ADEC. 2013. Alaska's Final 2012 Integrated Water Quality Monitoring and Assessment Report. December 23, 2013. Available at: [https://dec.alaska.gov/water/wqsar/waterbody/docs/2012\\_Integrated\\_Report\\_FINAL\\_24DEC13.pdf](https://dec.alaska.gov/water/wqsar/waterbody/docs/2012_Integrated_Report_FINAL_24DEC13.pdf) (accessed October 16, 2018).
- ADEC. 2015a. ADEC Regional Haze Progress Report, Section III, Appendix to Section III.K. Areawide Pollutant Control Program for Regional Haze. Adopted December 17, 2015. Available at: <http://dec.alaska.gov/air/anpms/regional-haze/sip/> (accessed October 16, 2018).
- ADEC. 2015b. Alaska State Greenhouse Gas Emissions Inventory 1990-2010, March 12. Available at: <https://dec.alaska.gov/air/anpms/projects-reports/greenhouse-gas-inventory/> (accessed October 16, 2018).
- ADEC. 2016a. Title 18, Alaska Administrative Code, Chapter 50, Air Quality Control 50 Section 10, Ambient Air Quality Standards, as amended through August 20, 2016. Available at: <http://www.legis.state.ak.us/basis/aac.asp#TitleTable> (accessed October 16, 2018).
- ADEC. 2016b. ADEC, Division of Air Quality, Air Non-Point Mobile Source. Wildfire Smoke Information. Available at: <https://dec.alaska.gov/air/anpms/wildfire-smoke/> (accessed October 16, 2018).
- ADEC. 2016c. Division of Air Quality. Air Permits, Approvals, and Public Notices Database. Available at: <http://dec.alaska.gov/Applications/Air/airtoolsweb/AirPermitsApprovalsAndPublicNotices> (accessed October 16, 2018).
- ADEC. 2016d. ADEC, Division of Air Quality, Air Non-Point Mobile Source. Dust— Rural Communities. Available at: <https://dec.alaska.gov/air/anpms/communities/pm10-rural/> (accessed October 16, 2018).
- ADEC. 2016e. ADEC Contaminated Sites Program. Contaminated Sites Map. Available at: <https://dec.alaska.gov/spar/csp.aspx> (accessed October 16, 2018).
- ADF&G (Alaska Department of Fish and Game). 1994. Hares. Available at: [www.adfg.alaska.gov/static/education/wns/hares.pdf](http://www.adfg.alaska.gov/static/education/wns/hares.pdf) (accessed October 16, 2018).
- ADF&G. 2007a. Wildlife Notebook Series. Alaska Department of Fish and Game website. Available at: <http://www.adfg.alaska.gov/index.cfm%3Fadfg%3Deducators.notebookseries> (accessed October 16, 2018).
- ADF&G. 2007b. Wood Bison Restoration in Alaska: A Review of Environmental and Regulatory Issues and Proposed Decisions for Project Implementation. ADF&G Department of Wildlife Conservation, Fairbanks, Alaska. [https://www.adfg.alaska.gov/static/species/speciesinfo/woodbison/pdfs/er\\_no\\_appendices.pdf](https://www.adfg.alaska.gov/static/species/speciesinfo/woodbison/pdfs/er_no_appendices.pdf) (accessed October 16, 2018).
- ADF&G. 2007c. Coyote Species Profile. <http://www.adfg.alaska.gov/index.cfm?adfg=coyote.main>
- ADF&G. 2008. Wolverine-wildlife notebook series. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=wolverine.resources> (accessed October 16, 2018).
- ADF&G. 2010a. Alaska Department of Fish and Game-division of wildlife conservation. Brown/Grizzly bear hunting in Alaska. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=brownbearhunting.main> (accessed October 16, 2018).
- ADF&G. 2010b. 2010-2011 hunting regulations. Available at: [www.wc.adfg.state.ak.us/regulations/pdfs/gmu19.pdf](http://www.wc.adfg.state.ak.us/regulations/pdfs/gmu19.pdf) (accessed October 16, 2018).

- ADF&G. 2011. Caribou management report of survey-inventory activities 1 July-30 June 2010. P. Harper, editor. Juneau, Alaska.
- ADF&G. 2012. Sport anglers prohibited from using felt soles in fresh waters of Alaska. February 24, 2012. 2 p.
- ADF&G. 2013a. Chinook salmon stock assessment and research plan. Alaska Department of Fish and Game Chinook Salmon Research Team.
- ADF&G. 2013b. Furbearer management report of survey-inventory activities, 1 July 2009–30 June 2012. Patricia Harper and Laura A. McCarthy, editors.
- ADF&G. 2013c. Dall Sheep, species profile. Available at: <http://www.adfg.alaska.gov/index.cfm%3Fadfg%3Ddallsheep.main> (accessed October 16, 2018).
- ADF&G. 2013d. Alaska Board of Game prohibition on footgear with absorbent, fibrous materials soles for hunters in fresh water, effective January 1, 2013.
- ADF&G. 2014a. Alaska Fish & Wildlife News. July 2014 Western Arctic Caribou Herd Numbers 235,000.
- ADF&G. 2014b. Moose management report of survey and inventory activities. 1 July 2011 to 30 June 2013. Moose management report ADF&G/DWC/SMR-2014-6.
- ADF&G. 2014c. Plains bison management report of survey-inventory activities. 1 July 2011 to 30 June.
- ADF&G. 2014d. Dall sheep management report of survey and inventory activities. 1 July 2011 to 30 June 2013. Dall sheep management report ADF&G/DWC/SMR-2014-4.
- ADF&G. 2014e. Black bear management report of survey and inventory activities. 1 July 2010 to 30 June 2013. Black bear management report ADF&G/DWC/SMR-2014-5.
- ADF&G. 2015a. Caribou management report of survey-inventory activities. 1 July 2012 to 30 June 2014. Available at: <http://www.ADF&G.alaska.gov/index.cfm?ADF&G=wildliferesearch.smr20154> (accessed October 16, 2018).
- ADF&G. 2015b. Brown bear management report of survey and inventory activities. 1 July 2012 to 30 June 2014. Brown bear management report ADF&G/DWC/SMR-2015-1.
- ADF&G. 2015c. Alaska's wildlife action plan, draft for public and agency review, 8-1-2015. Division of Wildlife Conservation, Juneau. 203 p.
- ADF&G. 2016a. 2016-2019. Arctic-Yukon-Kuskokwim Commercial-Subsistence-Personal Use finfish and shellfish fishing regulations. Juneau, Alaska. 144 pp.
- ADF&G. 2016b. Subsistence Fishing. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistence.main> (accessed October 16, 2018).
- ADF&G. 2016c. Invasive Species. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=invasive.main> (accessed October 16, 2018).
- ADF&G. 2016d. Alaska Wildlife News. September 2016. Western Arctic Caribou Herd Update by Lincoln Parrett.
- ADF&G. 2016e. Plains Bison Species Profile. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=plainsbison.main> (accessed October 16, 2018).
- ADF&G. 2016f. Bison Hunting in Alaska. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=bisonhunting.main> (accessed October 16, 2018).

- ADF&G. 2016g. 2016-2017 Trapping Regulations.
- ADF&G. 2016h. Lynx (*Lynx canadensis*), species profile. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=lynx.main> (accessed October 16, 2018).
- ADF&G e. 2016i. Little Brown Bat Species Profile. Available at: [http://www.adfg.alaska.gov/index.cfm?adfg=littlebrownbat.main&\\_ga=2.19894072.1660833426.1539706137-1423519000.1539706137](http://www.adfg.alaska.gov/index.cfm?adfg=littlebrownbat.main&_ga=2.19894072.1660833426.1539706137-1423519000.1539706137) (accessed October 16, 2018).
- ADF&G. 2016j. Community Subsistence Information System (CSIS). Kaltag, Bethel, Upper Kalskag, Lower Kalskag, Lime Village, Marshall, Shageluk, Holy Cross, Nulato, and Unalakleet. Available at: <http://www.adfg.alaska.gov/sb/CSIS/> (accessed October 16, 2018).
- ADF&G. 2018a. 2018 Northern Alaska sport fishing regulations (ADF&G) summary. Juneau, Alaska. 48 pp.
- ADF&G. 2018b. Alaska Department of Fish and Game. Invasive Pike in Southcentral Alaska Overview webpage. Available at: [http://www.adfg.alaska.gov/index.cfm?adfg=invasivepike.main&\\_ga=2.62294060.1660833426.1539706137-1423519000.1539706137](http://www.adfg.alaska.gov/index.cfm?adfg=invasivepike.main&_ga=2.62294060.1660833426.1539706137-1423519000.1539706137). (accessed October 16, 2018).
- ADF&G. 2018c. 2018-2019 Hunting Regulations. Available at: [http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting&\\_ga=2.65994606.1972276792.1539704899-1742066182.1531340203](http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting&_ga=2.65994606.1972276792.1539704899-1742066182.1531340203) (accessed October 16, 2018).
- ADF&G. 2018d. Living with Beavers. Accessed on August 9, 2018, Available at: [http://www.adfg.alaska.gov/index.cfm?adfg=livewith.beavers&\\_ga=2.263597196.1660833426.1539706137-1423519000.1539706137](http://www.adfg.alaska.gov/index.cfm?adfg=livewith.beavers&_ga=2.263597196.1660833426.1539706137-1423519000.1539706137) (accessed October 16, 2018).
- ADF&G. 2018e. Wood Bison News. Issue No. 10, Spring 2018. Available at: [http://www.adfg.alaska.gov/static/research/wildlife/species/woodbisonrestoration/pdfs/woodbison\\_news\\_10\\_spring\\_2018.pdf](http://www.adfg.alaska.gov/static/research/wildlife/species/woodbisonrestoration/pdfs/woodbison_news_10_spring_2018.pdf) (accessed October 15, 2018).
- ADLWD (Alaska Department of Labor and Workforce Development). 2011a. American Community Survey 2007-2011. Available at: <http://live.laborstats.alaska.gov/cen/acsarea.cfm> (accessed October 16, 2018).
- ADLWD. 2011b. Alaska Local and Regional Information database, 2011. Available at: <http://live.laborstats.alaska.gov/alari/> (accessed October 16, 2018).
- ADLWD. 2012. Alaska Population Projections, 2010 – 2035. Available at: <http://live.laborstats.alaska.gov/pop/projections.cfm> (accessed October 16, 2018).
- ADLWD. 2015. 2015 Population Estimates by Borough, Census Area, and Economic Region. Available at: <http://live.laborstats.alaska.gov/pop/>.
- ADLWD. 2016. Alaska Employment Down 1.6 Percent in First Half of 2016. Press Release No. 16-42. December 2, 2016.
- ADNR (Alaska Department of Natural Resources). 2009. Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2009-2014.
- ADNR. 2014. Exterior quarantine of aquatic invasive weeds. March 5, 2014. 1 p.
- ADNR. 2016. Alaska's Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2016 – 2021.
- ADNR. 2018. What's Bugging Alaska's Forests? Spruce Bark Beetle Facts and Figures. Available at: <http://forestry.alaska.gov/insects/sprucebarkbeetle> (accessed September 2018).

- ADNR-OHA (Alaska Department of Natural Resources, Office of History and Archaeology). 2016. Alaska Heritage Resources Survey. Database on file at ADNR, OHA, Anchorage, Alaska.
- AEA (Alaska Energy Authority). 2010. Alaska Wind Speed Map. Available at: <http://www.akenergyauthority.org/Content/Programs/AEEE/Wind/WindMaps/Regional%20Wind%20Maps/Western%20Alaska%2030m%20wind%20speed.jpg> (accessed October 29, 2018)
- AEA. 2012. Hotel McGrath Peat Fuel Project.
- AEA. 2014. Wind Energy Fact Sheet. Available at <http://www.akenergyauthority.org/Programs/AEEE/Wind> (accessed November 8, 2016).
- AEA. 2016a. Biomass Energy Website. Available at: <http://www.akenergyauthority.org/Programs/AEEE/Biomass> (accessed November 8, 2016).
- AEA. 2016b. Emerging Energy Technology Fund Review Results. Available at: <http://www.akenergyauthority.org/Programs/EETF/Results> (accessed November 8, 2016).
- AEA. 2016c. Power Cost Equalization Program. Statistical Data by Community, Reporting Period July 1, 2011-June 30, 2012. Available at: <http://www.akenergyauthority.org/Programs/PCE> (accessed November 8, 2016).
- Agee, J.K. 1993 Fire Ecology of Pacific Northwest Forests, Washington, D.C., Island Press.
- Agosta, S.J. 2002. Habitat use, diet and roost selection by the big brown bat (*Eptesicus fuscus*) in North America: a case for conserving an abundant species. *Mammal Rev.* 32:172-198.
- Ahlstrand G.M., and C.H. Racine. 1993. Response of a shrub-tussock community to selected all-terrain vehicle use, Alaska, U.S.A. *Arctic and Alpine Research* 25:142–149.
- AICC (Alaska Interagency Coordination Center). 2016. Welcome to the Alaska Interagency Coordination Center. Available at: <http://fire.ak.blm.gov/aicc.php> (accessed on November 1, 2016).
- AKEPIC (Alaska Exotic Plant Information Clearinghouse). 2016. Available at: <http://aknhp.uaa.alaska.edu/maps-js/integrated-map/akepic.php> (accessed November 8, 2016).
- Alaska. 1989. *McDowell v. State*, 785 P.2d 1, 9.
- Alaska Zoo. 2016. Little Brown Bat. Alaska Zoo webpage, 2016 (no longer available).
- Alessa, L., M. Altaweel, A. Kliskey, C. Bone, W. Schnabel, and K. Stevenson. 2011. Alaska's Freshwater Resources: Issues Affecting Local and International Interests. *Journal of the American Water Resources Association* 47(1):143-157.
- Altman, B. 1997. Olive-sided Flycatcher in western North America. Status review prepared for U.S. Fish and Wildlife Service. Portland, OR.
- Altman, B., and R. Sallabanks. 2012. Olive-sided Flycatcher (*Contopus cooperi*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/502> (doi:10.2173/bna.502) (accessed October 16, 2018).
- AmericanTrails.org. 2016. Resources and Library: The National Trails System—National Trails System facts and history.
- AMNWR (Alaska Maritime National Wildlife Refuge). 2007. Restoring wildlife habitat on rat island: Alaska Maritime National Wildlife Refuge Aleutian Islands Unit Environmental Assessment. US Fish & Wildlife Service, Homer, AK. 152 p.

- Anchorage Daily News*. 2016. Alaska Close to Recession, If Not There Already, Economist Says. Available at <https://www.adn.com/economy/article/uaa-economist-alaska-recession-or-very-close/2015/11/14/> (updated September 28, 2016, published November 13, 2015).
- Antonson, J., and D. Lewis. 2016. Iditarod Trail National Register of Historic Places Multiple Property Documentation Form. Prepared by the State of Alaska Office of History and Archaeology, Anchorage.
- Arctic Council. 2013. Arctic Resilience Interim Report 2013. Stockholm Environment Institute and Stockholm Resilience Centre, Stockholm.
- Arp, Christopher D., and Trey Simmons. 2012. Analyzing the impacts of off-road vehicle (RAC) Trails on watershed processes in Wrangell-St. Elias National Park and Preserve, Alaska. *Environmental Management*, 49: 751-766.
- Association of Village Council Presidents. 2014. Comprehensive Economic Development Strategy.
- Audubon Society. 2014. Important Bird Areas of Alaska. Available at: [http://docs.audubon.org/sites/default/files/documents/alaska\\_ibas\\_ecoregions\\_20aug2014.pdf](http://docs.audubon.org/sites/default/files/documents/alaska_ibas_ecoregions_20aug2014.pdf) (accessed October 15, 2018).
- Audubon Society. 2016. Ecological Atlas of Alaska's Western Arctic, Third Edition. July 2016. Available at: <http://ak.audubon.org/node4186/special-reports-and-publications> (accessed October 29, 2018).
- Avery, M.L. 2013. Rusty Blackbird (*Euphagus carolinus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/200> doi:10.2173/bna.200 (accessed October 16, 2018).
- AWFCG (Alaska Wildland Fire Coordinating Group). 2016. Alaska Interagency Wildland Fire Management Plan 2016.
- Barber, V.A., G.P. Juday, and B.P. Finney. 2000. Reduced growth of Alaskan white spruce in the twentieth century from temperature-induced drought stress. *Nature*, 405(6787), 668-673. doi:10.1038/35015049.
- Barrett, S., D. Havlina, J. Jones, W. Hann, C. Frame, D. Hamilton, and J. Menakis. 2010. Interagency fire regime condition class guidebook. Version 3.0. (Guidebook). National Interagency Fuels, Fire, and Vegetation Technology Transfer.
- Beck, P.S.A., G.P. Juday, C. Alix, V.A. Barber, S.E. Winslow, E.E. Sousa, . . . and S.J. Goetz. 2011. Changes in forest productivity across Alaska consistent with biome shift. *Ecology Letters*, 14(4), 373-379. doi:10.1111/j.1461-0248.2011.01598.x.
- Beikman, H.M., 1980. Geologic map of Alaska: U.S. Geological Survey, 1 p., 1 sheet, scale 1:2,500,000.
- Bergstrom, D.J., K.C. Schultz, V. Golembeski, B.M. Borba, D. Huttunen, L.H. Barton, T.L. Lingnau, R.R. Holder, J.S. Hayes, K.R. Boeck, and W.H. Busher. 1999. Annual management report Yukon Area, 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A99-26, Anchorage.
- Beschta, R.L. 1997. Riparian Shade and Stream Temperature: An Alternative Perspective. *Rangelands* 19: 25-28.
- BirdLife International. 2012. *Asio flammeus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1
- Birnbaum C.A. 1994. Protecting Cultural Landscapes: Planning, Treatment, and Management of Historic Landscapes: Planning, Treatment, and Management of Historic Landscapes. Preservation Brief 36. National Park Service. Washington, D.C.

- Blanchard, J. 2016. Personal communication between Jenny Blanchard BLM Archaeologist and Paleontologist and Ned Gaines, AECOM Resource Specialist on October 21, 2016 regarding BSWI paleontological resources and PFYC mapping.
- BLM (Bureau of Land Management). 1981. Management Framework Plan Southwest Planning Area. Anchorage: US DOI BLM ADO.
- BLM. 1982. The Iditarod National Historic Trail: Seward to Nome Route, Volume 2: Resource Inventories. Available at: [http://www.arlis.org/docs/vol2/Iditarod/INHT\\_1982\\_Resource\\_Inventory/~Index.pdf](http://www.arlis.org/docs/vol2/Iditarod/INHT_1982_Resource_Inventory/~Index.pdf) (accessed October 19, 2016).
- BLM. 1983. Unalakleet National Wild River Management Plan. U.S. Department of the Interior, Bureau of Land Management. Anchorage District, Alaska. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 1986a. Resource Management Plan and Record of Decision for the Central Yukon Planning Area. September 26, 1986. BLM, Anchorage District Office, Anchorage, AK.
- BLM. 1986b. BLM Manual H-8410-1 - Visual Resource Inventory.
- BLM. 1986c. The Iditarod National Historic Trail Seward to Nome Route. A Comprehensive Management Plan. March 1986. BLM, Anchorage District Office, Anchorage, AK.
- BLM. 1988. Manual 1613 – Areas of Critical Environmental Concern. BLM, Washington, DC. September 29, 1988.
- BLM. 1996. Partners against weeds: an action plan for the Bureau of Land Management. Western Weed Team, Billings, MT. 45 p.
- BLM. 2004. Alaska Statewide Land Health Standards and Guidelines. Instruction Memorandum No. AK 2004-023. 12 p.
- BLM. 2005. Land Use Planning Handbook. H-1601-1. Available at: [https://edit.blm.gov/sites/blm.gov/files/uploads/Media\\_Library\\_BLM\\_Policy\\_Handbook\\_h1601-1.pdf](https://edit.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_Handbook_h1601-1.pdf).
- BLM. 2006. Sec. 207 Alaska Lands Transfer Acceleration Act: Review of D-1 Withdrawals. Report to Congress June 2006.
- BLM. 2007a. Vegetation Treatments using Herbicides in Thirteen Western States Record of Decision. September 2007.
- BLM. 2007b. Environmental Assessment Donlin Creek Peat Resource Evaluation. Case File AA-086838, AK -040-07-EA-011.
- BLM. 2008. Assessment and Mitigation of Potential Impacts to Paleontological Resources: BLM Instruction Memorandum No. 2009-011.
- BLM. 2010a. Instruction Memorandum No. AK-2010-001. State Invasive Weed Policy and Attachments.
- BLM. 2010b. Memorandum of Understanding between the U.S. Department of the Interior Bureau of Land Management and the U. S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds.
- BLM. 2012a. BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands



- BLM. 2012b. BLM Handbook H-8342, Travel and Transportation. U.S. Department of the Interior. Anchorage. Bureau of Land Management. March 2012.
- BLM. 2012c. BLM Manual 6280 – Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation. BLM, Washington, DC. September 14, 2012.
- BLM. 2012d. BLM Manual 6400 – Wild and Scenic Rivers - Policy and Program Direction for Identification, Evaluation, Planning, and Management (Public).
- BLM. 2014a. BLM Handbook H-8320-1 – Planning for Recreation and Visitor Services.
- BLM. 2014b. BLM Handbook H-2930-1 Recreation Permit and Fee Administration Handbook.
- BLM. 2014c. Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Alaska.
- BLM. 2014d. Bering Sea-Western Interior Resource Management Plan Scoping Summary Report. May 2014. Available online at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431>
- BLM. 2015a. Analysis of the Management Situation, Bering Sea-Western Interior Resource Management Plan. February 17, 2015. Available online at: [https://eplanning.blm.gov/epl-front-office/projects/lup/36665/54700/59390/AMS\\_FinalDraft\\_v.02.15.2015\\_\(508\\_ready\).pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36665/54700/59390/AMS_FinalDraft_v.02.15.2015_(508_ready).pdf).
- BLM. 2015b. AIM National Aquatic Monitoring Framework: Introducing the Framework and Indicators for Lotic Systems. Technical Reference 1735-1. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.
- BLM. 2015c. BSWI Preliminary Alternatives Comment Summary Report, August 2015. Available at: [https://eplanning.blm.gov/epl-front-office/projects/lup/36665/62070/67313/FINAL\\_BSWI\\_Prelim\\_Alts\\_Rpt\\_and\\_Appendices.pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36665/62070/67313/FINAL_BSWI_Prelim_Alts_Rpt_and_Appendices.pdf) (accessed August 1, 2016).
- BLM. 2016a. Eastern Interior Proposed Resource Management Plan and Final Environmental Impact Statement. Prepared by U.S. Department of the Interior Bureau of Land Management-Alaska Eastern Interior Field Office. June 2016, 1791 pages. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=10151>.
- BLM. 2016b. Manual Transmittal Sheet 1730 – Management of Domestic Sheep and Goats to Sustain Wild Sheep (Public). March 2, 2016. 14p.
- BLM. 2016c. Record of Decision for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement.
- BLM. 2016d. Potential Fossil Yield Classification System. BLM Instruction Memorandum No. 2016-124.
- BLM. 2016e. Manual 1626, Travel and Transportation Management. U.S. Department of the Interior. Anchorage. Bureau of Land Management. September 2016.
- BLM. 2017a. The Council on Environmental Quality Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews. Permanent Instruction Memorandum (PIM) No. 2017-003.

- BLM. 2017b. Manual 2930 – Recreation Permits and Fees – (Public). Bureau of Land Management. October 22.
- BLM. 2017c. Determinations of Eligibility for Cultural Resources Associated with the Iditarod National Historic Trail (INHT): Farewell Burn Segment (MCG-0124), Kaltag Portage Segment (UKT-0044, NOB-0057, NUL-0065), Tenmile Cabin Site (NOB-033). Prepared by Carrie Cecil for the Alaska Office of History and Archaeology, Alaska State Historic Preservation Office, Alaska Division of Public and Outdoor Recreation.
- BLM. 2018a. Air Resources. Available at: <https://www.blm.gov/programs/natural-resources/soil-air-water/air> (accessed October 29, 2018).
- BLM. 2018b. Areas of Critical Environmental Concern Report on the Application of the Relevance and Importance Criteria. Bering Sea Western Interior Resource Management Plan. Version 3: September 2018. BLM, Anchorage Field Office, Anchorage, AK.
- BLM. 2018c. BSWI RMP Wilderness Characteristics Inventory Report.
- BLM. 2018d. Iditarod National Historic Trail. Available at: <https://www.blm.gov/programs/national-conservation-lands/national-scenic-and-historic-trails/iditarod> (accessed October 29, 2018).
- BLM. 2018e. Bering Sea-Western Interior Wild and Scenic River Study Report (BLM/AK/PL-15/006+8354+A010).
- BLM. 2018f. BLM Abandoned Mine Lands. Available at: <https://www.blm.gov/programs/public-safety-and-fire/abandoned-mine-lands> (website updated July 9, 2014, accessed October 29, 2018).
- BLM. 2018g. Red Devil Mine. Available at: <https://www.blm.gov/programs/public-safety-and-fire/abandoned-mine-lands/regional-information/alaska/projects/red-devil-mine> (accessed October 29, 2018).
- BLM. 2018h. Kolmakof Mine Site Project Homepage. Available at <https://www.blm.gov/programs/public-safety-and-fire/abandoned-mine-lands/regional-information/alaska/projects/kolmakof-mine> (accessed October 29, 2018).
- BLM. 2018i. BLM Anchorage Field Office Hazardous Materials Program. Available at: [http://www.blm.gov/ak/st/en/fo/ado/hazardous\\_materials.html](http://www.blm.gov/ak/st/en/fo/ado/hazardous_materials.html) (website updated June 9, 2016, accessed November 10, 2016).
- BLM-AFS (Bureau of Land Management-Alaska Fire Service). 2016. Alaska Fire Service Fact Sheet. Available at: <http://afs.ak.blm.gov/MediaToolKit/Fact%20Sheets/BLM%20AFS%20fact%20sheet%202016.pdf>.
- BLM-DOE (Bureau of Land Management and U.S. Department of Energy). 2003. Assessing the Potential for Renewable Energy On Public Lands. DOE/GO-102003-1704.
- BLM GIS (Bureau of Land Management Geographic Information Systems). 2016. Geographic Information Systems. BLM, Anchorage Field Office, Anchorage, AK.
- Boggs, K., L. Flagstad, T. Boucher, T. Kuo, D. Fehringer, S. Guyer, and M. Aisu. 2016a. Vegetation map and classification: Northern, Western and Interior Alaska - Second Edition. Alaska Center for Conservation Science, University of Alaska Anchorage, Anchorage, Alaska. 110 pp.
- Boggs, K., L. Flagstad, T. Boucher, A. Steer, P. Lema, B. Bernard, B. Heitz, T. Kuo, and M. Aisu. 2016b. Alaska ecosystems of conservation concern: biophysical setting and plant associations. University of Alaska Anchorage, Alaska Center for Conservation Science. Anchorage, AK. 300 p.

- Boreal Songbird Initiative. 2016. Olive-sided Flycatcher (*Contopus cooperi*). Available at: <http://www.borealbirds.org/bird/olive-sided-flycatcher>.
- Box, S.E., and W.P. Elder. 1992. Depositional and Biostratigraphic Framework of the Upper Cretaceous Kuskokwim Group, Southwestern Alaska. In Bradley, D.C. and A.B. Ford (editors). *Geologic Studies in Alaska by the U.S. Geological Survey*. 1990. U.S. Geological Survey, Bulletin 1999. p 8-16
- Brooks, J.J., and K.A. Bartley. 2016. What is Meaningful Role? Accounting for Culture in Fish and Wildlife Management in Rural Alaska. *Human Ecology*. Volume 44, No. 4. August 2016.
- Brown, C., Burr, J., Elkin, K., and R. J. Walker. 2005. Contemporary Subsistence Uses and Population Distribution of Non-salmon Fish in Graying, Anvik, Shageluk, and Holy Cross. Prepared by ADF&G, Fairbanks, AK. Technical Paper 289.
- Brown, C., J.S. Magdanz, D.S. Koster and N.M. Braem. 2012. Subsistence Harvests in 8 Communities in the Central Kuskokwim River Drainage, 2009. Alaska Department of Fish & Game, Division of Subsistence. Technical paper No. 365.
- Brown, J. K., and J. Kapler Smith, eds. 2000. *Wildland Fire Ecosystems; Effects of Fire on Flora*. Gen. Tech. Rep. RMRS-GTR-42 Vol. 2 Ogden, UT; U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station 257 p.
- Brown, R.J., C. Brown, N.M. Braem, W.K. Carter, N. Legere, and L. Slayton. 2011. *Whitefish and Whitefish Fisheries in the Yukon and Kuskokwim River Drainages in Alaska: A Status Review with Recommendations for Future Research Directed Towards Sustainable Management*. U.S. Fish and Wildlife Service and Alaska Department Fish & Game (editor). Fisheries Resources Monitoring Program Draft Report.
- Bundtzen, T.K., and J.T. Kline. 1986. Coal, peat, and geothermal potential of the Kuskokwim area plan: Alaska Division of Geological & Geophysical Surveys Public Data File 86-88, 16 p. <http://doi.org/10.14509/1289>.
- Bundtzen, T.K., and M.L. Miller. 1997. Precious metals associated with Late Cretaceous-early Tertiary igneous rocks of southwestern Alaska: *Economic Geology*, Monograph, 9, p. 242-286.
- Cady, W.M., R.E. Wallace, J.M. Hoare, and E.J. Weber. 1955. *The Central Kuskokwim Region, Alaska*. U.S. Geological Survey. Professional Paper 268. 132 pp.
- CAFF (Conservation of Arctic Flora and Fauna). 2016. Arctic invasive alien species (ARIAS) action plan. Akureyri, Iceland. 14 p.
- Caltrans (California Department of Transportation). 2009. Technical Noise Supplement, ICF Jones & Stokes, November. Available at: <http://www.dot.ca.gov/hq/env/noise/pub/Technical%20Noise%20Supplement.pdf>.
- Carlson, M., and M. Shephard. 2007. Is the spread of non-native plants in Alaska accelerating? In: Harrington, T., and S. Reichard (eds.). *Meeting the challenge: invasive plants. Pacific Northwest ecosystems*. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, OR. General Technical Report PNW-GTR-694. 111–127 p.
- Carlson, M. L., I. V. Lapina, M. Shephard, J. S. Conn, R. Densmore, P. Spencer, J. Heys, J. Riley, and J. Nielsen. 2008. *Invasiveness Ranking System for Non-Native Plants of Alaska*. R10-TP-143. USDA Forest Service, Anchorage, AK. 220 p.
- Carlson, S. M. 2005. *Economic Impact of Reindeer-Caribou Interactions on the Seward Peninsula*. Master of Science Thesis. University of Alaska Fairbanks: Fairbanks, AK. 112 p.

- Cella, B., J.L. Allen, P. Butteri, F.V., Cole, M.D. Fleming, K. Howard, J. Koltun, G. Long, P. Martyn, K.A. Murphy, E. Noonan-Wright, J. Passek, J.H. Scott, J.W. See, K. Slaughter, B. Sorbel, and S. Theisen. 2008. Fuel model guide to Alaska vegetation. Anchorage, AK: US Fish and Wildlife Service. 75 p.
- CEQ (Council on Environmental Quality) and ACHP (Advisory Council on Historic Preservation). 2013. NEPA and NHPA: A Handbook for Integrating NEPA and Section 106.
- Chapin, F.S., III, S.F. Trainor, O. Huntington, A.L. Lovecraft, E. Zavaleta, D.C. Natcher, and R.L. Naylor. 2008. Increasing wildfire in Alaska's boreal forest: Pathways to potential solutions of a wicked problem. *Bioscience*, 58(6), 531-540. doi:10.1641/B580609.
- Chapin, F.S., III, A.D. McGuire, R.W. Ruess, T.N. Hollingsworth, M.C. Mack, J.F. Johnstone, E.S. Kasischke, E.S. Euskirchen, J.B. Jones, M.T. Jorgenson, K. Kielland, G.P. Kofinas, M.R. Turetsky, J. Yarie, A.H. Lloyd, and D. Taylor. 2010. Resilience of Alaska's boreal forest to climatic change. *Canadian Journal of Forest Research*. 40(7): 1360-1370. [82445].
- Cheney, W.L. 1971. Life history investigations of northern pike in the Tanana River drainage. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Progress Report, 1970-71, Project F-9-3, Study R-11, volume 12. Juneau, AK.
- Churkin, M., and C. Carter. 1996. Stratigraphy, structure and graptolites of an Ordovician and Silurian sequence in the Terra Cotta Mountains, Alaska Range, Alaska: U.S. Geological Survey Professional Paper 1555, 84 pages.
- Coles-Ritchie, M.C., D.W. Roberts, J.L. Kershner, and R.C. Henderson. 2007. Use of a Wetland Index to Evaluate Changes in Riparian Vegetation After Livestock Exclusion. *Journal of the American Water Resources Association* 43 (3): 731-743.
- Collins, W.B., B.W. Dale, L.G. Adams, D.E. McElwain, and K. Joly. 2011. "Fire, Grazing History, Lichen Abundance, and Winter Distribution of Caribou in Alaska's Taiga." *Journal of Wildlife Management* 75(2):369-377.
- Conant, B., J.I. Hodges, D.J. Groves, and J.G. King. 2002. Census of Trumpeter Swans on Alaskan nesting habitats, 1968-2000. *Waterbirds: The International Journal of Waterbird Biology* 25:3-7.
- Cooper, D.J. 1986. White spruce above and beyond tree line in the arrigetch peaks region, Brooks Range, Alaska. *Arctic*, 39, 247-252.
- Cronin, M. A., and J. C. Patton. 2002. Caribou and Reindeer (*Rangifer tarandus*) Genetic Variation and Herd Structure in northern Alaska. LGL Report P587, for BP Exploration (Alaska), Inc. LGL Alaska Research Associates Inc.
- Cronin, M.A., M.D. MacNeil, N. Vu, V. Leesburg, H.D. Blackburn, and J.N. Derr. 2013. Genetic Variation and Differentiation of Bison (Bison bison) Subspecies and Cattle (Bos taurus) Breeds and Subspecies. *Journal of Heredity* 2013:104(4):500-509.
- Crouse, J. and S. Crouse. 2008. Moose. Alaska Wildlife Notebook Series. Original text by: R.A. Raush, B. Gasaway, and C. Schwartz. Alaska Department of Fish and Game, Juneau, AK.
- Daubenmire, R. F. 1968. Plant communities: a textbook of plant synecology. Harper & Row, 300 p.
- Davis, T. 2015. Personal communication between Tammy Davis, ADF&G and Elizabeth Bella, AECOM on marine and freshwater aquatic invasives in Alaska, current status and trends. July 8th, 2015.
- Decker, John; S.C. Bergman, R.B. Blodgett, S.E. Box, T.K. Bundtzen, J.G. Clough, W.L. Coonrad, W.G. Gilbert, M.L. Miller, J.M. Murphy, M.S. Robinson, and W.K. Wallace. 1994. Geology of southwestern Alaska, in Plafker, George, and Berg, H.C., eds., *The Geology of Alaska*: Geological Society of America, p. 285-310.

- DeLuca, W., R. Holberton, P. Hunt, P. D. Hunt, and B.C. Eliason. 2013. Blackpoll Warbler (*Setophaga striata*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/431> doi:10.2173/bna.431.
- DOI (U.S. Department of the Interior). 2016. Safeguarding America's lands and waters from invasive species: A national framework for early detection and rapid response. Washington D.C., 55p.
- DOWL HKM. 2010, Western Alaska Access Planning Study, Corridor Planning Report, Executive Summary. January 2010. Prepared for the State of Alaska Department of Transportation and Public Facilities, Northern Region Planning.
- Druckenmiller, P., T.K. Bundtzen, and R.T. Jacobus. 2013 Review of Fossil Localities on Non-Federal Lands in the Proposed Donlin Gold Mine Area and Natural Gas Pipeline Corridor, Southwestern Alaska. Report prepared by Department of Earth Sciences, University of Alaska Museum of North, for Northern Land Use Research and Donlin Gold, LLC. April 2013.
- Dumond, Don E. 1984. Prehistory of the Bering Sea Region. In: Handbook of North American Indians, Volume 5: Arctic. David Damas, Volume Editor. Smithsonian Institution, Washington, D.C.
- Eisler, R., and S.N. Wiemeyer. 2004. Cyanide Hazards to Plants and Animals from Gold Mining and Related Water Issues. Rev Environ Contam Toxicol 183:21-54
- Elder, W.P., and S.E. Box. 1992. Late Cretaceous Inoceramid Bivalves of the Kuskokwim Basin, Southwestern Alaska, and Their Implications for Basin Evolution, Journal of Paleontology, The Paleontological Society Memoir Vol. 26, Supplement to Vol. 66, no. 2, March 1992, pp 1-39.
- Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of Wood Bison in Alaska. Federal Register Vol. No. 79, No. 88, May 7, 2014, pages 26175–26188. Available at: <https://www.federalregister.gov/articles/2014/05/07/2014-10506/endangered-and-threatened-wildlife-and-plants-establishment-of-a-nonessential-experimental>.
- EPA (U.S. Environmental Protection Agency). 1978. Noise: A Health Problem, August. Available at: <http://www.nonoise.org/library/epahlth/epahlth.htm>.
- EPA. 1996. AP-42, Compilation of Air Pollutant Factors, Volume I, Stationary Point and Area Sources, 5th Edition; Section 13.1 Wildfires and Prescribed Burning. October. Available at: <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors>.
- EPA. 2016a. NAAQS Table. Available at: <https://www.epa.gov/criteria-air-pollutants/naaqs-table> (website updated September 16, 2016, accessed November 10, 2016).
- EPA. 2016b. Visibility - Regional Haze Program. Available at: <https://www.epa.gov/visibility/visibility-regional-haze-program> (website updated March 1, 2016, accessed November 10, 2016).
- EPA. 2016c. Air Quality Analysis: Treatment of Data Influenced by Exceptional Events. Available at: <https://www.epa.gov/air-quality-analysis/treatment-data-influenced-exceptional-events> (website updated October 3, 2016, accessed November 7, 2016).
- EPA. 2016d. Summary of the Noise Control Act. Available at: <https://www.epa.gov/laws-regulations/summary-noise-control-act> (website updated September 8, 2016, accessed November 7, 2016).
- EPA. 2017a. EPA History: Noise and the Noise Control Act. Available at: <https://www.epa.gov/history/epa-history-noise-and-noise-control-act>. (website updated October 18, 2016, accessed March 8, 2017).

- EPA. 2017b. Does the EPA regulate noise? Where can I find resources about noise pollution? Available at: <https://publicaccess.zendesk.com/hc/en-us/articles/211393078-Does-the-EPA-regulate-noise-Where-can-I-find-resources-about-noise-pollution->. (website accessed March 8, 2017).
- Euskirchen, E.S., A.D. McGuire, F.S. Chapin III, and T.S. Rupp. 2010. The changing effects of Alaska boreal forests on the climate system. *Can. J. For. Res.* doi:10.1139/X09-209.
- Fall, J.A., editor. 2013. Report on proposed changes to non-subsistence areas. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 386, Anchorage.
- FEC (Fire Executive Council). 2009. Guidance for Implementation of the Federal Wildland Fire Management Policy, 2009.
- FERC (Federal Energy Regulatory Commission). 2014. Nuvista Light and Electric Cooperative Notice of Surrender Of Preliminary Permit, LLC Project No. 14369-001.
- Fenton, M.B., and R.M. Barclay. 1980. *Myotis lucifugus*. Mammalian Species No. 142. Amer. Soc. Mamm. 8 p.
- Finstad, G. 2008. Applied Range Ecology of Reindeer (*Rangifer tarandus tarandus*) On the Seward Peninsula, Alaska.
- Finstad, G. L., K. Kielland, and W. S. Schneider. 2006. Reindeer herding in transition; historical and modern day challenges for Alaskan reindeer herders. *Nomadic Peoples* 10(2): 31-49.
- Fiorillo, A.R., S.T. Hasiotis, and Y. Kobayashi. 2014. Herd structure in Late Cretaceous polar dinosaurs: A remarkable new dinosaur tracksite, Denali National Park, Alaska, USA. *J.Geology*. 42(8):719-722.
- Fix, P.J. 2011. Iditarod National Historic Trail Travel Analysis. University of Alaska Fairbanks, School of Natural Resources and Agricultural Sciences, Department of Humans and the Environment, Fairbanks, AK.
- Flagstad, L., and H. Cortes-Burns. 2010. Tracking Weeds along the Iditarod National Historic Trail. Alaska Natural Heritage Program, University of Alaska, Anchorage.
- Flux, J.E.C., and R. Angermann. 1990. Chapter 4: The Hares and Jackrabbits. In: J.A. Chapman and J.E.C. Flux (eds), *Rabbits, Hares and Pikas: Status Survey and Conservation Action Plan*, pp. 61–94. The World Conservation Union, Gland, Switzerland.
- Freeman, L.K., Athey, J.E., Lasley, P.S., and Van Oss, E.J. 2015. Alaska's mineral industry 2014: Alaska Division of Geological and Geophysical Surveys Special Report 70, 60 p. Available at: <http://doi.org/10.14509/29515>.
- Fryer, Janet L. 2014. *Picea mariana*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/plants/tree/picmar/all.html> [2017, February 21].
- Gaines, Edmund P., Ben A. Potter, Peter M. Bowers, and Molly M. Proue. 2006. Documentation of Human Remains and Excavations at XHB-00115, Hooper Bay, Alaska. Report prepared for CE2 Engineers, Inc. by Northern Land Use Research Inc., Fairbanks.
- Gerhardt F., and others. 1989. A survey of potential raptor nesting sites in the southern Askinuk Mountains, Alaska. Anchorage, Alaska
- Gerlach, S.C., and E.S. Hall. 1988. The Later Prehistory of Northern Alaska: the View From Tukuto Lake. In: *The Late Prehistoric Development of Alaska's Native People*, edited by R.D. Shaw,

- R.K. Harritt, and D.E. Dumond. Aurora: Alaska Anthropological Association Monograph Series # 4.
- GINA (Geographic Information Network of Alaska). 2018. Alaska Science Catalog. MODIS Derived NDVI Metrics. Available at: <http://alaska.portal.gina.alaska.edu/catalogs/9738-modis-derived-ndvi-metrics>. (accessed on October 15, 2018).
- Goldfarb, R.J., R.A. Ayuso, M.L. Miller, S.W. Ebert, E.E. Marsh, S.A. Petsel, L.D. Miller, D. Bradley, C. Johnson, and W. McClelland. 2004. The Late Cretaceous Donlin Creek Gold Deposit, Southwestern Alaska: Controls on Epizonal Ore Formation: *Economic Geology*, v. 99, no. 4, 643–671.
- Gotthardt, T.A., K.M. Walton, and T.L. Fields. 2012. Alaska species ranking system report- blackpoll warbler. Available at: [http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/05/Dendroica\\_striata\\_report.pdf](http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/05/Dendroica_striata_report.pdf).
- Greenstein, C. 2013. Monitoring and Controlling Invasive Plants at Rohn Cabin: 2013 Update. Alaska Natural Heritage Program, University of Alaska, Anchorage.
- Gregory, S.V., F.J. Swanson, W.A. McKee, and K.W. Cummins. 1991. An Ecosystem Perspective of Riparian Zones. *BioScience* 41 (8): 540–551.
- Gray, J., P.M. Theodorakos, E.A. Bailey, and R.R. Turner. 2000. Distribution, speciation, and transport of mercury in stream-sediment, stream-water, and fish collected near abandoned mercury mines in southwestern Alaska, USA. USGS Staff – Published Research. Paper 395.
- Hale, S.S., T.E. McMahon, and P.C. Nelson. 1985. Habitat suitability index models and instream flow suitability curves: chum salmon. U. S. Department of the Interior, Fish and Wildlife Service, Biological Report 82(10.108).
- Harkness, M., M. Reid, N. Fresco, S. Martin, H. Hamilton, S. Auer, S. Marchenko, J. Bow, I. Varley, P. Comer, P. Crist, and L. Kutner. 2012. Seward Peninsula – Nulato Hills – Kotzebue Lowlands Rapid Ecoregional Assessment Report. Prepared for the U.S. Department of the Interior, Bureau of Land Management.
- Harper, K. C., F. Harris, S. J. Miller, J. M. Thalhauser, and S. D. Ayers. 2012. Life history traits of adult broad whitefish and humpback whitefish. *Journal of Fish and Wildlife Management* 3(1):56–75; e1944-687X. DOI: 10.3996/022011-JFWM-011.
- Harper, P., and L.A. McCarthy [eds.] 2017. Muskox Management Report of Survey-Inventory Activities, 1 July 2012–30 June 2014. Species Management Report ADF&G/DWC/SMR-2015-2. ADF&G Division of Wildlife Conservation, Juneau, Alaska.
- Headwaters Economics. 2013. Economic Profile System – Human Dimensions Toolkit. Available at <http://headwaterseconomics.org/tools/eps-hdt>.
- Hegg, K.M., and H. Sieverding. 1979. Timber Resources of the Kuskokwim Flood Plain and Adjacent Upland. Resource Bulletin PNW-87. Portland, OR: USDA Forest Service.
- Herbst, D.B., M.T. Bogan, S.K. Roll, and H.D. Safford. 2012. Effects of livestock exclusion on in-stream habitat and benthic invertebrate assemblages in montane streams. *Freshwater Biology* 57: 204–217.
- Hinzman, L.D. Bettez, N.D., Bolton, W.K., Chapin, F.S., III, Dyrurgerov, M.B., Fastie, C.L., Griffith, B., Hollister, R.D., Hope, A., Huntington, H.P., Jensen, A.M., Jia, G.J., Jorgenson, T, Kane, D.L. Klein, D.R., Kofinas, G., Lynch. A.H., Lloyd. A.H., McGuire. A.D., Nelson, F.E., Nolan, M., Oechel, W.C., Osterkamp. T.E., Racine, C.H., Romanovsky, V.E., Stone, R.S., Stow, D.A., Sturm, M., Tweedie, C.E., Vourlitis, G.L., Walker, M.D., Walker, D.A., Webber, P.J., Welker,

- J.M., Winker, K.S., and Yoshikawa, K. 2005. Evidence and implications of recent climate change in northern Alaska and other Arctic regions. *Clim. Change*, 72(3): 251-298. doi: 10.1007/s 10584-005-5352-2.
- Holmes, C.E., R. VanderHoek, and T.E. Dilley. 1996. Swan Point. In: *American Beginnings*, edited by F.H. West. University of Chicago Press, Chicago.
- Hunt, W.G., R.E. Jackman, T.L. Brown, J.G. Gilardi, D.E. Driscoll, and L. Culp. 1995. A pilot Golden Eagle population study in the Altamont Pass Wind Resource Area, California. *Predatory Bird Res. Group*, Univ. of California, Santa Cruz.
- Iditarod. 2017. Race Center. Available at: <http://iditarod.com/race/> (accessed February 21, 2017).
- Iditarod Trail Invitational. 2017. Race Information. Available at: <http://www.iditarodtrailinvitational.com/> (accessed February 21, 2017).
- Ikuta, H., C.L. Brown, and D.S. Koster. 2014. Subsistence Harvests in 8 Communities in the Kuskokwim River Drainage and Lower Yukon River, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 396. Fairbanks, AK.
- IMPROVE (Interagency Monitoring Protected Visual Environments). 2016. AQRV Summaries. Available at: <http://vista.cira.colostate.edu/Improve/aqrv-summaries/> (accessed November 1, 2016).
- Institute for Social and Economic Research. 2012. Kids Count Alaska 2011-2012. Available at: <http://kidscount.alaska.edu/> (accessed August 23, 2013).
- IPS (International Peatland Society). 2016. Global Peat Resources by Country. Available at: <http://www.peatsociety.org/peatlands-and-peat/global-peat-resources-country>.
- Iron Dog Snowmachine Race. 2017. Race Tracking, Available at: <http://www.irondog.org/race-tracking/> (accessed February 21, 2017).
- Jacobus, R.T, and P. Druckenmiller. 2013. Review of Fossil Localities on Federal Lands in the Proposed Donlin Gold Mine Area and Natural Gas Pipeline Corridor, Southwestern Alaska. Report prepared by Department of Earth Sciences, University of Alaska Museum of North, for Northern Land Use Research and Donlin Gold, LLC. April 2013.
- Johnson, J., and V. Litchfield. 2016a. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Interior Region, Effective March 1, 2016. Alaska Department of Fish and Game, Special Publication No. 16-02, Anchorage.
- Johnson, J., and V. Litchfield. 2016b. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Southwestern Region, Effective June 1, 2016. Alaska Department of Fish and Game, Special Publication No. 16-05, Anchorage.
- Johnson, J., and V. Litchfield. 2016c. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Western Region, Effective June 1, 2016. Alaska Department of Fish and Game, Special Publication No. 16-06, Anchorage.
- Johnstone, J. and T. Hollingsworth. 2007. Managing Fire with Fire in Alaska Black Spruce Forests: Impacts of Fire Severity on Successional Trajectory and Future Forest Flammability. Final Report to the Joint Fire Science Program. Project #05-1-2-06. October 31, 2007.
- Johnstone, J.F., T.N. Hollingsworth, F.S. Chapin, III, and M.C. Mack. 2010. Changes in fire regime break the legacy lock on successional trajectories in Alaskan boreal forest. *Global Change Biology*, 16(4), 1281-1295. doi:10.1111/j.1365-2486.2009.02051.x.



- Joly, K., B.W. Dale, W.B. Collins, and L.G. Adams. 2003. "Winter Habitat Use by Female Caribou in Relation to Wildland Fires in Interior Alaska." *Canadian Journal of Zoology* 81:1192-1201.
- Joly, K., M.J. Cole, and R.R. Jandt. 2007. Diets of overwintering caribou, *Rangifer tarandus*, track decadal changes in arctic tundra vegetation. *Canadian Field-Naturalist*, 121(4), 379-383.
- Joly, K., R.R. Jandt, and D.R. Klein. 2009. Decrease of lichens in arctic ecosystems: The role of wildfire, caribou, reindeer, competition and climate in north-western Alaska. *Polar Research*, 28(3), 433-442. doi:10.1111/j.1751-8369.2009.00113.
- Joyce, M. R., L.A. Rundquist, and L.L. Moulton. 1980. Gravel removal studies in Arctic and Subarctic floodplains in Alaska. US Dept. of Interior. U.S. Fish and Wildlife Service. Water Resource Analysis Project, Office of Biological Services. 404 pp.
- Juday, G. P., C. Alix, and T. A. Grant. 2015. Spatial coherence and change of opposite white spruce temperature sensitivities on floodplains in Alaska confirms early-stage boreal biome shift. *Forest Ecology and Management* 350:46-61.
- Jubenville, Alan, and Kevin O'Sullivan. 1987. Relationship of vegetation type and slope gradient to trail erosion in interior Alaska. *Journal of Soil and Water Conservation*.
- Kauffman, J.B., R.L. Beschta, N. Otting, and D. Lytjen. 1997. An Ecological Perspective of Riparian and Stream Restoration in the Western United States. *Fisheries* 22 (5): 12–24.
- Kennedy, B.W., and D.E. Langley. 2007. Assessment of hydrology, water quality, and trace elements in selected placer-mined creeks in the Birch Creek watershed near Central, Alaska, 2001–05: U.S. Geological Survey Scientific Investigations Report 2007-5124, 50 p.
- Kent, S.M. and D.J Bergstrom. 2009. Norton Sound Subdistrict 5 (Shaktookik) and Subdistrict 6 (Unalakleet) Chinook salmon stock status and action plan, 2010; a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 09-25, Anchorage.
- Kessel, B., and D.D. Gibson. 1978. Status and distribution of Alaska birds. *Stud. Avian Biol.* No. 1.
- Kirschner, C.E. 1994. Interior basins of Alaska, in Plafker, George and Berg, H.C., *The Geology of Alaska: Geological Society of America*. p. 469-493
- Knapp, R.A., and K.R. Matthews. 1996. Livestock Grazing, Golden Trout, and Streams in the Golden Trout Wilderness, California: Impacts and Management Implications. *North American Journal of Fisheries Management* 16: 805–820.
- Kochert, M.N., and K. Steenhof. 2002. Golden Eagles in the U.S. and Canada; status, trends conservation challenges. *J. Raptor Res.* 36 (supplement):33-41.
- Kochert, M.N., K. Steenhof, C.L. McIntyre, and E.H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Available at the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/684> doi:10.2173/bna.684.
- Krauss, M., G. Holton, J. Kerr, J., and C.T. West. 2011. Indigenous Peoples and Languages of Alaska. Fairbanks and Anchorage: Alaska Native Language Center and UAA Institute of Social and Economic Research.
- Kurtak, J., J. Hoppe, and R. Ellefson. 2010. Mineral Occurrence and Development Potential Report Locatable and Salable Minerals Bering Sea-Western Interior Resource Management Plan, U. S. Department of the Interior, BLM Alaska Technical Report 60 BLM/AK/ST-10/009+9218+3130 November.

- La Montagne, J.M., L.J. Jackson, and R M.R. Barclay. 2003. Characteristics of ponds used by Trumpeter Swans in a spring migration stop over area. *Canadian Journal of Zoology-Revue Canadienne De Zoologie* 81(11):1791-1798.
- Lenoir, J., J.C. Gegout, P.A. Marquet, P.de Ruffray, and H. Brisse. 2008. A significant upward shift in plant species optimum elevation during the 20th century. *Science*, 320(5884), 1768-1771. doi:10.1126/science.1156831.
- Lindsey, D.K. 1986. Paleontological Inventory and Assessment of Public Lands Administered by Bureau of Land Management State of Alaska. Bureau of Land Management Contract #AK 950CT5-15.
- Lingle, E.G, P.J. Fix, and A.M. Harrington. 2011. Bering Sea and Western Interior Land Use Study. Final Report for USDI Bureau of Land Management. #MP2011-03. Fairbanks, Alaska: Department of Humans and the Environment, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks.
- Lloyd, A.H., and C.L. Fastie. 2002. Spatial and temporal variability in the growth and climate response of treeline trees in Alaska. *Climatic Change*, 52(4), 481-509. doi:10.1023/A:1014278819094
- Lloyd, A.H., and C.L. Fastie. 2003. Recent changes in treeline forest distribution and structure in interior Alaska. *Ecoscience*, 10(2), 176-185.
- Lueng, Yu-Fai, and Jeffrey L. Marion. 1996. Trail degradation as influenced by environmental factors: A state-of-knowledge review. *Journal of Soil and Water Conservation*.
- Lukens, P.R. 1981. Annual book of ASTM standards. Gaseous f fuels; Coal and coke, atmospheric analysis. American Society for Testing and Materials, Philadelphia, Pennsylvania, 920 p.
- Magness, D.R., A.L. Sesser, and T. Hammond. 2018. "Using topographic geodiversity to connect conservation lands in the Central Yukon, Alaska." *Landscape Ecology*, 33(4), 547-556. Available at: <https://doi.org/10.1007/s10980-018-0617-0> (accessed August 2018).
- Marks, J.S., T.L. Tibbitts, R.E. Gill and B.J. McCaffery. 2002. Bristle-thighed Curlew (*Numenius tahitiensis*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/705> doi:10.2173/bna.705.
- Matsuoka, S.M., and J.A. Johnson. 2008. Using a multimodel approach to estimate the population size of McKay's Buntings. *Condor* 110(2):371-376.
- Matsuoka, S.M., D. Shaw, P.H. Sinclair, J.A. Johnson, R.M. Corcoran, N.C. Dau, P.M. Meyers, and N.A. Rojek. 2010. Nesting ecology of the Rusty Blackbird in Alaska and Canada. *Condor* 112(4):810-824.
- McCaffrey, B.J., T.L. Blooms, T. C.J Doolittle, F. Broerman, J.R. Morgart, and K.M. Sowl. 2011. The Ecology of Gyrfalcons *Falco rusticolus* on the Yukon-Kuskokwim Delta, Alaska.
- McClory, J. and T. Gotthardt. 2008. Non-native and invasive animals of Alaska: A comprehensive list and select species status reports. Prepared for the Alaska Department of Fish and Game, Invasive Species Program. Alaska Natural Heritage Program, University of Alaska Anchorage, Anchorage, Alaska.
- McDowell Group. 2014a. The Economic Impacts of Guided Hunting in Alaska. Alaska Professional Hunters Association: Juneau, AK. 23 p.
- McDowell Group. 2014b. The Economic Impacts of Placer Mining in Alaska. Alaska Miners Association: Juneau, AK. 25 p.

- McGuire, A.D., R.W. Ruess, A. Lloyd, J. Yarie, J.S. Clein, and G.P. Juday. 2010. Vulnerability of white spruce tree growth in interior Alaska in response to climate variability: Dendrochronological, demographic, and experimental perspectives. *Canadian Journal of Forest Research-Revue Canadienne De Recherche Forestiere*, 40(7), 1197-1209. doi:10.1139/X09-206
- McGuire, A.D., T.S. Rupp, A. Breen, E.S. Euskirchen, S. Marchenko, V.R. Romanovsky, A. Bennett, W.R. Bolton, T. Carman, H. Genet, T. Kurkowski, M. Lara, D. Nicolsky, R. Rutter, K. Timm, and M. Waldrop. 2016. Final Report: Integrated Ecosystem Model for Alaska and Northwest Canada Project U.S. Geological Survey, Alaska Cooperative Fish and Wildlife Research Unit, University of Alaska Fairbanks, Fairbanks, AK (Unpublished Report).
- Mecklenburg, C.W., T.A. Mecklenburg, and L.K. Thorsteinson. 2002. *Fishes of Alaska*. American Fisheries Society, Bethesda, Maryland.
- Meyer, K. 2013. *Designing Sustainable Off-Highway Vehicle Trails*. USDA Forest Service, Missoula Technical and Development Program.
- Miller, E.L., A. Grantz, and S.L. Klemperer, eds. 2002. *Tectonic Evolution of the Bering Shelf-Chukchi Sea-Arctic Margin and Adjacent Landmasses: Geological Society of America, Special Paper*, 360.
- Miller, J.A., R.L. Whitehead, and P.G. Olcott. 1999. *Ground-Water Atlas of the United States, Segment 13, Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands*. U. S. Geological Survey Hydrologic Investigations Atlas 730-N.
- Miller, M.L., T.K. Bundtzen, and J.E. Gray. 2005. Mineral resource assessment of the Iditarod Quadrangle, west-central Alaska: U.S. Geological Survey Miscellaneous Field Studies Map 2219-B, 1 sheet, scale 1:250,000.
- Mindell, David P. 1983. *Nesting Raptors in Southwestern Alaska: Status, Distribution, and Aspects of Biology*. BLM/AK/TR-83/08
- Mitchell, C.D., and M.W. Eichholz. 2010. Trumpeter Swan (*Cygnus buccinator*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/105> doi:10.2173/bna.105.
- Montgomerie, R., and B. Lyon. 2011. McKay's Bunting (*Plectrophenax hyperboreus*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/199> doi:10.2173/bna.199.
- Moore, K. E. 2011. Collaborative Monitoring of Seward Peninsula, Alaska Reindeer (*Rangifer tarandus tarandus*) Grazing Lands.
- Morrow, J.E. 1980. *The freshwater fishes of Alaska*. Alaska Northwest Publishing Company, Anchorage.
- Murray, D. and A.T. Smith. 2008. *Lepus othus*. In IUCN 2013. *IUCN Red List of Threatened Species*. Version 2013.1.
- NADP (National Atmospheric Deposition Program). 2016. NTN Site AK -3. Available at: <http://nadp.sws.uiuc.edu/data/ntn/plots/ntntrends.html?siteID=AK03> (accessed November 7, 2016).
- National Renewable Energy Laboratory. 2007. *Global Solar Radiation at Latitude, Alaska*. Available at: <http://www.akenergyauthority.org/Programs/AEEE/Solar/solardata>.
- Nawrocki, T., H. Klein, M. Carlson, L. Flagstad, J. Conn, R. DeVelice, A. Grant, G. Graziano, B. Million, and W. Rapp. 2011. *Invasiveness Ranking of 50 Non-Native Plant Species for Alaska*. Alaska Natural Heritage Program, University of Alaska Anchorage. Anchorage, AK. 32 p.

- NCA (National Climate Assessment). 2014. Available at: <http://nca2014.globalchange.gov/report>.
- NIFIT (National Interagency Fuels, Fire and Vegetation Technology Transfer). 2010. Interagency Fire Regime Condition Class (FRCC) Guidebook – Version 3.0.
- Nisbet, I.C.T., D.B. McNair, W. Post, and T.C. Williams. 1995. Transoceanic migration of the Blackpoll Warbler: Summary of scientific evidence and response to criticisms by Murray. J. Field Ornithol. 66:612-622.
- NMFS (National Marine Fisheries Services). 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. Alaska Region. Available at: <http://alaskafisheries.noaa.gov/habitat/seis/efheis.htm> (accessed February 25, 2015).
- NOAA (National Oceanic and Atmospheric Administration). 2016. Sunrise/Sunset Calculator, <http://www.esrl.noaa.gov/gmd/grad/solcalc/sunrise.html> (website updated on November 1, 2016, accessed November 9, 2016).
- Noon, B.R., T.A. Spies, and M.G. Raphael. 1999. Conceptual Basis for Designing an Effectiveness Monitoring Program. p. 21–48. In: B.S. Mulder, B.R. Noon, T.A. Spies, M.G. Raphael, C.J. Palmer, A.R. Olsen, G.H. Reeves, and H.H. Welsh (eds). The Strategy and Design of the Effectiveness Monitoring Program for the Northwest Forest Plan. Gen Tech Rep PNW-GTR-437. U.S. Department of Agriculture, U.S. Forest Service, Pacific Northwest Research Station, Portland, OR.
- Nowacki, G. P., P. Spencer, T. Brock, M. Fleming, and T. Jorgenson. 2001. Ecoregions of Alaska and neighboring territory. USGS, Reston, VA.
- NPS (National Park Service). 1997. How to Apply the National Register Criteria for Evaluation. National Register Bulletin #15.
- NPS. 2009. The Secretary of Interior’s Standards for the Treatment of Historic Properties and Guidelines for the Treatment of Cultural Landscapes. National Park Service. <https://www.nps.gov/tps/standards/four-treatments/landscape-guidelines/index.htm> (accessed October 2016).
- NPS. 2011. Denali National Park and Preserve. Natural Resource Condition Assessment. Natural Resource Report NPS/NRSS/WRD/NRR-2011/424.
- NPS. 2015. Monitoring Denali’s Air Quality and other Contaminants. Available at: <https://www.nps.gov/articles/denali-crp-air-quality.htm> (accessed November 1, 2016).
- NRCS (Natural Resource Conservation Service). 2001. A Procedure for Evaluating Lichen Utilization on Reindeer Ranges.
- NRCS. 2008. Soil Survey of the Western Interior Rivers Area, Alaska.
- NRCS. 2018. Ecological Site Description System for Rangeland and Forestland Data. Available at: <https://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD>. (accessed October 15, 2018).
- NWCG (National Wildfire Coordinating Group). 2014. NWCG Fuels Management Committee Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS484). Boise, ID.
- NWS (National Weather Service). 1999. ASOS Program. Available at: <http://www.nws.noaa.gov/ost/asostech.html> (website updated August 3, 1999, accessed October 31, 2016).

- Oldefeldt, D., S. Goswami, G. Grosse, D. Hayes, G. Hugelius, P. Kuhry, A.D. McGuire, V.E. Romanovsky, A.B.K. Sannel, E.A.G. Schuur and M.R. Turetsky. 2016. Circumpolar distribution and carbon storage of thermokarst landscapes. *Nature Communications*, October 11, 2016. 7:13043 DOI: 10.1038/ncomms1304, [www.nature.com/naturecommunications](http://www.nature.com/naturecommunications).
- Osgood, C. 1976. *The Ethnography of the Tanaina*. Yale University Publications in Anthropology, Vol. 16. Human Relations Area Files Press. New Haven, CT.
- OSM (Office of Subsistence Management). 2016. Federal subsistence management regulations for the harvest of wildlife on federal public lands in Alaska. Available at: [https://www.doi.gov/sites/doi.gov/files/uploads/wildlife\\_regs\\_16-18\\_correctedreduced.pdf](https://www.doi.gov/sites/doi.gov/files/uploads/wildlife_regs_16-18_correctedreduced.pdf) (accessed October 2018).
- Ott, A.G., J.F. Winters, W.A. Morris, and P.T. Bradley. 2014. North Slope flooded gravel mine sites, case histories. Alaska Dept. of Fish and Game. Juneau, AK. 76 pp.
- Page R., C. Gilbert, and S. Dolan. 1998. *A Guide to Cultural Landscape Reports*. U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program. Washington D.C.
- Pardieck, K.L., D.J. Ziolkowski Jr., M. Lutmerding and M.-A.R. Hudson. 2018. North American Breeding Bird Survey Dataset 1966 - 2017, version 2017.0. U.S. Geological Survey, Patuxent Wildlife Research Center. <https://doi.org/10.5066/F76972V8>
- Parker, D.I. 1996. Forest ecology and distribution of bats in Alaska. M. S. Thesis. Univ. of Alaska, Fairbanks. 73 pp.
- Parker, D.I., J.A. Cook, and S.W. Lewis. 1996. Effects of timber harvest on bat activity in southeastern Alaska's temperate rainforest. Pp. 277-292 In: R.M.R. Barclay and R.M. Brigham (eds.). *Bats and Forests Symposium*, October 19-21, 1995, Victoria, British Columbia, Canada. Research Branch, B.C. Ministry of Forests, Victoria, B.C., Working Paper 23/1996, 292pp.
- Parker, P. L., and T. F. King. 1998. National Register Bulletin No. 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service. Washington, D.C.
- Parr, B. L. 2016. 2015 Alaska trapper report: 1 July 2015–30 June 2016. Alaska Department of Fish and Game, Division of Wildlife Conservation, Wildlife Management Report ADF&G/DWC/WMR-2016-1, Juneau.
- Parry, P.L., C.M. Rozen, and G.A. Seaman. 1993. Restoration and enhancements of aquatic habitats in Alaska: Project inventory, case study selection, and bibliography. Alaska Dept. of Fish and Game. Juneau, AK. 256 pp.
- Pegau, R. E. 1970. Effect of reindeer trampling and grazing on lichens. *J. Range Manag.* 23:95-97.
- Perry, P. 2014. Unit 18 moose management report. Chapter 20, pages 20-1 through 20-17 [In] P. Harper and L. A. McCarthy, editors. Moose management report of survey and inventory activities 1 July 2011–30 June 2013. Alaska Department of Fish and Game, Species Management Report ADF&G/DWC/SMR-2014-6 Juneau.
- Petersen, M.R., D.N. Weir, and M.H. Dick. 1991. *Birds of the Kilbuck and Ahklun Mountain Region, Alaska*. U.S. Dep. Int., Fish Wildl. Serv., N. Am. Fauna 76, Washington, D.C.
- Pierce, J. M. 2014. Units 21A and 21E moose. Chapter 27, pages 27-1 through 27-15 [In] P. Harper and L. A. McCarthy, editors. Moose management report of survey and inventory activities 1 July 2011–30 June 2013. Alaska Department of Fish and Game, Species Management Report ADF&G/DWC/SMR-2014-6, Juneau.

- Pierce, J.M., and R.J. Seavoy. 2008. Units 21A and 21E moose. Pages 429-445 in P. Harper, editor. Moose management report of survey and inventory activities 1 July 2007-30 June 2009. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska, USA.
- Ping, C.F., R.D. Boone, M.H. Clark, E.C. Packee, and D.K. Swanson. 2006. State factor control of soil formation in interior Alaska. In: Chapin, F.S., Oswood, M.W., Van Cleve, K., Viereck, L.A., Verbyla, D.L. (Eds.), *Alaska's Changing Boreal Forest*. Oxford University Press, New York, NY, pp. 21–38.
- Platte, Robert M. 1996. Water bird abundance and distribution on Innoko National Wildlife Refuge, Alaska. USFWS Migratory Bird Management. Anchorage, Alaska.
- Poole, K.G., and R.G. Bromley. 1988. Interrelationships within a raptor guild in the central Canadian arctic. *Can. J. Zool.* 66:2275-2282.
- Potter, B.A., and J. Cook. 2006. Archaeological Survey of Water Line Installation in Hooper Bay, Alaska. Report prepared for CE2 Engineers, Inc. by Northern Land Use Research Inc., Fairbanks.
- Prichard, D., J. Anderson, C. Correll, J. Fogg, K. Gebhardt, R. Krapf, S. Leonard, B. Mitchell, and J. Staats. 1998. Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. Tech Ref 1737-15. U.S. Department of the Interior, Bureau of Land Management, National Business Center, Denver, CO.
- Racine, Charles H., and Gray M. Ahlstrand. 1991. Thaw response of tussock-shrub tundra to experimental all-terrain vehicle disturbances in South-Central Alaska. 1991. *Arctic*, Col. 44, NO 1 (March 1991), pp. 31-37.
- Ransome, A.L., and Kerns, W.H. 1954. Names and definitions of regions, districts and subdistricts in Alaska: U.S. Bureau of Mines Information Circular 7679, 91 p.
- Ray, D.T. 1986. Bering Strait Eskimo. In *Handbook of North American Indians: Arctic*. pp 285-302. W.C. Stuart (ed). Smithsonian Institute, Washington D.C.
- Reuther, J.D., P. Druckenmiller, J.S. Rogers, T. Bundtzen, K. May, and R.C. Bowman. 2014. Results of the 2013 Paleontological Resources Survey of the Proposed Donlin Gold Mine Facilities Area and Adjacent Sections of the Kuskokwim River, Alaska. Prepared by Northern Land Use Research Alaska, LLC and Department of Earth Sciences, University of Alaska Museum of the North, for Donlin Gold, LLC. April 2014. 82 p.
- Reynolds, J.S., R.C. Simmons, and A.R. Burkholder. 1989. Effects of Placer Mining Discharge on the Health and Food of Arctic Grayling. *JAWRA Journal of the American Water Resources Association*, volume # 25(Issue 3) pages # (625-635).
- Rinella D. and D.I. Bogan. 2003. Ecological impacts of three lower Kenai Peninsula, ATV stream fords. Anchorage: University of Alaska, pp. 1–34.
- Riordan, B., D. Verbyla, and A. McGuire. 2006. “Shrinking Ponds in Subarctic Alaska Based on 1950-2002 Remotely Sensed Images.” *Journal of Geophysical Research* 111(G04002), DOI:10.1029/2005JG000150.
- Roland, C.A., J.H. Schmidt, and E.F. Nicklen. 2013. Landscape-scale patterns in tree occupancy and abundance in subarctic Alaska. *Ecological Monographs*, 83(1), 19-48.
- Rupp, T.S., F.S. Chapin, and A.M. Starfield. 2000. Response of subarctic vegetation to transient climatic change on the Seward Peninsula in north-west Alaska. *Global Change Biology*, 6(5), 541-555. doi:10.1046/j.1365-2486.2000.00337.x.
- Rydell, J., D. Parker, and J. Eklof. 2002. Capture success of little brown bats (*Myotis lucifugus*) feeding on mosquitoes. *J. Zool., Lond.* 256:379-381.

- Sainsbury, C.L., and E.M. MacKevett Jr. 1965. Quicksilver deposits of southwestern Alaska. USGS Bulletin 1187. 89p.
- Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2012. The North American Breeding Bird Survey, Results and Analysis 1966 - 2011.
- Sauer, J.R., J.E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis 1966 - 2005. Version 6.2.2006. USGS Patuxent Wildlife Research Center, Laurel, MD.
- Schmutz, Joel, M.R. Petersen, J.A. Schmutz, and R.F. Rockwell. 2011. Emperor Goose (*Chencanagica*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Available from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/097> doi:10.2173/bna.97
- Schwede, L.K. 2005. Complex Ethnic Households in America. Oxford: Rowman and Littlefield.
- Scott, Joe H., and R.E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153.
- Seavoy, R.J. 2011. Units 19A, 19B, 19C, 19D, 21A, and 21E caribou. Pages 116-127 in P. Harper, editor. Caribou management report survey and inventory activities 1 July 2008-30 June 2010. Alaska Department of Fish and Game. Project 3.0. Juneau, Alaska.
- Seavoy, R. J. 2014. Units 19A, 19B, 19C, and 19D moose. Chapter 21, pages 21-1 through 21-34 [In] P. Harper and L. A. McCarthy, editors. Moose management report of survey and inventory activities 1 July 2011–30 June 2013. Alaska Department of Fish and Game, Species Management Report ADF&G/DWC/SMR-2014-6, Juneau.
- Seppi, Bruce. 2007. Peregrine Falcons *Falco Peregrinus* in the Central Kuskokwim River Area, Alaska. BLM Open File Report 117. Bureau of Land Management, Anchorage, Alaska.
- Seppi, Bruce. 1993. Use of Wetlands by Waterfowl Broods in Relation to Habitat Quality in the Lower Innoko River Area, Alaska. Thesis. Presented to the Faculty of the University of Alaska Fairbanks. September 1993.
- Shaw, L. 2015. Personal communication between Linda Shaw, NOAA and Elizabeth Bella, AECOM on marine and freshwater aquatic invasives in Alaska, current status and trends. July 8th, 2015.
- Shenoy, A., J.F. Johnstone, E.S. Kasischke, and K. Kielland. 2011. Persistent effects of fire severity on early successional forests in interior Alaska. Forest Ecology and Management, 261(3), 381-390. doi:10.1016/j.foreco.2010.10.021
- Sierra Research. 2007. Alaska Rural Communities Emission Inventory, prepared for: Western Governors' Association, Western Regional Air Partnership, Alaska Department of Environmental Conservation, February.
- Simeone, W.E. 1985. A History of Alaskan Athapaskans: A History of Alaskan Athapaskans including a description of Athapaskan culture and a historical narrative, 1785-1971. Alaska Historical Commission, Anchorage.
- Slaughter, Charles W., Charles Racine, Donald Walker, Larry Johnson, and Gunars Abele. 1990. Use of off-road vehicles and mitigation of effects in Alaska permafrost environments: A Review. Environmental Management, Vol 14, No 1 (pp 63-72).
- SNAP (International Arctic Research Center at the University of Alaska, Fairbanks, Scenarios Network for Alaska and Arctic Planning). 2016. Tools and Data, Regional Climate Projections.
- SNAP-EWHALE (Scenarios Network for Alaska and Arctic Planning and EWHALE Lab, University of Alaska Fairbanks). 2012. Predicting Future Potential Climate-Biomes for the Yukon, Northwest

- Territories, and Alaska: A climate-linked cluster analysis approach to analyzing possible ecological refugia and areas of greatest change. University of Alaska Fairbanks, Fairbanks, AK. 105 p.
- Solf, J.D., and H. Golden. 2013. River otter. Alaska Department of Fish and Game. Wildlife Notebook Series.
- Soong, J., A. Banducci, S. Kent, and J. Menard. 2008. 2007 annual management report Norton Sound, Port Clarence, and Kotzebue. Alaska Department of Fish and Game, Fishery Management Report No. 08-39, Anchorage.
- Sparrow, S.D., F.J. Wooding, and E.H. Whiting. 1978. Effects of off-road vehicle traffic on soils and vegetation in the Denali Highway Region of Alaska. *Journal of Soil and Water Conservation* (January-February).
- Spartz, R.A., and C. Mishler. 1985. Cultural Resources Report: Kuskokwim River Resources Management Mapping Project. Public Daa File 85-12. Alaska Division of Geological and Geophysical Surveys, Anchorage, Alaska.
- Spragens, K.A. 2016. The importance of pre-nesting spring staging areas on the Interior Yukon-Kuskokwim Delta. USGS San Francisco Bay Estuary Field Station, Vallejo, CA.
- Stern, R. O., Arobio, E. L., Naylor, L. L., and Thomas W. C. 1980. Eskimos, Reindeer and Land. AFES, School of Agriculture and Land Resources Management, Agricultural and Forestry Station, University of Alaska Fairbanks. Bulletin 59. 205 pp.
- Stout, G. W. 2014. Unit 21D moose. Chapter 30, pages 30-1 through 30-40 [In] P. Harper and L. A. McCarthy, editors. Moose management report of survey and inventory activities 1 July 2011–30 June 2013. Alaska Department of Fish and Game, Species Management Report ADF&G/DWC/SMR-2014-6, Juneau.
- Stuby, L. 2012. Spawning locations, seasonal distribution, and migration timing of Kuskokwim River sheefish using radiotelemetry, 2007-2011. Alaska Department of Fish and Game, Fish Data Series No. 12-65, Anchorage.
- Stueve, K.M., R.E. Isaacs, L.E. Tyrrell, and R.V. Densmore. 2011. Spatial variability of biotic and abiotic tree establishment constraints across a treeline ecotone in the Alaska Range. *Ecology*, 92(2), 496-506. doi:10.1890/09-1725.1
- Suarez, F., D. Binkley, M.W. Kaye, and R. Stottlemeyer. 1999. Expansion of forest stands into tundra in the Noatak national preserve, northwest Alaska. *Ecoscience*, 6(3), 465-470.
- Szumigala, D.J., and R.C. Swainbank. 2001. Alaska's mineral industry 2000—A summary: Fairbanks, AK, Alaska Department of Natural Resources Information Circular 47.
- Szumigala, D.J., and M.B. Werdon. 2011. Rare-Earth Elements: A brief overview including uses, worldwide resources, and known occurrences in Alaska: Alaska Division of Geological & Geophysical Surveys Information Circular 61, 12 p. <http://doi.org/10.14509/22262>
- Tait, C.K., J.L. Li, G.A. Lamberti, T.N. Pearsons, and H.W. Li. 1994. Relationships between riparian cover and the community structure of high desert streams. *Journal of the North American Benthological Society* 13: 45–56.
- Tessler, D.F., and M.L. Snively. 2014. New Insights on the Distribution, Ecology, and Overwintering Behavior of the Little Brown Myotis (*Myotis lucifugus*) in Alaska Northwestern Naturalist 95(3):251-263. doi: <http://dx.doi.org/10.1898/13-12.1>
- Thomas, D. C., S. J. Barry, and F. Alaie. 1996. "Fire–Caribou–Winter Range Relationships in Northern Canada." *Rangifer* 16:257–67.



- Thomas, D.W. 1995. Hibernating bats are sensitive to nontactile human disturbance. *Journal of Mammalogy* 76:940-946.
- Townsend, A.H. 1987. Placer mining in the upper Chatanika River system, 1980-1986. Alaska Dept. of Fish and Game. Juneau, AK. 29 pp.
- Townsend, Joan B. 1981. Tanaina. In *Handbook of the American Indian*. Vol. 6 – Subarctic. June Helm (ed), Smithsonian Institution, Washington, D.C. pp 623-640.
- Tramer, E.J., and F.E. Tramer. 1977. Feeding responses of fall migrants to prolonged inclement weather. *Wilson Bull.* 89:166-167.
- Trammell, E. J., M. L. McTeague, K. W. Boggs, M. L. Carlson, N. Fresco, T. Gotthardt, L. Kenney, and D. Vadapalli. 2014. Yukon River Lowlands – Kuskokwim Mountains – Lime Hills Rapid Ecoregional Assessment Technical Supplement. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado. 29 p.
- Tyler, Roger, A.R. Scott, and J.G. Clough. 2000. Coalbed natural gas potential and exploration targets for rural Alaska communities. Alaska Department of Natural Resources, Alaska Division of Geological & Geophysical Surveys Preliminary Investigative Report 2000-2, 177 p.
- UAF-RRP (University of Alaska Fairbanks, Reindeer Research Program). 2016. About Reindeer. Available at: [http://reindeer.salrm.uaf.edu/about\\_reindeer/#Description](http://reindeer.salrm.uaf.edu/about_reindeer/#Description) (accessed October 24, 2016).
- USACE (U.S. Army Corps of Engineers). 2015. Donlin Gold Project, Draft Environmental Impact Statement, November. Available at: <http://donlingoldeis.com/EISDocuments.aspx>.
- USDA (U.S. Department of Agriculture). 1979. Exploratory Soil Survey of Alaska. Soil Conservation Service.
- USDA. 2008. Soil Survey of Western Interior Rivers Area, Alaska. Michael Mungoven, Natural Resources Conservation Service and United States Department of Agriculture, 2008.
- USDA. 2018. Spruce Beetle. Available at: <https://www.fs.usda.gov/detailfull/r10/forest-grasslandhealth/?cid=FSEPRD536861&width=full#Historic%20Activity> (accessed October 31, 2018).
- USDA (U.S. Department of Agriculture–Forest Service), U.S. Department of the Interior, Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, and Bureau of Indian Affairs. 2009. Guidance for the Implementation of Federal Wildland Fire Management Policy. February 13. Available at: [http://www.nifc.gov/policies/policies\\_documents/GIFWFMP.pdf](http://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf).
- U.S. Forest Service. 2004. National Strategy and Implementation Plan for Invasive Species Management. FS-805. Washington, DC. 24 p.
- U.S. Forest Service. 2015. Forest Health Conditions in Alaska – 2015: A Forest Health Protection Report. R10-PR-38. Anchorage, AK. 90 p.
- U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service. 2010. Federal Land Managers’ Air Quality Related Values Work Group (FLAG): Phase I Report—Revised (2010). Natural Resource Report NPS/NRPC/NRR—2010/232. National Park Service, Denver, Colorado.
- USFWS (U.S. Fish and Wildlife Service). 2004. Land Conservation Plan for Yukon Delta National Wildlife Refuge. Bethel, Alaska September 2004.
- USFWS. 2015. Waterfowl Population Status, 2015. U.S. Department of the Interior, Washington, DC.
- USFWS. 2016. American Peregrine Falcon - Species Profile. Available at: <https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B01H>.

- USGS (U.S. Geological Survey). 2003. Geological Studies of Mercury by the U.S. Geological Survey. USGS Circular 1248, edited by J.E. Gray. 35 p.
- USGS. 2008. Alaska Resource Data Files (ARDF). Available at: <http://ardf.wr.usgs.gov>.
- USGS. 2016. Changing arctic ecosystems initiative, Alaska Science Center. Anchorage, AK.
- Van Wagner, C.E. 1988. The historical pattern of annual area burned in Canada. *Forestry Chronicle*, 64, 182-185.
- Viereck, L.A. 1983. The Effects of Fire in Black Spruce Ecosystems of Alaska and Northern Canada. In: Wein, Ross W.; MacLean, David A., Editors. *The role of fire in northern circumpolar ecosystems*. New York: John Wiley and Sons Ltd.:201-220.
- Viereck, L.A., Dyrness, C.T., Batten, A.R., and Wenzlick, K.J. 1992. The Alaska vegetation classification. Gen. Tech. Rep. PNW-GTR-286. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 278 p.
- Volney, W.J.A., and R.A. Fleming. 2000. Climate change and impacts of boreal forest insects. *Agriculture Ecosystems and Environment*, 82(1-3), 283-294. doi:10.1016/S0167-8809(00)00232
- Wahrhaftig, Clyde. 1965. Physiographic divisions of Alaska: U.S. Geological Survey Professional Paper 482, 52 p., 6 sheets, scale 1:2,500,000.
- Weber, P.K. 1986. Downstream effects of placer mining in the Birch Creek basin, Alaska. Alaska Dept. of Fish and Game. Juneau, AK. 21 pp.
- Weber, P.K., and R. Post. 1985. Aquatic habitat assessments in mined and unmined portions of the Birch Creek watershed. Alaska Dept. of Fish and Game. Juneau, AK. 65 pp.
- WEC (World Energy Council). 2001. Survey of Energy Resources published by the World Energy Council.
- West, E.W., and U. Swain. 1999. Surface activity and structure of a hydrothermally-heated maternity colony of the Little Brown Bat, *Myotis lucifugus*, in Alaska. *Canadian Field-Naturalist* 113:425-429.
- Western Arctic Caribou Herd Working Group. 2011. Western Arctic Caribou Herd Cooperative Management Plan- revised December 2011. Nome Alaska. 47 pp.
- White, C.M., and D.A. Boyce, Jr. 1978. A profile of various rivers and their raptor populations in western Alaska 1977. Technical Report 01, Bureau of Land Management, Anchorage, Alaska.
- Whitaker, J.O. Jr., and B. Lawhead. 1992. Foods of *Myotis lucifugus* in a maternity colony in central Alaska. *J. Mammalogy*. 73:646-648.
- Whitlock. 2016. Personal communication between James Whitlock, BLM and Luke Hoffman, AECOM on October 28, 2016 regarding placer operations within the BSWI planning area.
- Wiedmer, Michael. 2002. Lower Kenai Peninsula summer off-road vehicle trail stream crossings. Alaska Department of Fish and Game (Draft Report).
- Wiggins, D.A., D.W. Holt and S.M. Leasure. 2006. Short-eared Owl (*Asio flammeus*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Available from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/062> doi:10.2173/bna.62.
- Wilkinson, T. 2001. On the beaten path. *National Parks* 75(3-4): 34-38.
- Wolfe, R.J. and R.J. Walker. 1987. Subsistence economies in Alaska: productivity, geography, and development impacts. *Arctic Anthropology* 24(2): 56-81.

- Woolington, J.D. 2011. Caribou management report, Units 9B, 17, 18 south and 19A and 19B. Pages 11-32 in P. Harper, editor. Caribou management report of survey and inventory activities 1 July 2008–30 June 2010. Alaska Department of Fish and Game. Juneau, Alaska. Available at <http://www.ADF&G.alaska.gov/index.cfm?ADF&G=wildliferesearch.smr20154>.
- WRCC (Western Regional Climate Center). 2016a. Climate of Alaska. Available at: [https://wrcc.dri.edu/Climate/narrative\\_ak.php](https://wrcc.dri.edu/Climate/narrative_ak.php) (website copyright date 2016, accessed October 25, 2016).
- WRCC. 2016b. Climate Summaries. Available at: <https://wrcc.dri.edu/summary/climsmak.html> (website copyright date 2016, accessed October 25, 2016).
- Yeend, W., P.H. Stauffer, and J.W. Hendley. 1998. Rivers of gold – placer mining in Alaska. U.S. Department of the Interior, U. S. Geological Survey, Fact Sheet 058-98.
- Young, Jr., D.D., C.L. McIntyre, P.J. Bente, T.R. McCabe, and R.E. Ambrose. 1995. Nesting by Golden Eagles on the north slope of the Brooks Range in northeastern Alaska. *J. Field Ornithol.* 66:373-379.
- Zhang, Ning and Robert Blodgett. 2003. Alaska Paleontology Database. Available at: [www.alaskafossil.org](http://www.alaskafossil.org).

## **Appendix M-1: BLM Alaska Sensitive Species**





# United States Department of the Interior



BUREAU OF LAND MANAGEMENT  
Alaska State Office  
222 West Seventh Avenue, #13  
Anchorage, Alaska 99513-7504  
<http://www.blm.gov/ak>

In Reply Refer To:  
6840 (931) P

May 18, 2010

Instruction Memorandum No. AK-2010-018  
Expires: 9/30/2011

To: District Managers, AFS Manager, DSD - Division of Lands,  
Office of Pipeline Monitoring

From: State Director

Subject: BLM-Alaska Revised Sensitive Species Lists

**Program Area:** Special Status Species

**Purpose:** This Instruction Memorandum transmits the revised sensitive animal and plant lists for BLM-Alaska, and discloses the process used to develop the lists.

**Policy/Action:** Attachment 1 identifies 24 animals and 50 plants for sensitive species designation. As directed by BLM Manual 6840, the lists encompass federal candidate and proposed species, species that have been de-listed from the Endangered Species Act (ESA) during the past five years, and other species or distinct population segments that meet specific manual criteria. The 6840 Manual eligibility criteria and the locally-developed process to apply the criteria are consolidated in Attachment 2.

Data to inform the designations were obtained from both external and internal sources. External sources included several agencies and organizations responsible for identifying, tracking or managing species of concern, such as the Alaska Natural Heritage Program (ANHP), the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, and Boreal Partners in Flight. Internal sources were primarily biologists and other resource specialists at the state and field levels. Spatial data on species occurrences were used when available to determine species overlap with BLM lands; when such data were incomplete or not available, inferences were made based on both general distribution patterns and habitat availability.

Bureau sensitive species and their habitats must be addressed during the National Environmental Policy Act (NEPA) planning process. This includes both land use and implementation-level planning efforts. Where appropriate, land use plans shall be sufficiently detailed to identify and resolve conflicts without deferring to implementation-level planning. Where that has not been achieved, project-level planning should consider site-specific management practices that would mitigate negative effects and promote species conservation. The intent is to minimize or

eliminate threats to the species, and improve habitat conditions such that sensitive status is no longer necessary. All BLM-Alaska offices should work cooperatively with other agencies, organizations, and interested parties to promote conservation of these species, and to develop effective inventory and monitoring strategies.

**Timeframe:** The sensitive species lists identified here are effective immediately, and will remain in place until another revision is completed and a new IM is issued. Revision should be initiated whenever sufficient new information supports adding or removing species, but shall not exceed five years from the effective date of this IM.

Changes in federal ESA status may trigger automatic updates to the Bureau sensitive lists irrespective of a completed formal revision process. This includes immediate adoption of newly announced candidate, proposed, and de-listed species, and immediate removal of designated threatened or endangered species.

**Additional Information (Watch Lists):** The sensitive species selection process identified several species for which data were insufficient to satisfy the 6840 Manual eligibility criteria, but otherwise indicated reason to re-evaluate their status in the future. See Attachment 3 for lists of these species. These species are hereby termed “watch species,” as they may warrant additional data collection to more accurately determine their status. The watch species are not sensitive species, they are not subject to sensitive species policy, and they have no implied relevance to the NEPA process. Instead, these species should be emphasized for additional inventory, monitoring, or research efforts, as funding and time allow. Furthermore, they should be re-evaluated during subsequent sensitive species revision efforts to determine whether inclusion may be warranted at that time.

**Background:** Bureau sensitive species are plants and animals identified in accordance with BLM Manual 6840 as needing special management attention to reduce the likelihood and need for future listing under the Endangered Species Act (ESA). The manual was updated in December 2008 with new eligibility criteria, necessitating list revision by all BLM State Directors.

**Manual/Handbook Sections Affected:** No manual or handbook sections are affected by this memorandum. However, manual section 6840 Special Status Species Management informed it.

**Coordination:** Please direct questions to the appropriate State Office program lead. These are Cara Staab (Wildlife; 907-271-3128), Matthew Varner (Fisheries; 907-271-3348), and Paul Krabacher (Plants; 907-271-3266).

Signed by:  
Ted Murphy  
State Director (Acting)

Authenticated by:  
Anita R. Jette  
Records Specialist

### 3 Attachments

- 1 – [BLM-Alaska Sensitive Animal and Plant Lists \(2 pp\)](#)
- 2 – [Criteria and Process for Designating Sensitive Species in Alaska \(2 pp\)](#)
- 3 – [BLM-Alaska Watch Lists \(2 pp\)](#)

## Attachment 1

### BLM-Alaska Sensitive Animal and Plant Lists

#### BLM-Alaska Sensitive Animal List

	Scientific Name	Common Name
<b>Bird</b>	<i>Gavia adamsii</i>	Yellow-billed Loon
	<i>Cygnus buccinator</i>	Trumpeter Swan
	<i>Chen canagica</i>	Emperor Goose
	<i>Branta canadensis occidentalis</i>	Dusky Canada Goose
	<i>Aquila chrysaetos</i>	Golden Eagle
	<i>Numenius tahitiensis</i>	Bristle-thighed Curlew
	<i>Calidris canutus</i>	Red Knot
	<i>Calidris ptilocnemis tschuktschor</i>	Bering Sea Rock Sandpiper
	<i>Brachyramphus brevirostris</i>	Kittlitz's Murrelet
	<i>Brachyramphus marmoratus</i>	Marbled Murrelet
	<i>Asio flammeus</i>	Short-eared Owl
	<i>Contopus cooperi</i>	Olive-sided Flycatcher
	<i>Dendroica striata</i>	Blackpoll Warbler
	<i>Euphagus carolinus</i>	Rusty Blackbird
<i>Plectrophenax hyperboreus</i>	McKay's Bunting	
<b>Mammal</b>	<i>Lepus othus</i>	Alaskan Hare
	<i>Spermophilus parryii osgoodi</i>	Osgood's Arctic Ground Squirrel
	<i>Sorex yukonicus</i>	Alaskan Tiny Shrew
	<i>Mustela americana kenaiensis</i>	Kenai Marten
<b>Fish</b>	<i>Lampetra alaskensis</i>	Alaskan Brook Lamprey
	<i>Salvelinus alpinus</i>	Arctic Char (Kigluaik Mtns)
<b>Insect</b>	<i>Acentrella feropagus</i>	A mayfly
	<i>Rhithrogena ingalik</i>	Alaska Endemic Mayfly
	<i>Alaskaperla ovibovis</i>	Alaska Sallfly

#### BLM-Alaska Sensitive Plant List

Scientific Name	Common Name
<i>Antennaria densifolia</i>	
<i>Arnica lonchophylla</i>	Northern Arnica
<i>Artemisia globularia ssp. lutea</i>	
<i>Artemisia laciniata</i>	Siberian Wormwood
<i>Artemisia senjavinensis</i>	Arctic Sage
<i>Aster pygmaeus (Eurybia pygmaea)</i>	Pygmy Aster
<i>Botrychium ascendens</i>	Moonwort
<i>Carex adelostoma</i>	Circumpolar Sedge
<i>Claytonia arctica</i>	Arctic Springbeauty
<i>Claytonia ogilviensis</i>	Ogilvie Mts Spring Beauty
<i>Cryptantha shackletteana</i>	Shacklettes' Catseye
<i>Douglasia alaskana</i>	Alaska Rock-jasmine
<i>Douglasia arctica</i>	Mackenzie River Douglasia



BLM-Alaska Sensitive Plant List, Continued

Scientific Name	Common Name
<i>Douglasia beringensis</i>	Arctic Dwarf Primrose
<i>Draba micropetala</i>	Alpine Whitlow-grass
<i>Draba murrayi</i>	Murray's Whitlow-grass
<i>Draba ogilviensis</i>	
<i>Draba pauciflora</i>	Adam's Whitlow-grass
<i>Erigeron muirii</i>	Muir's Fleabane
<i>Erigeron yukonensis</i>	
<i>Eriogonum flavum</i> var. <i>aquilinum</i>	Yukon Wild-buckwheat
<i>Erysimum asperum</i> var. <i>angustatum</i>	A wallflower
<i>Gentianopsis detonsa</i> ssp. <i>detonsa</i>	Sheared Gentian
<i>Koeleria asiatica</i>	Oriental Junegrass
<i>Lesquerella calderi</i>	Calder's Bladderpod
<i>Mertensia drummondii</i>	Drummond's Bluebell
<i>Montia bostockii</i>	Bostock's Miner's-lettuce
<i>Oxytropis arctica</i> var. <i>barnebyana</i>	Barneby's Locoweed
<i>Oxytropis huddelsonii</i>	
<i>Oxytropis kobukensis</i>	Kobuk Locoweed
<i>Papaver alboroseum</i>	Pale Poppy
<i>Papaver gorodkovii</i>	
<i>Papaver walpolei</i>	Walpole Poppy
<i>Parrya nauruaq</i>	
<i>Pedicularis hirsuta</i>	
<i>Phacelia mollis</i>	Macbride Phacelia
<i>Pleuropogon sabinei</i>	Sabine-grass
<i>Poa hartzii</i> ssp. <i>alaskana</i>	
<i>Poa porsildii</i>	
<i>Potentilla stipularis</i>	Circumpolar Cinquefoil
<i>Primula tschuktschorum</i>	Chukchi Primrose
<i>Puccinellia wrightii</i>	
<i>Ranunculus camissonis</i>	
<i>Ranunculus glacialis</i> var. <i>1</i>	
<i>Ranunculus turneri</i>	Turner's Butter-cup
<i>Rumex graminifolius</i>	
<i>Rumex krausei</i>	Cape Krause Sorrel
<i>Smelowskia johnsonii</i>	
<i>Smelowskia pyriformis</i>	
<i>Trisetum sibiricum</i> ssp. <i>litorale</i>	Siberian False-oats

### Attachment 3

#### BLM-Alaska Watch Lists

sensitive species selection process identified several species for which data were insufficient to justify the 6840 Manual eligibility criteria, but otherwise indicated reason to re-evaluate their status in the future. These species are hereby termed “watch species,” as they may warrant additional data collection to more accurately determine their status. The watch species are not sensitive species, they are not subject to the sensitive species policy, and they have no implied relevance to the NEPA process. Instead, these species should be emphasized for additional inventory, monitoring, or research efforts, as funding and time allow. Furthermore, they should be re-evaluated during subsequent sensitive species revision efforts.

Watch species exhibit one or more of the following characteristics:

- Insufficient or contradictory data exists to reasonably assess population or habitat trends
- Regional adaptations are expressed that may ultimately be determined by the scientific community as distinctive and important for overall species conservation
- Potential threats to the species are poorly understood
- Species are rare and do not occur within several kilometers of BLM land, but potential habitat may exist on BLM land.

#### Watch List – Animals

	Scientific Name	Common Name
<i>Bird</i>	<i>Gavia stellata</i>	Red-throated Loon
	<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper
	<i>Limosa haemastica</i>	Hudsonian Godwit
	<i>Limosa lapponica</i>	Bar-tailed Godwit
	<i>Dendroica townsendi</i>	Townsend’s Warbler
	<i>Catharus minimus</i>	Gray-cheeked Thrush
<i>Fish</i>	<i>Oncorhynchus keta</i>	Chum Salmon (Clear Creek)
	<i>Oncorhynchus tshawytscha</i>	Chinook Salmon (Beaver Creek)
<i>Insect</i>	<i>Oeneis alpina</i>	Eskimo Arctic

#### Watch List – Plants

Scientific Name	Common Name
<i>Aphragmus eschscholtzianus</i>	
<i>Arenaria longipedunculata</i>	Low Sandwort
<i>Beckwithia glacialis Alaskansis</i>	Alaskan Glacier Buttercup
<i>Boechera lemmonii (Arabis lemmonii)</i>	
<i>Cardamine microphylla blaisdellii</i>	
<i>Cardamine microphylla microphylla</i>	Small-leaf Bittercress
<i>Carex heleonastes</i>	Hudson Bay Sedge
<i>Carex laxa</i>	
<i>Cerastium regelii</i>	Regel's Chickweed

Watch List – Plants, Continued

<i>Cochlearia sessilifolia</i>	Sessile-leaved Scurvy Grass
<i>Corispermum ochotense</i> var. <i>alaskanum</i>	Alaskan Bugseed
<i>Douglasia gormanii</i>	
<i>Draba densifolia</i>	Dense-leaf Whitlow-grass
<i>Draba paysonii</i>	Payson's Whitlow-grass
<i>Draba porsildii</i>	Porsild's Whitlow-grass
<i>Draba subcapitata</i>	Ellesmereland Whitlow-grass
<i>Erigeron ochroleucus</i>	Buff Fleabane
<i>Erigeron porsildii</i>	Largeflower Fleabane
<i>Festuca edlundiae</i>	
<i>Lupinus kuschei</i>	Yukon Lupine
<i>Minuartia yukonensis</i>	
<i>Oxygraphis glacialis</i>	
<i>Oxytropis kokrinensis</i>	Kokrines Oxytrope
<i>Oxytropis tananensis</i>	
<i>Papaver</i> sp. 1	
<i>Phlox richardsonii richardsonii</i>	Richardson's Phlox
<i>Plagiobothrys orientalis</i>	
<i>Poa macrantha</i>	
<i>Poa norbergii</i>	Norberg's Bluegrass
<i>Podistera yukonensis</i>	Yukon Podistera
<i>Potamogeton robbinsii</i>	Flatleaf Pondweed
<i>Potamogeton subsibiricus</i>	Yenisei River Pondweed
<i>Potentilla drummondii</i>	
<i>Potentilla rubricaulis</i>	Rocky Mountain Cinquefoil
<i>Puccinellia vahliana</i>	
<i>Ranunculus auricomus</i>	
<i>Ranunculus sabinei</i>	Sardinian Buttercup
<i>Salix reticulata glabellcarpa</i>	A willow
<i>Salix setchelliana</i>	A willow
<i>Saussurea</i> sp. 1 (cf. <i>S. triangularis</i> )	
<i>Saxifraga nelsoniana</i> ssp. <i>porsildiana</i>	Heart-leaf Saxifrage
<i>Smelowskia media</i>	Fernleaf False Candytuft
<i>Smelowskia porsildii</i>	
<i>Stellaria alaskana</i>	Alaska Starwort
<i>Stellaria dicranoides</i>	
<i>Symphyotrichum falcatum</i> var. <i>falcatum</i>	White Prairie Aster
<i>Symphyotrichum yukonense</i>	Yukon Aster
<i>Taraxacum carneocoloratum</i>	Pink-flower Dandelion
<i>Thlaspi arcticum</i>	Arctic Pennycress

## **Appendix M-1: BLM Alaska Sensitive Species**



# United States Department of the Interior



BUREAU OF LAND MANAGEMENT  
Alaska State Office  
222 West Seventh Avenue, #13  
Anchorage, Alaska 99513-7504  
<http://www.blm.gov/ak>

In Reply Refer To:  
6840 (931) P

May 18, 2010

Instruction Memorandum No. AK-2010-018  
Expires: 9/30/2011

To: District Managers, AFS Manager, DSD - Division of Lands,  
Office of Pipeline Monitoring

From: State Director

Subject: BLM-Alaska Revised Sensitive Species Lists

**Program Area:** Special Status Species

**Purpose:** This Instruction Memorandum transmits the revised sensitive animal and plant lists for BLM-Alaska, and discloses the process used to develop the lists.

**Policy/Action:** Attachment 1 identifies 24 animals and 50 plants for sensitive species designation. As directed by BLM Manual 6840, the lists encompass federal candidate and proposed species, species that have been de-listed from the Endangered Species Act (ESA) during the past five years, and other species or distinct population segments that meet specific manual criteria. The 6840 Manual eligibility criteria and the locally-developed process to apply the criteria are consolidated in Attachment 2.

Data to inform the designations were obtained from both external and internal sources. External sources included several agencies and organizations responsible for identifying, tracking or managing species of concern, such as the Alaska Natural Heritage Program (ANHP), the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, and Boreal Partners in Flight. Internal sources were primarily biologists and other resource specialists at the state and field levels. Spatial data on species occurrences were used when available to determine species overlap with BLM lands; when such data were incomplete or not available, inferences were made based on both general distribution patterns and habitat availability.

Bureau sensitive species and their habitats must be addressed during the National Environmental Policy Act (NEPA) planning process. This includes both land use and implementation-level planning efforts. Where appropriate, land use plans shall be sufficiently detailed to identify and resolve conflicts without deferring to implementation-level planning. Where that has not been achieved, project-level planning should consider site-specific management practices that would mitigate negative effects and promote species conservation. The intent is to minimize or

eliminate threats to the species, and improve habitat conditions such that sensitive status is no longer necessary. All BLM-Alaska offices should work cooperatively with other agencies, organizations, and interested parties to promote conservation of these species, and to develop effective inventory and monitoring strategies.

**Timeframe:** The sensitive species lists identified here are effective immediately, and will remain in place until another revision is completed and a new IM is issued. Revision should be initiated whenever sufficient new information supports adding or removing species, but shall not exceed five years from the effective date of this IM.

Changes in federal ESA status may trigger automatic updates to the Bureau sensitive lists irrespective of a completed formal revision process. This includes immediate adoption of newly announced candidate, proposed, and de-listed species, and immediate removal of designated threatened or endangered species.

**Additional Information (Watch Lists):** The sensitive species selection process identified several species for which data were insufficient to satisfy the 6840 Manual eligibility criteria, but otherwise indicated reason to re-evaluate their status in the future. See Attachment 3 for lists of these species. These species are hereby termed “watch species,” as they may warrant additional data collection to more accurately determine their status. The watch species are not sensitive species, they are not subject to sensitive species policy, and they have no implied relevance to the NEPA process. Instead, these species should be emphasized for additional inventory, monitoring, or research efforts, as funding and time allow. Furthermore, they should be re-evaluated during subsequent sensitive species revision efforts to determine whether inclusion may be warranted at that time.

**Background:** Bureau sensitive species are plants and animals identified in accordance with BLM Manual 6840 as needing special management attention to reduce the likelihood and need for future listing under the Endangered Species Act (ESA). The manual was updated in December 2008 with new eligibility criteria, necessitating list revision by all BLM State Directors.

**Manual/Handbook Sections Affected:** No manual or handbook sections are affected by this memorandum. However, manual section 6840 Special Status Species Management informed it.

**Coordination:** Please direct questions to the appropriate State Office program lead. These are Cara Staab (Wildlife; 907-271-3128), Matthew Varner (Fisheries; 907-271-3348), and Paul Krabacher (Plants; 907-271-3266).

Signed by:  
Ted Murphy  
State Director (Acting)

Authenticated by:  
Anita R. Jette  
Records Specialist

### 3 Attachments

- 1 – [BLM-Alaska Sensitive Animal and Plant Lists \(2 pp\)](#)
- 2 – [Criteria and Process for Designating Sensitive Species in Alaska \(2 pp\)](#)
- 3 – [BLM-Alaska Watch Lists \(2 pp\)](#)

**Attachment 1**

**BLM-Alaska Sensitive Animal and Plant Lists**

BLM-Alaska Sensitive Animal List

	<b>Scientific Name</b>	<b>Common Name</b>
<b>Bird</b>	<i>Gavia adamsii</i>	Yellow-billed Loon
	<i>Cygnus buccinator</i>	Trumpeter Swan
	<i>Chen canagica</i>	Emperor Goose
	<i>Branta canadensis occidentalis</i>	Dusky Canada Goose
	<i>Aquila chrysaetos</i>	Golden Eagle
	<i>Numenius tahitiensis</i>	Bristle-thighed Curlew
	<i>Calidris canutus</i>	Red Knot
	<i>Calidris ptilocnemis tschuktschor</i>	Bering Sea Rock Sandpiper
	<i>Brachyramphus brevirostris</i>	Kittlitz's Murrelet
	<i>Brachyramphus marmoratus</i>	Marbled Murrelet
	<i>Asio flammeus</i>	Short-eared Owl
	<i>Contopus cooperi</i>	Olive-sided Flycatcher
	<i>Dendroica striata</i>	Blackpoll Warbler
	<i>Euphagus carolinus</i>	Rusty Blackbird
<i>Plectrophenax hyperboreus</i>	McKay's Bunting	
<b>Mammal</b>	<i>Lepus othus</i>	Alaskan Hare
	<i>Spermophilus parryii osgoodi</i>	Osgood's Arctic Ground Squirrel
	<i>Sorex yukonicus</i>	Alaskan Tiny Shrew
	<i>Mustela americana kenaiensis</i>	Kenai Marten
<b>Fish</b>	<i>Lampetra alaskensis</i>	Alaskan Brook Lamprey
	<i>Salvelinus alpinus</i>	Arctic Char (Kigluaik Mtns)
<b>Insect</b>	<i>Acentrella feropagus</i>	A mayfly
	<i>Rhithrogena ingalik</i>	Alaska Endemic Mayfly
	<i>Alaskaperla ovibovis</i>	Alaska Sallfly

BLM-Alaska Sensitive Plant List

<b>Scientific Name</b>	<b>Common Name</b>
<i>Antennaria densifolia</i>	
<i>Arnica lonchophylla</i>	Northern Arnica
<i>Artemisia globularia ssp. lutea</i>	
<i>Artemisia laciniata</i>	Siberian Wormwood
<i>Artemisia senjavinensis</i>	Arctic Sage
<i>Aster pygmaeus (Eurybia pygmaea)</i>	Pygmy Aster
<i>Botrychium ascendens</i>	Moonwort
<i>Carex adelostoma</i>	Circumpolar Sedge
<i>Claytonia arctica</i>	Arctic Springbeauty
<i>Claytonia ogilviensis</i>	Ogilvie Mts Spring Beauty
<i>Cryptantha shackletteana</i>	Shacklettes' Catseye
<i>Douglasia alaskana</i>	Alaska Rock-jasmine
<i>Douglasia arctica</i>	Mackenzie River Douglasia

BLM-Alaska Sensitive Plant List, Continued

Scientific Name	Common Name
<i>Douglasia beringensis</i>	Arctic Dwarf Primrose
<i>Draba micropetala</i>	Alpine Whitlow-grass
<i>Draba murrayi</i>	Murray's Whitlow-grass
<i>Draba ogilviensis</i>	
<i>Draba pauciflora</i>	Adam's Whitlow-grass
<i>Erigeron muirii</i>	Muir's Fleabane
<i>Erigeron yukonensis</i>	
<i>Eriogonum flavum</i> var. <i>aquilinum</i>	Yukon Wild-buckwheat
<i>Erysimum asperum</i> var. <i>angustatum</i>	A wallflower
<i>Gentianopsis detonsa</i> ssp. <i>detonsa</i>	Sheared Gentian
<i>Koeleria asiatica</i>	Oriental Junegrass
<i>Lesquerella calderi</i>	Calder's Bladderpod
<i>Mertensia drummondii</i>	Drummond's Bluebell
<i>Montia bostockii</i>	Bostock's Miner's-lettuce
<i>Oxytropis arctica</i> var. <i>barnebyana</i>	Barneby's Locoweed
<i>Oxytropis huddelsonii</i>	
<i>Oxytropis kobukensis</i>	Kobuk Locoweed
<i>Papaver alboroseum</i>	Pale Poppy
<i>Papaver gorodkovii</i>	
<i>Papaver walpolei</i>	Walpole Poppy
<i>Parrya nauruaq</i>	
<i>Pedicularis hirsuta</i>	
<i>Phacelia mollis</i>	Macbride Phacelia
<i>Pleuropogon sabinei</i>	Sabine-grass
<i>Poa hartzii</i> ssp. <i>alaskana</i>	
<i>Poa porsildii</i>	
<i>Potentilla stipularis</i>	Circumpolar Cinquefoil
<i>Primula tschuktschorum</i>	Chukchi Primrose
<i>Puccinellia wrightii</i>	
<i>Ranunculus camissonis</i>	
<i>Ranunculus glacialis</i> var. <i>1</i>	
<i>Ranunculus turneri</i>	Turner's Butter-cup
<i>Rumex graminifolius</i>	
<i>Rumex krausei</i>	Cape Krause Sorrel
<i>Smelowskia johnsonii</i>	
<i>Smelowskia pyriformis</i>	
<i>Trisetum sibiricum</i> ssp. <i>litorale</i>	Siberian False-oats



### Attachment 3

#### BLM-Alaska Watch Lists

sensitive species selection process identified several species for which data were insufficient to justify the 6840 Manual eligibility criteria, but otherwise indicated reason to re-evaluate their status in the future. These species are hereby termed “watch species,” as they may warrant additional data collection to more accurately determine their status. The watch species are not sensitive species, they are not subject to the sensitive species policy, and they have no implied relevance to the NEPA process. Instead, these species should be emphasized for additional inventory, monitoring, or research efforts, as funding and time allow. Furthermore, they should be re-evaluated during subsequent sensitive species revision efforts.

Watch species exhibit one or more of the following characteristics:

- Insufficient or contradictory data exists to reasonably assess population or habitat trends
- Regional adaptations are expressed that may ultimately be determined by the scientific community as distinctive and important for overall species conservation
- Potential threats to the species are poorly understood
- Species are rare and do not occur within several kilometers of BLM land, but potential habitat may exist on BLM land.

#### Watch List – Animals

	Scientific Name	Common Name
<i>Bird</i>	<i>Gavia stellata</i>	Red-throated Loon
	<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper
	<i>Limosa haemastica</i>	Hudsonian Godwit
	<i>Limosa lapponica</i>	Bar-tailed Godwit
	<i>Dendroica townsendi</i>	Townsend’s Warbler
	<i>Catharus minimus</i>	Gray-cheeked Thrush
<i>Fish</i>	<i>Oncorhynchus keta</i>	Chum Salmon (Clear Creek)
	<i>Oncorhynchus tshawytscha</i>	Chinook Salmon (Beaver Creek)
<i>Insect</i>	<i>Oeneis alpina</i>	Eskimo Arctic

#### Watch List – Plants

Scientific Name	Common Name
<i>Aphragmus eschscholtzianus</i>	
<i>Arenaria longipedunculata</i>	Low Sandwort
<i>Beckwithia glacialis Alaskansis</i>	Alaskan Glacier Buttercup
<i>Boechera lemmonii (Arabis lemmonii)</i>	
<i>Cardamine microphylla blaisdellii</i>	
<i>Cardamine microphylla microphylla</i>	Small-leaf Bittercress
<i>Carex heleonastes</i>	Hudson Bay Sedge
<i>Carex laxa</i>	
<i>Cerastium regelii</i>	Regel's Chickweed

Watch List – Plants, Continued

<i>Cochlearia sessilifolia</i>	Sessile-leaved Scurvy Grass
<i>Corispermum ochotense</i> var. <i>alaskanum</i>	Alaskan Bugseed
<i>Douglasia gormanii</i>	
<i>Draba densifolia</i>	Dense-leaf Whitlow-grass
<i>Draba paysonii</i>	Payson's Whitlow-grass
<i>Draba porsildii</i>	Porsild's Whitlow-grass
<i>Draba subcapitata</i>	Ellesmereland Whitlow-grass
<i>Erigeron ochroleucus</i>	Buff Fleabane
<i>Erigeron porsildii</i>	Largeflower Fleabane
<i>Festuca edlundiae</i>	
<i>Lupinus kuschei</i>	Yukon Lupine
<i>Minuartia yukonensis</i>	
<i>Oxygraphis glacialis</i>	
<i>Oxytropis kokrinensis</i>	Kokrines Oxytrope
<i>Oxytropis tananensis</i>	
<i>Papaver</i> sp. 1	
<i>Phlox richardsonii richardsonii</i>	Richardson's Phlox
<i>Plagiobothrys orientalis</i>	
<i>Poa macrantha</i>	
<i>Poa norbergii</i>	Norberg's Bluegrass
<i>Podistera yukonensis</i>	Yukon Podistera
<i>Potamogeton robbinsii</i>	Flatleaf Pondweed
<i>Potamogeton subsibiricus</i>	Yenisei River Pondweed
<i>Potentilla drummondii</i>	
<i>Potentilla rubricaulis</i>	Rocky Mountain Cinquefoil
<i>Puccinellia vahliana</i>	
<i>Ranunculus auricomus</i>	
<i>Ranunculus sabinei</i>	Sardinian Buttercup
<i>Salix reticulata glabellcarpa</i>	A willow
<i>Salix setchelliana</i>	A willow
<i>Saussurea</i> sp. 1 (cf. <i>S. triangularis</i> )	
<i>Saxifraga nelsoniana</i> ssp. <i>porsildiana</i>	Heart-leaf Saxifrage
<i>Smelowskia media</i>	Fernleaf False Candytuft
<i>Smelowskia porsildii</i>	
<i>Stellaria alaskana</i>	Alaska Starwort
<i>Stellaria dicranoides</i>	
<i>Symphyotrichum falcatum</i> var. <i>falcatum</i>	White Prairie Aster
<i>Symphyotrichum yukonense</i>	Yukon Aster
<i>Taraxacum carneocoloratum</i>	Pink-flower Dandelion
<i>Thlaspi arcticum</i>	Arctic Pennycress

## **Appendix N: Supplemental Impact Analysis Information**

## Table of Contents

<b>Section 1. Introduction .....</b>	<b>1-1</b>
1.1 Analytical Assumptions .....	1-1
1.2 General Methodology for Analyzing Impacts.....	1-2
1.3 Consideration of Noise Impacts at the Planning Level.....	1-2
1.4 Incomplete or Unavailable Information.....	1-3
<b>Section 2. Cumulative Impacts .....</b>	<b>2-1</b>
2.1 Cumulative Analysis Methodology .....	2-1
2.2 Past, Present, and Reasonably Foreseeable Future Actions.....	2-2
2.2.1 Past and Present Land Use and Activities.....	2-2
2.2.2 Reasonably Foreseeable Future Land Use and Actions.....	2-7
<b>Section 3. Supplemental Impact Analysis.....</b>	<b>3-1</b>
3.1 Fisheries.....	3-1
3.1.1 Summary.....	3-1
3.1.2 Methods of Analysis .....	3-1
3.1.3 Effects Analysis .....	3-8
3.2 Vegetation.....	3-42
3.2.1 Summary.....	3-42
3.2.2 Methods of Analysis .....	3-42
3.2.3 Effects Analysis .....	3-44
3.3 Wildlife and Special Status Species.....	3-66
3.3.1 Summary.....	3-66
3.3.2 Methods of Analysis .....	3-66
3.3.3 Effects Analysis .....	3-71
3.4 Cultural Resources.....	3-112
3.4.1 Summary.....	3-112
3.4.2 Methods of Analysis .....	3-112
3.4.3 Effects Analysis .....	3-114
3.5 Locatable and Salable Minerals.....	3-136
3.5.1 Summary.....	3-136
3.5.2 Methods of Analysis .....	3-136
3.5.3 Nature and Types of Effects .....	3-137
3.5.4 Effects Analysis .....	3-138
3.6 Lands and Realty.....	3-149
3.6.1 Summary.....	3-149

3.6.2	Methods of Analysis .....	3-149
3.6.3	Potential Effects and Indicators .....	3-149
3.6.4	Effects Analysis .....	3-151
3.7	Areas of Critical Environmental Concern.....	3-176
3.7.1	Summary .....	3-176
3.7.2	Methods of Analysis .....	3-176
3.7.3	Effects Analysis .....	3-179
3.8	National Trails .....	3-201
3.8.1	Summary .....	3-201
3.8.2	Methods of Analysis .....	3-201
3.8.3	Effects Analysis .....	3-204
3.9	Wild and Scenic Rivers.....	3-228
3.9.1	Summary .....	3-228
3.9.2	Methods of Analysis .....	3-229
3.9.3	Effects Analysis .....	3-231
3.10	Support for BSWI Communities.....	3-259
3.10.1	Economic Conditions.....	3-259
3.10.2	Social Conditions.....	3-278
3.11	Subsistence.....	3-289
3.11.1	Summary .....	3-289
3.11.2	Methods of Analysis .....	3-289
3.11.3	Effects Analysis .....	3-293
<b>Section 4.</b>	<b>References .....</b>	<b>4-1</b>

## List of Tables

Table 2.2.2-1: High Locatable Mineral Potential in the Planning Area.....	2-10
Table 3.1.1-1: Ranking Summary of Alternatives by Management Action and Indicator .....	3-1
Table 3.1.2-1: Summary of Effects to Fisheries Resource by Management Action.....	3-6
Table 3.1.3-1: River Miles/Waterbody Acreage by ROW Management Status and Stream Classification: Alternatives B, C, and D.....	3-11
Table 3.1.3-2: Summary of Stream Miles and Acres of Waterbodies by Alternative for ROW Combined by NHD Region for the Planning Area .....	3-13
Table 3.1.3-3: Commercial Woodland Miles/Acres by Closed, Permittable, and Permitted Streams/Waterbodies: Alternatives A, B, C, and D.....	3-18
Table 3.1.3-4: Summary of Stream Miles and Acres of Waterbodies by all Alternatives for Commercial Woodlands Combined by NHD Region for the Planning Area .....	3-20
Table 3.1.3-5: Areas Open/Closed to Grazing by Miles/Acres of Streams: Alternatives A, B, C, and D.....	3-24
Table 3.1.3-6: Summary of Stream Miles and Acres of Waterbodies by Alternatives for Grazing Combined by NHD Region for the Planning Area .....	3-26
Table 3.1.3-7: Summary of Stream Miles and Acres of Waterbodies by Alternatives for Locatable and Salable Combined by NHD Region for the Planning Area.....	3-29
Table 3.1.3-8: Summary of Stream Miles and Acres of Waterbodies by Action Alternative for Transportation and Travel Combined by NHD Region for the Planning Area.....	3-33
Table 3.1.3-9: Cumulative Effects Analysis for Fisheries Resources.....	3-41
Table 3.2.2-1: Summary of Effects to Vegetation by Management Action.....	3-43
Table 3.2.3-1: Cumulative Effects Analysis for Vegetation.....	3-65
Table 3.3.2-1: Summary of Effects to Wildlife by Management Action.....	3-68
Table 3.3.3-1. Extent of Wildlife Management Actions under Alternative B .....	3-79
Table 3.3.3-2: Extent of Wildlife Management Actions under Alternative C .....	3-80
Table 3.3.3-3: Extent of Wildlife Management Actions under Alternative D.....	3-81
Table 3.3.3-4: Available Disposals, Acquisitions, and Exchanges under Alternative B, by Indicator .....	3-98
Table 3.3.3-5: Available Disposals, Acquisitions, and Exchanges under Alternative C, by Indicator .....	3-99
Table 3.3.3-6: Available Disposals, Acquisitions, and Exchanges under Alternative D, by Indicator .....	3-100
Table 3.3.3-7: Cumulative Effects Analysis for Wildlife and Special Status Species.....	3-111
Table 3.4.2-1: Types of Effects to Cultural Resources .....	3-114
Table 3.4.3-1: Cumulative Effects Analysis for Cultural Resources .....	3-135
Table 3.5.3-1: Summary of Effects to Locatable and Salable Minerals .....	3-137
Table 3.5.4-1: Cumulative Effects Analysis for Locatable and Salable Minerals .....	3-148
Table 3.6.3-1: Summary of Effects to Lands and Realty by Management Action .....	3-150
Table 3.6.4-1: Alternative A ACECs Affecting Lands and Realty.....	3-164

Table 3.6.4-2: Alternative B ACECs Affecting Lands and Realty .....	3-168
Table 3.6.4-3: Cumulative Effects Analysis for Lands and Realty.....	3-175
Table 3.7.2-1: Summary of Effects to ACECs by Management Action .....	3-177
Table 3.7.3-1: Potential Beneficial or Adverse Impacts on Potential ACECs.....	3-180
Table 3.7.3-2: Cumulative Effects Analysis for ACECs .....	3-200
Table 3.8.2-1: Effects and Indicators for National Trails .....	3-202
Table 3.8.3-1: Potential Effects on the INHT .....	3-205
Table 3.8.3-2: Cumulative Effects Analysis for the INHT .....	3-227
Table 3.9.2-1: Rivers Identified as Eligible (Alternative A) and Recommended as Suitable (Alternative B) within the Planning Area .....	3-229
Table 3.9.2-2: Summary of Effects to Wild and Scenic Rivers by Management Action .....	3-230
Table 3.9.3-1: WSR Intersections with Proposed HVWs (all alternatives).....	3-233
Table 3.9.3-2: Suitable WSR Intersections with Proposed HVWs (Alternative B).....	3-235
Table 3.9.3-3: WSR Intersections with VRM actions.....	3-237
Table 3.9.3-4: WSR Intersections with ROW Actions .....	3-247
Table 3.9.3-5: WSR Intersections with ACECs.....	3-250
Table 3.9.3-6: Intersections of Eligible WSRs with Existing ACECs (Alternative A) .....	3-251
Table 3.9.3-7: Suitable WSR Intersections with Potential ACECs (Alternative B) .....	3-251
Table 3.9.3-8: Cumulative Effects Analysis for Wild and Scenic Rivers.....	3-258
Table 3.10.1-1: Summary of Effects to Economic Conditions by Management Action .....	3-260
Table 3.10.2-1: River Miles of HVW by Alternative .....	3-265
Table 3.10.2-2: Wildlife Habitat for Important Subsistence Game Species .....	3-266
Table 3.10.2-3: Acres identified by Alternative as Open to Mineral Entry .....	3-268
Table 3.10.2-4: Special Recreation Permit Measures Affecting Non-Market Values .....	3-269
Table 3.10.2-5: Acres of Land Open for Subsistence and Personal Use .....	3-271
Table 3.10.2-6: Summer and Winter Subsistence Travel Designations.....	3-272
Table 3.10.2-7: Acres of ACECs by Alternative .....	3-273
Table 3.10.2-8: Acres of New Wild and Scenic River Corridors by Alternative .....	3-274
Table 3.10.3-1: Summary of Effects to Social Conditions by Management Action.....	3-279
Table 3.10.3-2: Expected Change from Existing Conditions under All Alternatives.....	3-281
Table 3.10.3-3: Incremental Cumulative Impact to Economic and Social Conditions.....	3-288
Table 3.11.2-1: Summary of Effects to Subsistence by Management Action .....	3-291
Table 3.11.3-1: Extent of Wildlife Management Actions Influencing Subsistence under Alternative B.....	3-300
Table 3.11.3-2: Extent of Wildlife Management Actions Influencing Subsistence under Alternative C.....	3-302
Table 3.11.3-3: Extent of Wildlife Management Actions Influencing Subsistence under Alternative D.....	3-303

Table 3.11.3-4: Overland Travel Restrictions for Subsistence and Casual Use Proposed under Alternative B.....	3-322
Table 3.11.3-5: Overland Travel Restrictions for Subsistence and Casual Use Proposed under Alternative C.....	3-323
Table 3.11.3-6: Overland Travel Restrictions for Subsistence and Casual Use Proposed under Alternative D.....	3-323
Table 3.11.3-7: Cumulative Effects Analysis for Subsistence.....	3-331

### **List of Figures**

Figure 3.1.2-1: Watershed Boundaries and Hydrography .....	3-2
Figure 3.1.2-2: Anadromous Waters and Spawning Habitat .....	3-3
Figure 3.1.2-3: Streams within Medium and High Areas of Mineral Potential (HUC 6).....	3-4
Figure 3.10.2-1: U.S. Average Monthly Prices for Crude Oil and Heating Oil, 2000-2017 .....	3-276



## ***Section 1. Introduction***

This document presents the direct, indirect, and cumulative environmental, social, and economic impacts on the human and natural environment that are expected to result from implementing the alternatives presented in Chapter 2 of the Bering Sea-Western Interior (BSWI) Draft Resource Management Plan (RMP)/Environmental Impact Statement (EIS). Irretrievable or irreversible commitment of resources and unavoidable adverse impacts are presented at the end of the report.

Impact analyses and conclusions are based on interdisciplinary team knowledge of the BSWI Planning Area (planning area) and resources, information provided by experts in the Bureau of Land Management (BLM), other agencies' monitoring data, and information contained in pertinent literature. The baseline used for the impact analysis is the existing condition or management situation, as described in Chapter 3 of the BSWI Draft RMP/EIS. Analysis assumptions have also been developed to help guide the determination of effects. Assumptions that apply to impact analyses for all resources, resource uses, and special designations are included in Section 1.1 below. Additionally, assumptions specific to each resource, resource use, or special designation are described in the respective impact section.

The BSWI Draft RMP/EIS provides a broad management framework over the 13.4-million-acre planning area and does not include specifics on actual developments or implementation-level planning. Because the BSWI Draft RMP/EIS provides a broad management framework and exact locations of development or management are not specified, the analysis in this report presents best estimates of impacts. Impacts are quantified to the extent practical with available data and all reported acreages throughout this report are approximate. In the absence of quantitative data, best professional judgment provides the basis for the impact analysis. Because of the broad scope, impact analysis of planning-level decisions is speculative with respect to projecting specific activities and therefore would be performed on a project-specific basis. Subsequent documents tiered to this RMP would generally contain a greater level of detail and would be subject to the National Environmental Policy Act (NEPA) analysis and compliance process.

### **1.1 Analytical Assumptions**

Several assumptions were made to facilitate the estimation of the effects of the alternatives. These assumptions are made only for the purpose of analysis and do not represent potential RMP decisions. The following are general assumptions applicable to all resource categories. Any specific resource assumptions are provided under the "Assumptions" subheading for that resource.

- Sufficient funding and BLM personnel will be available for implementing the final decision.
- Implementing actions from any of the RMP alternatives will comply with all valid existing rights, federal regulations, BLM policies, Alaska National Interest Lands Conservation Act (ANILCA), State laws and regulations, and other requirements.
- Implementation-level actions necessary to execute the land use plan-level decisions in the RMP will be subject to further environmental review, including compliance with NEPA, as appropriate.
- Acres open to potential development (grazing, mineral development, commercial forestry) would influence the amount of development that would occur over the life of the RMP. However, the number of acres open to development is not directly proportional to the number of acres that would actually be developed under each alternative, because it is unlikely that all acres open to development would be developed due to the remoteness of the project area and lack of

infrastructure (i.e., roads). Actual development will be influenced by economic drivers and ecological conditions.

- The functional capability of all developments will be maintained.
- The discussion of impacts is based on the best available data. Knowledge of the planning area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used to infer environmental impacts where data are limited.
- Acreage figures and other numbers used in the analyses are approximate projections for comparative and analytic purposes only. Readers should not infer that they reflect exact measurements or precise calculations.

## 1.2 General Methodology for Analyzing Impacts

Direct, indirect, and cumulative impacts are considered in this effects analysis. The effects analysis was performed consistent with direction provided in Title 40 Code of Federal Regulations (CFR) 1502.16, Considering Cumulative Effects under the National Policy Act (CEQ 1997); BLM National Environmental Policy Act Handbook H-1790-1 (BLM 2008); Council on Environmental Quality (CEQ) NEPA regulations for incomplete or unavailable information dated April 25, 1986, in *Federal Register* 51(80); and Executive Memo to all federal agencies dated January 24, 2005, regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ 2005).

- *Direct impacts* are caused by an action or implementation of an alternative and occur at the same time and place.
- *Indirect impacts* result from implementing an action or alternative and are later in time or farther removed in distance but are still reasonably foreseeable.
- *Cumulative effects* are defined in Section 2, “Cumulative Impacts.”

Effects are quantified where possible using geographic information system (GIS) analysis. In the absence of quantitative data, best professional judgment was used to describe impacts in qualitative terms. Management actions that would have the same impacts for all alternatives are described together. However, more emphasis is placed on management actions that would result in different impacts among the alternatives to provide the reader with an understanding of the range of impacts that could result, depending on the alternative selected. Only management actions with potential impacts are described. The standard definitions for terms referring to impact duration that are used in the effects analysis are as follows, unless otherwise stated:

- *Temporary impact*: The impact would occur during or immediately after implementation of the action and may occur intermittently. Duration of temporary impacts would be 1 year or less and could be beneficial or adverse.
- *Short-term impact*: The impact would occur during or immediately after implementation of the action and could be beneficial or adverse (e.g., during the first 5 years of the RMP).
- *Long-term impact*: The impact could last for several years or more and could be beneficial or adverse (e.g., beyond the first 5 years of the RMP).

## 1.3 Consideration of Noise Impacts at the Planning Level

Changes to noise levels, noise-producing activities, and associated impacts throughout the planning area would depend on actual activities and projects implemented in the planning area. Therefore, a detailed

noise analysis is not included in this EIS and instead would be performed at the project level. Management actions being evaluated in this RMP that would have impacts on noise are primarily related to mining activity, vehicular use (including recreation), and construction activity. The alternatives evaluated in this EIS include areas where these noise-producing activities could occur based on allowable uses and the level of restrictions associated with each alternative. Information about potential noise-producing activities in the planning area was used to provide a high-level discussion of potential changes to noise levels and noise-producing activities to resources, resource uses, and special designations that could be affected by noise.

#### **1.4 Incomplete or Unavailable Information**

CEQ established implementing regulations for NEPA requiring that a federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an EIS (40 CFR 1502.22). The best available information pertinent to the decisions to be made was used in developing the Draft RMP/EIS. Considerable effort has been taken to acquire and convert resource data into digital format for use in the plan—both from BLM sources and from outside sources. However, certain information was unavailable when developing the RMP/EIS and is disclosed under the “Incomplete or Unavailable Information” subheading for the respective resource.

## ***Section 2. Cumulative Impacts***

The CEQ regulations implementing NEPA define cumulative impacts as "...[T]he impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

### **2.1 Cumulative Analysis Methodology**

Because of the programmatic nature of an RMP, this cumulative effects analysis methodology is broad and generalized to address potential effects that could occur from a reasonably foreseeable management scenario combined with other reasonably foreseeable activities or projects. The cumulative effects analysis evaluates the projected trends and forecasts of each resource, resource use, or special designation that could result from the RMP. To understand the RMP's influence on cumulative effects, trends and forecasts are identified in consideration of:

- Past and present actions (synonymous with the affected environment, described in the BSWI Draft RMP/EIS Appendix M);
- Reasonably foreseeable actions along with past and present actions (this is also representative of Alternative A); and
- Each RMP action alternative along with past, present, and reasonably foreseeable future actions.

As a result of this analysis, trends and forecasts for each resource, resource use, or special designation are identified to fit within one of the following four categories:

- No contribution to resource trend
- Stabilizes existing trend
- Continues existing trend
- Counters existing trend

This analysis provides a broad understanding of how each alternative would influence the cumulative effects, or trends and forecasts, for each resource, resource use, or special designation in the same geographic area. If the resource trend is projected to change as a result of any action alternative, that constitutes a cumulative impact. The impact could be adverse or beneficial, depending on the direction of the change.

The following factors were considered in the cumulative impact assessment:

- Federal, nonfederal, and private actions
- Potential for synergistic interaction among or between effects
- Potential for effects across political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives

- Climate change
- Identified planning issues

## **2.2 Past, Present, and Reasonably Foreseeable Future Actions**

The following sections describe activities that were considered in the cumulative effects analysis.

### **2.2.1 Past and Present Land Use and Activities**

Relevant past and present actions are those that have influenced the current condition of the resources in the planning area. These actions, described below, have been identified based on review of the planning issues; agency records, including existing decisions and formal proposals; and non-federal actions on lands not managed by the BLM.

#### **Land Use**

The planning area and much of the surrounding lands are characterized by large tracts of undisturbed ecosystems that support a variety of native wildlife and fish species. Past and present land use and activities within the planning area are summarized below and provide the basis for analysis of cumulative effects.

Although this RMP/EIS does not address lands that are not managed by the BLM, including State of Alaska lands, Alaska Native Claims Settlement Act (ANCSA) Native corporation lands, National Park Service (NPS) lands, U.S. Fish and Wildlife Service (USFWS) lands, private lands, and Native allotments, past and present (as well as reasonable foreseeable future actions) land use for all lands within the planning area has influenced or has the potential to influence the current condition of the resources in the planning area and is therefore considered in the cumulative effects analysis. Impacts from such actions include right-of-way (ROW) establishment, lease sales, and surface occupancy. Management of subsurface estate within USFWS lands is administered by the BLM under the Mineral Leasing Act of 1920. ANILCA section 304(c) is addressed in the Mineral Occurrence and Development Potential Report for Leasable Minerals within the planning area (BLM 2015a). Conservation System Units (CSUs) and other land tracts established by ANILCA will be addressed on a case-by-case basis and are not subject to this plan, with the exception of the Unalakleet Wild River Corridor. Similarly, any prior existing mining claims administered by the BLM within USFWS or NPS lands will be addressed on a case-by-case basis.

#### ***BLM Land***

Past and current land use on BLM-managed land in the planning area, including the Iditarod National Historic Trail (INHT), is considered for the cumulative effects analysis. This information is described in detail in the BSWI Draft RMP/EIS, Appendix M. These are lands that will most likely be retained in long-term federal ownership. These lands, which constitute 10,727,251 acres, or approximately 17 percent of the planning area, are not selected by the State of Alaska or by Native corporations. An additional 2,594,941 (approximately 4 percent of the planning area) and 144,284 acres (less than 1 percent of the planning area) are selected by the State of Alaska and Native corporations, respectively. Selected lands are in BLM management until interim conveyed or tentatively approved.

#### ***National Wildlife Refuges***

The Yukon Delta National Wildlife Refuge (NWR) and the Innoko Unit of the Innoko NWR fall within the planning area. These refuges were established in 1980 by ANILCA with the following management

goals: 1) to conserve fish and wildlife populations and their habitats in their natural diversity; 2) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats; 3) to provide the opportunity for continued subsistence uses by local residents; and 4) to ensure adequate water quantity and quality necessary to meet refuge purposes. Activities taking place on the refuges include hunting, fishing, recreational use, and subsistence harvest, as well as research and management activities. Residents of adjacent villages on the lower Innoko and Yukon Rivers harvest the land's fish and wildlife resources (USFWS 1988). Fish and fall hunting camps are still in use today up and down rivers of the Innoko region. Indigenous people known as the Yup'ik and Cup'ik Eskimos and Athabaskans inhabit the Yukon Delta NWR and rely heavily on local natural resources.

Historically, 77 lode and placer mining claims were located within the Yukon Delta NWR, mostly in the Kilbuck Mountains in the southeastern quarter of the refuge. Currently, no active mining claims or valid oil and gas leases are located on refuge lands. Fifty-nine pending oil and gas lease applications are on file with the BLM for the Yukon Delta NWR. All but one were filed in 1968, but leases were never issued. The lease applications were "grandfathered in" under the authority of the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (101 Stat. 1330-256, 259) (BLM 2015a).

### ***National Park Service Lands***

One NPS Unit, Lake Clark National Park and Preserve, reaches into the southeastern portion of the planning area, constituting approximately 1.0 percent of the planning area. The 4-million-acre Lake Clark National Park and Preserve was established in 1980 by ANILCA. Approximately 2,572,000 acres of the park is designated wilderness. The stated purpose of Lake Clark National Park and Preserve is to "protect a region of dynamic geologic and ecological processes that create scenic mountain landscapes, unaltered watersheds supporting Bristol Bay red salmon, and habitats for wilderness dependent populations of fish and wildlife, vital to 10,000 years of human history" (NPS 2009). Subsistence activities by local rural residents and those who live on private land within the park and preserve boundaries include hunting, trapping, fishing, and timber harvest. Recreational and sport uses of the Lake Clark area are those commonly associated with Alaskan wilderness activities such as hunting, fishing, trapping, river running, hiking, photography, and wilderness camping. Sport fishing is allowed throughout the park and preserve, but sport hunting and trapping are confined to the national preserve. Visitor access is by commercial and privately operated airplanes and boats. The use of off-road vehicles for other than subsistence activities is prohibited on federal lands within the park and preserve.

Management of the park and preserve is guided by a portfolio of management plans, including a foundation statement (NPS 2009), a general management plan amendment (NPS 2014) and draft land protection plan (NPS 2013). The guiding principle of land protection plans is to ensure the protection of each unit of the national park system consistent with the stated purposes for which the unit was created and administered.

Nine patented mining claims total 51.2 acres within the Lake Clark Park and Preserve boundary. Park and preserve lands are no longer available for new mineral entry and location (NPS 2013).

### ***State Lands***

The planning area includes roughly 18.1 million acres of State lands and 2.6 million acres of BLM lands that have been selected by the State (approximately 21 and 4 percent of the planning area, respectively). The BLM continues to manage lands selected by the State of Alaska that have not yet been conveyed. Lands that have already been conveyed to the State of Alaska constitute approximately 29 percent of the

planning area. State lands in the planning area are managed under guidelines outlined in the specific Alaska Department of Natural Resources (ADNR) area plans, such as the Kuskokwim Area Plan (ADNR 1988) and Tanana Basin Area Plan (ADNR 1991). The State lands are managed for multiple uses, with priorities varying according to the resource values for particular subunits. Primary land uses include forestry, agriculture, minerals management, recreation, fish and wildlife habitat, heritage resources, recreation and tourism, settlement, public access, transportation, and low-value resource management.

Wood-Tikchik State Park reaches into the southern boundary of the planning area. The park is a 1.6-million-acre area that was established to protect fish and wildlife populations and to support traditional subsistence and recreational activities. Traditional activities in the park include subsistence fishing, hunting, and trapping, as well as recreational fishing and hunting. The number of recreational wilderness-travel activities in the park has grown and includes kayaking, river floating, hiking, and some mountain climbing. The park management plan (ADNR 2002) designates the upper Tikchik Lakes and Kulik/Grant lakes as “Wilderness”, designates most of the remainder of the park “Natural Area”, and designates the Agulowak River and Lake Aleknagik State Recreation Site as “Recreational Development.”

### ***Native Lands***

The planning area includes lands conveyed to village and regional Native corporations (approximately 16 percent of the planning area) and lands acquired by Alaska Natives under the Alaska Native Allotment Act of 1906 and the Native Townsite Act of 1926 (approximately 440,000 acres, or 1 percent of the planning area).

Over 50 village corporations and five regional corporations (Doyon, Limited, Calista Corporation, Cook Inlet Region Incorporated, Bering Straits Native Corporation, and NANA Regional Corporation) have a nexus to the planning area. Management objectives for regional corporation lands within the planning area are focused on protection of traditional shareholder uses and responsible economic development of resources. Throughout much of the twentieth century, mining provided an economic basis for shareholders. Placer gold mining supported several settlements, including Iditarod, Marshall, and Nyac. Currently, placer gold production continues on a small scale and is an important source of revenue for shareholders. Illustrative of regional corporation objectives to support responsible development is NANA’s historic involvement with the Red Dog mine (north of the planning area).

Exploration and baseline studies for the Donlin Gold Project, located in the Calista Region near Crooked Creek, have been ongoing since 1995. This mineral resource site is located on surface land owned by the Kuskokwim Corporation (TKC), and Calista Corporation owns the subsurface land. Donlin Gold LLC, a limited liability company jointly owned by Barrick Gold U.S. Inc. and NovaGold Resources Alaska, Inc., received key permits on August 13, 2018, for development of the Donlin Gold Project, an open pit hardrock mine near the village of Crooked Creek, including ROW permit approval from BLM. More information is included below under “Future Land Uses” (NovaGold 2018).

### ***Military Lands***

Military lands constitute less than 0.1 percent of the planning area. If military lands are released and returned to BLM management during the life of the plan, direction contained in this RMP/EIS would apply. Generally, military use of lands in the planning area was during the Cold War era following World War II was tied to the communication, navigation, and radar needs of the time. Most military installations have been decommissioned, and little present use exists.

## **Past and Present Activities**

### ***Oil, Gas, Coal, and Geothermal Leasing and Exploration***

The most current report analyzing leasable mineral resource potential within the planning area for this RMP is the Mineral Occurrence and Development Potential Report – Leasable Minerals Bering Sea-Western Interior Resource Management Plan (BLM 2015a). Fluid mineral occurrence and development potential in the planning area is primarily associated with coal and coal bed natural gas, oil and gas, peat, and geothermal resources. The following is a summary of findings from this report on past and present activities.

#### **Coal**

The areas that contain coal within the planning area have been divided into one field and five districts: Farewell (Little Tonzona) Coal Field and the Windy Fork, Middle Fork, Cheeneetnuk, Big River, and Nelson Island Districts (BSWI Draft RMP/EIS, Map 3.3.4-1). The majority of the coal in the planning area is tertiary-aged and subbituminous. Known coal mineral resources are limited to a few thin coal beds on Nelson and Nunivak Islands, but these are considered noncommercial. Modest amounts of coal from Windy Fork have been used by trappers, prospectors, and big game hunters for local home heating applications. Coal was also noted to have been mined at Flat and used for home heating until the 1930s. Some limited coal exploration of the Little Tonzona River coal deposits occurred in the 1980s for Doyon, Ltd. However, this field has no substantial past production.

#### **Oil and Gas**

Oil and gas basins in the planning area include Bethel, Galena, Holitna, Innoko, Minchumina, and Yukon Delta Basins. Historically, several geophysical surveys (e.g., airborne magnetic surveys, gravity surveys, and reflection seismic surveys) have been conducted in the region, and one exploratory well was drilled in the Bethel Basin (Napatuk Creek No. 1) in the early 1960s, which was abandoned as a dry hole. No additional exploratory wells have been drilled in the area, and no recent federal oil and gas leasing has taken place.

#### **Pending Oil and Gas Leases**

Fifty-nine pending oil and gas Pre-Reform Act lease offers within the planning area were filed in the late 1960s, all within the boundary of the Yukon Delta NWR. These pending lease offers were subsequently suspended by Public Land Orders (PLOs) and remain unavailable for oil and gas leasing.

#### **Geothermal**

Two geothermal springs are documented within the planning area: Ophir Hot Springs and Chuilnuk Hot Springs. The only spring that is currently being used as a source of energy is the hot spring occurrence near Ophir Creek.

#### **Mineral Exploration and Mining**

The most current report analyzing locatable and salable mineral resource potential within the planning area for this RMP is the Mineral Occurrence and Development Potential Report – Locatable and Salable Minerals Bering Sea-Western Interior Resource Management Plan (Kurtak et al. 2017). The following is a summary of findings from this report on past and present activities specific to this resource. Distribution



of mineral occurrences within the planning area is illustrated in BSWI Draft RMP/EIS, Map 3.3.3-1, and is generally concentrated in upland portions of the planning area and lowlands in the immediate vicinity of these uplands where placer deposits occur.

The planning area has a long and colorful mining history, dating back to the late 1830s when Russian traders discovered mercury-bearing minerals along the Kuskokwim River near Aniak. Gold was discovered in the Flat area in 1908, driving one of the last great gold rushes in Alaska. Documented mineral production within the planning area totals 3.2 million ounces of gold, 151,750 ounces of silver, 2.1 million pounds of copper, and 41,767 flasks of mercury. The Iditarod Mining District, which includes the Flat area, ranks third in placer gold production in Alaska (Kurtak et al. 2017).

The planning area contains 453 documented mineral occurrences (BSWI Draft RMP/EIS, Map 3.3.3-1) and 2,480 mining claims, with 207 of those under federal management. Mineral occurrences include placer gold, gold-bearing quartz veins, copper-gold skarns, and silica-carbonate mercury deposits. In 2015, there were 19 active placer mines and one active lode mine. Currently, less than 1 percent of the total acres taken up by mining claims and prospecting sites in the planning area are under federal management. The majority of the mining and mineral exploration is taking place on State of Alaska, Native corporation, or private lands (Kurtak et al. 2017).

Twelve separate companies or individuals (11 open pit placers and one hard rock mine) were estimated to be producing metals (predominantly gold) in the planning area in 2014. Additionally, the Donlin Gold Project near Crooked Creek is an advanced stage exploration project (Kurtak et al. 2017). On August 13, 2018, the US Army Corps of Engineers (Corps) and BLM issued a joint Federal Record of Decision (ROD), along with the Clean Water Act Section 404/Rivers and Harbors Act Section 10 permit and the Offer to Lease for the pipeline ROW at Donlin Gold. The project is currently seeking State permit approval for initial mine startup (NovaGold 2018).

The primary mineral material commodities used within the planning area are crushed rock and sand and gravel. Thirteen material sites were reported to be active in 2008 in Southwest Alaska, which includes the planning area. Sand and gravel are used in construction and road maintenance. Currently, the BLM does not have any requests to develop sand and gravel on BLM-managed land in the planning area, as local demands are being met by sand and gravel producers located on private or State-owned lands. This status is unlikely to change in the near future due to lack of appropriate BLM-managed land in the vicinity of population centers that require sand and gravel (Kurtak et al. 2017).

### ***Forest Resources Use***

Forest resources within the planning area have historically provided materials for sheltering and heating. House logs and local sawmills have been used to construct housing, lodges, and commercial buildings throughout the area. Firewood is a staple of the subsistence lifestyle for heating and, in some instances, cooking. BLM forests, although generally farther from communities than non-BLM lands, still may play a role in the long-term supply of wood—especially those BLM lands near rivers that can assist in wood transport. Most villages have portable sawmills to produce building materials or repair materials locally, and one full sawmill located in Chuathbaluk has produced building materials for use in the Kuskokwim Basin. There has been recent interest from some villages in the use of biomass for heating buildings or communities; these projects could eventually expand to include power generation.

### ***Development of Infrastructure for Communities***

Sixty-five rural communities are found within the planning area. Based on 2010 data from the U.S. Census Bureau for these communities, the population of the planning area is approximately 25,000 (U.S. Census 2010). The largest population center is Bethel, located in the southwest portion of the planning area, with a population of 6,080 (U.S. Census 2010b). Very few roads pass through the planning area; the longest is a 43-mile gravel road that connects Sterling Landing on the Kuskokwim River with the historic mining community of Ophir on the Innoko River. A handful of short roads serving local communities, or remaining from past human activities, also exist. Almost all of these existing roads in the planning area are located on lands managed by entities other than the BLM.

### ***Military Activities***

Very little additional military use and activities are anticipated within the planning area. The limited amount of existing use will likely decline.

### ***Research, Monitoring, and Land Management***

Research, monitoring, and land management are frequent activities on non-BLM lands in the planning area. Specifically, fixed-wing aircraft and helicopters are used to transport personnel and equipment and to conduct surveys. Remote areas are also accessed by boats during the summer and snowmobile during winter to conduct research, monitoring, and other land management activities.

### ***Recreation and Subsistence***

Recreational and subsistence use is the most prevalent land use in the planning area. The undeveloped nature of the planning area, the existence of unique historical features such as the INHT, and the presence of surrounding NWRs provide opportunities for unique outdoor recreational opportunities, including guided hunting, fishing, eco-tourism, and organized events such as the Iditarod Sled Dog Race and the Iron Dog Snowmobile Race. Subsistence fishing and hunting are important for the economies and cultures of many families and communities in Alaska, especially for rural families who depend on subsistence hunting and fishing as sources of nutrition and cultural practices. Subsistence use occurs under both federal subsistence regulations and State general fishing, hunting, and subsistence regulations. The Alaska Department of Fish and Game (ADF&G) reports statewide harvest for 2014 as follows: 0.9 percent—subsistence food harvested by Alaska residents (about 33.8 million pounds); 0.2 percent—personal use fishing and hunting under general regulations by Alaskans; 0.4 percent—sport fishing and hunting; 98.5 percent—commercial fisheries (ADF&G 2014).

## **2.2.2 Reasonably Foreseeable Future Land Use and Actions**

The term “reasonably foreseeable future action” is used in concert with the CEQ definitions of indirect and cumulative effects, but the term itself is not further defined. Most regulations that refer to “reasonably foreseeable” do not define the meaning of the words but do provide guidance on the term. For this analysis, reasonably foreseeable future actions are those actions that are external to the proposed action and likely (or reasonably certain) to occur, although they may be subject to a degree of uncertainty, within the next 15 to 25 years. Typically, they are based on documents such as existing plans, permit applications, and fiscal appropriations.

## **Future Land Use**

### ***BLM Lands***

Alternative land use scenarios for BLM-managed land in the planning area are described in Chapter 2 of the BSWI Draft RMP/EIS. Conveyance of lands to the State of Alaska and Native corporations is ongoing. On a statewide basis, about 98 percent of the Native conveyances and 95 percent of the State conveyances have been completed.

Donlin Gold LLC, a limited liability company jointly owned by Barrick Gold U.S. Inc. and NovaGold Resources Alaska, Inc., received key permits on August 13, 2018, for development of the Donlin Gold Project, an open pit hardrock mine near the village of Crooked Creek., including ROW permit approval from BLM. The ROW Grant has a term of 30 years. Construction has not yet begun, and Donlin Gold LLC has 8 years from August 13, 2018, to complete construction.

The Donlin Gold Mine Project includes development and operation of an open pit mine, mine facilities, and a port site, as well as ancillary facilities such as airstrips, access roads, material sites, and a connecting 14-inch-diameter, 316-mile-long natural gas pipeline. The pipeline would cross 97 miles of largely remote and undisturbed BLM-managed land. The total footprint for the temporary 150-foot construction ROW and ancillary facilities on BLM land is 2,329 acres. The total footprint for the 51-foot operations and maintenance ROW on BLM land is 601 acres. The proposed project would require 3 to 4 years to construct, followed by an active mine life of approximately 27 years. After the end of the Operations Phase, the mine site facilities, port facilities, and the pipeline would be closed and reclaimed as required by permit conditions. The ROW Grant includes stipulations to reduce impacts to the environment.

### ***National Wildlife Refuges***

Conservation plans are in place for the refuges that guide management principles for a span of 15 years. The Yukon Delta plan was prepared in 2004 (USFWS 2008) and the revised Innoko plan was prepared in 2008 (USFWS 2008). This analysis assumes that management of the Yukon Delta and Innoko NWRs would continue as it has during recent decades and as outlined in the current conservation plans (USFWS 1988, 2008). Approximately 1.3 million acres (comprising 35 percent of the refuge) southeast of the Innoko River is designated Wilderness. Two wilderness areas (Andraefsky Wilderness and Nunivak Wilderness) are designated inside the Yukon Delta NWR, totaling approximately 1.9 million acres. Limited activities are allowed in designated wilderness areas. Wilderness characteristics would be preserved on the majority of the refuge lands that are not designated as wilderness. Development and exploration activities could occur on Native and privately owned lands within the refuge boundaries. While oil and gas development is not reasonably foreseeable on the refuge lands due to low potential, some exploration from Native corporation lands and private land owners within the refuge boundaries could occur. Decisions to allow exploration on refuge lands would be made on a case-by-case basis. These activities would require a Special Use Permit with site-specific stipulations to ensure compatibility with refuge purposes and consistency with comprehensive conservation plan management objectives.

### ***National Park Service Lands***

This analysis assumes that the current management direction for the Lake Clark National Park and Preserve would continue. As outlined in the General Management Plan amendment (NPS 2014) and Lake Clark National Park and Preserve Draft Land Protection Plan (NPS 2013), the NPS intends to manage the

park to maintain its natural and cultural resource values and maintain and enhance public understanding and enjoyment of these values.

Park and preserve lands are no longer available for new mineral entry and location. Mining could occur on private lands, including Native corporation lands, within the park and preserve boundaries. Additionally, State mineral claims may currently be filed anywhere on State lands inside the unit (the submerged lands beneath the navigable lakes and rivers). As outlined in the Lake Clark National Park and Preserve Draft Land Protection Plan (NPS 2013), the NPS recommends that the State close the beds of navigable waters to new mineral entry, extraction of oil and gas, and sand and gravel resources, and will apply to the State for these closures. The NPS will also pursue cooperative agreements with the State for the management of lands under navigable waterbodies (shorelands).

Mineral development and operation of the existing mining claims within the park boundary could continue. Development of these claims would need to comply with the Mining in the Parks Act. NPS (2013) identifies the Johnson River as the area of the park most likely to see future mining.

### ***State Lands***

State lands would continue under multiple use management, with uses prioritized to conserve valuable resources in some areas while allowing resource use in other areas. As much as possible, State lands are managed so that uses are compatible with land use on adjoining federal lands. Land use for recreation, subsistence, and tourism may increase as local, state, and national populations grow.

One example of anticipated State of Alaska permitting in the planning area is for the proposed Donlin Gold Mine Project's ancillary facilities that would be constructed on State lands, such as material sites and portions of the natural gas pipeline ROW. Project details are listed above in the section "BLM Lands." Significant progress has been made to advance state permitting for the Donlin Gold Mine Project, including issuance of the State air quality and Alaska Pollutant Discharge Elimination System wastewater discharge permits (NovaGold 2018). The State of Alaska would benefit financially from the project's mining license and corporate income taxes.

### ***Native Lands***

Economic development of resources is a reasonably foreseeable use of Native-owned lands within the planning area. The Donlin Gold Project, described above in the section "BLM Lands," also includes land leased from Calista Native Corporation, which holds the subsurface (mineral) estate for ANCSA lands in the project area. A surface use agreement with TKC, the village corporation that owns the surface land, grants surface use rights to lands that TKC holds at the mine site. The proposed project would provide an economic boost to the Yukon-Kuskokwim region while helping residents financially sustain a lifestyle with cultural traditions of fishing, hunting, and gathering. The Yukon-Kuskokwim region is one of the most economically depressed regions in Alaska and the U.S. as a whole. Job and economic opportunities are limited. The proposed project would generate up to 3,000 jobs during construction and 800 to 1,400 jobs during operation and give hiring preference to Calista and TKC shareholders, spouses, and descendants. Production royalties would be paid to Calista Corporation with distribution to other ANCSA corporations, and TKC would construct and operate the upriver port (Jungjuk). Additionally, the project proponent has performed numerous community investments and corporate giving in the region to date and are planned to continue into the future.

## Future Activities

### *Oil and Gas, Coal, and Geothermal Leasing and Exploration*

The development potential for leasable mineral resources, such as coal, coal bed natural gas, oil and gas, geothermal, peat, and coalbed natural gas, in the planning area is low (BLM 2015a). The expense of developing some of these resources and the lack of roads or railroads connecting the planning area to the rest of the state would also likely preclude small and large-scale development in the foreseeable future. Prospective oil and gas basins in the region of the planning area include the Holitna, Bethel, and Minchumina Basins, along with the Yukon Delta. There are 59 pending oil and gas Pre-Reform Act lease offers within the planning area, all within the boundary of the Yukon Delta NWR and, therefore, have been suspended due to their being within the refuge. No additional oil and gas lease offers may be filed until the land selection process that the State and various Alaska Native entities are undertaking is complete. The BLM will continue its adjudicative role on prior existing rights under the mining laws and process dispositions under the mineral leasing laws or material sales. Some areas of known coal (leasable) mineral potential exist, but there has been little interest in developing it to date.

### *Mineral Exploration and Mining*

A total of 101 areas within the planning area are considered to have high locatable mineral potential (LMP), including a number of areas that fall within BLM-managed land and are covered by federal mining claims. These include the Nixon Fork Mine area, Flat-Chicken Mountain area, Ophir Creek drainage (Kilbuck Mountains), and the Nyac (Shamrock Creek) area. Additional areas of interest include the high LMP areas on State-selected lands near the Little Creek (west of Donlin), Oskawalik, Julian Creek, and the Granite-Willow Creek areas. Future mineral exploration and mining activities have the potential to occur in these areas and could have impacts on BLM-managed land extending outside the mining claim boundaries (Kurtak et al. 2017). See discussion of the Donlin Gold Project above in the section “BLM Lands.” Table 2.2.2-1 details the high LMP areas in the planning area as identified in Kurtak et al. (2017).

**Table 2.2.2-1: High Locatable Mineral Potential in the Planning Area**

District	Name	Production Status	Deposit Type	Land Status
Aniak	Canyon Creek	Past producer	Placer Au-PGE	State
	Cripple Creek	Producer	Placer Au-PGE	State
	Eureka Creek	Past producer	Past producer	Past producer
	Gemuk Mtn	No production	Au-polymetallic	State
	Kisa	No production	Felsic-dike-hosted qtz veinlets	State
	Marvel Creek	Producer	Placer Au-PGE	State
	Nyac Placer	Producer	Placer Au-PGE	Calista Corp./ BLM
	Nyac Lode	No production	Plutonic-hosted cu-au polymetallic	Calista Corp.
	Ophir Creek	No production	Placer Au-PGE	BLM
	Russian Mtns	No production	Polymetallic veins	Calista Corp.
Georgetown	Donlin Creek (Ruby Gulch)	Producer	Placer Au-PGE	Calista Corp.
	Donlin Creek (Lewis)	Producer	Placer Au-PGE	Calista Corp.

District	Name	Production Status	Deposit Type	Land Status
	Gulch)			
	Donlin Creek Lode	No production	Felsic-dike-hosted qtz veinlets	Calista Corp.
	Fortyseven Creek	Past producer	Placer Au-PGE	State
	Granite-Willow Creeks	Producer	Placer Au-PGE	State
	Julian Creek	Producer	Placer Au-PGE	State
	Mountain Top	Past producer	Silica-carbonate Hg	State
	Oskawalik River	No production	Polymetallic replacement deposits and veins	State
	Red Devil	Past producer	Silica-carbonate Hg	BLM
	Murry Gulch	Past producer	Placer Au-PGE	State
	Taylor Creek	Past producer	Placer Au-PGE	State
Iditarod	Chicken Mtn-Flat	No production	Plutonic-hosted Cu-Au polymetallic	Doyon Ltd
	Decourcy Mtn	Past producer	Silica-carbonate Hg	Calista Corp.
	Flat Creek	Past producer	Placer Au-PGE	BLM
	Golden Horn Mine	Past producer	Plutonic-hosted Cu-Au polymetallic	State
	Little Creek	No production	Placer Au-PGE	State
	Otter Creek	Past producer	Placer Au-PGE	BLM
	Prince Creek	Past producer	Placer Au-PGE	BLM
	Willow Creek	Past producer	Placer-Au-PGE	BLM
	Little Creek	Producer	Placer Au-PGE	Patented
Innokko	Beaver Mtns (Cirque)	No production	Polymetallic vein	State
	Boob Creek-Mt Hurst	Past producer	Placer Au-PGE	State
	Colorado Creek	Past producer	Placer Au-PGE	State
	Cripple Creek	Past producer	Placer Au-PGE	State
	Ester Creek	Past producer	Placer Au-PGE	State
	Esperanto Creek	Past producer	Placer Au-PGE	State
	Ganes Creek (Lower)	Past producer	Placer Au-PGE	Patented
	Ganes Creek (Upper)	Producer	Placer Au-PGE	Patented/State
	Innokko River (Lower)	Past producer	Placer Au-PGE	State
	Montana Creek	Producer	Placer Au-PGE	State
	Moore Creek	Producer	Placer Au-PGE	State
	Yankee Creek (Lower)	Past producer	Placer Au-PGE	Doyon Ltd.
	Yankee Creek (Upper)	Producer	Placer Au-PGE	Patented/ Doyon Ltd./ State
	Win	No production	Sn-polymetallic veins	State
Marshall	Buster Creek	Past producer	Placer Au-PGE	Patented
	Stuyahok - Flat Creek	No production	Felsic-dike-hosted qtz veinlets	Calista Corp.
	Willow Creek	Past producer	Placer Au-PGE	Calista

District	Name	Production Status	Deposit Type	Land Status
McGrath	Bowser	No production	Zn-Pb skarn deposits	State
	Broken Shovel	No production	Plutonic-hosted Cu-Au polymetallic	State
	Candle Creek	Producer	Placer Au-PGE	State/ Doyon Ltd.
	Eagle Creek	Past producer	Placer Au-PGE	State
	Nixon Fork Mine	Producer	Cu skarn deposits	BLM/ Doyon Ltd.
	Roberts Pgm	No production	Noril'sk Cu-Ni-PGE	State
	Sheep Creek	No production	Polymetallic replacement deposits and veins	Doyon Ltd.
	Terra	Producer	Low-sulfide Au-quartz veins	State
	Tin Creek	No production	Zn-Pb skarn deposits	Doyon Ltd.
	Vinasale	No production	Plutonic-hosted Cu-Au polymetallic	Doyon Ltd.
Tonzona	Reef Ridge	No production	Southeast Missouri Pb-Zn	Doyon Ltd.
Source: Kurtak et al. (2017)				
Notes:				
AU = gold		Pb = lead		
BLM = Bureau of Land Management		PGE = platinum group element		
Cu = copper		qtz = quartz		
Hg = mercury		Sn = tin		
Ni = nickel		Zn = zinc		

### ***Sand and Gravel***

Future demand for additional sand and gravel will be driven by development in the planning area, such as the proposed Donlin Gold Project pipeline that would cross 97 miles of BLM lands.

### ***Peat***

It is possible that villages and individuals in the planning area could develop peat as a resource for small-scale energy and heat generation. Development of this type is unlikely on BLM-managed land due to the low potential for fuel grade peat to occur in accessible areas of the planning area. A study performed in 2007 by Barrick Gold United States Inc. assessing peat deposits in two study areas within the planning area found the peat in both study areas to existing in permafrost (BLM 2015a). Additionally, most villages in the planning area have enough land to harvest peat on their own or from adjacent State lands with fewer restrictions and less required infrastructure due to proximity. Additional discussion of peat resources can be found in BSWI Draft RMP/EIS, Appendix M.

### ***Infrastructure and Communities***

Potential transportation corridors are under review by the State of Alaska and include two road and ROW corridors, the Western Alaska Access Planning Study (“Road to Nome” Fairbanks–Nome route) and the Yukon-Kuskokwim Energy Corridor Plan (with a terminus at Paimiute Slough on the Yukon River and near the Kalskags on the Kuskokwim River), both of which propose to cross BLM-managed land within the planning area. The Western Alaska Access Planning Study has evaluated three routes, including the preferred Yukon River Corridor, to connect the Nome-Council Road to the existing road system in the Fairbanks area. The proposed final stage of the Yukon River Corridor is between the villages of Koyuk

and Nulato and would cross BLM-managed land in the Nulato Hills region of the planning area. The Yukon-Kuskokwim Energy Corridor Plan evaluated overland transport routes in the Portage Mountains area to connect the Yukon and Kuskokwim Rivers for fuel and freight transport purposes. The studied routes would cross BLM-managed land from Paimute Slough on the Yukon River to the northeast of the Upper and Lower Kalskag as well as other Kuskokwim River communities.

Projects that have been studied but not considered as a reasonably foreseeable future action for the time frame of the impact analysis include the following:

- Yukon-Kuskokwim Transportation Corridor – This project was proposed by the Association of Village Council Presidents (funded through a State of Alaska general fund appropriation) and is in the planning phase focusing on completion of subsistence and cultural resource studies, public outreach, identifying potential barge improvement projects, and beginning the corridor preservation process. The project is estimated to be practical to construct between 2028 and 2038 (Association of Village Council Presidents 2018a, 2018b).
- Road to Nome – A proposed highway from the Interior to Western Alaska was studied by the Alaska Department of Transportation in the past (study completed in 2011) but has not advanced beyond conceptual design. One route studied would connect the Elliott Highway near Manley Hot Springs to the end of the Nome-Council Highway. No definite sources of funding for the project have been identified, and it is not currently identified in an Alaska Statewide Long Range Transportation Plan.

### ***State Lands***

Activities on State lands and for State-managed resources will continue and increase in proportion to population growth and tourism. The mission of the ADF&G is to protect, maintain, and improve the fish, game, and aquatic resources of the state and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle (ADF&G 2018). Education, nongame management and research, and wildlife viewing opportunities are expected to increase. Future actions will address human-wildlife conflicts, subsistence management, and predator management.

### ***Research, Monitoring, and Land Management***

Research, monitoring, and land management will continue on federal, State, and Native lands. Remote areas will continue to be accessed by fixed-wing aircraft, helicopters, boats, and snowmobiles, depending on season.

### ***Subsistence and Recreation***

Past recreation, sport hunting and fishing activities, and traditional subsistence practices are expected to continue. Past uses of the INHT are also expected to continue. Recent funding has supported trail improvements such as shelter cabins. Land use for recreation, subsistence, and tourism may increase as local, state, and national populations grow. However, due to the undeveloped nature and limited access to BLM lands in the planning area, recreation, subsistence, and tourism on BLM lands is expected to be stable with no more than a 5 to 10 percent increase over the next 15 to 25 years.

### **Climate Change**

The following climate warming scenarios are likely in the planning area, based on the Rapid Ecoregional Assessment and the National Climate Assessment and are considered in the cumulative effects analysis:



- Increased temperatures
- Permafrost thaw (The only areas in the planning area expected to retain permafrost to a depth of one meter [which is the most influential on vegetation and surface conditions] in the future, aside from isolated pockets, are in the Nulato Hills region.)
- Decreased snow cover (albedo effect), subnivean species impacts
- Increased wildland fire intensity, size, and frequency
- Increase in NNIS presence/spread
- Later freeze-up dates (river ice)
- Sea level rise (salt intrusion, transportation changes)

There is less agreement from researchers on the following two climate warming scenarios. There is empirical evidence of these already occurring, although the magnitude and rate are expected to increase in the future.

- Shrub encroachment
- Spruce trees replaced with aspen/birch hardwood trees

## Section 3. Supplemental Impact Analysis

### 3.1 Fisheries

#### 3.1.1 Summary

Table 3.1.1-1 summarizes the management actions, indicators, and ranking of the alternatives as they pertain to fish and aquatic resources. Fish and aquatic resources would be primarily affected by surface-disturbing activities such as placer mining, timber harvest, infrastructure development, or grazing, etc., which can alter stream channels, remove or damage riparian vegetation, or result in soil erosion and increased sedimentation to fish and aquatic habitat. The level of impact would depend on the success and adequacy of protective measures (i.e., BMPs). Numerous effects can be expected to occur at differing magnitudes, extents, and durations, and in different contexts. These effects would be evaluated in greater detail on a project-specific basis. Rankings for Climate Change, NNIS, and Wildland Fire are not included in the table because they ranked the same between alternatives. A detailed analysis of all management actions is provided in subsequent sections. The ranking of alternatives in Table 3.1.1-1 is also a relative comparison of the degree to which the alternatives are consistent with DOI's National Priorities, particularly to create a conservation stewardship legacy and to sustainably develop our energy and natural resources (DOI 2018).

**Table 3.1.1-1: Ranking Summary of Alternatives by Management Action and Indicator**

Management Action	Indicator	Alternative Ranking (Most to Least Protective)
Water Resources and Fisheries	Stream miles / acres available	B, C, D, A
Forestry and Woodland Products	Acres open, closed, or restricted for harvest	B, A, C, D
Grazing	Acres open or closed to grazing	B, C, A, D
Minerals Management	Acres and stream miles / acres open, closed, or NSO	B, A, C, D
Travel/Transportation	Stream miles and waterbody acres restricted	B, C, D, A
ACECs	Acres of designated ACECs	B, A, C, D
<b>Summary</b>		<b>B, A, C, D</b>

#### 3.1.2 Methods of Analysis

Potential impacts on aquatic resources, fish, and special status fish from each alternative are based on interdisciplinary team knowledge of the resources and the planning area and information gathered from the public during the planning process. Assessment of potential fish and aquatic resource impacts are discussed at the landscape level within the planning area. The exact values (miles of streams/acres of waterbodies) associated with each action cannot be determined quantitatively and would be addressed on a case-by-case basis in future projects and actions. River and stream (miles), and waterbody (i.e., lakes/ponds; acres) metrics identified in the following analyses are based on data provided from the National Hydrography Data (NHD) set ([https://nhd.usgs.gov/NHD\\_High\\_Resolution.html](https://nhd.usgs.gov/NHD_High_Resolution.html)). This data set is divided into watersheds for the planning area (Figures 3.1.2-1 through 3.1.2-3) based on the Hydrologic Unit Code (HUC 4 or HUC 6) data set and is generated containing one or more of the following features: watersheds, rivers, streams, lakes, and ponds.

Draft RMP/EIS

Watershed Boundaries and Hydrography  
Fisheries



U.S. DEPARTMENT OF THE INTERIOR | BUREAU OF LAND MANAGEMENT | ALASKA | BERING SEA- WESTERN INTERIOR RMP/EIS

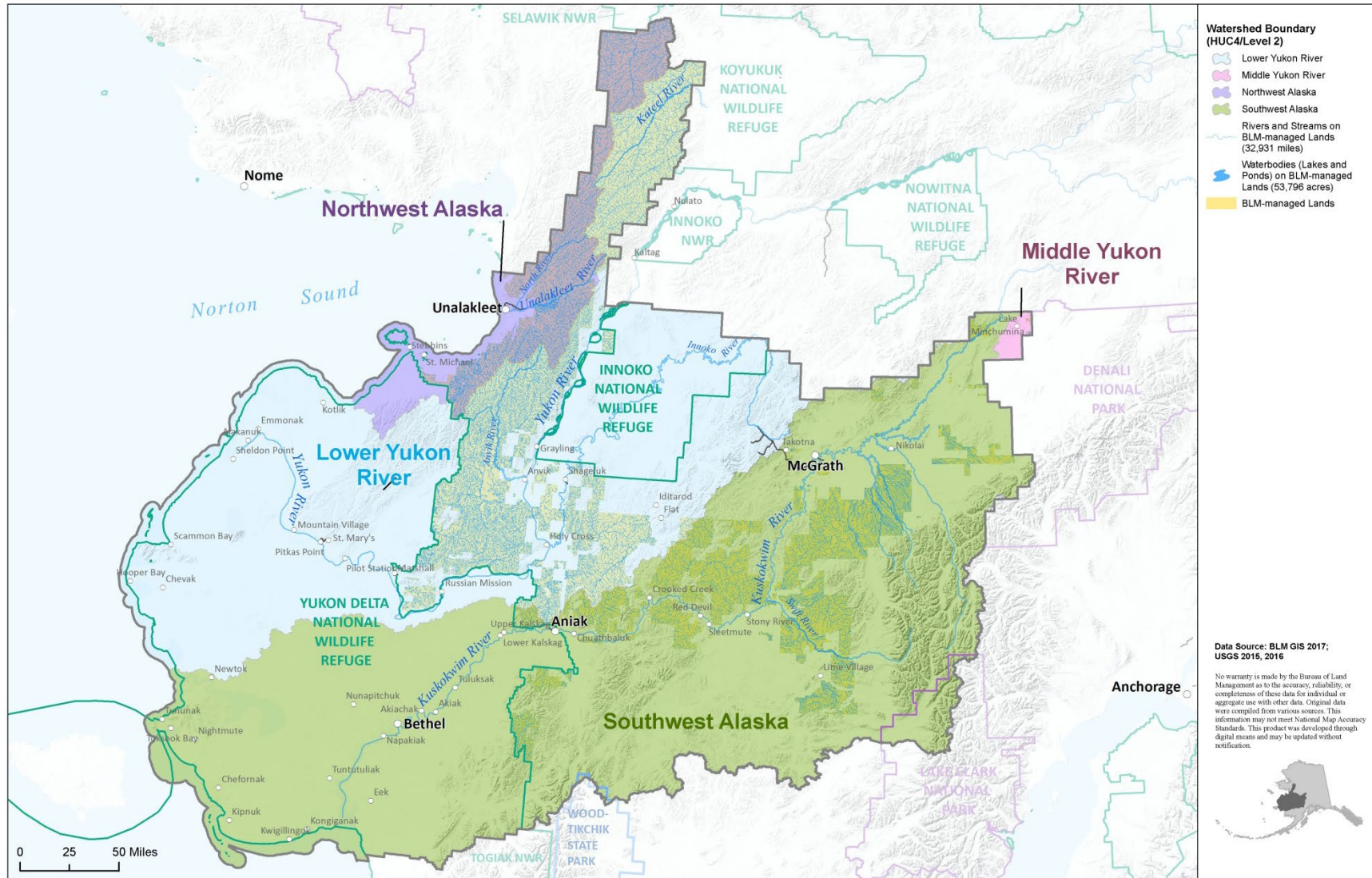


Figure 3.1.2-1: Watershed Boundaries and Hydrography

Draft RMP/EIS

Anadromous Waters and Spawning Habitat Fisheries



U.S. DEPARTMENT OF THE INTERIOR | BUREAU OF LAND MANAGEMENT | ALASKA | BERING SEA- WESTERN INTERIOR RMP/EIS

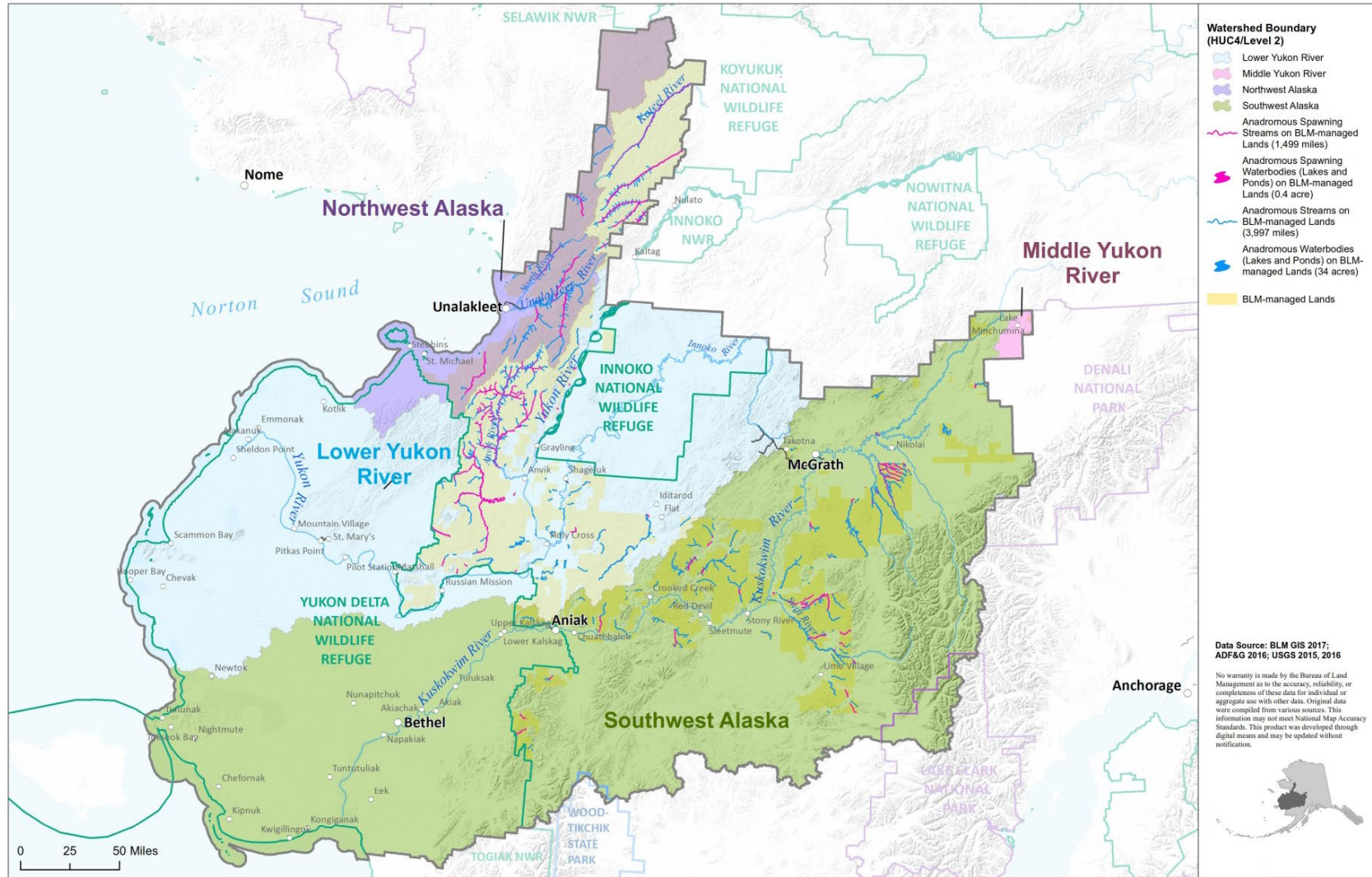


Figure 3.1.2-2: Anadromous Waters and Spawning Habitat

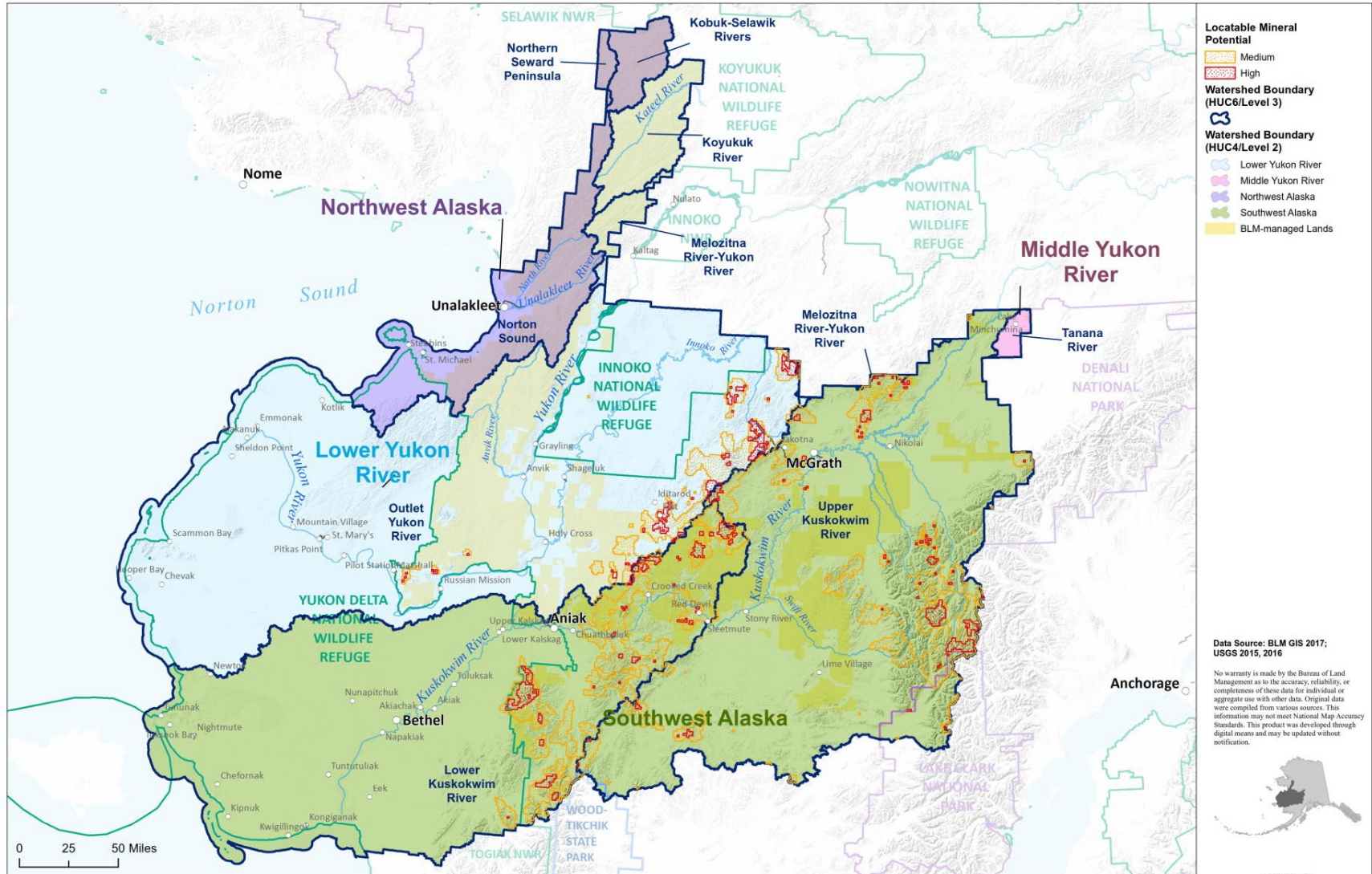


Figure 3.1.2-3: Streams within Medium and High Areas of Mineral Potential (HUC 6)

Figure 3.1.2-1 shows HUC 4/Level 2 watersheds within the planning area, rivers and streams on BLM-managed lands (32,931 miles), and waterbodies (lakes and ponds) on BLM-managed lands (53,796 acres). The figure also shows BLM-managed lands. Four watersheds intersect the planning area: Northwest Alaska, which includes Unalakleet and the very northwest portion of the planning area; Lower Yukon River, which includes most of the north half of the Yukon Delta NWR and the Innoko NWR; Southwest Alaska, which includes a large portion of the southern and eastern planning area, including Bethel, Aniak, and McGrath; and Middle Yukon River, which includes a very small piece of the planning area in the northeast at Lake Minchumina. Rivers labeled on the map include the Kateel River, North River, Unalakleet River, Yukon River, Innoko River, Anvik River, Kuskokwim River, and Swift River. No waterbodies are apparent on the figure.

Figure 3.1.2-2 depicts the anadromous waters and spawning streams and waterbodies on BLM-managed lands. The figure also shows the watersheds and BLM-managed lands. Anadromous spawning streams are concentrated in the northwest portion of the planning area and in the area between the Lower Yukon and Innoko NWRs west of the Yukon River, and are scattered elsewhere on BLM-managed lands. Anadromous streams are more prevalent throughout BLM-managed lands. No anadromous waterbodies or anadromous spawning waterbodies are apparent on the map.

There are approximately 170,358 miles of streams and rivers and 3.92 million acres of lakes and ponds within the planning area, and 17,962 miles of streams and 414,967 acres of lakes and ponds have been cataloged as important for the spawning, rearing, and migration of anadromous fish (Johnson and Litchfield 2016 a–c). Approximately 24 percent (33,932 miles) of all streams and 1 percent (53,798 acres) of pond/lake habitats in the planning area occur on BLM-managed public lands. Calculations of potential impacts to streams and waterbodies presented in this section are based on the streams and waterbodies (33,932 miles and 53,798 acres, respectively) located on BLM-managed public lands.

Stream miles and waterbody acres are either summarized in categories by HUC 4 or HUC 6 watershed or as Anadromous Waters or they are summarized in total without category breaks in the BLM-managed lands within the planning area. Information presented in the tables associated with each resource management action section should be viewed as planning-level data. Stream mile and waterbody acreage totals are limited in precision by the resolution of the source data; however, the data allow for the relative comparison of impacts across alternatives. Categories may have overlapping streams and waterbodies as they may be subsets of another data set; therefore, the sums of these categories may not accurately reflect the sums of the total stream miles and waterbody acres.

Depending on the resource being analyzed, the rivers, streams, lakes, and ponds are either summarized across the entire planning area or divided into four regions on BLM-managed lands (Figure 3.1.2-1) based on the HUC 4 watershed data set. For HUC 4, the regions/watersheds are as follows:

- Northwest Alaska – North and Unalakleet Rivers and waterbodies are present within this region.
- Lower Yukon River – Yukon, Innoko, and Anvik Rivers and waterbodies are present within this region.
- Middle Yukon River – Portions of the Kuskokwim River and waterbodies are present within this region.
- Southwest Alaska – Kuskokwim and Swift Rivers and waterbodies are present within this region.

For identifying areas of high and medium mineral potential, HUC 6 regions/watersheds were reviewed. HUC 6 regions follow the same boundaries as HUC 4 but are further broken down into additional

watersheds; these data are shown on Figure 3.1.2-3. Figure 3.1.2-3 shows areas of medium and high LMP, as well as HUC 6/Level 3 and HUC 4/Level 2 watershed boundaries. The figure also shows BLM-managed lands. Nearly all areas of medium and high mineral potential are the eastern half of the planning area and most are in the Southwest Alaska watershed, with concentrations in higher elevation areas associated with the Alaska Range and the Kuskokwim and Ahklun Mountains.

### Potential Effects and Indicators

The major activities that could affect fish habitat and aquatic productivity within the planning area are those activities with potential to cause surface disturbances near streams or waterbodies or occur within areas of influence for these streams or waterbodies. Activities with the highest potential to affect fish production include placer mining, hard rock mining, and gravel mining within or near important fish habitats; timber harvests near important fish habitats; and stream crossings by roads, trails, and utility corridors in or near important fish habitats. Stream crossings with potential to impact fish production include culverts and bridges, ice bridges, fords used by heavy- and light-duty equipment (such as OHVs), and trench-buried utility crossings. Activities and stream crossings that occur within particularly sensitive habitats, such as spawning and overwintering habitats, or those that could preclude or inhibit fish access to those habitats, have the highest potential to impact fish productivity.

The level of impact would depend on the magnitude and extent of the disturbance, as well as the success and adequacy of compliance to the mining regulations and reclamation compliance. Notwithstanding the alternatives and management actions considered, numerous effects can be expected to occur on multiple variables and at differing magnitudes and extents. These effects are summarized in Table 3.1.2-1 and not repeated in subsequent management action sections. The effects are based on impact indicators identified below (stream miles and waterbody acres affected) and characterized based on the management actions associated with each alternative. Specific proposals for development and surface-disturbing activities would be evaluated in greater detail on a project-specific basis.

The potential for and level of impact on fish and aquatic resources is influenced by numerous factors, including management decisions allowing for surface-disturbing activities, combined with the success and adequacy of protective measures, such as maintaining riparian vegetation in proper functioning condition and the application of mineral withdrawals, BMPs, and reclamation procedures.

**Table 3.1.2-1: Summary of Effects to Fisheries Resource by Management Action**

Types of Effects	Management Actions	Indicators
Development and associated surface disturbance within the 100-year floodplain could potentially increase sediment loading in streams, alter stream processes, and degrade fish habitat.	<ul style="list-style-type: none"> <li>• Water Resources and Fisheries Decisions</li> <li>• Lands and Realty Decisions, including ROW avoidance and exclusion</li> </ul>	<ul style="list-style-type: none"> <li>• Stream miles ROW open, avoidance, or exclusion areas</li> <li>• Waterbodies acreage within ROW open, avoidance, or exclusion areas</li> </ul>
Timber harvest and associated surface disturbance could potentially increase sediment loading in streams, alter stream processes, and degrade fish habitat.	<ul style="list-style-type: none"> <li>• Forest and Woodland Harvest Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Stream miles within commercial woodlands closed, permissible, and permitted for harvesting</li> <li>• Waterbodies acreage within commercial woodlands closed, permissible, and permitted for harvesting</li> </ul>

Types of Effects	Management Actions	Indicators
Changes to stream processes and water quality from grazing activities could eliminate riparian habitats, altering watershed vegetation characteristics, and increasing nitrogen inputs to the aquatic environment.	<ul style="list-style-type: none"> <li>• Livestock Grazing Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Stream miles within areas open and closed to grazing</li> <li>• Waterbodies acreage within areas open and closed to grazing</li> </ul>
Mining within streams and within watersheds could alter stream processes and fish habitat directly by affecting riparian function such as removal of pools, overwintering areas, destroying spawning beds, and impacting short- and long-term water quality.	<ul style="list-style-type: none"> <li>• Minerals Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres open to locatable, salable, and leasable minerals</li> </ul>
<p>Stream crossings at ROW intersections for roads, trails, and/or utility corridors could increase sedimentation, affect fish passage, and alter fish habitat directly or indirectly by affecting riparian function, and/or access to fish habitat.</p> <p>Concentrated recreational use could increase nutrient inputs to streams and can alter aquatic productivity either beneficially or adversely.</p> <p>Summer stream crossings with ATVs and UTVs could create localized degradation of fish habitat and affect fish passage.</p> <p>Winter stream crossings with UTVs can affect sensitive fish overwintering habitat (including eggs of summer/fall spawning species).</p>	<ul style="list-style-type: none"> <li>• Lands and Realty Decisions, including ROW avoidance and exclusion</li> <li>• Recreation and Visitor Services Decisions</li> <li>• Transportation and Travel Management Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Linear miles of potential stream/ acres of potential pond/lake habitat potentially affected</li> <li>• Linear miles of documented anadromous stream/ acres of documented anadromous pond/lake habitat potentially affected, including all documented anadromous fish spawning habitats potentially affected</li> </ul>
Designation of ACECs would indirectly reduce potential effects on fisheries by reducing potential development and associated stream alteration by increasing protective management prescriptions for such areas.	<ul style="list-style-type: none"> <li>• Designation of ACECs</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of designated ACECs</li> </ul>

## Assumptions

The following assumptions were used to assess effects associated with fisheries:

- Development associated with mining, timber harvest, and development activities that trigger stream crossings and water withdrawal, would occur in areas suitable for resource extraction and/or development, as allowed by the RMP for a given watershed/drainage.
- Specific measures of change (e.g., total dissolved solids, stream hydrogeomorphics, fish population estimates, etc.) were not sufficient to adequately use as landscape-level indicators for this evaluation.
- Assessment, Inventory, and Monitoring (AIM) metrics will be addressed qualitatively as the means to ensure consistency with the alternatives in the analysis; however, for analysis purposes, detailed metrics were unavailable.
- Healthy riparian areas are essential for properly functioning aquatic ecosystems. Improvements or protection of riparian habitats would directly/indirectly improve or protect aquatic habitats and fisheries. Adverse impacts to riparian habitats would directly and indirectly degrade aquatic habitats and fisheries.
- Emphasis on and management opportunities for maintenance or improvement of fish habitat conditions would occur in designated ACECs and high-value watersheds (HVWs).
- Not all anadromous streams or extent of anadromy has been documented within the planning area.



- The lifting of 17(d)(1) mineral withdrawals in areas with high mineral potential could result in an increased number of placer mining operations with the potential to adversely affect fish and aquatic resources.

The effects analysis for fisheries is limited due to incomplete or unavailable information, but is based primarily on evaluation of the following:

- Analysis by BLM using ADF&G Anadromous Waters Catalog and Freshwater Fish Inventory (AFFI) data.
- Agency (e.g., BLM, USFWS) reports on fish studies in the area. Studies identifying spawning and overwintering habitats for anadromous and resident fish species classified by BLM as sensitive.
- GIS databases showing fish distributions in the planning area—GIS map overlaying withdrawal management decisions on HVWs by alternative, ACECs by alternative, and Anadromous Waters Catalog overlay.

### **Standard Operating Procedures and Best Management Practices**

The impact analyses below consider SOP and BMP that could be implemented by the BLM. A comprehensive list of SOPs/BMPs pertaining to fisheries is provided in the BSWI RMP/EIS.

#### **3.1.3 Effects Analysis**

Proposed management of the following resources, resource uses, and programs will not be analyzed further at the present time, given their limited potential to impact fish and aquatic habitats, but may need to be analyzed further during specific project development:

- Air Quality and AQRVs
- Soils
- NNIS
- Wildland Fire
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Lands with Wilderness Characteristics
- Recreation and Visitor Services
- National Trails
- WSRs
- Support for BSWI Communities
- Subsistence
- Hazardous Materials and Health and Human Safety

The following types of effects are common to all action alternatives, though the potential amount and distribution of such effects may vary by alternative.

- The direct effects from allowing any type of specific development would vary depending upon the amount and extent of area open, the activity allowed, and the level/application of BMPs implemented. The duration of these effects would also vary and would be assessed on a case-by-case basis for each specific project.
- BMPs that protect streams and associated habitats would mitigate adverse impacts and could provide beneficial effects and would include avoidance of known spawning/rearing habitat and timeframes for fish migrations and spawning/rearing within the region.
- Direct effects from any development or surface-disturbing activities that have the potential to occur include, but are not limited to, the following:
  - Permanent/temporary loss of fish habitat
  - Increased sedimentation/turbidity
  - Reduction of fish habitat
  - Reduction of riparian habitat
  - Loss of and/or access to realized or potential fish migration/spawning/rearing habitat
  - Reduction in water quality/quantity
  - Reduction in water flow/availability
  - Increased/decreased water temperatures
- Indirect effects could result from the direct effects and include the following:
  - Permanent/temporary loss of fish habitat
  - Restricted access to areas recognized as fish spawning habitats
  - Increased sedimentation/turbidity
  - Reduction in water quality/quantity
  - Reduction in water flow/availability
  - Increase/decrease in water temperature
  - Potential for all direct effects to have impacts in downstream reaches of the areas of any development.

### **Fisheries: Effects from Water Resources and Fisheries Management Actions**

Potential impacts from the following management topics were considered:

- Designated HVW
- Proposed HVWs
- Locatable Mining

As described previously, the 100-year floodplain is the area inundated by the 100-year flood or the 1 percent annual exceedance probability flood. It is the flood event that has a 1 percent chance of being equaled or exceeded in any single year. It is often mistakenly thought of as the flood that occurs every 100 years. In actuality, if one has a project located within the 100-year floodplain and the project life is expected to be 30 years, it would have a 25 percent chance of experiencing flood damage due to a 100-

year flood. For a project with an anticipated life of 15 years, the chance of incurring flood damage due to a 100-year flood would be 14 percent.

The 100-year floodplain is difficult to accurately map without extensive ground surveys. On-the-ground surveys conducted within the planning area typically employ the Freeboard Approach, which is based on the current 1 percent annual chance flood elevation with the addition of freeboard to account for uncertainties in future conditions (see: Guidelines of Implementing EO 11988, Floodplain management; October 2015) to determine the horizontal floodplain. With this approach, the BLM uses three times maximum bankfull depth as an estimate of the 100-year floodplain.

Given the difficulty of remotely mapping the 100-year floodplain and the desire to convey the intent of the various management alternatives to the reader, *riparian buffer distances are used in the RMP as proxies for the 100-year floodplain*. Buffer distances are given as a distance from bankfull elevation and are dependent on stream order. Buffer distances apply to each side of the stream, as follows:

Stream Order	Buffer Distance (feet)	Acres
1st and 2nd	100	593,569
3rd	500	407,038
4th and 5th	1,000	761,680
6th, 7th, and 8th	1,500	110,147

Because HVW decisions define where ROW avoidance areas would be established, information regarding ROW management by alternative is presented in this section. Table 3.1.3-1 presents the lengths and areas of streams and areas of waterbodies affected by ROW management status and stream classification for Alternatives B, C, and D for each region. Table 3.1.3-2 presents summary information for all regions combined.

### ***Effects under Alternative A***

#### **Development in the 100-year Floodplain**

- The numbers of acres/miles of streams that lie within the 100-year floodplain vary by drainage. Under this alternative, there are no specific restrictions preventing development of these acres/streams at this time. The BLM must consider protecting the floodplains on a case-by-case basis.
- Development of these areas can alter stream processes and affect water quality and quantity, potentially degrading or modifying fish habitat at the area of development within the region.
  - Direct impacts could be short or long term and have the potential to include increased turbidity and sedimentation, reduced flow, increased water temperatures, and reduction in access by migrating fish to spawning/rearing habitat. Stream reaches within these areas could recover over time.
  - Direct impacts could be lessened through BMPs, which could alter times of development to avoid times of migration, spawning, and rearing of fish species.
  - Indirect impacts could be similar to direct impacts, could be short or long term, but would occur further downstream from the development or surface disturbance.

**Table 3.1.3-1: River Miles/Waterbody Acreage by ROW Management Status and Stream Classification: Alternatives B, C, and D**

	Open to ROW			ROW Avoidance			Row Avoidance for Linear Realty Actions	ROW Exclusion			ROW Permitted on a Case-by-Case Basis		
	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D	Alt. C	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D
<b>Lower Yukon River Streams [miles] (% of stream miles on BLM-managed land)</b>													
Anadromous Waters Spawning Streams	4 (<1)	4 (<1)	29 (<1)	627 (2)	865 (3)	949 (3)	109 (<1)	347 (1)	-	-	-	-	-
Anadromous Waters Streams	29 (<1)	187 (<1)	369 (1)	1,307 (4)	1,522 (5)	1,581 (5)	242 (1)	615 (2)	-	-	-	-	-
NHD Streams	3,161 (10)	5,229 (16)	8,340 (25)	9,833 (30)	8,958 (27)	7,367 (22)	1,526 (10)	2,720 (8)	-	-	-	-	7 (<1)
<b>Middle Yukon River Streams [miles] (% of stream miles on BLM-managed land)</b>													
Anadromous Waters Streams	-	3 (<1)	3 (<1)	3 (<1)	-	-	-	-	-	-	-	-	-
NHD Streams	3 (<1)	29 (<1)	29 (<1)	26 (<1)	-	-	-	-	-	-	-	-	-
<b>Northwest Alaska Streams [miles] (% of stream miles on BLM-managed land)</b>													
Anadromous Waters Spawning Streams	-	-	-	96 (<1)	163 (<1)	163 (<1)	-	67 (<1)	-	-	-	-	-
Anadromous Waters Streams	<1 (<1)	35 (<1)	72 (<1)	383 (1)	568 (2)	493 (2)	-	219 (1)	-	-	-	-	37 (<1)
NHD Streams	1,489 (5)	2,174 (7)	3,311 (10)	3,709 (11)	4,187 (13)	2,810 (9)	-	1,164 (4)	-	-	-	-	240 (1)
<b>Southwest Alaska Streams [miles] (% of stream miles on BLM-managed land)</b>													
Anadromous Waters Spawning Streams	1 (<1)	2 (<1)	34 (<1)	242 (1)	356 (1)	323 (1)	-	116 (<1)	-	-	-	-	1 (<1)

	Open to ROW			ROW Avoidance			Row Avoidance for Linear Realty Actions	ROW Exclusion			ROW Permitted on a Case-by-Case Basis		
	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D	Alt. C	Alt. B	Alt. C	Alt. D	Alt. B	Alt. C	Alt. D
Anadromous Waters Streams	14 (<1)	315 (1)	648 (2)	1,160 (4)	1,126 (3)	792 (2)	-	267 (1)	-	-	-	-	1 (<1)
NHD Streams	1,802 (5)	4,553 (14)	7,472 (23)	8,319 (25)	6,275 (19)	3,341 (10)	-	706 (2)	-	-	-	-	15 (<1)
<b>Lower Yukon River Waterbodies [acres] (% of waterbody acres on BLM-managed land)</b>													
Anadromous Water (Lakes/Ponds)	<1 (<1)	<1 (<1)	<1 (<1)	-	-	34 (<1)	34 (<1)	34 (<1)	-	-	-	-	-
NHD Waterbodies	6,293 (12)	14,431 (27)	17,006 (32)	12,973 (24)	7,056 (13)	9,975 (19)	5,494 (10)	7,716 (14)	-	-	-	-	-
<b>Middle Yukon River Waterbodies [acres] (% of waterbody acres on BLM-managed land)</b>													
NHD Waterbodies	-	57 (<1)	57 (<1)	57 (<1)	-	-	-	-	-	-	-	-	-
<b>Northwest Alaska Waterbodies [acres] (% of waterbody acres on BLM-managed land)</b>													
NHD Waterbodies	1,804 (3)	2,411 (5)	2,829 (5)	552 (1)	1,860 (3)	1,156 (2)	-	1,913 (4)	-	-	-	-	286 (1)
<b>Southwest Alaska Waterbodies [acres] (% of waterbody acres on BLM-managed land)</b>													
Anadromous Water (Lakes/Ponds)	<1 (<1)	<1 (<1)	<1 (<1)	-	-	-	-	-	-	-	-	-	-
NHD Waterbodies	5,650 (11)	14,117 (26)	17,077 (32)	15,939 (30)	8,371 (16)	5,354 (10)	-	899 (2)	-	-	-	-	56 (<1)

**Table 3.1.3-2: Summary of Stream Miles and Acres of Waterbodies by Alternative for ROW Combined by NHD Region for the Planning Area**

All Four Regions (Lower Yukon, Middle Yukon, Northwest Alaska, Southwest Alaska)	Alternative <sup>1</sup>		
	B	C	D
	Streams [miles] (% of stream miles on BLM-managed land)		
ROW – Open	6,454 (20)	11,985 (36)	19,151 (58)
ROW – Avoidance	21,887 (66)	19,420 (59)	13,518 (41)
ROW – Avoidance for Linear Realty Actions	-	1,526 (5)	-
ROW – Exclusion	4,590 (14)	-	-
ROW – Permitted on a Case-by-Case Basis	-	-	262 (1)
	Waterbodies [acres] (% of waterbody acres on BLM-managed lands)		
ROW – Open	13,748 (26)	31,015 (58)	36,969 (69)
ROW – Avoidance	29,520 (55)	17,287 (32)	16,486 (31)
ROW – Avoidance for Linear Realty Actions	-	5,494 (10)	-
ROW – Exclusion	10,528 (20)	-	-
ROW – Permitted on a Case-by-Case Basis	-	-	341 (1)
Note: <sup>1</sup> There are no current management decisions identified for Alternative A.			

**Designated HVW Criteria and Proposed HVWs**

- Currently, there are no criteria for identification of HVWs or proposed HVWs under this alternative.
  - Direct/indirect effects under this alternative would be highly variable and depend on the type of activities/authorizations permitted. All activities have the potential to alter stream processes and degrade fish habitat. The duration of these impacts would also be highly variable and dependent upon the activity and the BMPs that are implemented. Any BMP that protects the streams and associated habitats would be valuable and would include avoidance of known spawning habitat and migration/spawning time periods.

**Locatable Mining**

- Currently, the number of miles/acres of waterbodies open to mining varies by mining activity and by region within high and medium LMP areas (see Table 3.1.3-7).
- Under Alternative A, there is a 300-foot occupancy setback on the Lower Kateel, Tag, and Gisasa Rivers and tributaries to the Nulato and Ray Rivers and Squaw Creek. The number of acres this represents is not currently available. This setback would provide some protection to riparian and aquatic habitats and fish from surface-disturbing activities.
- Mineral extraction within streams and watersheds could alter stream processes and fish habitat directly by removing pools and overwintering areas, destroying spawning beds, and impacting short- and long-term water quality. Locatable mineral development has the potential to affect about 85 miles of streams (less than 1 percent of streams in the planning area on BLM-managed lands) and 6 acres of other waterbodies (less than 1 percent of other waterbodies in the planning area on BLM-managed lands) in lands with high LMP and about 524 miles of streams (about 2 percent of streams in the planning area on BLM-managed plan) and 706 acres of other

waterbodies (about 1 percent of other waterbodies in the planning area on BLM-managed land) in medium LMP.

- Under this alternative, the “known” anadromous/spawning streams are protected; however, there are an unknown percentage of undocumented streams that could be impacted directly. These direct impacts could include total removal of spawning habitat, increased turbidity and sedimentation, and loss of access to other known habitats upstream of an area which became mineable. These impacts, depending on severity, could be short or long term.

### ***Effects Common to All Action Alternatives***

See the “Effects Analysis” section above for potential direct/indirect effects common to all actions. Potential impacts from Alternative A are quantified above in terms of the indicators selected for comparing alternatives. While the types of impacts are similar for all alternatives, the intensity, duration and magnitude differ by alternative.

### ***Effects under Alternative B***

#### **Designated HVWs Criteria**

- Criteria for identifying HVWs under this alternative include ARVs, protection of areas of sufficient size to ensure hydrologic connectivity and landscape resiliency, and watersheds with High, Medium-high, and Medium resource values. Metrics associated with miles/acres of fish spawning/rearing habitat would be project specific and addressed as needed.
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

#### **Proposed HVWs**

- High resource value = 12,982 stream miles (about 39 percent of stream miles on BLM-managed lands); 4,891,935 acres
- Medium-High resource value = 1,906 stream miles (about 6 percent of stream miles on BLM-managed lands); 668,706 acres
- Medium resource value = 6,494 stream miles (about 20 percent of stream miles on BLM-managed lands); 2,733,412 acres
- All management actions specific to HVWs would apply to streams and corridors identified in the 100-year floodplain.
- Management actions within HVWs, including appropriate buffers (BSWI Draft RMP/EIS, Map 2-2), would extensively limit surface-disturbing activities from minerals, travel management, and realty management actions including ROW, which would result in fewer impacts on water quality and fish and aquatic habitat compared to other alternatives.
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

#### **Locatable Mining**

- For fish-bearing streams, the disturbance-restriction buffer would be the 100-year floodplain area. Subject to valid existing rights, no surface-disturbing activities or permanent structures would be

allowed within these buffer areas. Recovery of riparian vegetation and an upward trend of recovery would be realized within 5 years.

- Mineral extraction within streams and within watersheds could alter stream processes and fish habitat directly by removing pools and overwintering areas, destroying spawning beds, and impacting short- and long-term water quality. Under Alternative B, locatable mineral development has the potential to affect about 40 miles of streams (less than 1 percent of streams in the planning area on BLM-managed lands) and about 1 acre of other waterbodies (less than 1 percent of other water bodies in the planning area on BLM-managed lands) in high LMP areas and approximately 369 miles of streams (about 1 percent of streams in the planning area on BLM-managed lands) and 608 acres of other waterbodies (about 1 percent of other waterbodies in the planning area on BLM-managed lands) in medium LMP areas (see Table 3.1.3-7)
- For mine site reclamation, the recovery of riparian vegetation and an upward trend would be realized within 5 years.
- Operator is required to submit a plan for preventing nonnative invasive species (NNIS) infestations as a result of their mining operation.
- All permitted mining operations would be required to implement 100 percent water recycle systems (zero discharge) and may be required to use a settling pond liner based on site specific conditions, where possible.
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

### ***Effects under Alternative C***

See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

### **Designated HVW Criteria**

- Criteria for identifying HVWs under this alternative include watersheds with High and Medium-high ARVs. Metrics associated with miles/acres of fish spawning/rearing habitat would be project specific and addressed as needed.
- Proposed HVWs
- High resource value = 12,982 stream miles (about 39 percent): 4,891,935 acres
- Medium-high resource value = 1,906 stream miles (about 6 percent): 668,706 acres
- All management actions specific to HVWs would apply to streams and corridors identified in the 100-year floodplain
- Any management action within HVWs apply to these values including appropriate buffers (BSWI Draft RMP/EIS, Map 2-3)
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

### **Locatable Mining**

- For fish-bearing streams, the disturbance-restriction buffer would be the 100-year floodplain area. Subject to valid existing rights, no surface-disturbing activities or permanent structures would be allowed within these buffer areas. Recovery of riparian vegetation and an upward trend of recovery would be realized within 5 years.



- Alternative C would open areas to locatable minerals and would have the potential to affect almost 92 miles of streams (less than 1 percent of streams in the planning area on BLM-managed lands) and 6 acres of other waterbodies (less than 1 percent) in lands with high LMP. There would be no stream miles or acres of waterbodies withdrawn from locatable mineral extraction in high LMP areas. Alternative C would open areas to locatable minerals and have the potential to affect about 1,082 miles of streams (3 percent of streams in the planning area on BLM-managed lands) and 1,033 acres of waterbodies (2 percent) in medium LMP areas. There would be no stream miles and no acres of waterbodies withdrawn from locatable mineral extraction in medium LMP areas (see Table 3.1.3-7).
- For mine site reclamation, the recovery of riparian vegetation and an upward trend would be realized within 5 years.
- If NNIS are found, a comprehensive NNIS plan will be developed to address monitoring, prevention, and abatement.
- Operations would be required to obtain Individual Mixing Zone permits under the APDES if they anticipate discharges or if the site characteristics limit recycle capacity/potential

### ***Effects under Alternative D***

#### **Designated HVW Criteria**

- Criteria for identifying HVWs under this alternative include watersheds with High ARVs. Metrics associated with miles/acres of fish spawning/rearing habitat would be project specific and addressed as needed. Metrics related to mining actions can be found within the “Fisheries: Locatable, Salable, and Leasing Management Actions” section.
- Alternative D provides the least protection of fish and aquatic resources of all the alternatives.
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

#### **Proposed HVWs**

- High resource value = 12,982 river miles (about 39 percent): 4,891,935 acres
- All management actions specific to HVWs would apply to streams and corridors identified in the 100-year floodplain
- Any management action within HVWs applies to these values including appropriate buffers (BSWI Draft RMP/EIS, Map 2-4).
- Alternative D would provide the least amount of protection for fish and aquatic resources.
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

#### **Locatable Mining**

- For plans of operations, development of the stream reclamation objectives would rely substantially upon the characterization of stream potential as determined from the baseline environmental information provided by the operator.
- Alternative D provides the least amount of protection for fish and aquatic resources and relies on the operator to characterize the potential of streams for reclamation. Regulations require that

operators use the technology and practices that will meet performance standards. Deliberate design, use of specific construction techniques, and riparian transplants have demonstrated success in the rehabilitation of fisheries habitat.

- Mineral extraction within streams and watersheds could alter stream processes and fish habitat directly by removing pools and overwintering areas, destroying spawning beds, and impacting short- and long-term water quality. Alternative D would open areas to locatable minerals and would have the potential to affect almost 92 miles of streams (less than 1 percent of streams in the planning area on BLM-managed lands) and 6 acres of other waterbodies (less than 1 percent of other water bodies in the planning area on BLM-managed lands) in lands with high LMP. As with Alternative C, Alternative D would withdraw no stream miles or acres of waterbodies from locatable mineral development in high LMP areas. Alternative D have the same potential impacts to stream miles and acres of waterbodies as Alternative C, except it would withdraw zero acres of waterbodies from locatable mineral development in areas of medium LMP (see Table 3.1.3-7).
- See the “Effects Analysis” section above for potential direct/indirect effects common to all actions.

### ***Summary***

In summary, Alternative B, compared to the other alternatives, provides the most restrictive management for streams/acres of waterbodies, with the least amount available for development or disturbance that could impact fish and aquatic resources. Table 3.1.3-1 and Table 3.1.3-2 provide a summary of the stream miles and acres of waterbodies within ROW status categories related to this resource. The numbers of miles of streams and/or acres of waterbodies where ROWs would be allowed, avoided, or excluded represent the potential for protecting aquatic habitat by alternative for the other actions presented above. These results show that the alternatives can be ranked in order based on the potential to protect aquatic resources: B, C, and D, followed by the No Action Alternative (A).

### **Fisheries: Effects from Forestry and Woodland Products Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Permitted Commercial Woodlands Harvesting Areas
- Personal Use and Subsistence Woodland Harvest Areas
- Woodland Harvest in HVWs
- Woodland Harvest in the INHT NTMC
- Woodland Harvest in ACEC
- Forestry BMPs for Casual Use

Table 3.1.3-3 presents the lengths and areas of streams and waterbodies affected by commercial woodlands harvesting management status and stream classification for Alternatives A, B, C, and D for each region, and Table 3.1.3-4 presents summary information for all regions combined.

**Table 3.1.3-3: Commercial Woodland Miles/Acres by Closed, Permittable, and Permitted Streams/Waterbodies: Alternatives A, B, C, and D**

	Closed			Permittable				Permitted			
	Alt. A	Alt. B	Alt. C	Alt. A	Alt. B	Alt. C	Alt. D	Alt. A	Alt. B	Alt. C	Alt. D
	Streams [miles] (percent of stream miles on BLM-managed lands)										
<b>Lower Yukon River</b>											
Anadromous Waters Spawning Streams	138 (<1)	972 (3)	-	716 (2)	-	971 (3)	-	123 (<1)	6 (<1)	6 (<1)	977 (3)
Anadromous Waters Streams	240 (1)	1,815 (6)	-	1,490 (5)	7 (<1)	1,632 (5)	7 (<1)	220 (1)	129 (<1)	319 (1)	1,943 (6)
NHD Streams	1,563 (5)	11,184 (34)	-	12,622 (38)	17 (<1)	8,469 (26)	18 (<1)	1,530 (5)	4,514 (14)	7,245 (22)	15,696 (48)
<b>Middle Yukon River</b>											
Anadromous Waters Streams	-	2 (<1)	-	3 (<1)	-	-	-	-	<1 (<1)	3 (<1)	3 (<1)
NHD Streams	-	26 (<1)	-	29 (<1)	-	-	-	-	3 (<1)	29 (<1)	29 (<1)
<b>Northwest Alaska</b>											
Anadromous Waters Spawning Streams	46 (<1)	163 (1)	6 (<1)	118 (<1)	-	157 (<1)	-	-	-	-	163 (1)
Anadromous Waters Streams	-	602 (2)	74 (<1)	428 (1)	-	469 (1)	-	<1 (<1)	<1 (<1)	59 (<1)	603 (2)
NHD Streams	1,406 (4)	4,681 (14)	204 (<1)	3,458 (11)	38 (<1)	3,907 (12)	64 (<1)	-	1,643 (5)	2,250 (7)	6,297 (19)
<b>Southwest Alaska</b>											
Anadromous Waters Spawning Streams	-	355 (1)	-	358 (1)	-	354 (1)	-	-	4 (<1)	5 (<1)	358 (1)
Anadromous Waters Streams	-	1,413 (4)	-	1,441 (4)	-	916 (3)	-	-	28 (<1)	525 (2)	1,441 (4)
NHD Streams	-	8,093 (25)	-	10,828 (33)	-	4,230 (13)	-	-	2,734 (8)	6,598 (20)	10,828 (33)

	Closed			Permittable				Permitted			
	Alt. A	Alt. B	Alt. C	Alt. A	Alt. B	Alt. C	Alt. D	Alt. A	Alt. B	Alt. C	Alt. D
	Waterbodies [acres] (percent of waterbody acres on BLM-managed lands)										
<b>Lower Yukon River</b>											
Anadromous Water (Lakes/Ponds)	-	34 (<1)	-	34 (<1)	-	34 (<1)	-	-	<1 (<1)	<1 (<1)	34 (<1)
NHD Waterbodies	-	5,720 (11)	-	-	17 (<1)	3,702 (7)	-	-	21,244 (39)	23,279 (43)	-
<b>Middle Yukon River</b>											
NHD Waterbodies	-	42 (<1)	-	57 (<1)	-	-	-	-	15 (<1)	57 (<1)	57 (<1)
<b>Northwest Alaska</b>											
NHD Waterbodies	38 (<1)	1,459 (3)	131 (<1)	2,939 (5)	39 (<1)	1,362 (3)	39 (<1)	1,293 (2)	2,277 (4)	2,777 (5)	4,231 (8)
<b>Southwest Alaska</b>											
Anadromous Spawning Habitat (Lakes/Ponds)	-	-	-	<1 (<1)	-	-	-	-	<1 (<1)	<1 (<1)	<1 (<1)
Anadromous Waters (Lakes/Ponds)	-	-	-	<1 (<1)	-	-	-	-	<1 (<1)	<1 (<1)	<1 (<1)
NHD Waterbodies	-	13,375 (25)	-	22,488 (42)	-	3,951 (7)	-	-	9,133 (17)	18,537 (34)	22,488 (42)
Note: <sup>1</sup> Closed data were only generated for Alternatives A, B, and C.											

**Table 3.1.3-4: Summary of Stream Miles and Acres of Waterbodies by all Alternatives for Commercial Woodlands Combined by NHD Region for the Planning Area**

All Four Regions (Lower Yukon, Middle Yukon, Northwest Alaska, Southwest Alaska)	Alternative			
	A	B	C	D
	Stream [miles] (percent of stream miles on BLM-managed lands)			
Commercial – Closed	2,969 (9)	23,984 (73)	204 (1)	-
Commercial – Permittable	26,963 (82)	54 (<1)	16,605 (50)	82 (<1)
Commercial – Permitted	3,000 (9)	8,893 (27)	16,122 (49)	32,850 (>99)
	Waterbodies [acres] (percent of waterbody acres on BLM-managed lands)			
Commercial – Closed	372 (1)	20,596 (38)	131 (<1)	-
Commercial – Permittable	51,225 (95)	56 (<1)	9,015 (17)	56 (<1)
Commercial – Permitted	2,199 (4)	33,145 (62)	44,650 (83)	53,740 (>99)

***Effects under Alternative A*****Permitted Commercial Woodlands Harvesting Areas**

- Current management plans allow subsistence and commercial harvest in most areas with permitting. Specific miles/acres of streams/waterbodies for closed/permittable/permitted commercial woodlands can be found in Table 3.1.3-3 and are summarized in Table 3.1.3-4.
- Permits issued on a case-by-case basis for house logs, poles, and firewood.
  - There are no subsistence or commercial forestry harvests within eight Research Natural Areas (RNAs). Specifics for management of these harvests are summarized in BSWI Draft RMP/EIS, Chapter 2.

**Forestry BMPs for Casual Use**

- Permits issued on a case-by-case basis for house logs, poles, and firewood.

There are no current management directions for Woodland Harvest in HVWs, INHT NTMCs, and ACECs, and no subsistence or commercial forestry within eight RNAs.

***Effects Common to All Action Alternatives***

- See the “Effects Analysis” section above for potential direct/indirect effects to fisheries common to all actions.

***Effects under Alternative B*****Permitted Commercial Woodlands Harvesting Areas**

- Timber sale operations would not be allowed within the 100-year floodplain of perennial rivers and streams.
- All types of commercial woodland harvest would be permitted by the BLM on all BLM-managed lands in the planning area described below unless they are within the Unalakleet Wild River

Corridor, ACECs, lands managed for wilderness characteristics as a priority, or the INHT NTMC, or the 100-year floodplain within an HVW.

- Areas within 15 miles of a river are open for commercial woodland harvest.
- Areas within 25 miles of a community are open for commercial woodland harvest.
- Burned areas outside of the areas above are open for commercial woodland harvest.
- Permits would be granted outside these areas on a case-by-case basis dependent on resource concerns.

#### **Woodland Harvest in HVWs**

- The 100-year floodplain within HVWs would be closed to commercial woodland harvest; non-subsistence house log harvest prohibited.
- The INHT NTMC would be closed to woodland harvest.

#### **Woodland Harvest in ACEC**

- Closed to commercial woodland harvest; non-subsistence house log harvest prohibited.

#### **Forestry BMPs for Casual Use**

- Timber sales are not allowed within the 100-year floodplain of perennial rivers and streams.
- House log harvests are not allowed within the riparian zone of perennial streams.

Table 3.1.3-3 presents stream mile and waterbody acreages for closed, permittable, and permitted by stream classification for commercial woodlands management actions for Alternatives A, B, and C.

#### ***Effects under Alternative C***

#### **Permitted Commercial Woodlands Harvesting Areas**

- Timber sale operations would not be allowed within the 100-year floodplain of perennial rivers and streams.
- All types of commercial woodland harvest would be permitted by the BLM on all BLM-managed public lands described below unless they are within the Unalakleet Wild River Corridor (Table 3.1.3-3 and Table 3.1.3-2).
  - Areas within 15 miles of a river are open for commercial woodland harvest.
  - All areas within 25 miles of a community are open for subsistence, and personal use woodland harvest.
  - All burned areas outside of the areas above are open for subsistence and personal use woodland harvest (includes mushrooms, berries, bark, and other forest products).
- Permits would be granted on a case-by-case basis for HVWs, areas identified as important for cultural or fish resources, and other areas outside of those listed in the bullets above.

**Woodland Harvest in HVWs**

- Commercial woodland harvest in HVWs would be determined on a case-by-case basis depending on watershed health.

**Woodland Harvest in the INHT NTMC**

- These areas are open to commercial harvest on a case-by-case basis.

**Woodland Harvest in ACEC**

- There are no management plans for this alternative. See the section “Effects Common to All Action Alternatives” for Forestry and Woodland Products above.

**Forestry BMPs for Casual Use**

- House log harvests are not allowed within the riparian zone of perennial streams.

***Effects under Alternative D*****Permitted Commercial Woodlands Harvesting Areas**

- Commercial woodland harvest would be permitted by the BLM on all BLM-managed public lands described below.
  - Areas within 15 miles of a river are open for commercial woodland harvest
  - Areas within 25 miles of a community are open for commercial woodland harvest.
  - Burned areas outside of the areas above are open for commercial woodland harvest.
- Permits would be granted outside these areas on a case-by-case basis dependent on resource concerns.
- Table 3.1.3-3 has information for miles of streams and acres of waterbodies permitted and permissible for commercial harvest.

**Woodland Harvest in HVWs**

- Permits issued in HVWs on a case-by-case basis.

**Woodland Harvest in the INHT NTMC**

- These areas are open to commercial harvest.

**Woodland Harvest in ACEC**

- There are no management plans for this alternative – see the section “Effects Common to All Action Alternatives” for Forestry and Woodland Products above.

**Forestry BMPs for Casual Use**

- Same as Alternative C – except that house log harvest is allowed within riparian zone of perennial streams.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### **Fisheries: Effects from Grazing Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Potentially Open to Grazing
- Areas Closed to Grazing
- Fees and Permits
- Utilization

Grazing of any type has potential to alter stream dynamics and thereby reduce the realized fish and aquatic habitat present within these regions. See Effects Analysis (Methods of Analysis) for potential Direct/Indirect effects common to all actions.

Table 3.1.3-5 presents the lengths of streams and areas of waterbodies affected by grazing management status and stream classification for Alternatives A, B, C, and D for each region. Table 3.1.3-6 presents summary information for all regions combined.

#### ***Effects under Alternative A***

##### **Areas Open/Closed to Grazing**

- BLM policy has been to provide grazing leases for domestic livestock including reindeer and musk oxen where feasible. Where range is available, and a need exists for seasonal grazing, this policy may be maintained. Currently, there are 32,292 miles of streams and 53,798 acres of waterbodies where grazing may occur (Table 3.1.3-4).
- Alternative A excludes the Unalakleet and Anvik Rivers and their major tributaries from grazing leases to protect important fisheries resources within these drainages.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

##### ***Grazing Management Plans***

- Current management plans do not specify requirement for Grazing Management Plan.

##### **Fees and Permits**

- There are no current management directives regarding fees or permits.

##### **Utilization**

- There are no current management directives.

#### ***Effects Common to All Action Alternatives***

- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.



**Table 3.1.3-5: Areas Open/Closed to Grazing by Miles/Acres of Streams: Alternatives A, B, C, and D**

	Areas Closed to Grazing until Standards are Developed <sup>1</sup>	Closed to Grazing <sup>2</sup>			Potentially Open to Grazing <sup>3</sup>		
		Alt. C	Alt. A	Alt. B	Alt. C	Alt. A	Alt. C
Stream [miles] (percent of stream miles on BLM-managed lands)							
<b>Lower Yukon River</b>							
Anadromous Waters Spawning Streams	886 (3)	130 (<1)	977 (3)	87 (<1)	857 (3)	4 (<1)	977 (3)
Anadromous Waters Streams	1,484 (5)	183 (1)	1,951 (6)	184 (1)	1,767 (5)	283 (<1)	1,951 (6)
NHD Streams	7,690 (23)	428 (1)	15,714 (48)	612 (2)	15,286 (7)	7,412 (23)	15,714 (47)
<b>Middle Yukon River</b>							
Anadromous Waters Streams	-	-	3 (<1)	-	3 (<1)	3 (<1)	3 (<1)
NHD Streams	-	-	29 (<1)	-	29 (0)	29 (<1)	29 (<1)
<b>Northwest Alaska</b>							
Anadromous Waters Spawning Streams	131 (<1)	6 (<1)	163 (<1)	32 (<1)	157 (<1)	-	163 (<1)
Anadromous Waters Streams	361 (1)	74 (<1)	603 (2)	169 (1)	529 (2)	72 (<1)	603 (2)
NHD Streams	2,321 (7)	209 (<1)	6,361 (19)	729 (2)	6,152 (19)	3,311 (10)	6,361 (19)
<b>Southwest Alaska</b>							
Anadromous Waters Spawning Streams	320 (1)	-	358 (1)	29 (<1)	358 (1)	9 (<1)	358 (1)
Anadromous Waters Streams	856 (3)	-	1,441 (4)	34 (<1)	1,441 (4)	551 (2)	1,441 (4)
NHD Streams	3,824 (12)	-	10,828 (33)	108 (<1)	10,828 (33)	6,896 (21)	10,828 (33)

	Areas Closed to Grazing until Standards are Developed <sup>1</sup>	Closed to Grazing <sup>2</sup>			Potentially Open to Grazing <sup>3</sup>		
		Alt. C	Alt. A	Alt. B	Alt. C	Alt. A	Alt. C
Waterbodies [acres] (percent of waterbody acres on BLM-managed lands)							
<b>Lower Yukon River</b>							
Anadromous Water (Lakes/Ponds)	34 (<1)	-	33.86 (0.06)	-	33.86 (0.06)	<1 (<1)	33.86 (0.06)
NHD Waterbodies	6,158 (11)	219 (<1)	26,982 (50)	15 (<1)	26,762 (50)	20,809 (39)	26,982 (50)
<b>Middle Yukon River</b>							
NHD Waterbodies		-	57 (<1)	-	57 (<1)	57 (<1)	57 (<1)
<b>Northwest Alaska</b>							
NHD Waterbodies	517 (1)	131 (<1)	4,270 (8)	925 (2)	4,139 (8)	2,829 (5)	4,270 (8)
<b>Southwest Alaska</b>							
Anadromous Spawning Habitat (Lakes/Ponds)	-	-	<1 (<1)	-	<1 (<1)	<1 (<1)	<1 (<1)
Anadromous Waters (Lakes/Ponds)	-	-	<1 (<1)	-	<1 (<1)	<1 (<1)	<1 (<1)
NHD Waterbodies	5,705 (11)	-	22,488 (42)	325 (1)	22,488 (42)	16,458 (31)	22,488 (42)
Notes:							
<sup>1</sup> Areas Closed to Grazing until Standards are Developed only apply to Alternative C. <sup>2</sup> Closed to Grazing data were generated for Alternatives A, B, and C. No areas closed to grazing under Alternative D. <sup>3</sup> Open to Grazing data were generated for Alternatives A, C, and D. No areas open to grazing under Alternative B.							

**Table 3.1.3-6: Summary of Stream Miles and Acres of Waterbodies by Alternatives for Grazing Combined by NHD Region for the Planning Area**

All Four Regions (Lower Yukon, Middle Yukon, Northwest Alaska, Southwest Alaska)	Alternative			
	A	B	C	D
	Stream [miles] (percent of stream miles on BLM-managed lands)			
Grazing – Closed	639 (2)	32,932 (100)	1,449 (4)	-
Grazing – Potentially Open on a Case-by-Case Basis	32,294 (98)		17,648 (54)	32,932 (100)
Grazing – Areas Closed to Grazing until Standards are Developed			13,835 (42)	
	Waterbodies [acres] (percent of waterbody acres on BLM-managed lands)			
Grazing – Closed	352 (1)	53,798 (100)	1,264 (2)	-
Grazing – Potentially Open on a Case-by-Case Basis	53,446 (99)	-	40,152 (75)	53,798 (100)
Grazing – Areas Closed to Grazing until Standards are Developed	-	-	12,380 (23)	-

***Effects under Alternative B***

- This alternative has all BLM lands closed to grazing of any type and is the most restrictive of all alternatives. Therefore, Alternative B is the most protective of fish and aquatic resources and represents approximately 32,932 miles of streams (100 percent) and 53,798 acres of waterbodies (100 percent) (Table 3.1.3-4).
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

***Effects under Alternative C*****Areas Open/Closed to Grazing**

- Grazing would only be permitted in areas where ecological conditions can support that grazing. This would be determined at the site-specific level and analyzed through implementation-level NEPA analyses.
- Nulato River watershed, Unalakleet Wild River Corridor, and INHT NTMC would be closed to grazing.
- HVWs would be closed to grazing until grazing standards and guidelines for riparian vegetation health are developed, then grazing in HVWs would be determined on a case-by-case basis.
- New applications submitted under the 1937 Reindeer Industry Act and the Alaska Livestock Grazing Act of 1927 would be considered on a case-by-case basis. New applications submitted under the 1937 Reindeer Industry Act would be considered if the applicant can: (1) provide a management plan which includes management objectives and how the applicant would ensure separation between domestic and wild animals and (2) conduct all land health monitoring activities as determined appropriate by the BLM AO.
- Under this alternative, there are approximately 17,648 miles of streams (about 54 percent) and 40,152 acres of waterbodies (about 75 percent) where grazing would be allowed on a case-by-case basis, with an additional 13,835 miles of streams (about 42 percent) and 12,380 acres of other waterbodies (about 23 percent) that could be opened to grazing once standards are developed (Table 3.1.3-4).

- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### **Grazing Management Plans**

- Proposed grazing operations must submit a grazing permit application that includes a comprehensive Grazing Management Plan or a Range Conservation Plan.

### **Fees and Permits**

- New applications submitted under the 1937 Reindeer Industry Act would be considered if the applicant can: (1) provide a detailed Operations Plan which includes management objectives and how the applicant would ensure separation between domestic and wild animals, (2) conduct all land health monitoring activities as determined appropriate by the BLM AO, and (3) provide assurance that their Business Plan has considered the markets and cost of operations for their proposed operation.
- Herd crossing permit applications would be addressed per direction in 43 CFR 4300.80 for proposals to move livestock across BLM-managed lands in the planning area, lands that are currently not administered under an existing grazing permit.
- Permitted grazing would require satellite collars/ tracking devices on at least one animal for herds of up to 75 or less and at least two collars for herds larger than 75 animals. These data would be immediately available to the BLM upon request, and the BLM would be provided with annual reports showing location(s) of the herd throughout the year.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### **Utilization Monitoring**

- Grazing operations would be administered to a maximum utilization threshold of Grazed Class 4 (50–75 percent of primary forage species utilized). This utilization would be revised if scientific research indicates a different level of utilization is necessary to maintain rangeland health.
- The Alaska Grazed Class Method (AGCM) would be used for monitoring permitted reindeer herds to determine utilization and lichen abundance.
- The BLM would monitor range utilization and herd location(s) every 3 years, at a minimum, or more frequently if deemed necessary for permit compliance.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### ***Effects under Alternative D***

#### **Areas Open/Closed to Grazing**

- No areas would be closed to grazing.
- New applications submitted under the 1937 Reindeer Industry Act and the Alaska Livestock Grazing Act of 1927 would be considered in the planning area on a case-by-case basis.
- Grazing would only be permitted in areas where ecological conditions can support that grazing. This would be determined at the site-specific level and analyzed through implementation-level NEPA analyses.
- Grazing would be allowed in HVWs, but only where ecological conditions can support that grazing.

- Grazing would be permitted in the Unalakleet Wild River Corridor and the INHT NTMC only if it is determined that the proposed permitted grazing is consistent with maintenance of the outstandingly remarkable values for which the Unalakleet Wild River Corridor was designated and the historical and cultural setting of the INHT NTMC.
- Grazing permits would be authorized on a case-by-case basis by the AO according to the BLM Alaska Grazing Policy.
- Under this alternative, there are 32,932 miles of streams (100 percent) and 53,798 acres of waterbodies (100 percent) where grazing would be possible on a case-by-case basis (Table 3.1.3-4).
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### **Grazing Management Plans**

- No requirement for a Grazing Management Plan or a Range Conservation Plan when applying for a grazing permit.

### **Fees and Permits**

- New applications submitted under the 1937 Reindeer Industry Act and the Alaska Livestock Grazing Act of 1927 would be considered in the planning area on a case-by-case basis.
- Grazing fees and permit terms would be determined during promulgation of regulations to guide the implementation of the Alaska Livestock Grazing Act of 1927.
- Herd crossing permit applications would be addressed as per direction in 43 CFR 4300.80 for proposals to move livestock across BLM-managed public lands, lands that are currently not administered under an existing grazing permit.

### **Utilization**

- Grazing operations would be administered to a maximum utilization threshold of Grazed Class 4 (50–75 percent of primary forage species utilized). This utilization would be revised if scientific research indicates a different level of utilization is necessary to maintain rangeland health.
- The AGCM would be used for monitoring permitted reindeer herds to determine utilization and lichen abundance.
- The BLM would monitor range utilization and herd location(s) every 3 years, at a minimum, or more frequently if deemed necessary for permit compliance.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### ***Summary***

In summary, Alternative B is the most protective of access to grazing habitat and therefore most protective of aquatic habitat. This is followed by Alternative C and Alternative A and is based on the amount of habitat that is open/closed and/or restricts caribou grazing. Alternative D opens all areas within the planning area to grazing and therefore is the least protective of all alternatives; however, under Alternative D, allowing or restricting grazing would occur on a case-by-case basis.

### Fisheries: Effects from Locatable, Salable, and Leasable Minerals Management Actions

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Surface-Disturbing Activities
- Minerals Decisions within HVWs

Table 3.1.3-7 presents the lengths and areas of non-HVW and HVW streams and waterbodies affected by locatable and salable management status and stream classification for Alternatives A, B, C, and D for each HUC 6 watershed within areas of high and medium LMP. Impacts from leasable mineral development are unlikely due to low potential in the planning area.

**Table 3.1.3-7: Summary of Stream Miles and Acres of Waterbodies by Alternatives for Locatable and Salable Combined by NHD Region for the Planning Area**

All Regions (Lower Kuskokwim, Melozitna River- Yukon River, Outlet Yukon River, Upper Kuskokwim – HUC 6 Data)	Alternative			
	A	B	C	D
<b>STREAMS</b>	Stream miles (percent of stream miles on BLM-managed lands)			
<b>Locatable – Total Open</b>	<b>609 (2)</b>	<b>409 (1)</b>	<b>1,173 (4)</b>	<b>1,173 (4)</b>
High	85 (<1)	40 (<1)	92 (<1)	92 (<1)
Medium	524 (2)	369 (1)	1,082 (3)	1,082 (3)
<b>Locatable – Total Withdrawn</b>	<b>565 (2)</b>	<b>764 (2)</b>	-	-
High	7 (<1)	52 (<1)	-	-
Medium	558 (2)	712 (2)	-	-
<b>WATERBODIES</b>	Acres (percent of waterbody acres on BLM-managed lands)			
<b>Locatable – Total Open</b>	<b>712 (1)</b>	<b>609 (1)</b>	<b>1,038 (2)</b>	<b>1,040 (2)</b>
High	6 (<1)	1 (<1)	6 (<1)	6 (<1)
Medium	706 (1)	608 (1)	1,033 (2)	1,033 (2)
<b>Locatable – Total Withdrawn</b>	<b>328 (1)</b>	<b>430 (1)</b>	-	-
High	0 (0)	5 (<1)	-	-
Medium	328 (1)	425 (1)	-	-
<b>STREAMS</b>	Stream miles (percent of stream miles on BLM-managed lands)			
<b>Salable – Total Open</b>	<b>609 (2)</b>	<b>409 (1)</b>	<b>738 (2)</b>	<b>1,173 (4)</b>
High	85 (<1)	40 (<1)	79 (<1)	92 (3)
Medium	524 (2)	369 (1)	659 (12)	1,082 (3)
<b>Salable – Total Closed</b>	<b>565 (2)</b>	<b>764 (2)</b>	-	-
High	7 (<1)	52 (<1)	-	-
Medium	558 (2)	712 (2)	-	-
<b>Salable – Total Open on a Case-by-case Basis</b>	-	-	436 (1)	-
High	-	-	13 (<1)	-

All Regions (Lower Kuskokwim, Melozitna River- Yukon River, Outlet Yukon River, Upper Kuskokwim – HUC 6 Data)	Alternative			
	A	B	C	D
Medium	-	-	423 (1)	-
<b>WATERBODIES</b>	Acres (percent of waterbody acres on BLM-managed lands)			
<b>Salable – Total Open</b>	<b>712 (1)</b>	<b>609 (1)</b>	<b>658 (1)</b>	<b>1,040 (2)</b>
High	6 (1)	1 (<1)	1 (<1)	6 (<1)
Medium	706 (1)	608 (1))	656 (1)	1,033 (2)
<b>Salable – Total Closed</b>	<b>328 (1)</b>	<b>430 (1)</b>		-
High	-	5 (<1)		-
Medium	328 (1)	425 (1)		-
<b>Salable – Total Open on a Case-by- case Basis</b>	-	-	382 (1)	-
High	-	-	5 (<1)	-
Medium	-	-	377 (1)	-

### *Effects under Alternative A*

#### **Surface-Disturbing Activities**

- The objective of this alternative is to protect all crucial salmon spawning beds from adverse impacts of mineral location and development. There are no metrics provided to estimate how the objective will be evaluated.

#### **Minerals Decisions within HVWs**

- There are currently no metrics for comparison for HVWs under this alternative.
- SWMFP directs the BLM to mitigate fisheries conflicts in fisheries-based ACECs by use of seasonal restrictions, area withdrawals, and other measures.

### *Effects Common to All Action Alternatives*

- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

### *Effects under Alternative B*

#### **Surface-disturbing Activities**

- For the entire planning area (exception would be locatable mineral development and permitted activities by other agencies [e.g., ADF&G]), for fish-bearing streams the disturbance buffer would be the 100-year floodplain – no surface-disturbing activities or permanent structures would be allowed within these buffers. Buffers and therefore the totals miles of streams would vary depending on stream order. Therefore, metrics for this alternative would be calculated on a case-by-case basis.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

**Minerals Decisions within HVWs**

- Closed Locatable/Salable
  - 24,712 miles (82 percent) of streams and 38,068 acres (71 percent) of waterbodies are withdrawn due to existing withdrawals retained or proposed new withdrawals or closed to salable mineral development, respectively (Table 3.1.3-7).
- Withdrawn from locatable mineral entry due to existing withdrawals retained or proposed new withdrawals.
- No suction dredging on the non-navigable waterways within HVWs.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

***Effects under Alternative C*****Surface-disturbing Activities**

- Within HVWs (exception would be locatable mineral development and permitted activities by other agencies [e.g., ADF&G]) and subsistence users for permitted camps within HVWs, for fish-bearing streams, the disturbance buffer would be the 100-year floodplain; no surface-disturbing activities or permanent structures would be allowed within these buffers. Buffers and therefore the total miles of streams would vary depending on stream order. Therefore, metrics for this alternative would be calculated on a case-by-case basis. Areas open/closed to mining activities within high and medium LMP areas are provided in Table 3.1.3-7.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

**Minerals Decisions within HVWs**

- Open to locatable mineral entry and open to salable mineral development, case-by-case (Table 3.1.3-7).
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

***Effects under Alternative D*****Surface-disturbing Activities**

- Surface-disturbing activities or permanent structures would be allowed within the 100-year floodplain of perennial and fish-bearing streams if permittees can demonstrate these activities would not substantively impact floodplain function and would be decided on a case-by-case basis.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

**Minerals Decisions within HVWs**

- Open to salable mineral entry (Table 3.1.3-7).
- Suction dredging is permitted within non-navigable waterways on a case-by-case basis.
- Areas are open to locatable mineral entry.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.



### **Fisheries: Effects from Travel and Transportation Management**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Travel and Transportation Management within HVWs
- Fish Passage Design Requirement/Standard
- River Crossing BMPs

Table 3.1.3-4 presents travel and transportation alternatives by lengths and areas of streams and waterbodies for Alternatives B, C, and D for each region.

#### ***Effects under Alternative A***

- There are no current travel designations with the exception of the Unalakleet Wild River Corridor, which does not allow casual or subsistence OHV use.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

#### ***Effects Common to All Action Alternatives***

- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

#### ***Effects under Alternative B***

OHV Designation = Limited (Table 3.1.3-4)

- Travel decisions vary throughout the planning area for the INHT NTMC, Lands with Wilderness Characteristics TMA, and Unalakleet Wild River Corridor.
- Alternative B would have fewer acres open to subsistence and casual use than Alternatives C and D (Table 3.1.3-4).
- This alternative increases restrictions on travel and transportation and provides the most protection for fish and aquatic resources of all the alternatives.

#### **Fish Passage Design Requirement/Standard**

- At least 3 years of hydrologic and fish data would be collected prior to construction of any proposed stream crossing whose structure is designed to occur, wholly or partially, below the stream’s OHWM.

#### **River Crossing BMPs**

- Except for approved crossings and approved locatable mine plans and Notice Level Operations, alteration of the banks of a waterway and floodplains would be avoided. If they cannot be avoided, BMPs will be used to reduce impacts; cut plugs or similar means will be used to restore stream banks. Waterways include natural features with sufficient water to create riparian habitat such as rivers, streams, deep and shallow lakes, tundra ponds, and shallow-water tracks (swales) in permafrost areas. Clearing of riparian vegetation along the riparian zone would be avoided whenever possible. Movement of equipment through riparian vegetation would be avoided whenever possible. All actions would be compliant with Executive Orders 11990 and 11988.

***Effects under Alternative C***

OHV Designation = Limited (Table 3.1.3-8)

- Travel decisions vary throughout the planning area for the INHT NTMC, Lands with Wilderness Characteristics TMA, and Unalakleet Wild River Corridor.
- Alternative C would have more acres open to subsistence and casual use than Alternative B and fewer than Alternative D (Table 3.1.3-8).
- Work in coordination with the State of Alaska to designate stream crossing routes; these routes would be designated within the 100-year floodplain.
- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

**Table 3.1.3-8: Summary of Stream Miles and Acres of Waterbodies by Action Alternative for Transportation and Travel Combined by NHD Region for the Planning Area**

All Subunits (Lower Yukon, Middle Yukon, Northwest Alaska, Southwest Alaska)	Alternative <sup>1</sup>		
	B	C	D
	Stream [miles] (percent of stream miles on BLM-managed lands)		
Travel – Lands with Wilderness Characteristics	666 (2)	-	-
Travel – Summer Casual OHV Limited	31,367 (95)	32,293 (98)	204 (1)
Travel – Open to Summer Subsistence Overland OHV Travel	-	32,293 (98)	-
Travel – Summer Casual OHV Prohibited	1,565 (5)	639 (2)	639 (2)
Travel – Summer Subsistence OHV Limited	871 (3)	-	639 (2)
Travel – Summer Subsistence OHV Prohibited	694 (2)	639 (2)	-
Travel – Winter Casual Snowmobiles	32,931 (100)	7,133 (22)	639 (2)
Travel – Winter Subsistence Snowmobiles	9,989 (30)	7,133 (22)	639 (2)
Travel – Summer OHV Subsistence Allowed	31,367 (95)	32,293 (98)	32,087 (97)
Travel – Summer OHV Subsistence Denied	1,565 (5)	844 (3)	844 (3)
Travel – Winter Subsistence – Allowed	32,265 (98)	32,931 (100)	32,931 (100)
Travel – Winter Subsistence – Prohibited	666 (2)	-	-
	Waterbodies [acres] (percent of waterbody acres on BLM-managed lands)		
Travel – INHT	1,298 (2)	1,250 (2)	1,250 (2)
Travel – Lands with Wilderness Characteristics	2,878 (5)	-	-
Travel – Summer Casual OHV Limited	49,623 (92)	52,678 (98)	131 (<1)
Travel – Summer Casual OHV Prohibited	4,175 (8)	1,118 (2)	1,118 (2)
Travel – Summer Subsistence OHV Limited	3,009 (6)	-	1,118 (2)
Travel – Summer Subsistence OHV Prohibited	1,167 (2)	1,118 (2)	-
Travel – Winter Casual Snowmobiles	53,796 (100)	6,301 (12)	1,118 (2)
Travel – Winter Subsistence Snowmobiles	15,929 (30)	6,301 (12)	1,118 (2)

All Subunits (Lower Yukon, Middle Yukon, Northwest Alaska, Southwest Alaska)	Alternative <sup>1</sup>		
	B	C	D
Travel – Summer OHV Subsistence Allowed	49,621 (93)	52,678 (98)	52,547 (99)
Travel – Summer OHV Subsistence Denied	4,175 (8)	1,250 (2)	1,250 (2)
Travel – Winter Subsistence – Allowed	50,918 (95)	53,796 (100)	53,796 (100)
Travel – Winter Subsistence – Prohibited	2,878 (5)	-	-
Note: <sup>1</sup> There are no current management decisions identified for Alternative A.			

### **Fish Passage Design Requirement/Standard**

- Determinations on required data collection to support implementation of these BMPs would be made on a case-by-case basis.

### **River Crossing BMPs**

- Same as Alternative B.

### ***Effects under Alternative D***

OHV Designation = Limited (Table 3.1.3-8)

- Travel decisions vary throughout the planning area for the INHT NTMC, Lands with Wilderness Characteristics TMA, and Unalakleet Wild River Corridor.
- Alternative D would have more acres open to subsistence and casual use than Alternative B and C (Table 3.1.3-8).
- Work in coordination with the State of Alaska to designate stream crossing routes; these routes would be designated within the 100-year floodplain.

### **Fish Passage Design Requirement/Standard**

- Same as Alternative C.

### **River Crossing BMPs**

- Determinations of when permitted activities can alter the banks of a waterway would be made on a case-by-case basis by the AO.

### **Fisheries: Effects from Areas of Critical Environmental Concern Management Actions**

Potential impacts from the following management topics were considered:

- Anvik River Watershed ACEC
- Gisasa River ACEC
- Inglutalik River ACEC
- Kateel River ACEC
- Nulato River ACEC

- Shaktoolik River ACEC
- Sheefish ACEC
- Swift River Whitefish Spawning ACEC
- Ungalik River ACEC
- North River ACEC
- Unalakleet River Watershed ACEC

Within the ACECs of the planning area, the potential for impacts (direct and/or indirect) are directly related to the activities proposed. These potential impacts are summarized early in this section, under the heading “Effects Analysis.” The differences within alternatives presented below are based on acres designated as ACECs. Within any ACEC, further analyses would be required to determine fish and aquatic habitat (i.e., miles of streams or acres of lakes) for each specific project or activity proposed.

Alternative A would maintain the current ACEC designations on BLM lands; there would be no changes to current ACECs or the addition of new ACECs. Alternative B has the most total acreage designated as ACECs in the planning area (29 percent) compared with Alternative A (14 percent). Alternative B would be the most restrictive, leading to fewer potential adverse impacts on fisheries resources.

### ***Effects under Alternative A***

#### **Anvik River ACEC – 114,386 acres**

- Fisheries are the primary relevance and importance (BLM 1981a).

#### **Gisasa River ACEC – 278,055 acres**

- Fisheries are the primary relevance and importance.
- Consider the protection of riparian habitat in all aspects of projects on BLM lands.
- Objective – maintain aquatic habitat which supports populations of fish in the planning area.

#### **Inglutalik River ACEC – 71,713 acres**

- Fisheries are the primary relevance and importance.
- Consider the protection of riparian habitat in all aspects of projects on BLM lands.
- Objective – maintain aquatic habitat which supports populations of fish in the planning area.

#### **Kateel River ACEC – 568,083 acres**

- Fisheries are the primary relevance and importance.
- Consider the protection of riparian habitat in all aspects of projects on BLM lands.
- Objective – maintain aquatic habitat which supports populations of fish in the planning area.

#### **Nulato River ACEC**

- Not managed as an ACEC.

- Maintain the water quality of watersheds on BLM-managed lands in the planning area in compliance with the Alaska Water Quality Standards.
- Perfect legal water rights to the water resource on public lands in support of BLM programs and in compliance with the Alaska Water Use Act. Protect existing water rights of the United States.

#### **Shaktoolik River ACEC – 192,591 acres**

- Fisheries are the primary relevance and importance.
- Consider the protection of riparian habitat in all aspects of projects on BLM lands.
- Objective – maintain aquatic habitat which supports populations of fish in the planning area.

#### **Ungalik River ACEC – 112,719 acres**

- Fisheries are the primary relevance and importance.

#### **North River ACEC – 132,200 acres**

- Fisheries are the primary relevance and importance.

#### **Unalakleet River Watershed ACEC**

- Not managed as an ACEC.

#### ***Effects Common to All Action Alternatives***

- See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

#### ***Effects under Alternative B***

#### **Anvik River Watershed ACEC – 248,867 acres**

- Fisheries are the primary relevance and importance value.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Gisasa River ACEC - 278,241**

- Fisheries are the primary relevance and importance.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:

- Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
- Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Inglutalik River ACEC - 70,888 acres**

- Fisheries are the primary relevance and importance.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Kateel River ACEC - 692,659 acres**

- Fisheries are the primary relevance and importance.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Nulato River ACEC - 344,182 acres**

- Fisheries are the primary relevance and importance.
- Nulato River ACEC would encompass 649 acres of land within the existing North River ACEC boundary and 868 acres within the existing drainages of the Unalakleet ACEC boundary.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and

- Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Shaktoolik River ACEC - 191,067 acres**

- Fisheries are the primary relevance and importance.
- Would encompass 1,621 acres of land within the existing North River ACEC boundary.
- Any proposal to use or develop the lands, waters, or resources within 300 feet or within the 100-year floodplain (whichever is greater) of the banks of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Sheefish ACEC – 696,901 acres**

- Fisheries and cultural resources are the primary relevance and importance.
- Coordinate with State of Alaska in the annual monitoring of potential Sheefish spawning rivers within the boundary of the Sheefish ACEC. For those rivers identified as supporting spawning sheefish, the following management actions would apply within a quarter mile on each side (from OHWM) of the reaches with known active spawning.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

#### **Swift River Whitefish Spawning ACEC – 220,032 acres**

- Fisheries are the primary relevance and importance.
- Any proposal to use or develop the lands, waters, or resources within the 100-year floodplain of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

**Ungalik River ACEC - 113,454 acres**

- Fisheries are the primary relevance and importance.

**North River ACEC**

- Not managed as an ACEC.
- 64,885 acres within the existing North River ACEC boundary would no longer be managed as an ACEC.

**Unalakleet River Watershed ACEC - 733,995 acres**

- Fisheries and cultural resources are the primary relevance and importance.
- Unalakleet River Watershed ACEC would encompass 299,968 acres of land within the existing Drainages of the Unalakleet ACEC boundary and 65,046 acres within the existing North River ACEC boundary.
- Any proposal to use or develop the lands, waters, or resources within 300 feet or within the 100-year floodplain (whichever is greater) of the banks of active stream channels must demonstrate to the satisfaction of the AO that such use or development:
  - Would not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; and
  - Would not diminish the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential.

***Effects under Alternative C***

- There are no ACEC management plans under this alternative. See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

***Effects under Alternative D***

- There are no ACEC management plans under this alternative. See the “Effects Analysis” section for potential direct/indirect effects common to all actions.

***Summary***

In summary, Alternative B would provide the most acres designated as an ACEC which would help minimize impacts to fisheries by limiting development near waterbodies and requiring projects to meet standards that avoid impacts to streams and aquatic habitat. Under Alternative A, fewer acres would be designated as ACECs than under Alternative B. Alternatives C and D remove all management of ACECs, including current management of established ACECs.

**Fisheries: Effects from Climate Change**

According to the Scenarios Network for Alaska and Arctic Planning, 50-year modeled surface water temperature may increase in some watersheds or decrease in other areas where more ice melt is occurring. Other potential changes as a result of climate change could include the following:

- Water flow increase or decrease



- Sedimentation from thawing permafrost and changes related to peak-flow events
- Lake bed drying
- Invasive species introduction due to changing condition
- Changes to the occurrence, quantity, distribution, movement, and quality of water affecting fish production and survival

Potential effects from climate change under all alternatives are unknown and would be determined on a case-by-case basis once future projects are evaluated. There are no management actions under any alternatives that would counteract impacts from climate change on fisheries.

### **Fisheries: Cumulative Effects**

Table 3.1.3-9 summarizes the results of the cumulative effects analysis for fisheries for all alternatives.

**Table 3.1.3-9: Cumulative Effects Analysis for Fisheries Resources**

Trends and Forecasts of Fisheries Resources in Consideration of Past and Present Actions	Trends and Forecasts of Fisheries Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Fisheries Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Fisheries Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Fisheries Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Based on past commercial, subsistence, and personal use fisheries harvest data, resident fish production is generally forecast to remain stable in the planning area. The forecasted extent of disturbances to habitat is expected to remain minimal throughout the majority of the watersheds in the planning area. Activities that occur within the planning area that have the highest potential to affect fish production include placer mining, hard rock mining, gravel mining, timber harvests, and stream crossings of roads, trails, and utility corridors in important fish habitats. Impacts from these potential activities are unknown, though not expected to substantially increase in the near future.</p> <p><b>Trend: Stabilized</b></p>	<p>The No Action Alternative represents the status quo. Any activities or actions that could degrade or remove fish and aquatic habitat could result in substantial impacts to the resource, such as the Donlin Gold Project. However, current forecasts do not show large increases in development throughout the planning area such that the fisheries resource would remain stabilized overall.</p> <p><b>Trend: No contribution to existing trend (remain stabilized)</b></p>	<p>Alternative B consistently limits access or requires substantially more requirements to gain access for development. The inclusion of larger and more numerous HVWs and ACECs would minimize and prevent impacts to aquatic species to maintain healthy populations. The inclusion of the Sheefish ACEC and Swift River Whitefish Spawning ACEC would provide protective measures for aquatic habitats for sheefish and whitefish that rely on these existing habitats.</p> <p><b>Trend: Counters existing trend (improving)</b></p>	<p>The effectiveness of Alternative C to protect fish and aquatic resources is essentially an intermediary between Alternative B (least impactful) and Alternative D (potentially most impactful) with respect to acreage of impacts. The inclusion of a greater number of HVWs would minimize and prevent impacts to fisheries habitat and allow aquatic species to maintain healthy populations; however, Alternative C would allow more surface-disturbing activities that could affect fisheries habitat than Alternative B. There would be no ACECs considered under this alternative that would provide habitat protection for aquatic species—specifically, important subsistence species such as chum and Chinook salmon, sheefish, or whitefish. BMPs, SOPs, and detailed reclamation requirements included under Alternative C would help to maintain fish habitat and healthy populations.</p> <p><b>Trend: Counters existing trend (improving but at a lesser rate than Alternative B)</b></p>	<p>Alternative D consistently allows more development with less regulation, decreases protected habitat, and opens more areas to potentially degrade fish and aquatic resource habitat. There would be no ACECs considered under this alternative that could provide habitat protection for aquatic species—specifically important subsistence species like chum, Chinook salmon, sheefish, or whitefish—that could be realized through the implementation of ACECs. Furthermore, the substantial decrease of areas considered protected under HVWs further compounds the potential for future cumulative impacts.</p> <p><b>Trend: Counters existing trend (degrading)</b></p>

## 3.2 Vegetation

### 3.2.1 Summary

Vegetation is an important component of land-based resources and resource uses. Management actions for many resources, resource uses, and special designations on BLM-managed lands in the planning area have the potential to affect vegetation and special status species (SSS) flora either through direct or indirect impacts or by implementing protections that eliminate or reduce the magnitude of these impacts. Direct and indirect impacts would include impacts of both short- and long-term duration. These impacts could result in changes to plant community composition and/or plant characteristics (e.g., vigor, fecundity, and biomass) over short- and long-term timeframes.

The three action alternatives would result in varying ranges in magnitude and extent of potential impacts or potential protections for vegetation and SSS flora. Management under Alternative B would be most protective of vegetation and SSS flora, as restrictions on resource uses would be the most stringent, and the magnitude and extent of requirements for protection and restoration of vegetation would be the greatest. Alternative D would provide the least amount of additional protections to vegetation and SSS flora, and Alternative C would provide a level of protection that would be intermediate between Alternative B and Alternative D. Management of vegetation under the alternatives would be consistent with BLM priorities for conserving land and water and utilizing natural resources.

### 3.2.2 Methods of Analysis

Analysis of impacts to vegetation is based on quantification of acreages that are available or unavailable to management actions that could result in direct or indirect impacts to vegetation. Qualitative descriptions of potential direct or indirect impacts to vegetation are presented in the “Effects Common to All Action Alternatives” subsections for each resource, resource use, or special designation analysis section.

### Potential Effects and Indicators

Vegetation and SSS flora are affected by actions that temporarily or permanently remove or damage individual plants or plant communities. Removal of vegetation would occur with any surface-disturbing action, such as minerals extraction, commercial woodland harvest, certain fire or fuels treatments, or with high-intensity grazing. If SSS flora occurs in these areas, these species could also be removed or damaged. Damage to individual plants (i.e., crushing, removal or breaking of leaves or branches, damage to roots, etc.), could occur with non-surface-disturbing actions such as certain types of minerals actions, personal use/subsistence woodland harvest, fire and fuels treatments, OHV use, or livestock grazing). Land disposals could lead to fewer protections for vegetation and SSS flora in disposed areas. Removal of or damage to vegetation may change vegetation cover and composition over the short or long term. This would result in cascading ecosystem effects such as changes in habitat suitability for wildlife species, changes to soil erosion potential, decreased livestock grazing suitability, and increased potential for colonization and spread of nonnative invasive plants (these effects are discussed in the analysis sections for these resources). Reclamation of vegetation in disturbed areas required as part of certain management actions would generally minimize impacts to vegetation communities, though the ability of reclamation to mitigate surface-disturbing actions would depend on project-specific reclamation requirements, site characteristics, and reclamation methods. Actions that could remove or damage plants could be restricted by certain resource protections, such as NSO minerals development, exclusions for surface-disturbing

minerals actions or commercial woodland harvest, VRM Class I and II designations, WSR protection areas, ROW exclusion and avoidance areas, and designation of the INHT NTMC.

A list of SSS flora in the planning area is presented in Appendix M of the BSWI Draft RMP/EIS.

Potential impacts to vegetation and SSS flora, management actions relevant to these impacts, and analysis impact indicators are presented in Table 3.2.2-1.

**Table 3.2.2-1: Summary of Effects to Vegetation by Management Action**

Types of Effects	Management Actions	Indicators
Surface disturbance due to minerals extraction and woodland harvest would remove vegetation. Vegetation may also be damaged incidentally as the result of non-surface-disturbing minerals actions and woodland harvest activities through vegetation crushing or damage to individual plants.	<ul style="list-style-type: none"> <li>• Minerals Decisions</li> <li>• Woodland Harvest Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres open to locatable, salable, and leasable minerals</li> <li>• Acres open to woodland harvest</li> </ul>
Fire and fuels treatments may require removal of vegetation communities, which would result in localized, major impacts to vegetation; however, treatments would be implemented with the goal of minimizing the impacts of wildland fires on vegetation and other resources.	<ul style="list-style-type: none"> <li>• Fire and Fuels Treatment Management Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for removal or degradation of vegetation communities associated with fire and fuels treatments (qualitative discussion)</li> </ul>
OHV use could degrade vegetation along overland travel routes through crushing, removal, and soil disturbance.	<ul style="list-style-type: none"> <li>• Vegetation Management Decisions</li> <li>• Transportation and Travel Management Decisions</li> <li>• Lands Managed for Wilderness Characteristics TMA</li> </ul>	<ul style="list-style-type: none"> <li>• Acres open to OHV use</li> </ul>
Livestock grazing would result in removal of lichen and vascular plants, trampling, transportation of plant propagules, and soil disturbance that could alter habitat conditions for vegetation species, including SSS flora. These impacts could result in changes to vegetation community composition in grazed areas.	<ul style="list-style-type: none"> <li>• Livestock Grazing Management Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres open to livestock grazing</li> </ul>
Land disposals could lead to fewer protections for vegetation and SSS flora, which may result in degradation of these resources over time.	<ul style="list-style-type: none"> <li>• Disposals</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of BLM-managed lands identified for acquisition, retention, or disposal</li> </ul>
Conditions of vegetative communities and SSS flora habitat could be improved through avoidance of surface-disturbing actions, monitoring, restoration and mitigation, and/or adherence to cited standards associated with management actions for vegetation and other resources.	<ul style="list-style-type: none"> <li>• Vegetation Management Actions</li> <li>• Minerals Decisions</li> <li>• Woodland Harvest Decisions</li> <li>• VRM Class Designations</li> <li>• Buffers for Surface-Disturbing BLM-Permitted Activities</li> <li>• Lands with Wilderness Characteristics Management</li> <li>• ACEC Designations</li> <li>• Lands and Realty Withdrawals</li> <li>• ROW Exclusion and Avoidance Areas</li> <li>• Transportation and Travel Management Decisions</li> <li>• Designation of the INHT NTMC</li> </ul>	<ul style="list-style-type: none"> <li>• Acres within buffers for surface-disturbing BLM-permitted activities</li> <li>• Total VRM Class acreages</li> <li>• Acres of BLM-managed surface ownership affected by ROW restrictions (i.e., avoidance or exclusion areas)</li> <li>• Acres affected by land withdrawals</li> <li>• Acres affected by ACEC designations</li> <li>• Extent of vegetation communities identified for avoidance of surface-disturbing actions, monitoring, reclamation, restoration and mitigation, and/or adherence to cited standards associated with other resource uses or designations</li> </ul>

## Assumptions

The following assumptions were used to assess effects associated with vegetation.

- Future human development proposals would be appropriately distributed in different vegetation community types in proportion to the abundance of those habitat types under the baseline conditions.
- Adaptive management tools would be implemented to test, evaluate, and adjust the assumptions, objectives, actions, and subsequent on-the-ground results from the implementation of RMP decisions. This strategy would provide resource managers with the flexibility to respond quickly and effectively to changing resource and user conditions.

## Standard Operating Procedures and Best Management Practices

The impact analysis below considers the SOPs and BMPs that could be implemented by the BLM. A comprehensive list of SOPs/BMPs pertaining to vegetation is provided in the BSWI RMP/EIS.

### 3.2.3 Effects Analysis

Management actions proposed for the following resources, resource uses, and special designations would not result in effects to vegetation:

- Air Quality and AQRVs
- Water Resources and Fisheries
- Cultural Resources
- Paleontological Resources
- WSRs
- Support for BSWI Communities
- Hazardous Materials and Health and Human Safety

## Vegetation: Effects from Soils Management Actions

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- ROW Decisions
- Floodplains and Springs

In general, actions that minimize impacts to soils, such as by reduction in direct disturbance and minimization of erosion, also directly and indirectly minimize impacts to vegetation.

### *Effects under Alternative A*

Restrictions for surface-disturbing actions in the vicinity of floodplains and springs would simultaneously minimize impacts to vegetation in these areas, though no specific restrictions for impacts in these areas are listed in existing management plans.

***Effects Common to All Action Alternatives***

Actions to reduce impacts to permafrost areas under all alternatives would simultaneously reduce impacts to vegetation. Requirements for minimization of surface disturbance and reclamation or restoration after surface-disturbing activities would also reduce vegetation removal and/or mitigate impacts of vegetation removal. Minimization of disturbance to riparian communities as an erosion control measure would minimize impacts to vegetation in these areas. Coordinating with USFWS to sustain and strengthen landscape-level ecosystem resiliency through managing connectivity of neighboring NWRs would also minimize potential impacts to vegetation from surface-disturbing actions.

***Effects under Alternative B***

Permafrost areas would be ROW exclusion areas, which would eliminate potential removal or damage of vegetation due to ROW activities in these areas. Restrictions of surface-disturbing activities within 100-year floodplains and within 100 feet of natural springs would eliminate potential removal or damage of vegetation due to surface-disturbing activities in these areas.

***Effects under Alternative C***

Permafrost areas would be ROW avoidance areas, which would reduce potential removal or damage of vegetation due to ROW activities in these areas, though some impacts could still occur if avoidance is not possible. Permitting of surface-disturbing activities in the vicinity of floodplains and natural springs on a case-by-case basis could allow some minimization of impacts to vegetation in these areas.

***Effects under Alternative D***

ROW authorization in permafrost areas on a case-by-case basis could allow some minimization of impacts to vegetation in these areas.

**Vegetation: Effects from Vegetation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- SSS Flora and Lichen Areas (Caribou Habitat) – Travel Management Decisions
- BLM-Permitted Surface Disturbance
- Seeding and Planting for Reclamation or Restoration

Vegetation management actions would generally minimize impacts of surface-disturbing actions on vegetation communities and SSS flora and their habitats. The BLM would continue to protect SSS flora in accordance with BLM Manual 6840 under all alternatives.

***Effects under Alternative A***

Existing land use plans provide some restrictions for surface-disturbing actions in floodplains, wetlands, riparian areas, threatened and endangered plant habitat, and caribou habitat (lichen-rich areas) and provide guidance for sustainable yield of forest resources that would minimize impacts of these actions on vegetation communities and SSS flora. Restrictions are inconsistent between plan areas and do not provide specific actions.

***Effects Common to All Action Alternatives***

Conservation and maintenance of areas near NWRs and connectivity corridors would minimize impacts of surface-disturbing actions on vegetation in these areas. Implementation of a monitoring plan for vegetation, including rare ecosystems, would benefit vegetation by identifying areas appropriate for rapid restoration response actions in identified degraded areas. Prioritization of restoration and mitigation in riparian zones, lichen-rich habitat, SSS flora habitat (including BLM sensitive plant species habitat or rare ecosystems), HVWs, and areas with potential for permafrost degradation would reduce impacts from other actions in these areas. Rerouting, restoring, hardening, or closing unauthorized OHV trails (especially in wetlands or permafrost areas) would reduce further impacts in these areas and provide opportunities for reestablishment of vegetation.

Requirements for reclamation in surface disturbance areas and burned areas would generally minimize impacts to vegetation communities from these actions or events, as some degree of vegetation reestablishment would occur after disturbance (with specifics developed during individual project permitting). Avoidance of ROW authorization in tundra areas; requirements for preservation of tundra mats, vegetative mats, and topsoil for use in reclamation; and specific reclamation cover requirements would reduce long-term impacts to vegetation in areas subject to surface disturbance. Utilizing existing roads and trails where feasible would minimize direct loss of vegetation from construction of new roads and trails. Avoiding the use of heavy equipment and overland travel in snow-free months and avoidance of creation of new roads and trails in wetlands and floodplains would minimize the adverse effects of these actions on vegetation, particularly in tundra areas and wetlands.

***Effects under Alternative B***

OHV use limitations, trail relocation, trail hardening, or trail closure implemented to reduce or eliminate degradation to SSS flora habitats (including dwarf shrub and lichen habitats [approximately 2,711,156 acres; or 20 percent of BLM-managed land in the planning area] or sparse vegetation types [approximately 139 acres; less than 1 percent of BLM-managed land in the planning area]) would protect vegetation in these areas from further degradation. Survey requirements in SSS flora habitat and 300-foot avoidance buffers would protect SSS flora and other vegetation in these areas. Approximately 65 acres of BLM-managed land in the planning area (less than 1 percent) are within 300 feet of known locations of BLM sensitive plant species; additional acreages would be protected if new populations were located during project-specific surveys. Avoiding limestone or serpentine geologic substrate areas could also provide protections for SSS flora and other vegetation that occur on these features.

Requirements for use of native and ecologically adapted species (i.e., species that are well-suited to the ecological conditions of an area) for reclamation or restoration are likely to reduce impacts to vegetation (in terms of changes to community composition and function) from surface-disturbing activities or fire in reclaimed or restored areas.

***Effects under Alternative C***

Under Alternative C, OHV use limitations in SSS flora habitats (including dwarf shrub and lichen habitats or sparse vegetation types) would be the same as under Alternative B. Survey requirements in SSS flora habitat and 100-foot setback buffers would minimize or eliminate impacts to SSS flora and other vegetation in these areas. Approximately 7 acres of BLM-managed land (less than 1 percent) are within 100 feet of known locations of BLM sensitive plant species; restrictions would be implemented on additional acreages if new populations are located during project-specific surveys.

Requirements for use of native and ecologically adapted species where available for reclamation or restoration would preserve the integrity of vegetation communities in reclaimed or restored areas, thereby reducing impacts to vegetation from surface-disturbing activities or fire. The allowed use of nonnative seed and propagules where native species are not available or unable to establish could result in changes to vegetation community composition and function as compared to pre-disturbance or pre-fire conditions. Overall, protection for SSS flora and other vegetation would be lower than under Alternative B.

### ***Effects under Alternative D***

No OHV use limitations would be implemented in SSS flora habitats and lichen areas if these areas become degraded by OHV use and therefore these areas could be subject to further degradation. Survey requirements in SSS flora habitat and case-by-case avoidance and minimization measures could minimize some impacts to SSS flora and other vegetation in these areas. Requirements that propagules used in restoration or reclamation be suited to existing climatic condition and ecosystem function could increase the success of disturbed area revegetation, though restoration could result in changes to vegetation community composition and function as compared to pre-disturbance or pre-fire conditions. Overall, minimization of impacts to SSS flora and other vegetation from surface-disturbing actions would be lower for Alternative D than under the other action alternatives.

### **Vegetation: Effects from Wildlife Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Caribou and Moose
- Innoko Bottoms Priority Wildlife Habitat Area
- Connectivity Corridors
- Migratory Bird
- Raptor

In general, measures that reduce impacts of surface-disturbing activities in wildlife habitat would simultaneously reduce impacts in the vegetation that composes this habitat. The BLM would continue to manage habitat for special status wildlife species as directed by national or State policy or through conservation agreements under all alternatives.

### ***Effects under Alternative A***

Continued implementation of protections for wildlife species (predominantly Endangered Species Act [ESA]-listed species, BLM sensitive species, rare habitats, subsistence resources, and migratory birds and their habitats) would also reduce impacts of surface-disturbing actions on vegetation and SSS flora in areas of habitat for these species. Restrictions of impacts on wildlife under Alternative A, and thus, associated minimization of impacts on vegetation and SSS flora, are less extensive and less specific than under the action alternatives.



***Effects Common to All Action Alternatives***

Under all action alternatives, management actions and BMPs/SOPs to minimize impacts on wildlife species and their habitats from surface-disturbing actions would also minimize impacts on vegetation and SSS flora in these areas.

***Effects under Alternative B***

Restrictions of impacts on vegetation that would occur in association with restrictions of impacts on wildlife species and their habitats would be the most extensive under this alternative. Management under Alternative B would provide the greatest extent and magnitude of minimization of impacts to caribou and moose calving and wintering habitats, the Innoko Bottoms Priority Wildlife Habitat Area, connectivity corridors, riparian habitat, raptor nesting habitat, and other migratory bird habitat that would minimize impacts from various surface-disturbing actions. As such, concurrent minimization of impacts to vegetation would be highest under this alternative.

***Effects under Alternative C***

Restrictions of impacts on vegetation that would occur in association with restrictions of impacts on wildlife species and their habitats would be less extensive than under Alternative B, as minimization of impacts in caribou and moose calving and wintering habitats, the Innoko Bottoms Priority Wildlife Habitat Area, connectivity corridors, riparian habitat, raptor nesting habitat, and other migratory bird habitat would be less stringent. However, minimization of impacts would still be more extensive than under Alternatives A and D.

***Effects under Alternative D***

The management under Alternative D would provide the lowest extent and magnitude of minimization of impacts to wildlife and SSS, as it would have the fewest restrictions on resource uses and would minimize impacts from surface-disturbing actions within the smallest extent of habitat. As such, concurrent impacts to vegetation would be greatest under this alternative.

**Vegetation: Effects from Nonnative Invasive Species Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

***Effects under Alternative A***

NNIS, including noxious weeds, would continue to be managed under State and federal laws and policy.

***Effects Common to All Action Alternatives***

As under Alternative A, NNIS, including noxious weeds, would continue to be managed under State and federal laws and policy. Additional NNIS control and eradication measures required for actions on BLM lands would minimize the establishment and spread of NNIS infestations. These measures would provide more stringent NNIS management and therefore minimize the impact of these species on vegetation and SSS flora to a greater degree than under Alternative A.

**Vegetation: Effects from Wildland Fire Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

***Effects under Alternative A***

Limited use of wildland fire and fuels treatments would continue to occur in order to meet resource objectives, including those for vegetation management. Wildland fire and fuels treatments, when they occur, would adversely impact vegetation in the local area over the short term but would also reduce the potential spread of catastrophic wildland fires, thereby minimizing the effects of these fires on vegetation. Wildland fire and fuels treatments would also support maintenance of appropriate vegetation community successional stages, which would reduce potential negative impacts of wildland fires on vegetation in the planning area and increase the health of vegetation communities over the long term.

***Effects Common to All Action Alternatives***

Impacts of wildland fire and fuels treatments would be the same as under Alternative A.

Revegetation actions (including for fire recovery) would be employed with varying requirements under the action alternatives, as analyzed in *Vegetation: Effects from Vegetation Management Actions*.

**Vegetation: Effects from Visual Resources Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- VRM Class I
- VRM Class II
- VRM Class III
- VRM Class IV

In general, VRM designation provides some level of minimization of impacts from certain actions on vegetation in designated areas.

***Effects under Alternative A***

The Unalakleet Wild River Corridor would continue to be designated as VRM Class I and impacts to vegetation in these areas associated with implementation of transportation or utility projects or authorizations of other ROWs would continue to be minimized or eliminated. No other areas would be assigned VRM designations.

***Effects Common to All Action Alternatives***

Under all action alternatives, existing vegetation would be retained as much as possible when implementing proposed actions, and disturbed areas would be restored or reclaimed as closely as possible to previous conditions. These requirements would minimize impacts to vegetation communities and SSS flora habitats as compared to Alternative A.

***Effects under Alternative B***

VRM designations under this alternative would restrict changes to characteristic landscapes in most of the planning area to within the range of natural ecological changes (VRM Class I; approximately 1,335,771 acres or 10 percent of BLM-managed lands in the planning area) or low-level changes (VRM Class II; approximately 6,490,087 acres or 48 percent of BLM-managed lands in the planning area). Smaller areas would be designated where moderate changes (VRM Class III; approximately 3,516,066 acres or 26 percent of BLM-managed lands in the planning area) and high-level changes (VRM Class IV; approximately 2,123,971 acres or 16 percent BLM-managed lands in the planning area) to the characteristic landscape are allowed. As such, VRM-associated impacts to vegetation in the planning area would be less extensive than under all other alternatives.

***Effects under Alternative C***

VRM designations under this alternative would designate 46,953 acres (less than 1 percent of the planning area) as VRM Class I where changes to characteristic landscapes would be restricted to within the range of natural ecological changes and 2,766,229 acres (21 percent of BLM-managed lands in the planning area) as VRM Class II where low levels of change would be allowed. Moderate change would be allowed (VRM Class III) over approximately 6,095,778 acres or 42 percent of BLM-managed lands in the planning area, and high-level change (VRM Class IV) over approximately 4,556,934 acres or 34 percent of BLM-managed lands in the planning area. VRM designations under this alternative would result in a greater degree of impacts to vegetation than under Alternative B.

***Effects under Alternative D***

VRM designations under this alternative would designate 46,953 acres (less than 1 percent of the planning area) as VRM Class I where changes to characteristic landscapes would be restricted to within the range of natural ecological changes and 679,553 acres (5 percent of BLM-managed lands in the planning area) as VRM Class II where low levels of change would be allowed. Moderate visual change (VRM Class III) would be allowed over approximately 6,140,235 acres or 46 percent of BLM-managed lands in the planning area, and high-level change (VRM Class IV) over approximately 6,599,152 acres or 49 percent of BLM-managed lands in the planning area. VRM designations under this alternative would result in a greater degree of impacts to vegetation than under Alternative B or C.

**Vegetation: Effects from Lands with Wilderness Characteristics Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Acres and Areas Managed to Protect Wilderness Characteristics as a Priority Over Other Resource Values and Multiple Uses
- Acres and Areas Managed to Emphasize Other Resource Values and Multiple Uses While Applying Management Restrictions to Reduce Impacts on Wilderness Characteristics

In general, lands managed according to the above two designations would avoid or minimize impacts to vegetation to some level.

***Effects under Alternative A***

Under Alternative A, no specific objectives are outlined for protection of wilderness characteristics that would minimize impacts to vegetation, though maintenance of an area's existing natural conditions (which would include vegetation communities and SSS flora habitats) is stated as a goal under the SWMFP.

***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives, because areas managed for wilderness characteristics as a priority are only identified under Alternative B. The alternatives would vary in terms of area of lands managed for wilderness characteristics, area of lands managed to emphasize resource values and multiple uses, and the extent and magnitude of management restrictions in these areas that could reduce the potential for impacts to vegetation from various land uses.

***Effects under Alternative B***

Under Alternative B, approximately 277,489 acres (2 percent of BLM lands in the planning area) would be managed to protect wilderness characteristics as a priority and would reduce the potential for impacts to vegetation and SSS flora in these areas through restrictions on OHV use, wood cutting, and mineral entry and surface occupancy. These restrictions would be more specific and enforceable than goals outlined for wilderness areas under Alternative A.

Most of BLM-managed lands in the planning area (approximately 12,040,490 acres; 89 percent) would be managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Potential impacts to vegetation in the remaining BLM-managed lands in the planning area could occur in association with any management decisions beyond basic State and federal regulations.

***Effects under Alternative C***

The nature and type of effects under this alternative would be the same as described under Alternative B, though no areas would be managed for wilderness characteristics as a priority. Approximately 8,105,942 acres (60 percent) would be managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Potential impacts to vegetation in the remaining approximately 5,360,168 acres (40 percent) would not be minimized in association with any management decisions beyond basic State and federal regulations. Overall, protection for vegetation in association with lands with wilderness characteristics protection areas would be lower under this alternative than under Alternative B.

***Effects under Alternative D***

Under Alternative D, no land would be identified as lands managed for wilderness characteristics as a priority or managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Similar to Alternative A, there would be no beneficial effects to vegetation associated with management pertaining to lands with wilderness characteristics.

### **Vegetation: Effects from Forestry and Woodland Products Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Permitted Commercial Woodland Harvesting Areas
- Personal Use and Subsistence Woodland Harvest Areas
- Woodland Harvest in HVWs
- Woodland Harvest in the INHT NTMC
- Woodland Harvest in ACECs
- Forestry BMPs for Commercial Activities

Vegetation can be directly impacted by woodland harvest actions by removal of individual plants or parts of plants, crushing, or large-scale removal of forests, or indirect impacts through human movement through an area (e.g., soil disturbance, transportation of NNIS and other plant propagules in a way that alters species ranges and/or vegetation community compositions). Higher intensity impacts would occur as a result of commercial harvest, which may remove all vegetation and disturb soils. Lower intensity impacts would occur with personal use and subsistence woodland harvest, which would generally remove smaller amounts of vegetation and have less of an impact on soils.

#### ***Effects under Alternative A***

Under Alternative A, most of the planning area (approximately 10,237,555 acres or about 76 percent of the planning area) would be open to commercial harvest permits on a case-by-case basis and approximately 1,644,588 acres (about 12 percent of the planning area) would be open for commercial harvest. Allowing for flexibility in restrictions would retain accessibility for commercial harvest. For subsistence and casual uses, all 13,465,894 acres of BLM-managed land in the planning area would be available on a case-by-case basis, allowing for continued access for house log and fuel wood harvesting. As such, impacts to vegetation from all types of woodland harvest on vegetation would be the most extensive under this alternative.

#### ***Effects Common to All Action Alternatives***

Requirements to minimize the effects of harvest action on vegetation and SSS flora include requiring timber harvest to occur during the winter, requiring surveys for sensitive species (including SSS flora) for surface-disturbing harvest actions, and restoration of disturbed areas. These actions would minimize impacts to vegetation and SSS flora associated with harvest activities to a greater degree than under Alternative A.

#### ***Effects under Alternative B***

Under Alternative B, approximately 8,418,904 acres (63 percent of the planning area) would be available for commercial woodland harvest and an additional 29,829 (less than 1 percent of the planning area) would be available for commercial woodland harvest on a case-by-case basis. Timber sale operations and woodland harvest would not be allowed within the 100-year floodplain of perennial rivers and streams. All 13,465,894 acres of BLM-managed land in the planning area would be open to subsistence and personal use gathering of woodland product, though permits would be required when gathering more than that required for incidental use. Non-subsistence house log harvest would also be prohibited in site-

specific areas to protect sensitive resources such as in HVWs, the riparian zone of perennial streams, and some ACECs (total of approximately 9,332,481 acres or 69 percent of the planning area). As a result, associated impacts to vegetation due to commercial, subsistence, or personal use woodland harvest would be less extensive and of a lower magnitude than under Alternative A.

### ***Effects under Alternative C***

Under Alternative C, 9,811,727 acres (about 73 percent of the planning area) would be open to commercial woodland harvest by permit with an additional 3,607,214 acres (about 27 percent of the planning area) available on a case-by-case basis. Timber sale operations would not be allowed within the 100-year floodplain of perennial rivers and streams. Although the number of acres closed to harvest would be greater than under Alternative A, classifying a larger area as available for harvest, rather than on a case-by-case basis, could increase easily accessible acres for commercial harvest. Subsistence use gathering of products would not require a permit in most of the planning area (13,423,449 acres, nearly the entire planning area), thus increasing ease of access for subsistence use. Personal use gathering of woodland product would require a permit but would be available, providing flexibility. Non-subsistence house log harvest would be prohibited on 3,044,073 acres (or about 23 percent of the planning area), providing site-specific restrictions on harvest. Restrictions for woodland harvesting would be lower under this alternative than Alternative B, which could allow for greater direct and indirect impacts to vegetation due to harvest activities.

### ***Effects under Alternative D***

Under Alternative D, commercial harvest area would include 13,423,449 acres (nearly 100 percent of the planning area), maximizing the number of accessible acres for harvest. Personal use and subsistence gathering would not require a permit, providing maximum acres accessible for those uses. As restrictions for woodland harvesting would be lower under this alternative than all other alternatives, the greatest potential direct and indirect vegetation impacts could occur due to harvest activities.

## **Vegetation: Effects from Grazing Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Open/Closed to Grazing
- Utilization

Impacts to vegetation from domestic livestock (reindeer) grazing include removal of lichen and biomass of other plants, trampling, transportation of plant propagules, and soil disturbance. Reindeer grazing also modifies composition of vegetation communities in complex ways based on community type and local topography (Pajunen et al. 2008). Requirements such as those for conducting rangeland health assessments to determine compliance with Alaska Land Health Standards would be applied under all alternatives to reduce impacts to vegetation in permitted grazed areas.

### ***Effects under Alternative A***

A total of approximately 13,304,555 acres of BLM-managed land in the planning area (about 99 percent) would potentially be open to grazing, and vegetation in these areas could be subject to grazing impacts.

No specific utilization levels are assigned; therefore, it is not possible to quantify specific impacts to vegetation due to grazing under this alternative.

### ***Effects under Alternative B***

BLM-managed lands in the planning area would be closed to domestic livestock grazing; therefore, impacts to vegetation from livestock grazing would not occur.

### ***Effects under Alternative C***

Domestic livestock grazing would be permitted in areas determined to have ecological conditions that support grazing within approximately 7,742,975 acres (about 58 percent) of BLM-managed lands in the planning area. Grazing would result in some impacts to vegetation due to forage utilization, trampling, transportation of plant propagules, and soil disturbance. Forage utilization would be managed at a maximum threshold of Grazing Class 4 (50–75 percent of lichen utilized), which could result in visible reductions in lichen cover, though not enough to inhibit regeneration (Swanson and Barker 1992). Restricting grazing in areas with important fish and watershed values in the Nulato River watershed, the Unalakleet Wild River Corridor, the INHT NTMC, and HVWs (allowed on a case-by-case basis only after riparian standards are developed) would protect vegetation in these areas from the effects of domestic livestock grazing. Impacts to vegetation under this alternative would be greater than under Alternative B, which would not permit livestock grazing. Comprehensive Grazing Management Plans or Range Conservation Plans required to be developed and submitted with permit applications would specify practices and mitigations to minimize impacts to vegetation.

### ***Effects under Alternative D***

Effects would be similar to those described under Alternative C, though grazing could be permitted on a case-by-case basis over the entire planning area, and therefore could affect a larger geographic extent. Livestock grazing would not be excluded from the Nulato River watershed, the Unalakleet Wild River Corridor, the INHT NTMC, and HVWs unless it is determined that the proposed permitted grazing is inconsistent with maintenance of the values for which these areas were designated or recognized as important. Forage utilization would be managed at a maximum threshold of Grazing Class 5 (75 to 100 percent of lichen utilized), which could result in visible trampling, craters, and reductions in lichen cover, though not enough to inhibit regeneration (Swanson and Barker 1992). Overall, impacts to vegetation under this alternative due to livestock grazing would be greater than under Alternative B or C, as greater acreages would be available for livestock grazing and proposed utilization thresholds would be higher.

## **Vegetation: Effects from Locatable and Salable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Locatable Mineral Withdrawals
- Salable Mineral Withdrawals

Impacts to vegetation from mineral exploration, location, development, and extraction would include complete removal of plants in surface disturbance areas, as well as indirect impacts such as ecosystem degradation due to increased dust creation and deposition, increased erosion and changes to erosional

patterns, and increased fragmentation of vegetation communities and habitat for SSS flora. Closing or withdrawing areas to locatable and/or salable mineral withdrawals would occur to varying degrees under the alternatives. In general, closing or withdrawing areas from minerals actions would eliminate effects to vegetation associated with these types of actions.

### ***Effects under Alternative A***

Under Alternative A, impacts to vegetation from locatable and salable mineral development could occur on 8,661,406 acres (about 64 percent of BLM-managed land in the planning area) which would remain open to both locatable and salable mineral development. However, impacts would be most likely to occur on the 294,325 acres of medium or high LMP (about 2 percent) that would remain open to mineral entry.

### ***Effects Common to All Action Alternatives***

Reclamation or restoration would be required in areas subject to surface disturbance, which would minimize some of the effects of these actions on vegetation communities. No specific SOPs or BMPs relate to vegetation management in lands that are authorized for locatable or salable minerals actions, though it is required that authorized projects are designed and located to minimize development footprints, which would reduce direct and indirect impacts to vegetation.

### ***Effects under Alternative B***

Under Alternative B, impacts to vegetation from locatable and salable mineral development could occur on 3,623,397 acres (about 27 percent of BLM-managed land in the planning area) which would remain open to both locatable and salable mineral development. However, impacts would be most likely to occur on the 202,610 acres of medium or high LMP (about 2 percent) that would remain open to mineral entry. Therefore, Alternative B would result in the smallest extent (acreage) of impacts to vegetation and SSS flora as compared to other alternatives.

### ***Effects under Alternative C***

Under Alternative C, impacts to vegetation from locatable mineral development could occur on 13,418,941 acres (over 99 percent of BLM-managed land in the planning area) and 13,182,85 acres (about 98 percent of BLM-managed land in the planning area) which would remain open to locatable mineral development and salable mineral development (including on a case-by-case basis). All areas of medium or high LMP would be open locatable mineral entry, and therefore impacts to vegetation (as described above) could occur in association with minerals entry activities in these areas. Management under Alternative C could result in greater impacts to vegetation than under Alternatives A and B due to the lack of acres withdrawn in medium or high LMP.

### ***Effects under Alternative D***

Impacts to vegetation under Alternative D would be the same as under Alternative C.

## **Vegetation: Effects from Leasable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Identified as Closed to Leasing and Open to NSO Leasing



As with locatable and salable minerals, impacts to vegetation from standard stipulation leasable minerals actions would include complete removal of plants in surface disturbance areas, as well as indirect impacts such as ecosystem degradation due to increased dust creation and deposition, increased erosion and changes to erosional patterns, and increased fragmentation of vegetation communities and habitat for SSS flora.

#### ***Effects under Alternative A***

The entire planning area would be open to oil and gas leasing unless already closed under other legal or regulatory requirements, such as peregrine falcon nesting habitat in the Unalakleet River drainage, raptor nesting areas in the Anvik River drainage, and various other areas with stipulations for protection of wildlife and other resources. Vegetation and SSS flora in areas open to oil and gas leasing could be impacted as described in the following subsection.

#### ***Effects Common to All Action Alternatives***

Vegetation in areas open to leasable minerals actions could experience direct and indirect effects. Reclamation or restoration of vegetation in areas subject to soil disturbance would minimize some of the potential effects on vegetation in these areas. No specific SOPs or BMPs relate to vegetation management in lands that are authorized for leasable minerals actions, though it is required that authorized projects are designed and located to minimize development footprints, which would reduce direct and indirect impacts to vegetation.

#### ***Effects under Alternative B***

Under Alternative B, 2,517,414 acres (19 percent of BLM-managed land in the planning area) would be open to leasing subject to standard stipulations which is less than the other alternatives. Therefore, management under Alternative B would allow the lowest amount of impacts to vegetation and SSS flora from the effects of minerals leasing under all alternatives.

#### ***Effects under Alternative C***

Under Alternative C, approximately 6,594,906 acres of BLM-managed lands in the planning area (49 percent) would be open to leasing subject to standard stipulations; therefore, management under Alternative C would allow a greater degree of potential impacts to vegetation than under Alternative B.

#### ***Effects under Alternative D***

Under Alternative D, approximately 13,177,785 acres of BLM-managed lands in the planning area (98 percent) would be open to leasing subject to standard stipulations; therefore, management under Alternative D would allow the greatest degree of potential impacts to vegetation of all action alternatives.

### **Vegetation: Effects from Lands and Realty Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- ANCSA 17(d)(1) Withdrawals
- FLPMA Withdrawals
- Locatable and Leasable Mineral Withdrawals

- FLPMA ROW Exclusion and Avoidance Areas
- Wind Energy Development
- Permits and Leases

Authorization of ROWs could occur to varying degrees under the alternatives. ROW authorizations may result in a range of impacts to vegetation (including SSS flora populations and habitat), including temporary vegetation clearing and revegetation, crushing or permanent removal of vegetation (such as with construction of roads or facilities), or indirect impacts such as dust deposition. Impacts to vegetation would not occur in ROW exclusion areas and may not occur or would be minimized in avoidance areas.

Disposal of lands would occur to varying degrees under the alternatives. The effects of disposals or exchanges of land on vegetation vary by the resources present in that land and the reason for the disposal or exchange but could range from no impact to permanent removal of vegetation. These impacts would not occur in areas unavailable for exchange or disposal.

#### ***Effects under Alternative A***

Vegetation in the approximately 13,465,894 acres of land available for ROW authorization on a case-by-case basis (100 percent of BLM-managed lands in the planning area) could be impacted by ROW actions.

#### ***Effects Common to All Action Alternatives***

Authorizations of ROWs and disposals of land could happen to varying extents for land under the action alternatives. No specific SOPs or BMPs relate to vegetation management in lands that are authorized as ROWs or subject to disposals, though it is required that authorized projects are designed and located to minimize development footprints, which would reduce direct and indirect impacts to vegetation.

#### ***Effects under Alternative B***

Under Alternative B, vegetation in the approximately 3,176,977 acres of land open to ROW location (24 percent of BLM-managed lands in the planning area) could be impacted by ROW actions. Overall, management under Alternative B would result in the smallest degree of potential impacts to vegetation and SSS flora from ROW actions under the alternatives.

#### ***Effects under Alternative C***

Under Alternative C, vegetation in the approximately 5,820,362 acres of land open to ROW location (43 percent of BLM-managed lands in the planning area) could be impacted by ROW actions. Overall, management under Alternative C would result in a greater degree of potential impacts to vegetation than under Alternative B.

#### ***Effects under Alternative D***

Under Alternative D, vegetation in the approximately 8,234,323 acres of land open to ROW location (61 percent of BLM-managed lands in the planning area) and the additional 100,644 acres of land where ROW could be permitted on a case-by-case basis (less than 1 percent of BLM-managed lands in the planning area) could be impacted by ROW actions. Management under Alternative D would result in the greater degree of potential impacts to vegetation under the action alternatives.

### **Vegetation: Effects from Recreation and Visitor Services Management Actions**

There are no alternative-specific management actions that pertain to impacts to vegetation from recreation and visitor services; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

#### ***Effects under Alternative A***

Recreation in the planning area has the potential to impact vegetation via trampling by recreators. Trampling could occur in any vegetated area, including off-trail locations. The effects of trampling on vegetation (ranging from no effect to mortality of individual plants) depend on a variety of factors (e.g., type of vegetation, type of soil, frequency of trampling). The potential for adverse effects of trampling on vegetation could increase with increasing recreation use in the planning area over time.

#### ***Effects Common to All Action Alternatives***

Impacts of recreation and visitor services management under all action alternatives would be the same as under Alternative A.

### **Vegetation: Effects from Travel and Transportation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Vegetation and Wildlife Travel Management
- All BSWI Lands Not Designated as Conservation System Units or Sensitive Resource Areas
- Unalakleet Wild River Corridor Travel Management Decisions
- INHT NTMC TMA
- Rohn Site Travel Decisions
- Lands Managed for Wilderness Characteristics TMA
- Travel Management in ACECs

OHV use can result in direct and indirect impacts to vegetation and SSS flora. Direct impacts may include crushing or removal of individual plants, and indirect impacts may include soil compaction, increased potential for soil erosion and sedimentation of waterways, increased potential for human-caused wildland fires, increased potential for transportation of plant propagules, and fragmentation of vegetation communities or habitat for SSS flora. Direct and indirect impacts to vegetation from OHVs would be minimized in areas where OHV is limited or prohibited.

#### ***Effects under Alternative A***

Under Alternative A, no areas would be subject to OHV use limitations or prohibitions with the exception of the Unalakleet Wild River Corridor, which does not allow casual OHV use; therefore, vegetation throughout the planning area could be impacted by OHV use.

#### ***Effects Common to All Action Alternatives***

Areas where OHV is limited or prohibited would vary under the alternatives.

***Effects under Alternative B***

Under Alternative B, the following OHV restrictions would apply:

- Summer casual OHV access would be prohibited on approximately 565,955 acres (4 percent of BLM-managed lands in the planning area)
- Summer subsistence OHV access would be prohibited on approximately 241,512 acres (2 percent of BLM-managed lands in the planning area)
- Summer casual OHV access would be limited to existing trails on approximately 12,899,939 acres (96 percent of BLM-managed lands in the planning area)
- Summer subsistence OHV access would be limited to existing trails on approximately 324,443 acres (2 percent of BLM-managed lands in the planning area)
- Winter casual use would be restricted to snowmobiles only on approximately 13,465,894 acres (100 percent of BLM-managed lands in the planning area)
- Winter subsistence use would be restricted to snowmobiles only on approximately 4,243,914 acres (32 percent of BLM-managed lands in the planning area)

Under Alternative B, the largest extent of lands would be subject to limitations or prohibitions of OHV use, and as such, this alternative would result in the smallest degree and extent of impacts to vegetation and SSS flora due to OHV use. Additionally, OHV use limitations or trail relocation, hardening, or closures would be implemented if monitoring shows degradation of SSS flora or lichen areas due to OHV use. Implementation of these measures would eliminate further impacts to vegetation in these areas.

***Effects under Alternative C***

Under Alternative C, the following OHV restrictions would apply:

- Summer casual and subsistence OHV access would be prohibited on approximately 225,925 acres (2 percent of BLM-managed lands in the planning area)
- Summer casual OHV access would be limited to existing trails on approximately 13,239,969 acres (98 percent of BLM-managed lands in the planning area)
- Summer subsistence OHV access would not be limited to existing trails on any BLM-managed lands in the planning area
- Winter casual and subsistence use would be restricted to snowmobiles only on approximately 3,097,798 acres (23 percent of BLM-managed lands in the planning area)

The extent of lands subject to OHV use limitations or prohibitions would be smaller than under Alternative B; therefore, potential impacts to vegetation would be higher than under Alternative B. Requirements for OHV use limitations or trail relocation, hardening, or closures to address OHV-related degradation of SSS flora or lichen areas would be the same as under Alternative B.

***Effects under Alternative D***

Under Alternative D, the following OHV restrictions would apply:

- Summer casual OHV access would be prohibited on approximately 225,925 acres (2 percent of BLM-managed lands in the planning area)

- Summer subsistence OHV access would not be prohibited on any BLM-managed lands in the planning area
- Summer casual OHV access would be limited to existing trails on approximately 46,953 acres (less than 1 percent of BLM-managed lands in the planning area)
- Summer subsistence OHV access would be limited to existing trails on approximately 225,925 acres (2 percent of BLM-managed lands in the planning area)
- Winter casual and subsistence use would be restricted to snowmobiles only on approximately 225,925 acres (2 percent of BLM-managed lands in the planning area)

The extent of lands subject to OHV use limitations or prohibitions would be the smallest of all the alternatives. Additionally, no measures to address OHV-related degradation of SSS flora or lichen areas would be required under this alternative. As such, potential impacts to vegetation due to travel and transportation management actions would be more extensive than under Alternatives B and C.

### **Vegetation: Effects from Areas of Critical Environmental Concern Management Actions**

Potential impacts from the following management topics were considered:

- Anvik Traditional Trapping Area ACEC
- Anvik River Watershed ACEC
- Gisasa River ACEC
- Inglutalik River ACEC
- Kateel River ACEC
- Nulato River ACEC
- Shaktoolik River ACEC
- Sheefish ACEC
- Swift River Whitefish Spawning ACEC
- Tagagawik River ACEC
- Ungalik River ACEC
- Unalakleet River ACEC

Designation of ACECs for protection of identified values (i.e., fisheries and/or cultural resources) would generally benefit adjacent vegetation through the prohibition of actions that could result in irreparable damage to these values.

#### ***Effects under Alternative A***

Under Alternative A, approximately 1,884,376 acres of BLM-managed lands in the planning area (14 percent) would continue to be managed as ACECs and impacts to vegetation in these areas would continue to be prohibited or minimized in association with protection of identified values within established ACECs.

***Effects Common to All Action Alternatives***

Varying sizes of ACECs would be designated under the action alternatives.

***Effects under Alternative B***

The greatest extent of ACECs would be designated under Alternative B (approximately 3,912,698 acres or 24 percent of BLM-managed land in the planning area); as such, impacts to vegetation would be prohibited or minimized in association with protections of fisheries and/or cultural resources.

***Effects under Alternative C***

As no ACECs would be designated under this alternative, impacts to vegetation would not be prohibited or minimized in association with protections of other resources that would occur with ACEC designation.

***Effects under Alternative D***

Impacts under Alternative D would be the same as under Alternative C.

**Vegetation: Effects from National Trails Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- INHT NTMC
- VRM Decisions in the INHT NTMC Viewshed
- FLPMA Withdrawals
- Mineral Decisions in the INHT NTMC
- Surface-Disturbing Activities and Other Realty Decisions
- Forestry and Woodland Decisions in the INHT NTMC
- Grazing Decisions in the INHT NTMC

In general, designation of national trails corridors would minimize impacts to vegetation in these areas by prohibiting or limiting various impacts that could occur without trail designation, such as ROW authorization, commercial woodland harvest, livestock grazing, and minerals extraction.

***Effects under Alternative A***

Under Alternative A, the INHT NTMC would not be designated, and vegetation in this area could be impacted by various activities that could occur without trail designation.

***Effects Common to All Action Alternatives***

The INHT NTMC would be established, and certain surface-disturbing actions would be prohibited or limited within the corridor for this trail. These prohibitions or limitations vary by alternative and are associated with VRM designations, restrictions for surface-disturbing activities, woodland harvest, and grazing.

***Effects under Alternative B***

Vegetation in the approximately 288,466-acre INHT NTMC (2 percent of BLM-managed lands in the planning area) would not be impacted by surface disturbance due to minerals exploration and development and ROW actions unless these uses would not conflict with the nature and purpose of the INHT. Commercial woodland harvest would be excluded in the INHT NTMC, which would also eliminate associated impacts to vegetation in these areas. Overall, designation of the INHT NTMC under this alternative would reduce impacts to vegetation from surface-disturbing activities in the trail corridor to the greatest degree of the alternatives.

***Effects under Alternative C***

Vegetation in the approximately 273,242-acre INHT NTMC (2 percent of BLM-managed lands in the planning area) could be subject to surface-disturbing impacts of minerals development (except leasable development) or ROW development if these uses are determined not visible or not in conflict with the nature and purpose of the INHT. Grazing-associated impacts to vegetation that would occur in other areas under this alternative would not occur in the INHT NTMC. Vegetation in the INHT NTMC could be impacted by commercial woodland harvest if authorized. Overall, designation of the INHT NTMC and associated management under this alternative would result in a lesser degree of minimization of impacts to vegetation than under Alternative B.

***Effects under Alternative D***

Vegetation in the approximately 273,242-acre INHT NTMC (2 percent of BLM-managed lands in the planning area) could be subject to surface-disturbing impacts of minerals development (including leasable development) or ROW development unless these uses would conflict with the nature and purpose of the INHT. Vegetation in the INHT NTMC would be subject to impacts from livestock grazing and woodland harvest. Overall, designation of the INHT NTMC and associated management under this alternative would result in the least degree of minimization of impacts to vegetation in this area than under other action alternatives.

**Vegetation: Effects from Climate Change**

This section presents analysis of how management actions would counteract cumulative climate change impacts to vegetation and SSS flora. Impacts to vegetation in the planning area as a result of anticipated climate change could be due to any of the following effects, or complex interactions thereof:

- Increased temperatures
- Permafrost thaw
- Decreased snow cover (albedo effect), subnivean species impacts
- Increased wildland fire intensity, size, and frequency
- Increase in NNIS introduction or spread
- Later freeze-up dates (river ice)
- Sea level rise (salt intrusion, transportation changes)

Generally, actions that protect or restore degraded vegetation could minimize effects of climate change on vegetation and other resources. Reclamation, restoration, or protection of vegetated areas would minimize the effects of climate change through such mechanisms as:

- Sequestering carbon or allowing continued carbon sequestration
- Protecting sensitive soils and permafrost
- Maintaining or reestablishing habitat connectivity, including for SSS flora species

Restoration actions that take changing environmental conditions into consideration are likely to be more successful in the long term and beneficial in terms of counteracting the cumulative effects of climate change on vegetation. Actions such as identifying the most appropriate species lists for revegetation (e.g., selecting for adaptability and genetic diversity in seeded/planted species) or locations for restoration projects using projected climate envelopes increase the beneficial value and long-term success of restored areas (Harris et al. 2006). Additionally, restoration actions that incorporate projected climate change information may be most beneficial in minimizing loss of vegetation species and habitat that are vulnerable to changing climate conditions.

#### ***Effects under Alternative A***

No current management direction for reclamation or restoration related to climate change effects exists; therefore, the potential for restoration or protection of vegetation to counteract the cumulative effects of climate change would be minimal. Restoration actions that could occur under this alternative would not be required to adhere to standards for vegetation suitability to projected climate conditions and therefore the long-term success of reclamation or restoration efforts may be lower than under the action alternatives.

#### ***Effects Common to All Action Alternatives***

Restoration or reclamation actions would be required for surface-disturbing activities under all action alternatives. Under all action alternatives, the BLM would use various monitoring and models to evaluate potential changes in vegetative communities and to adjust the identified management actions to shift with any changes in cover type. This adaptive management approach would help counteract cumulative climate change impacts.

#### ***Effects under Alternative B***

Provisions for the reclamation, restoration, or protection of vegetation under the various resources and resource uses are highest under Alternative B. Reclamation or restoration actions would be required to use native species and adhere to standards for selecting seed sources based on adaptability to climate conditions and desired (future) ecosystem function, which would consider changing climate conditions. As such, this alternative would be the most beneficial in terms of counteracting the cumulative effects of climate change on vegetation.

#### ***Effects under Alternative C***

Provisions for the reclamation, restoration, or protection of vegetation under the various resources and resource uses are less extensive than under Alternative B. Reclamation or restoration actions would be required to adhere to standards for selecting seed sources based on suitability to current climate conditions and desired (future) ecosystem function, though the use of native species would not be



mandated in all situations. As such, this alternative may be less beneficial in terms of counteracting the cumulative effects of climate change on vegetation than Alternative B.

### ***Effects under Alternative D***

Provisions for reclamation, restoration, or protection of vegetation under the various resources and resource uses would be the least extensive under Alternative D. Reclamation or restoration actions would be required to utilize species that are applicable for existing climatic condition and ecosystem function but would not be required to be suitable for desired (future) ecosystem function. Therefore, this alternative would be the least beneficial of the action items in terms of counteracting the cumulative effects of climate change on vegetation.

### **Vegetation: Cumulative Effects**

Table 3.2.3-1 summarizes the results of the cumulative effects analysis for vegetation for all alternatives. Cumulative adverse effects on vegetation under the action alternatives would generally be less and beneficial effects greater than under Alternative A because of the increased restrictions under Alternatives B, C, and D. Cumulative effects under Alternative B would generally be less adverse and more beneficial than under the other alternatives. The degree of adverse incremental impact or benefit to vegetation is related to the relative levels of protections afforded under the various management alternatives.

**Table 3.2.3-1: Cumulative Effects Analysis for Vegetation**

Trends and Forecasts of Vegetation in Consideration of Past and Present Actions	Trends and Forecasts of Vegetation in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Vegetation in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Vegetation in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Vegetation in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Vegetation communities in the planning area are maintaining proper functioning condition. Trends for special status plant species are unknown.</p> <p><b>Trend: No Change.</b></p>	<p>Due to continued adherence to State and federal regulations such as requirements for project-specific NEPA analysis, impacts to SSS flora and vegetation communities are likely to be limited, though impacts are still likely to occur due to increasing resource use in the planning area. Construction and operation of the Donlin Gold Project would be expected to increase impacts to vegetation and SSS flora within the planning area, within the footprint of the Donlin Gold Project transportation corridor and mine site. The Donlin Gold Project construction and operation would result in removal of vegetation for access and operations infrastructure and may impact habitat that supports SSS.</p> <p><b>Trend: Counter the existing trend by resulting in increased impacts to vegetation and SSS flora over time.</b></p>	<p>Continued adherence to State and federal regulations as well as the greatest restrictions to the extents of surface-disturbing actions would protect vegetation and SSS flora species and habitats to a greater extent than all other alternatives, though minimal impacts to vegetation and SSS flora are still likely to occur.</p> <p><b>Trend: Counter the existing trend by resulting in increased impacts to vegetation and SSS flora over time, though impacts would be less than under all other alternatives.</b></p>	<p>Continued adherence to State and federal regulations as well as some restrictions to the extents of surface-disturbing actions would protect vegetation and SSS flora species and habitats, though protections would be less extensive and potential surface-disturbing actions would be more extensive than under Alternative B.</p> <p><b>Trend: Counter the existing trend by resulting in increased impacts to vegetation and SSS flora over time.</b></p>	<p>Continued adherence to State and federal regulations as well as some restrictions to the extents of surface-disturbing actions would protect vegetation and SSS flora, though protections would be less extensive and potential surface-disturbing actions would be more extensive than under Alternative B or C.</p> <p><b>Trend: Counter the existing trend by resulting in increased impacts to vegetation and SSS flora over time.</b></p>

### **3.3 Wildlife and Special Status Species**

#### **3.3.1 Summary**

All resource uses on BLM-managed lands in the planning area have the potential to impact wildlife and SSS. Therefore, management actions for all resource uses also have the potential to affect wildlife or SSS to some extent and magnitude. Additionally, because wildlife habitat occurs over all of the planning area and is often interrelated with other resources, management actions and BMPs/SOPs specifically for other resources often have an incidental effect on wildlife and SSS or their habitat. Management actions that protect wildlife and SSS and their habitat are consistent with BLM priorities for conserving land and water (DOI 2018). All three action alternatives would provide additional protections and management actions for wildlife and SSS, including adaptive management to address climate change and watershed-level cumulative impact analysis for proposed surface-disturbing activities. The management under Alternative B would provide the greatest extent and magnitude of protections to wildlife and SSS, followed by Alternative C. Alternative D would provide the lowest extent and magnitude of additional protections to wildlife and SSS, as it would have the fewest restrictions on most resource uses and would protect the least amount of habitat. Additionally, the BLM would not manage connectivity corridors under Alternative D, which would eliminate one aspect of long-term landscape level planning for wildlife and SSS. The BLM would continue to manage SSS wildlife species according to BLM Manual 6840 under all alternatives.

#### **3.3.2 Methods of Analysis**

The direct and indirect impacts of management actions on wildlife and SSS resources may vary widely and are difficult to quantify without site-specific information on species and habitats present and the baseline condition of habitats and populations. Seasonal considerations are also important, as actions may affect wildlife to a greater or lesser degree depending on if they occur during the breeding season, migration or hibernation periods, periods when greater numbers of individuals may be present, periods when food or other habitat elements are scarce, or periods when vegetation and other habitat components are least resilient.

Because of the large number of wildlife species in the planning area, this analysis focuses on key habitats and species and addresses the quantity and quality of available habitat, habitat connectivity and the degree to which habitat is fragmented, and what habitat protections and use restrictions would occur under each alternative. The quantitative analysis of alternatives focuses on species and habitats for which information is available (moose, caribou, bison, muskox, riparian areas) and on areas within the planning area where land uses with the greatest potential to impact wildlife (mineral development, ROWs, commercial forest harvest) are likely to occur. Additional qualitative descriptions are also included as appropriate. The impact analysis discusses applicable management actions for each resource and resource use and identifies whether they would result in the possible destruction, degradation, or modification of wildlife and SSS habitat, or would minimize these impacts from resource uses in the planning area. Habitat connectivity and landscape-level management through protection of connectivity corridors are discussed where pertinent.

## Potential Effects and Indicators

Potential impacts to wildlife and SSS on BLM-managed lands in the planning area include disturbance, displacement, mortality, or injury of individuals; alteration, elimination, or fragmentation of habitat; reduction in availability of food and water; interference with breeding; reduction in reproductive success; and increased susceptibility to predation, among other possible impact mechanisms. Activities that involve surface disturbance, such as mineral development, can alter the structure, composition, and productivity of vegetation communities, which provide the foundation of wildlife habitats. Mineral development can also lead to new roads with the potential to fragment wildlife habitat and impede migration and other types of movement by species like moose, caribou, and bison. However, mining shafts and adits may provide habitat for bats. Mineral development is also associated with noise and human activity that may affect wildlife behavior and breeding success. Seismic surveys may impact wildlife habitat by removing vegetation and potentially creating new summer and winter OHV routes. Exploration can harm small mammals and nesting birds and can temporarily displace larger mammals such as caribou.

Removal of forest and woodland products can modify habitats of forest-dwelling species by reducing the components of wildlife physical habitat and food sources. Domestic reindeer grazing has the potential to reduce available winter forage for caribou and may result in impacts to populations through inbreeding and transmission of disease. OHV use can degrade wildlife habitats through surface disturbance, crush nests and small terrestrial species, and lead to the creation of new trails that can cause an increase in human use. OHVs may also introduce NNIS, which could adversely impact wildlife habitat. ROW development can lead to habitat loss, degradation, and fragmentation through vegetation removal over long linear areas.

Management actions for wildlife and other resources and resource uses can affect wildlife by either allowing resource uses with the potential to impact wildlife and SSS and their habitat within the planning area or by implementing restrictions on those resource uses that prevent or reduce impacts to wildlife in certain areas. Based on the resource uses with the greatest potential to impact wildlife and SSS, management actions for mineral decisions, travel management, ROW, and commercial woodland harvest would have the greatest potential to affect wildlife and SSS. Management to create connectivity corridors to facilitate wildlife movement across the landscape would also have a high potential to affect wildlife and SSS. Management for other resources uses would have a lesser potential to affect wildlife and SSS.

Table 3.3.2-1 summarizes the types of effects by management actions and the indicators used to compare the differences among alternatives.

## Assumptions

The following assumptions were made to assess effects on wildlife and SSS:

- Although wildlife and SSS may occur throughout the entire planning area, there are areas of higher concentration and/or higher value habitat within the planning area, such as riparian areas, Audubon Important Bird Areas, and the Innoko Bottoms area. Management actions in these areas may have a greater effect on wildlife compared to actions outside these areas.

**Table 3.3.2-1: Summary of Effects to Wildlife by Management Action**

Types of Effects	Management Actions	Indicators
<p>Potential changes in wildlife habitat use and migration patterns could result from land use development in the planning area, such as mineral development, surface development, and ROW.</p> <p>Such actions could result in the addition of structures (and potential lighting), vegetation removal (in ROW), and increased human presence. These habitat alterations could affect the use of these areas for wildlife movement.</p> <p>Connectivity corridors could limit these adverse impacts by not allowing activities that could fragment habitat, particularly between known and/or otherwise protected habitat (e.g., NWRs).</p>	<ul style="list-style-type: none"> <li>• Connectivity Corridors</li> <li>• Mineral Decisions</li> <li>• ROW decisions</li> <li>• Travel and transportation management decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Areas where land uses that could result in adverse impacts to wildlife habitat connectivity between known and/or protected habitat are not permitted, as measured by number, size (acres), and/or location of connectivity corridor(s) and the management measures associated with these geographic areas (e.g., mineral entry, ROW).</li> </ul>
<p>Human presence, vehicles, and surface-disturbing activities associated with mineral development could result in habitat loss and/or disturbance to migratory birds and other wildlife in riparian areas.</p> <p>Management actions that prohibit or limit mineral development in riparian areas would reduce the potential for adverse effects to the suite of species that use these habitats by removing the actions that cause the impacts or reducing their magnitude or extent.</p>	<ul style="list-style-type: none"> <li>• Mineral decisions</li> <li>• ROW decisions</li> <li>• Development in the 100-year floodplain</li> <li>• Mineral decisions within HVWs</li> </ul>	<ul style="list-style-type: none"> <li>• Riparian areas (defined as areas within 300 feet of streams) in the planning area.</li> <li>• Riparian areas open to locatable and salable mineral development in areas of medium to high mineral potential, as measured by overlap of riparian areas with areas of medium to high mineral potential.</li> </ul>
<p>Noise, movement, and vegetation disturbance from human presence, motorized vehicles, aircraft, construction, and other activities associated with various resource uses in the vicinity of raptor nests can disturb breeding raptors and reduce reproductive success.</p> <p>Buffers around nesting raptors would limit the potential for adverse impacts by reducing noise and human disturbance near nests.</p>	<ul style="list-style-type: none"> <li>• Surface- and non-surface-disturbing activity buffers</li> <li>• Permanent structures</li> <li>• Campsite buffers</li> <li>• Aircraft use buffers</li> <li>• Motorized ground vehicle use buffers</li> <li>• Construction buffers</li> </ul>	<ul style="list-style-type: none"> <li>• Areas where land uses that could result in adverse impacts to nesting raptors are not permitted, as measured by the management measures associated with these geographic areas.</li> </ul>
<p>OHV use, surface disturbance, commercial woodland harvest, and other human actions associated with various resource uses could impact wildlife and SSS through disturbance, and loss, degradation, and fragmentation of wildlife habitat.</p> <p>Management actions that prohibit or limit these human actions would reduce the potential for adverse effects by removing the human actions or reducing their magnitude and extent.</p>	<ul style="list-style-type: none"> <li>• Mineral decisions</li> <li>• Commercial woodland harvest</li> <li>• ROW decisions</li> <li>• Travel decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the planning area in which there are no restrictions on mineral development, commercial woodland harvest, ROWs, and OHV use.</li> <li>• Acres of the planning area in which there are no restrictions on mineral development, commercial woodland harvest, ROWs, and OHV use, that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.</li> </ul>
<p>Changes in the effectiveness of wildlife habitat management could result in a reduction or improvement of wildlife habitat quality on BLM lands by removing or adding protections that target key wildlife habitats.</p>	<ul style="list-style-type: none"> <li>• Caribou and moose</li> <li>• Innoko Bottoms Priority Wildlife Habitat Area</li> <li>• Connectivity corridors</li> <li>• Migratory birds</li> <li>• Raptors</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the planning area covered by protections that target key wildlife habitat: connectivity corridors, Innoko Bottoms, riparian areas, caribou and moose calving and wintering areas, moose and caribou crucial winter habitat</li> </ul>

Types of Effects	Management Actions	Indicators
<p>Land status changes could result in increases in or loss of wildlife and SSS habitat managed by the BLM. Acquisitions, particularly of high-value habitat, can benefit wildlife by creating more contiguous blocks of habitat for management purposes. Disposals can fragment management of habitat and may impact wildlife if management by the new landowner is less protective of wildlife. Exchanges involve both acquiring land and disposing other lands in a transaction involving the BLM and another land owner. As such, an exchange can have beneficial or detrimental impacts for wildlife and high-value habitat.</p>	<ul style="list-style-type: none"> <li>• Land acquisitions</li> <li>• Land exchanges and disposals</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of land acquisitions, disposals, and exchanges in the planning area.</li> <li>• Acres of land acquisitions, disposals, and exchanges that overlap riparian areas, the Innoko Bottoms Priority Wildlife Habitat Area, Audubon Important Bird Areas, caribou and moose calving and wintering areas, potential caribou migration habitat, wood bison range, and muskox range.</li> </ul>
<p>Limiting or prohibiting OHV use would reduce the potential for impacts to wildlife and SSS from disturbance, habitat degradation, or direct mortality to wildlife from vehicle-wildlife collisions.</p>	<ul style="list-style-type: none"> <li>• Travel and transportation management decisions within HVWs</li> <li>• SSS flora and lichen areas (caribou habitat) – travel management decisions</li> <li>• Unalakleet Wild River Corridor travel management decisions</li> <li>• INHT NTMC TMA</li> <li>• Lands managed for wilderness characteristics TMA – travel decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Riparian areas protected as HVWs that overlap caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.</li> <li>• Acres of the planning area within TMAs and the management measures associated with these geographic areas.</li> <li>•</li> </ul>
<p>Specific protections for lichens would reduce the potential for impacts to caribou from degradation caused by OHV use, as lichens are a key winter forage species.</p>	<ul style="list-style-type: none"> <li>• SSS flora and lichen areas (caribou habitat) – travel management decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of caribou habitat in planning area with limitations on OHV use.</li> </ul>
<p>Limitations within TMAs would reduce the potential for loss, degradation, and fragmentation of wildlife and SSS habitats by limiting OHV use to certain areas or specific trails.</p>	<ul style="list-style-type: none"> <li>• INHT TMA – OHV limitations</li> <li>• Lands with wilderness characteristics TMA – OHV limitations</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the planning area within TMAs and the management measures associated with these geographic areas.</li> </ul>
<p>Areas designated as VRM Class I or II would include limitations on vegetation manipulation that reduce the potential for impacts to wildlife species and SSS using that habitat.</p>	<ul style="list-style-type: none"> <li>• VRM actions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of VRM Class I and II.</li> <li>• Acres of VRM Class I and II that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.</li> </ul>
<p>Management of land for wilderness characteristics as a priority would reduce the potential for impacts to wildlife and SSS within those areas because it would include measures to limit OHV use, facility development, wood harvest, and mineral development.</p>	<ul style="list-style-type: none"> <li>• Lands managed for wilderness characteristics management actions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of lands managed for wilderness characteristics.</li> <li>• Acres of lands managed for wilderness characteristics that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms</li> </ul>
<p>Designation of areas as ACECs would reduce the potential for impacts to wildlife and SSS within those areas because it would include measures that limit ROWs, commercial woodland harvest, mineral and other development, and OHV use, as well as additional management to prevent impacts to wildlife habitats.</p>	<ul style="list-style-type: none"> <li>• ACEC designations</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of lands designated as ACECs.</li> <li>• Acres of lands designated as ACECs that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.</li> </ul>

Types of Effects	Management Actions	Indicators
Measures to protect WSR corridors would reduce the potential for impacts to wildlife and SSS within those areas, as they would include measures that limit development and vehicle/human disturbance in these areas.	<ul style="list-style-type: none"> <li>• Travel management decisions</li> <li>• UAS uses</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of land within WSR corridors.</li> <li>• Acres of lands within WSR corridors that overlap riparian areas; caribou, moose, wood bison, and muskox ranges; Audubon Important Bird Areas; and Innoko Bottoms.</li> </ul>
Seasonal use restrictions would reduce the potential for impacts to moose, caribou, and birds by preventing construction disturbances that might interfere with breeding or winter foraging of moose and caribou and by limiting/prohibiting activities that alter nesting habitat and disturb birds during the nesting season.	<ul style="list-style-type: none"> <li>• Caribou and moose – seasonal use restrictions</li> <li>• Migratory birds – surface-disturbing activity</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of caribou and moose habitat covered by seasonal use restrictions.</li> <li>• Acres of migratory bird habitat covered by seasonal use restrictions</li> </ul>

- The BLM is primarily responsible for managing habitats. State and federal wildlife management agencies (e.g., ADF&G, USFWS) oversee management of wildlife species, although the BLM is the season manager for wildlife populations on federal lands for a subsistence priority. This analysis focuses on impacts to wildlife habitats.
- Disturbance impacts to wildlife are evaluated by comparison to current management practices in the planning area; management actions proposed under the action alternatives that would reduce the potential for adverse impacts, whereas reduced protection compared to current management may increase the potential for adverse impacts.
- Natural and prescribed fires are tools used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts to wildlife and wildlife habitats.
- Management actions aimed at benefiting specific wildlife species or groups (e.g., moose, caribou, raptors, migratory birds) can have adverse or beneficial impacts on other wildlife species or groups.
- Wildlife is currently using the proposed connectivity corridors for movement and would continue to do so.
- The BLM will use the best available information, management and conservation plans, and other research and related directives, as appropriate, to guide wildlife habitat management on BLM-managed lands in the planning area.

For many wildlife and SSS species, information on specific areas of occurrence and population size and trends is incomplete or unavailable. Therefore, the effects analysis for wildlife and SSS focuses on important wildlife habitats for which information is available. These include caribou calving and wintering habitat, moose calving and wintering habitat, Audubon Important Bird Areas, the Innoko Bottoms area, muskox range, and wood bison range. Riparian areas are also considered, although they have not been mapped for the planning area. Therefore, the quantitative analysis for riparian areas is based on river miles, which gives an approximate location of riparian areas, but not their complete coverage.

### Standard Operating Procedures and Best Management Practices

The impact analysis below takes into account the SOPs and BMPs that could be implemented by the BLM, shown in the BSWI RMP/EIS.

### 3.3.3 Effects Analysis

Management actions proposed for the following resources, resource uses, and special designations would not result in effects to wildlife and are therefore not analyzed:

- Paleontological Resources
- Support for BSWI Communities

#### **Wildlife and Special Status Species: Effects from Air Quality and Air Quality-related Values Management Actions**

Air quality has the potential to affect animal health or the habitat quality of wildlife and SSS. In the planning area, these impacts are generally associated with short-term generation of dust, smoke, or other air pollution (e.g., mercury contamination from dust generated in mines).

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

##### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to comply with all applicable regulations and standards for air quality, which would continue to keep impacts to wildlife and SSS from air quality short-term, localized, and negligible to minor. There would be no change in the indicators for this resource.

##### ***Effects Common to All Action Alternatives***

Actions to improve or prevent degradation of air quality, particularly in and near VRM Class I and Class II areas, sensitive areas, sensitive receptors, urban interface areas, NLCS units, and areas that contain sensitive resources, would reduce the potential for localized air quality-related impacts to wildlife and SSS in these areas. Dust abatement activities and actions to stabilize transportation ROWs could result in short-term disturbance to wildlife in the vicinity of affected areas, but these impacts would be minor and localized. Under all action alternatives, the BLM would implement BMPs to reduce emission of GHGs. These actions would have a negligible effect on wildlife from an air quality standpoint but could help reduce the impacts of climate change. There would be no change in the indicators for this resource as a result of management pertaining to air quality.

#### **Wildlife and Special Status Species: Effects from Soils Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Soil Survey
- Floodplains and Springs

Soils provide a component of wildlife and SSS habitat, as soil type and soil function influence plant productivity and vegetation cover types. Soils are also an important habitat component for burrowing mammals. Soil fauna perform important roles in ecosystem function, such as nutrient cycling, infusion of organic matter, and components of the food web. Because soil disturbance has a localized effect on wildlife and SSS habitat by removing vegetation and potentially damaging nests and underground burrows, management actions related to soils may have an incidental effect on wildlife and SSS.



***Effects under Alternative A***

Under Alternative A, the BLM would continue to consider potential impacts to natural resources when permitting soil-disturbing activities. The BLM would use soil surveys to obtain information in support of recommendations pertaining to certain resource uses. However, there would be no specific threshold of activity that would trigger a requirement for a soil survey, and potential impacts to wildlife or SSS would not be a consideration.

***Effects Common to All Action Alternatives***

Under all action alternatives, SOPs and BMPs to reduce or prevent erosion, compaction, and other types of soil degradation could also help reduce impacts to wildlife and SSS habitat in the areas receiving this protection by preventing disturbance and habitat degradation. These benefits would be localized and minor. The cumulative impacts analysis for all surface-disturbing activities and collaboration with USFWS would provide a landscape-level planning tool that would also help reduce the potential for impacts to wildlife and SSS by requiring a landscape-level assessment of all surface disturbances, which help prevent widespread loss or fragmentation of wildlife and SSS habitat.

As described below, the alternatives would vary primarily in terms of the magnitude and extent of restrictions on surface-disturbing BLM-permitted activities and the amount of information about soil obtained prior to these activities.

***Effects under Alternative B***

Under Alternative B, the requirement for soil surveys for all surface-disturbing BLM-permitted activities would allow the BLM to reduce impacts to fragile soils and would result in more successful reclamation of disturbed sites. In localized areas, this management would reduce the potential for impacts to wildlife and SSS through avoidance of sensitive habitats and quicker recovery of degraded habitats. The greatest potential for reduction in impacts to habitat and ground-dwelling wildlife and SSS from surface-disturbing activities would occur within floodplains and near springs (where species such as wood frog, moose, mink, and riparian-associated bird species occur), as management actions would prohibit surface-disturbing activities within 100 feet of a natural spring and require that surface-disturbing activities within the 100-year floodplain include detailed reclamation plans. The reduction in potential impacts to soils from management actions would be larger in magnitude and more extensive in area than under Alternative A.

***Effects under Alternative C***

Under Alternative C, management pertaining to surface-disturbing activities would result in slightly less reduction in the potential for impacts to wildlife and SSS from surface-disturbing activities than the management under Alternative B. Because soil surveys would provide less detailed information than under Alternative B, and restrictions on surface-disturbing BLM-permitted activities in floodplains and near springs would be determined on a case-by-case basis rather than as a requirement for all activities, the extent of wildlife habitat in which impacts would be avoided would be less than, but of a similar magnitude to, the extent under Alternative B. Overall, the effectiveness of soil management actions to reduce the potential for impacts to wildlife and SSS under Alternative C would be of a similar magnitude to that under Alternative B, with management actions affecting wildlife and SSS over a similar geographic extent.

***Effects under Alternative D***

Under Alternative D, some management actions pertaining to surface-disturbing activities would have a lower potential to reduce impacts to wildlife and SSS from surface-disturbing activities than those under Alternatives B and C, but other management actions would have a similar effect on wildlife and SSS. Overall, the ability of soil management actions under Alternative D to reduce the potential for impacts to wildlife and SSS would be of a similar but lower magnitude compared to that under Alternatives B and C, and management actions would affect wildlife and SSS over a similar but smaller geographic extent.

**Wildlife and Special Status Species: Effects from Water Resources and Fisheries Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Proposed HVWs
- Locatable Mining
- Surface-Disturbing Activities
- Forestry and Woodland Decisions within HVWs
- Minerals Decisions within HVWs

Lakes and streams and their associated riparian areas and floodplains provide important habitat for a large variety of wildlife in the planning area, including SSS, as described in Appendix M of the BSWI Draft RMP/EIS. Additionally, fish and other aquatic species provide a source of food for wildlife, such as bears, river otters, and waterfowl. Therefore, management actions for water resources and fisheries may also affect wildlife and SSS that use these habitats.

***Effects under Alternative A***

Under Alternative A, the BLM would continue to meet all applicable laws, regulations, and policies pertaining to surface water and groundwater quality and quantity. The BLM would continue to consider protection of floodplains and crucial salmon spawning habitat when implementing actions, which would reduce the potential for impacts to wildlife and SSS that use these habitats from habitat loss or degradation due to surface-disturbing activities, human disturbance, and reduction in salmon and other aquatic prey species. This alternative includes minimal management direction, but does include prescriptions for mining, such as 300-foot occupancy setbacks in certain rivers and tributary streams and closure of certain areas, which are intended to prevent pollution of key fishery areas and protect spawning areas. The geographic extent of management actions under Alternative A would be less than under the action alternatives, as HVWs would not be defined or designated. Therefore, the amount of wildlife and SSS protected by water resources and fisheries habitat management actions would also be less than under the action alternatives.

***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would implement numerous BMPs/SOPs designed to limit impacts to water quality, achieve proper functioning condition of stream channels and riparian zones, maintain or restore hydrological conditions, maintain sufficient quantities of surface water and

groundwater to support wildlife, and maintain vegetation and riparian buffers around water bodies. These BMPs/SOPs would help prevent impacts to wildlife and SSS that use these habitats from disturbance and habitat degradation. Under all action alternatives, the BLM would complete a watershed-level cumulative impact analysis of all disturbances as a part of permitting for most surface-disturbing activities. This activity would allow the BLM to better manage wildlife habitats at the watershed scale, as the BLM would coordinate and share information with USFWS and manage for connectivity of neighboring NWRs. Permanent structures and disturbance over 5 acres would be avoided within the 100-year floodplain, and locatable mining activities would include measures to rehabilitate wildlife and reestablish vegetation which would minimize long-term impacts to wildlife from locatable mineral activity.

The alternatives would vary in terms of the extent of riparian and floodplain habitat designated as HVWs and in the magnitude of management restrictions in HVWs, floodplains, ACECs, and WSRs.

### ***Effects under Alternative B***

Under Alternative B, 21,382 river miles (65 percent of total river miles on BLM-managed lands within the planning area) would be designated as HVWs and, as such, would be subject to management actions that could reduce impacts to wildlife and SSS and their habitat from commercial woodland harvest, mineral development, and OHV use. Closing 100-year floodplains within these HVWs to commercial woodland harvest, withdrawing them from locatable mineral entry, closing them to salable and leasable minerals, and implementing some restrictions on OHV use would reduce loss, degradation, and fragmentation of habitat, mortality, and reduced reproductive success associated with human disturbance for wildlife and SSS that inhabit riparian areas associated with these HVWs, likely including numerous migratory birds. Additionally, HVW designations intersect other high-value wildlife habitats, including caribou calving habitat (41,577 acres; 26 percent)<sup>1</sup> and wintering habitat (6,100,853 acres; 60 percent), moose calving habitat (158,756 acres; 42 percent) and wintering habitat (592,802 acres; 66 percent), Audubon Important Bird Areas (246,510 acres; 78 percent), the Innoko Bottoms area (97,049 acres; 41 percent), muskox range (1,733,656 acres; 53 percent), and wood bison range (2,589,336 acres; 70 percent). Therefore, a variety of important wildlife habitats would have a reduction in potential impacts from various land uses as a result of management associated with HVW designations under Alternative B.

Alternative B would designate the largest geographic area as HVWs and would provide the greatest magnitude of reduction in potential impacts to wildlife and SSS, compared to the other alternatives. This alternative would have the least potential for impacts to numerous wildlife species that inhabit or forage in riparian areas, such as moose, mink, wood frogs, bears, and BLM sensitive bird species (e.g., blackpoll warbler, trumpeter swan, emperor goose, olive-sided flycatcher, and rusty blackbird), as well as other species with habitat that occurs in HVWs, including caribou, muskox, and wood bison.

### ***Effects under Alternative C***

Under Alternative C, 14,888 river miles (45 percent of total river miles on BLM-managed lands within the planning area) would be designated as HVWs and subject to associated management actions, which is 20 percent less than under Alternative B. Therefore, management that would minimize impacts to

---

<sup>1</sup> Percentage of total acreage of high-value wildlife habitat type present on BLM-managed lands in the planning area.

riparian wildlife and SSS would occur over a smaller geographic area than under Alternative B. Under Alternative C, HVW designations intersect caribou calving habitat (11,838 acres; 7 percent) and wintering habitat (4,196,187; 40 percent), moose calving habitat (84,886 acres; 22 percent) and wintering habitat (414,705 acres; 46 percent), Audubon Important Bird Areas (217,358 acres; 69 percent), the Innoko Bottoms area (51,195 acres; 22 percent), muskox range (1,318,562 acres; 40 percent), and wood bison range (1,856,906 acre; 50 percent). These are the same important wildlife habitats that would be affected by HVW management actions under Alternative B, but for a smaller geographic area. Additionally, the magnitude of reduction in potential impacts to wildlife and SSS would be less, as management actions pertaining to OHV use would be less protective than those under Alternative B, and these areas would be open to locatable entry, commercial woodland harvest on a case-by-case basis, and salable mineral development on a case-by-case basis.

### ***Effects under Alternative D***

Under Alternative D, 12,982 river miles (39 percent of total river miles on BLM-managed lands within the planning area) would be designated as HVWs and subject to associated management actions, which is 26 percent less than under Alternative B and 6 percent less than under Alternative C. Therefore, riparian wildlife and SSS over a smaller geographic area would benefit from reduced potential for impacts from commercial woodland harvest, mineral development, and OHV use than under Alternatives B and C. Under Alternative D, HVW designations would intersect the same important wildlife habitats as under Alternatives B and C, but the size of this overlap would be less for all but Audubon Important Bird Areas, which would be the same as under Alternative B. Differences between Alternatives B and C would include caribou calving habitat (9,716 acres; 6 percent) and wintering habitat (3,757,392 acres; 37 percent), moose calving habitat (46,622 acres; 12 percent) and wintering habitat (369,974 acres; 41 percent), the Innoko Bottoms area (12,939 acres; 5 percent), muskox range (1,306,339 acres; 40 percent), and wood bison range (1,458,393 acres; 39 percent). Additionally, the magnitude of reduction in potential impacts to wildlife and SSS would be less, as management actions pertaining to commercial harvest, OHV use, and mineral decisions would be less protective than under Alternatives B and C. Under Alternative D, these less restrictive management actions could result in a greater potential for injury/mortality, disturbance, habitat loss, degradation, and fragmentation for riparian wildlife and SSS than management under Alternatives B and C.

### **Wildlife and Special Status Species: Effects from Vegetation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- SSS Flora and Lichen Areas
- BLM-permitted Surface Disturbance
- Seeding and Planting Reclamation/Restoration

Because vegetation provides the basic foundation of wildlife habitat, vegetation management would also affect wildlife and SSS. Actions to maintain certain vegetation types would benefit wildlife and SSS that use habitats associated with those vegetation types. Additionally, actions to protect special status plant species could help reduce potential impacts to wildlife and SSS that co-occur in the same habitats. In the

planning area, these habitats predominantly include dwarf shrub habitats, sparsely vegetated areas, and persistently snow-covered areas.

### ***Effects under Alternative A***

Under Alternative A, the BLM would follow all federal regulations to protect threatened and endangered plant species (none currently in planning area) and internal BLM guidance to protect sensitive species, which would continue to result in a localized and minor reduction in the potential for impacts to wildlife and SSS in the vicinity of sensitive plant populations from permitted activities on BLM-managed lands. No additional management actions specific to vegetation or special status plants would be implemented in the planning area that would affect wildlife and SSS and their habitat.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, vegetation management that focuses on landscape resiliency, maintenance of connectivity corridors, monitoring of rare ecosystems, and restoration of degraded habitats (such as riparian areas and lichen-rich habitat) would provide a landscape-level benefit to wildlife and SSS in the planning area and could increase the amount or suitability of habitat in certain areas. Actions to minimize the footprint of BLM-permitted surface-disturbing activities, limit the magnitude or duration of impacts, and preserve vegetation would reduce the potential for associated wildlife and SSS habitat loss and fragmentation in the development areas.

The action alternatives would vary primarily in terms of travel management decisions in SSS flora areas and caribou habitat areas and in requirements for native plant species use in reclamation and restoration of disturbed areas.

### ***Effects under Alternative B***

Under Alternative B, monitoring of dwarf shrub, lichen, or sparse vegetation types (6,511,856 acres or 48 percent of the planning area) and potential travel management actions for OHV use would limit direct disturbance of wildlife and SSS that use these habitats, such as Alaskan hare and caribou, and would also limit habitat degradation and fragmentation associated with surface disturbance and creation of trails. Additional actions to protect special status plant species from BLM-permitted surface-disturbing activities would provide a minor and localized reduction in the potential for impacts to wildlife and SSS habitats, limited to the area within 300 feet of special status plant populations. Based on the known locations of these populations, this management would affect a small amount of wildlife in dwarf shrub habitats, sparsely vegetated areas, and persistently snow-covered areas. The management action that requires use of native seed and propagules in reclamation/restoration would provide a minor, localized reduction in the potential for long-term degradation of habitats used by wildlife and SSS that require native plant species and would also reduce the risk of habitat degradation caused by the spread of invasive plants beyond the reclamation area.

### ***Effects under Alternative C***

The effect of vegetation management actions on wildlife and SSS under Alternative C would be similar, but not identical, to Alternative B. The reduction in potential impacts to wildlife and SSS in dwarf shrub, lichen, or sparse vegetation types from management actions would be the same as under Alternative B.

Additional actions to protect special status plant species from BLM-permitted surface-disturbing activities would be limited to a smaller area than under Alternative B (within 100 feet of special status plant populations). Therefore, localized reduction in potential for impacts to wildlife and SSS would be smaller in geographic extent than under Alternative B and would still be minor. Overall, the magnitude and extent of reduced potential for impacts to wildlife and SSS would be slightly less than under Alternative B.

### ***Effects under Alternative D***

Alternative D would provide the lowest reduction in potential impacts to wildlife and SSS from surface-disturbing activities compared to Alternatives B and C, because travel management restrictions that would protect wildlife by limiting disturbance would not apply in dwarf shrub, lichen, or sparse vegetation habitat types. The management action pertaining to surface disturbance in the vicinity of SSS would also be less protective and would be less effective in reducing impacts to wildlife and SSS locally. Because there would be no requirement to use native species during reclamation/restoration, the potential for adverse impacts to wildlife and SSS that require habitat with native plant species would be greater than under Alternatives C and D, as reclamation actions could lead to the spread of invasive species in the disturbance area and adjacent habitat. There would be no minor, localized reduction in the potential for impacts to wildlife and SSS in the vicinity of sensitive plant populations associated with buffers around special status plant species.

### **Wildlife and Special Status Species: Effects from Wildlife Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Caribou and Moose
- Innoko Bottoms Priority Wildlife Habitat Area
- Connectivity Corridors
- Migratory Birds
- Raptors

Management actions designed to meet goals and objectives for wildlife and SSS would benefit target species and habitats, as well as other species that use the same habitats. Landscape-scale actions that focus on resilience and maintenance of connectivity corridors would tend to benefit most wildlife and SSS in the planning area.

### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to follow all laws, regulations, and policies, which predominantly pertain to listed species, sensitive species, unique habitats, subsistence resources, and migratory birds. The BLM would consider impacts to wildlife and SSS when evaluating actions in the planning area that may have the potential to affect these resources and would implement mitigation as needed on a case-by-case basis. Alternative A includes additional management pertaining to peregrine falcons and other raptors, including seasonal buffer zones around active peregrine nests for oil, gas, and mining activities and designation of 91,520 acres as ACECs to protect crucial riparian habitat for peregrine falcons. Under Alternative A, the BLM would also consider caribou and moose in its

management of resource uses in the planning area, although no specific management actions are identified. This alternative would not include management direction for the Innoko Bottoms Priority Wildlife Habitat Area, and the BLM would not manage connectivity corridors for passage between NWRs. Therefore, this alternative could have a long-term impact on migration and other species movement across the landscape if future development occurs in areas where it will fragment species ranges and reduce habitat connectivity. However, the proposed connectivity corridors under Alternatives B and C occur in areas that do not have medium or high LMP, so future development may have a low impact on migration under this alternative even without the corridors.

### ***Effects Common to All Action Alternatives***

All action alternatives would include management considerations that focus on ESA-listed species, BLM sensitive species, caribou, moose, muskox, Dall sheep, mountain goats, migratory birds, raptors, bats, wood bison, and pollinators. Under all action alternatives, the BLM would ensure coordination with ADF&G on predator control planning and reporting. Additionally, the BLM would use adaptive management that considers climate change and shifts in habitat or timing of crucial portions of species' life cycles. The BLM would also implement numerous BMPs/SOPs designed to protect sensitive species and habitats, including buffer requirements, design features, seasonal restrictions, aircraft height restrictions, and location restrictions for activities with the potential to impact species and habitats of management concern from habitat loss, degradation, and fragmentation; noise and human disturbance; spread of diseases; and direct harm of individuals.

The alternatives would vary in terms of the timing, extent, and magnitude of restrictions on mineral activities; construction, vegetation clearing, and surface-disturbing activities in caribou and moose habitat and riparian areas; the extent of land receiving additional protections through designation as the Innoko Bottoms Priority Wildlife Habitat Area; and the number of connectivity corridors that the BLM would manage to protect wildlife movement between two NWRs.

### ***Effects under Alternative B***

Management actions under Alternative B would provide the highest magnitude and greatest extent of reduction in potential impacts to wildlife and SSS. Management actions would target important species and habitats in the planning area. The geographic extent of these actions is summarized in Table 3.2.3-1, although in many cases these areas overlap. Note that these tables do not take into account management for other resources or resources uses that may also provide protections to wildlife.

The geographic extent of protective wildlife management actions under Alternative B would be greater than under Alternatives C and D. In addition to the species and habitats targeted by these management actions, the associated portions of the planning area also include habitat used by other important species, such as wood bison and muskox. Therefore, management actions under this alternative would also help reduce the potential for impacts to these species.

**Table 3.3.3-1. Extent of Wildlife Management Actions under Alternative B**

Species/Habitat	Geographic Extent on BLM-managed Lands in Planning Area	Associated Management Actions
Caribou and moose calving and wintering habitats	10,251,780 acres (76 percent)	Mineral development, seasonal use restrictions
Innoko Bottoms Priority Wildlife Habitat Area	236,556 acres (2 percent)	Mineral development, surface-disturbing activities, ROW exclusion, casual use airboats/hovercraft
Connectivity Corridors	Two corridors totaling 845,670 acres (6 percent)	Mineral development, surface-disturbing activities, ROW exclusion areas, casual use airboats/hovercraft
River Miles	32,931 miles	ROW avoidance, mineral development
Raptor nesting habitat	Not quantified	Seasonal restrictions, buffers
Other migratory bird habitat	Not quantified	Surface-disturbing activity – seasonal restrictions

In caribou and moose calving and wintering habitats, a designation of NSO for leasable minerals and seasonal use restrictions on construction would reduce the potential for disturbance during crucial periods and would reduce the potential for habitat loss, degradation, and fragmentation from surface disturbance associated with leasable minerals. This management would reduce impacts to wildlife and SSS over a large portion of the planning area (76 percent). However, because leasable potential in the planning area is very low, the effects to wildlife and SSS from the leasable mineral management would be minor.

The management actions listed in Table 3.3.3-1 would affect wildlife and SSS in the Innoko Bottoms Priority Wildlife Habitat Area and two proposed connectivity corridors (North Connectivity Corridor and South Connectivity Corridor—see BSWI Draft RMP/EIS, Map 3.2.7-3). These actions include:

- withdrawal of these areas from locatable mineral entry (includes retained existing withdrawals and new proposed withdrawals),
- designation as NSO for leasable development,
- designation as closed to salable development,
- designation as NSO for surface-disturbing BLM-permitted activities,
- designation as ROW exclusion areas, and
- restrictions on casual use airboats and hovercraft.

These management actions would reduce disturbance to wildlife and reduce the potential for loss, degradation, and fragmentation of these key habitats. Connectivity corridors are designed to sustain and maximize abundance and landscape-scale biodiversity by maintaining general habitat connectivity, minimizing habitat fragmentation and loss, and avoiding or mitigating barriers to wildlife movement within the corridors (Magness et al. 2018). The corridors are expected to benefit a wide range of species. The South Connectivity Corridor includes a portion of the Innoko Bottoms area, where a variety of wildlife species occur, including waterfowl, moose, and wood bison. The North Connectivity Corridor includes a portion of the winter range of the Western Arctic Caribou Herd; this corridor would allow for movement of caribou in this herd near the southern end of their range. Creating two connectivity corridors between the Innoko and Yukon Delta NWRs allows for landscape connectivity at multiple



locations, provides more options for movement, and benefits a greater number of wildlife than a single connectivity corridor.

Classifying riparian areas as ROW avoidance areas and prohibiting mineral leasing in riparian areas would reduce disturbance and habitat impacts to migratory birds and other species over approximately 17 percent of BLM-managed lands in the planning area. Additionally, seasonal restrictions in migratory bird habitat would help minimize vegetation alteration, habitat destruction, and auditory disturbance to nesting birds, which could reduce the potential for mortality or reduced reproductive success. BLM sensitive species that management actions may affect include blackpoll warbler, trumpeter swan, emperor goose, olive-sided flycatcher, and rusty blackbird.

For priority raptors (peregrine falcon, gyrfalcon, golden eagle, and bald eagle), implementing nesting-season buffers for surface- and non-surface-disturbing activities, permanent structures, campsites, aircraft, and human activities would help minimize disturbance to nesting raptors that could result in reduced reproductive success.

### ***Effects under Alternative C***

Under Alternative C, protections for wildlife and SSS from management actions would be of slightly lower magnitude and smaller geographic extent than those under Alternative B (Table 3.3.3-2).

**Table 3.3.3-2: Extent of Wildlife Management Actions under Alternative C**

<b>Species/Habitat</b>	<b>Geographic Extent on BLM-Managed Lands in Planning Area</b>	<b>Associated Management Actions</b>
Caribou and moose calving habitat	540,896 acres (4 percent)	Mineral development, seasonal use restrictions
Innoko Bottoms Priority Wildlife Habitat Area	236,556 acres (2 percent)	ROW avoidance, airboats/hovercraft
Connectivity Corridors	1 corridor 576,038 acres (4 percent)	surface-disturbing activities, ROW avoidance, airboats/hovercraft, case by case salable mineral development
River Miles	32,931 miles	ROW avoidance, mineral development
Raptor nesting habitat	Not quantified	Seasonal restrictions, buffers
Other migratory bird habitat	Not quantified	Surface-disturbing activity – seasonal restrictions

For caribou and moose, the management actions pertaining to leasable minerals and construction would apply only to calving habitat. Therefore, while disturbances to caribou and moose would be reduced during the breeding period, they could occur in crucial winter habitat areas, potentially causing increased energy expenditures and stresses on wintering populations, which could result in decreased survivorship. This management would reduce potential impacts to wildlife over only 4 percent of the planning, a much smaller geographic extent (72 percent less) than under Alternative B. Under Alternative C, there would be fewer management actions for the Innoko Bottoms Priority Wildlife Habitat Area than under Alternative B; the area would be open to locatable development and surface-disturbing BLM-permitted activities and would be a ROW avoidance area rather than exclusion area. Therefore, in this area management actions would offer less reduction in potential impacts to wildlife and SSS from disturbance, habitat loss, and fragmentation from mineral development and ROWs. Restrictions on casual use airboats and hovercraft would be the same as under Alternative B, so there would be no

difference as far as potential reductions in auditory disturbance to wildlife and SSS from these types of vehicles/boats.

Management actions for connectivity corridors under Alternative C would be less restrictive for locatable and salable mineral development (which would be allowed) than those under Alternative B. Additionally, the BLM would manage one connectivity corridor, the South Connectivity Corridor, rather than the two proposed under Alternative B. This alternative would maintain the long-term benefits to wildlife movement in the Innoko Bottoms area that were discussed for the South Connectivity Corridor under Alternative B but would not provide the same management benefits in the area identified as the North Connectivity Corridor, which intersects the range of the Western Arctic Caribou Herd. One connectivity corridor would still allow for landscape connectivity between the Innoko and Yukon Delta NWRs, but would offer fewer options for movement across the landscape and would potentially benefit less wildlife than Alternative B. Because neither proposed connectivity corridor under Alternative B occurs in an area of medium or high LMP, the probability of future development in key movement areas may be low and having only one corridor under Alternative C may not have a sizable difference on wildlife movement and habitat connectivity. Without information regarding the existing migration routes in the vicinity of the two corridors, it is difficult to assess the impacts of one location compared to another. It is also difficult to evaluate the effectiveness of the proposed management actions without knowing how existing migration may be currently affected by the types of activities that would be restricted. However, in general, having one corridor rather than two may increase the distance wildlife would have to travel to reach the corridor and could lead to decreased resources such as forage and increased predation along a sole corridor.

Alternative C would have the same management actions for migratory birds as Alternative B and therefore the same type, magnitude, and extent of impacts. Management actions for raptors would be similar to Alternative C, although slightly less defined with respect to surface- and non-surface-disturbing activities within 1 mile of raptor nests.

#### ***Effects under Alternative D***

Alternative D would offer fewer management actions to reduce impacts to wildlife and SSS than Alternatives B and C (Table 3.3.3-3).

**Table 3.3.3-3: Extent of Wildlife Management Actions under Alternative D**

<b>Species/Habitat</b>	<b>Geographic Extent on BLM-Managed Lands in Planning Area</b>	<b>Associated Management Actions</b>
Innoko Bottoms Priority Wildlife Habitat Area	236,556 acres (2 percent)	Mineral development, seasonal use restrictions, ROW avoidance
Riparian habitat	32,931 miles	Case by case
Raptor nesting habitat	No information	Case by case, buffers
Other migratory bird habitat	No information	Surface-disturbing activity – case by case

The geographic extent of management actions for wildlife would be less than under Alternatives B and C. Similar to Alternative A, the BLM would not manage connectivity corridors under Alternative D. However, the proposed connectivity corridors under Alternatives B and C occur in areas that do not have medium or high LMP, so future development may have a low impact on migration under this alternative

even without the corridors. There would be fewer management actions to reduce the potential for impacts to caribou and moose, particularly during the winter use period, during which there would be no additional management actions beyond those described for all action alternatives in Section 2.7.5 of the BSWI Draft RMP/EIS and the BMPs also listed in that document. For the Innoko Bottoms Priority Wildlife Habitat Area, management actions pertaining to mineral decisions and ROWs would be the same as those under Alternative C, and the reduced potential for impacts to wildlife and SSS from disturbance and habitat loss and fragmentation from mineral development and ROWs would also be the same. However, unlike Alternatives B and C, there would be no restrictions on casual use airboats and hovercraft and therefore the potential for impacts to waterbirds and other species from associated disturbance would be greater under Alternative D. Because restrictions and mitigations for migratory birds would be determined on a case-by-case basis, it is difficult to assess the difference as far as impacts to migratory birds relative to other alternatives. Similarly, for raptors, the need for buffers around raptor nests associated with permanent structures, aircraft use, human activities motorized ground vehicles, and construction would be determined on a case-by-case basis, so it is difficult to assess the difference as far as impacts to nesting raptors relative to other alternatives. Permits for surface-disturbing activities would require pre-work raptor nesting surveys, but there would be no associated buffer; therefore, the potential for associated disturbance to raptors would be greater under Alternative D than under Alternatives B and C. Campsite buffers would only apply to authorized agency and construction campsites, but would be the same as those under Alternatives B and C. Therefore, the potential for noise disturbance to nesting raptors from this type of campsite would be less than under Alternatives B and C.

### **Wildlife and Special Status Species: Effects from Nonnative Invasive Species Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

#### ***Effects under Alternative A***

Under Alternative A, the BLM would follow all laws, regulations, and policies pertaining to use of nonnative species and management of noxious weeds and other NNIS. Management actions to minimize the introduction and spread of NNIS would prevent the long-term degradation of wildlife and SSS habitats in the planning area. These effects would be limited to areas where infestations of NNIS presently occur or are likely to occur in the future. Use of vegetation treatments could have localized adverse short-term impacts on wildlife and SSS habitats by removing vegetation used for cover and food and other habitat elements, but treatments would follow all required measures designed to protect SSS and their habitats (such as herbicide buffers).

#### ***Effects Common to All Action Alternatives***

Management under the action alternatives would be similar to that under Alternative A, with a similar effect on wildlife and SSS habitats. The only difference would be better defined management actions under the action alternatives, which may result in more effective control of NNIS and better long-term protection of wildlife and SSS habitats. Control and eradication of NNIS would occur within the planning area as described in SOPs, BMPs, and management actions for various resources and resource uses, which would help prevent the degradation of wildlife habitats through the spread of NNIS. Under

the action alternatives, monitoring locations and extents of NNIS infestations and shifting management priorities and eradication efforts to target changes caused by climate change would allow the BLM to better control and manage NNIS populations and prevent future large-scale degradation of wildlife habitats. There would be no change to the indicators for wildlife and SSS as a result of management actions under the action alternatives.

### **Wildlife and Special Status Species: Effects from Wildland Fire Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

#### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to follow all laws, regulations, and guidance pertaining to wildland fire management and would follow the applicable BLM wildland fire management direction for the planning area. While there are no specific management actions stipulated under this alternative, managing wildland fire in the planning area according to the goals and objectives identified in the 2005 Land Use Plan Amendment Environmental Assessment for Wildland Fire and Fuels Management for Alaska (BLM 2005) would reduce the risk of human-caused fires in the planning area and associated short- and long-term impacts to wildlife and SSS habitat through direct mortality and loss or alteration of habitat. Emergency Stabilization and Rehabilitation (ES&R) plans would help rehabilitate wildlife and SSS habitat following burns, which could reduce the intensity and duration of impacts from fire. Use of wildland fire to meet wildlife management objectives would also benefit wildlife and SSS habitat. These actions would not change the amount of wildlife habitat in the planning area but could minimize short- and long-term reductions in late-successional habitat types in certain areas. However, fire suppression actions may result in a deviation from the natural fire regime, which may affect wildlife and SSS habitat. This alternative does not specify the amount of BLM-managed land in the planning area that is protected from fire or allowed to burn. The amount of wildlife habitat allowed to burn may increase or decrease, depending on where natural wildland fires occur and what wildlife and SSS habitats are present in those areas.

#### ***Effects under All Action Alternatives***

Wildland fire management under the action alternatives would be similar to that under Alternative A, although there would be BMPs/SOPs and additional management actions implemented that may help reduce impacts to wildlife and SSS and their habitat from wildland fire. These actions include measures to prevent impacts to wildlife and SSS from wildland fire suppression efforts, fuel breaks, and ES&R activities. Avoiding fire-fighting overflights within 1,500 feet of known occupied raptor nests would minimize associated disturbance to raptors but would not affect the amount of raptor nesting habitat in the planning area. Additionally, the BLM would monitor and measure the interactions between climate change, wildland fire, and resource objectives (including wildlife), and would adapt fire management strategies as necessary to protect resources, including high-value wildlife habitats. Strategies that pertain to lichen forage to changes in fire regime could allow the BLM to better manage caribou winter habitat in the long term.

## **Wildlife and Special Status Species: Effects from Cultural Resources Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Decisions Pertaining to the INHT NTMC (also see the National Trails section)

Management actions for cultural resources may provide incidental protection of wildlife and SSS habitat in areas that contain identified cultural resources by minimizing impacts associated with surface disturbance, erosion, and vegetation loss in these areas.

### ***Effects under Alternative A***

The BLM would continue to meet all applicable laws, regulations, and policies that pertain to cultural resources, which could minimize potential impacts to wildlife and SSS from surface-disturbing and other activities in areas where cultural resources are present.

### ***Effects Common to All Action Alternatives***

All action alternatives would include additional management actions and SOPs/BMPs for cultural resources that could provide greater reduction in the potential for impacts to wildlife and SSS from surface-disturbing activities in localized areas. Establishment of the INHT NTMC under the action alternatives would likely focus reductions in potential impacts to wildlife and SSS in this corridor.

The alternatives would vary in terms of land area within the INHT NTMC, but there would be little difference as far as effect to wildlife and SSS.

### ***Effects under Alternative B***

Under Alternative B, the BLM would designate the INHT NTMC on 288,466 acres (2 percent) of BLM-managed lands in the planning area, with protections that could reduce potential impacts to wildlife and SSS and their habitat along this corridor from various land uses. Under this alternative, the INHT would overlap riparian areas (associated with 898 river miles; 3 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (250,947 acres; 2 percent), moose calving habitat (15,106 acres; 4 percent) and wintering habitat (125,776 acres; 14 percent), and muskox range (8,094 acres; less than 1 percent). There could be reduced potential impacts in these important wildlife habitats as a result of INHT NTMC management.

### ***Effects under Alternative C***

Under Alternative C, the INHT NTMC would consist of 273,242 acres (2 percent) of BLM-managed lands in the planning area, which would provide protections to wildlife and SSS and their habitat over a slightly smaller area than under Alternative B. Under this alternative, the INHT would overlap the same types of important wildlife habitat as under Alternative B, with slightly smaller areas of overlap for some. Areas of overlap would include riparian areas (associated with 844 river miles; 3 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (247,796 acres; 2 percent), moose calving habitat (10,438 acres; 3 percent) and wintering habitat (123,405 acres; 14 percent), and muskox range (8,094 acres; less than 1 percent). The geographic extent of reduced

potential for impacts to wildlife and SSS associated with INHT NTMC management would be less than, but of the same order of magnitude, as that under Alternative B.

### ***Effects under Alternative D***

Effects on wildlife and SSS under Alternative D would be identical to effects under Alternative C.

### **Wildlife and Special Status Species: Effects from Visual Resources Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Total VRM Class Acreages: VRM Class I and II

Visual resources management can affect wildlife and special status resources in areas where management applies. In general, management of VRM Class I and II-designated areas allows for fewer intrusions to the landscape, which results in fewer short- and long-term impacts to wildlife habitat in these areas associated with development of structures, surface-disturbing activities, and other human activities.

### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to manage wild and scenic sections of the Unalakleet Wild River Corridor as VRM Class I. No VRM Class II-designated areas are specified under current management plans. Wildlife and SSS habitats in 46,953 acres of VRM Class I areas (less than 1 percent of BLM-managed lands in the planning area) could be affected from these designations by reduced potential for impacts from land uses that are considered visual intrusions. VRM Class I designations overlap a relatively small amount of riparian area (associated with 204 river miles; less than 1 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (46,953 acres; less than 1 percent), and moose wintering habitat (30,021 acres; 3 percent), and a negligible amount (less than 5 acres of 3,295,578 total acres) of muskox range. These and other wildlife habitats over the same limited geographic extent would have a reduction in potential impacts as a result of VRM management.

### ***Effects Common to All Action Alternatives***

Under the action alternatives, BMPs/SOPs for reclamation of landscapes, restoration of native habitats, and restoration of waterways and riparian areas in VRM Class I and II-designated areas would reduce the potential for impacts to wildlife and SSS habitats in these areas from development of structures, surface-disturbing activities, and other human activities. These actions would affect a variety of habitat types. The alternatives would vary in terms of land area classified as VRM Class I and II-designated areas.

### ***Effects under Alternative B***

Under Alternative B, 7,825,858 acres (58 percent) of BLM-managed lands in the planning area would be VRM Class I and II VRM designated areas. This alternative would affect wildlife and SSS habitat over a larger area than under Alternatives A, C, and D. VRM Class I and II designations under this alternative would overlap riparian areas (associated with 20,329 river miles; 62 percent of total river miles on BLM-

managed lands within the planning area), caribou calving habitat (4,197 acres; 3 percent) and wintering habitat (5,536,887 acres; 54 percent), moose calving habitat (347,806 acres; 91 percent) and wintering habitat (693,711; 78 percent), the Innoko Bottoms Area (235,501 acres; greater than 99 percent), Audubon Important Bird Areas (314,297 acres; greater than 99 percent), muskox range (1,407,690 acres; 43 percent) and wood bison range (2,689,039 acres; 73 percent). Therefore, it is expected that there would be a reduction in potential impacts to these wildlife habitats from intrusive land uses as a result of VRM management under this alternative.

### ***Effects under Alternative C***

Under Alternative C, 46,953 acres (less than 1 percent) would be VRM Class I-designated areas and 2,766,229 acres (21 percent) of BLM-managed lands in the planning area would be VRM Class II-designated areas. This alternative would affect wildlife and SSS habitat over a smaller area than under Alternative B, but over a larger area than under Alternatives A and D. VRM Class I and II designations under this alternative overlap riparian areas (associated with 6,968 river miles; 21 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (1,996,606 acres; 19 percent), moose calving habitat (161,356 acres; 42 percent) and wintering habitat (377,529 acres; 42 percent), the Innoko Bottoms Area (126,129 acres; 53 percent), muskox range (783,545 acres; 24 percent), and wood bison range (680,266 acres; 18 percent). While management actions for VRM would affect the same types of important wildlife habitat areas as Alternative B, with the exception of Audubon Important Bird Areas, the geographic extent of each of these habitats overlapping VRM Class I or II designations would be less than under Alternative B.

### ***Effects under Alternative D***

Under Alternative D, 46,953 acres (less than 1 percent) would be VRM Class I-designated areas and 679,553 acres (5 percent) of BLM-managed lands in the planning area would be VRM Class II-designated areas. This alternative would affect wildlife and SSS habitat over a smaller area than under Alternatives B and C, but over a larger area than under Alternative A. VRM Class I and II designations under this alternative overlap riparian areas (associated with 1,985 river miles; 6 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (557,171 acres; 5 percent), moose calving habitat (33,687 acres; 9 percent) and wintering habitat (167,383 acres; 19 percent), and muskox range (73,749 acres; 2 percent). Management actions for VRM would affect fewer important wildlife habitat areas than under Alternatives B and C, and the geographic extent of each habitat overlapping VRM Class I or II designations would be less than under Alternatives B and C.

## **Wildlife and Special Status Species: Effects from Lands with Wilderness Characteristics Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Acres Managed to Protect Wilderness Characteristics as a Priority Over Other Resource Values and Multiple Uses
- Acres Managed to Emphasize Other Resource Values and Multiple Uses While Applying Management Restrictions to Reduce Impacts on Wilderness Characteristics

***Effects under Alternative A***

Wilderness characteristics are not addressed under Alternative A. Therefore, there would be no effects to wildlife and SSS associated with management pertaining to lands with wilderness characteristics.

***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives, because areas managed for wilderness characteristics as a priority are only identified under Alternative B.

The alternatives would vary in terms of area of lands managed for wilderness characteristics, area of lands managed to emphasize resource values and multiple uses, and the extent and magnitude of management restrictions in these areas that could reduce the potential for impacts to wildlife from various land uses.

***Effects under Alternative B***

Under Alternative B, 277,489 acres (2 percent of BLM-managed lands in the planning area) would be identified as lands managed for wilderness characteristics as a priority. Management restrictions to reduce impacts on wilderness characteristics in these areas would also limit disturbance to wildlife and SSS and degradation of habitats from land uses such as OHV use, facility construction, wood cutting and other forms of vegetation manipulation, and some types of mineral development. Additionally, actions to monitor and assess climate change impacts on current wildlife corridors and allocations for lands managed for wilderness characteristics based on predicted shifts in wildlife corridors would benefit wildlife and SSS habitat by preserving movement corridors over the long term. Lands managed for wilderness characteristics as a priority under this alternative would overlap riparian areas (associated with 666 river miles; 2 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (180,158 acres; 2 percent), and moose calving habitat (18,757 acres; 5 percent) and wintering habitat (26,100 acres; 3 percent). Therefore, it is expected that there would be a reduction in potential impacts to these wildlife habitats from various land uses as a result of wilderness management under this alternative.

Additionally, the BLM would manage 12,040,490 acres (89 percent of BLM-managed lands in the planning area) to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. This management would also reduce the potential for impacts to wildlife and SSS that are associated with lands with wilderness characteristics from various land uses, but to a lesser degree than lands managed for wilderness characteristics as a priority, because land uses with the potential to impact wildlife would be allowed in these areas. Lands managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics under this alternative would overlap a wider range of important wildlife habitat areas, although the magnitude of effects as far as reduced potential for impacts would be lower. This management category would affect riparian areas (associated with 29,716 river miles; 90 percent of total river miles on BLM-managed lands within the planning area), caribou calving habitat (160,096 acres; 100 percent) and wintering habitat (8,956,098 acres; 87 percent), moose calving habitat (362,042 acres; 95 percent) and wintering habitat (868,707 acres; 97 percent), Audubon Important Bird Areas (314,297 acres; greater than 99 percent), the Innoko Bottoms area (236,556 acres; 100 percent), muskox range (3,289,736 acres; greater than 99 percent), and wood bison range (3,362,942 acres; 91 percent).



### ***Effects under Alternative C***

Under Alternative C, no land would be identified as lands managed for wilderness characteristics as a priority, and 8,105,979 acres (60 percent of BLM-managed lands in the planning area) would be managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. This management would also reduce the potential for wildlife and SSS in these areas from various land uses, but to a lesser degree than under Alternative B. Important wildlife habitats that overlap this land management designation would be the same as those under Alternative B, with either the same or lower geographic extent of overlap. This management category would affect riparian areas (associated with 20,640 river miles; 63 percent of total river miles on BLM-managed lands within the planning area), caribou calving habitat (160,096 acres; 100 percent) and wintering habitat (5,881,286 acres; 57 percent), moose calving habitat (304,906 acres; 34 percent) and wintering habitat (717,457; 80 percent), Audubon Important Bird Areas (217,545 acres; 69 percent), the Innoko Bottoms area (236,555 acres; 100 percent), muskox range (2,053,738; 62 percent), and wood bison range (2,418,190 acres; 65 percent). Management under this alternative would have the potential to reduce impact to wildlife and SSS in these important habitat areas from various land uses. However, reduced impacts associated with use restrictions and wildlife corridor planning would not occur under this alternative.

### ***Effects under Alternative D***

Under Alternative D, no land would be identified as lands managed for wilderness characteristics as a priority or managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Similar to Alternative A, there would be no effects to wildlife and SSS associated with management pertaining to lands with wilderness characteristics.

## **Wildlife and Special Status Species: Effects from Forestry and Woodland Products Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Permitted Commercial Woodland Harvesting Areas
- Personal Use and Subsistence Woodland Harvest Areas
- Forestry BMPs for Commercial Activities

Removal of forest and woodland products from BLM-managed lands in the planning area has the potential to modify habitats of forest-dwelling wildlife and SSS, such as lynx, brown and black bear, marten, and forest birds. Forests and woodlands make up approximately 35 percent of the planning area. Removal of both living and dead forest products from these areas can reduce components of wildlife physical habitat (such as nesting trees and branches and vegetation used for cover) and food sources (such as berries, seeds, and lichens). The magnitude and extent of the impact depends on the amount of habitat removed and the availability of these habitat components in nearby areas.

### ***Effects under Alternative A***

Commercial harvest of forest and woodland products in the planning area is currently limited but could increase with increasing demand. Under Alternative A, 1,644,588 acres (12 percent of BLM-managed

lands in the planning area) would continue to be open to commercial harvest, with permits granted on a case-by-case basis for 10,237,555 acres (76 percent). A total of 1,583,751 acres (12 percent) would be closed to commercial harvest. Under current management, impacts to wildlife would be limited in extent to areas where forest and woodland products removal occurs, and crucial wildlife habitat would be protected. Important wildlife habitats most likely to be affected by permitted vegetation removal are those that occur in areas open to commercial harvest, which include riparian areas (associated with 3,000 river miles; 9 percent), caribou wintering habitat (1,644,569 acres; 16 percent), and muskox range (1,576,235 acres; 48 percent of total habitat present). Subsistence harvest would continue to be common in areas around communities and could affect wildlife and SSS habitat in these areas. Forests and woodlands over the entire planning area would continue to be open to personal use and subsistence woodland harvest, with permits for certain products issued on a case-by-case basis.

### ***Effects Common to All Action Alternatives***

Management actions and BMPs/SOP would include considerations for wildlife when planning forest products harvest, surveys for sensitive resources prior to surface-disturbing activities, and labeling wildlife trees, among others. Actions to reduce impacts to other resources, such as lands managed for wilderness characteristics, could also help reduce impacts to wildlife and SSS that occur in these areas, relative to Alternative A.

The action alternatives would vary in terms of area of land in which personal and commercial woodland harvest is allowed and the type and amount of harvest allowed in these areas.

### ***Effects under Alternative B***

Under Alternative B, the total acres of wildlife and SSS habitat that could be impacted by removal of forest and woodland products would be less than under Alternative A because a larger area (8,418,904 acres; 63 percent of BLM-managed lands in the planning area) would be closed to commercial woodland harvest. However, the areas that would be open to commercial woodland harvest would overlap a larger variety and a greater extent of important wildlife habitats than under Alternative A: riparian areas (associated with 8,534 river miles; 26 percent of total river miles on BLM-managed lands within the planning area), caribou calving habitat (152,078 acres 95 percent) and wintering habitat (5,821,005 acres; 54 percent), moose calving habitat (283,561 acres; 74 percent) and wintering habitat (438,198; 49 percent), Audubon Important Bird Areas (272,578 acres; 86 percent), the Innoko Bottoms area (202,988 acres; 86 percent), muskox range (1,047,863 acres; 31 percent), and wood bison range (2,882,497 acres; 61 percent). Potential impacts to wildlife in these areas would be reduced through considerations for wildlife discussed under Effects Common to All Action Alternatives. Only a small portion of BLM-managed lands in the planning area (29,853 acres; less than 1 percent) would have permits for commercial harvest granted on a case-by-case basis.

Personal use and subsistence woodland harvest would be designated over 42,445 acres (3 percent of the planning area) in the vicinity of streams, communities, and burned areas, and permits would be required for harvest in these areas. These management actions could help reduce impacts to wildlife and SSS from removal of habitat features, although areas of greatest impact—areas around communities—would likely be the same as those under Alternative A

***Effects under Alternative C***

Under Alternative C, the total acres of wildlife and SSS habitat that could be impacted by removal of forest and woodland projects would be greater than under Alternatives A and B, with only 46,953 acres (less than 1 percent of BLM-managed lands in the planning area) closed to commercial woodland harvest and 9,811,727 acres (73 percent) open to commercial harvest. Permits for commercial harvest on a case-by-case basis would occur on 3,607,214 acres (27 percent). Additionally, areas that would be open to commercial woodland harvest would overlap a larger extent of important wildlife habitats than under Alternatives A and B: riparian areas (associated with 16,122 river miles; 49 percent of total river miles on BLM-managed lands within the planning area), caribou calving habitat (158,602; 99 percent) and wintering habitat (6,516,009 acres; 67 percent), moose calving habitat (325,506 acres; 85 percent) and wintering habitat (549,357 acres; 61 percent), Audubon Important Bird Areas (276,474 acres; 87 percent), the Innoko Bottoms area (209,795 acres; 89 percent), muskox range (1,428,102 acres; 43 percent) and wood bison range (2,995,404 acres; 81 percent). Similar to Alternative B, potential impacts to wildlife in these areas would be reduced through considerations for wildlife discussed under Effects Common to All Action Alternatives.

Management actions under Alternative C would have fewer restrictions on personal use and subsistence harvest that could reduce impacts to wildlife and SSS, as the amount of harvest requiring a permit would increase. However, this alternative would otherwise be similar to Alternative B, with the same acres and locations of personal use and subsistence woodland harvest areas.

***Effects under Alternative D***

Under Alternative D the potential for impacts to wildlife and SSS habitat from removal of forest and woodland products would be greater than under Alternatives A through C, as almost the entire the planning area (13,423,449 acres; nearly 100 percent) would potentially be open to commercial woodland harvest, and no areas would be closed to commercial woodland harvest. Permits for commercial harvest on a case-by-case basis would occur on 42,445 acres (less than 1 percent). Additionally, areas that would be open to commercial woodland harvest would overlap a larger extent of important wildlife habitats than under Alternatives A through C: riparian areas (associated with 32,850 river miles; greater than 99 percent of total river miles on BLM-managed lands within the planning area), caribou calving habitat (160,096 acres; 100 percent) and wintering habitat (9,752,211 acres; 95 percent), moose calving habitat (374,631 acres; 98 percent) and wintering habitat (888,640 acres; 99 percent), Audubon Important Bird Areas (314,373 acres; 100 percent), the Innoko Bottoms area (236,556 acres; 100 percent), muskox range (3,269,799 acres; 99 percent ) and wood bison range (3,686,168 acres; greater than 99 percent). Similar to Alternatives B and C, potential impacts to wildlife in these areas would be reduced through considerations for wildlife discussed under Effects Common to All Action Alternatives.

Potential impacts to wildlife from subsistence use harvest and personal use gathering of firewood would be greatest under this alternative, as permits would not be required for subsistence use harvest or personal use gathering of firewood, and all of the planning area would potentially be available for personal use and subsistence woodland harvest.

## **Wildlife and Special Status Species: Effects from Grazing Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Open/Closed to Grazing
- Utilization
- Grazing Management Plan

### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to provide grazing leases for seasonal grazing of domestic livestock, in accordance with applicable laws, regulations, and policies. There is one permitted reindeer grazing range in the planning area, and it is predicted that interest in reindeer grazing will increase. Domestic reindeer grazing has the potential to impact caribou habitat by reducing available winter forage and may result in impacts to populations through inbreeding and transmission of disease. Disease may also be transmitted to Dall sheep, mountain goats, and muskox. Reindeer grazing may provide a food source for predators such as grizzly bear. Under Alternative A, these adverse effects would be minor and limited to areas where domestic grazing occurs. At present, this would affect a negligible amount of caribou and moose calving and wintering areas and crucial winter habitat in the planning area, but the extent would increase with demand for grazing leases. Management under Alternative A would allow for grazing of domestic livestock only where compatible with other resources, which would minimize impacts to wildlife and SSS habitats. This alternative would also exclude grazing leases along the Unalakleet and Anvik Rivers and their major tributaries, which would prevent impacts to wildlife and SSS habitats in these areas.

### ***Effects under Alternative B***

Under Alternative B, all BLM-managed lands in the planning area would be closed to grazing, which would eliminate the grazing-related impacts on caribou and other wildlife species and their habitat discussed under Alternative A.

### ***Effects under Alternative C***

Under Alternative C, the area of wildlife and SSS habitat affected by grazing would depend on future interest in grazing leases, but the potential for impacts to wildlife and SSS from grazing would be greater than under Alternative B because a much smaller portion of the planning area would be closed to grazing (617,422 acres; 5 percent of BLM-managed lands within the planning area). Exclusion of grazing in these areas could reduce the potential for impacts locally to predominantly riparian-dwelling wildlife and SSS. Additionally, closure of HVWs to grazing until grazing standards for riparian vegetation health are developed, and then permitting grazing in these areas on a case-by-case basis, would reduce the potential for impacts to riparian wildlife and SSS habitat over an additional 5,105,497 acres (38 percent). In the remainder of BLM-managed lands in the planning area, grazing would be permitted only in areas where ecological conditions can support grazing (meaning areas with least 20 percent lichen cover). Where grazing occurs, utilization of 50 to 75 percent of primary forage species could cause localized alteration of wildlife and SSS habitat through reduction in forage species, which could reduce wildlife abundance

and biodiversity in the area. In known caribou habitat, grazing would be permitted on a case-by-case basis, and the BLM would impose permit requirements designed to reduce conflicts with caribou and protect the health of the land in grazed areas in accordance with Alaska Land Health Standards. These actions would help reduce impacts to wildlife habitat in caribou and moose calving and wintering areas and crucial winter habitat in the planning area. The requirement for development of a comprehensive Grazing Management Plan or a Range Conservation Plan with permit applications would help reduce long-term impacts to wildlife and SSS habitat in grazed areas.

### ***Effects under Alternative D***

Under Alternative D, the potential for impacts to wildlife and SSS from grazing would be higher than under Alternatives B and C, as all BLM-managed lands in the planning area would potentially be open to grazing on a case-by-case basis, and utilization of 75–100 percent of primary forage species would be permitted. Alteration of wildlife and SSS habitat from removal of vegetation in grazed areas would be greater than under Alternatives B and C. However, similar to Alternative C, grazing would be permitted only in areas where ecological conditions can support grazing. The area of wildlife and SSS habitat affected by grazing would depend on future interest in grazing leases. Because there would be no requirement for a Grazing Management Plan or a Range Conservation Plan when applying for a grazing permit, the potential for long-term impacts to wildlife and SSS habitat in grazed areas would be greater than under Alternative C.

### **Wildlife and Special Status Species: Effects from Locatable and Salable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Locatable Mineral Withdrawals
- Areas Closed to Salable Minerals

Locatable and salable minerals management affects wildlife and SSS because development of mineral sites results in a loss of wildlife habitat, and there is generally long-term surface disturbance, noise, and human activity at these sites for as long as they remain open and active. Associated access roads may result in loss and fragmentation of wildlife and SSS habitat. Mining activities may cause localized degradation of important components of wildlife habitat, through contamination of air quality, water, and soil. Mining shafts and adits and associated buildings may provide habitat for bats.

### ***Effects under Alternative A***

Under Alternative A, 4,804,488 acres (36 percent) of BLM-managed lands in the planning area would continue to be withdrawn from locatable minerals and closed to salable minerals, including withdrawals to protect crucial peregrine falcon habitat and other resource values. There would be no impacts to wildlife or SSS from mineral development in these areas. The remainder of BLM-managed lands in the planning area (8,661,406 acres; 64 percent) would be open to both locatable and salable mineral development. Wildlife and SSS and habitat in these areas could potentially be impacted by future mineral development, as described in the previous paragraph. Based on predicted future mineral development in the planning area, wildlife and SSS habitats occurring in areas open to locatable

development with medium to high mineral development are the most likely to be impacted. Under Alternative A, these high potential impacts areas total 294,325 acres (2 percent of BLM-managed lands in the planning area) and include the following important wildlife habitat areas: riparian areas (associated with 609 river miles; 2 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (14,001 acres; less than 1 percent), moose wintering habitat (294,325 acres; 33 percent), and a small amount of wood bison range (8,402 acres; less than 1 percent).

Under Alternative A, the number of adits and mine buildings under BLM management with the potential to provide bat habitat would increase as the number of mines increases in the planning area. This effect cannot be quantified because growth would be related to demand and economic drivers that cannot be predicted. An increase in the number of mines would cause impacts to other wildlife habitats in the mine area.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, WSR corridors would continue to be withdrawn from mineral entry. This management would provide protection from habitat loss and other impacts to wildlife and SSS associated with mineral development in these areas. Additionally, BMPs/SOPs to protect wildlife and other natural resources would help reduce long-term impacts to wildlife and SSS habitat in the planning area. Specifically, these actions would minimize mineral development and extraction in stream and river channels, deltas, wetlands, riparian zones, active floodplains, lakes, and habitat crucial to local fish and wildlife populations, which would help prevent impacts to associated wildlife and SSS. BMPs/SOPs would also include measures to minimize degradation of these habitats and expedite reclamation of disturbed areas. These measures would help reduce the level of impact to wildlife habitats in areas that remain open to locatable and salable mineral development.

The alternatives would vary in terms of land open to locatable and salable mineral development, and land withdrawn from locatable minerals and closed to salable minerals.

### ***Effects under Alternative B***

Under Alternative B, 9,842,497 acres (73 percent) of BLM-managed lands in the planning area would be withdrawn from locatable minerals (retained existing withdrawals as well as new proposed withdrawals) and closed to salable minerals in order to protect resource values, which is more than double the amount under Alternative A. Therefore, management under this alternative would reduce the potential for impacts to wildlife and SSS habitat from mineral development over a larger geographic extent than current management. Additionally, because less of the planning area (202,610 acres; 2 percent) would be open to locatable mineral development in areas of medium to high mineral potential, the extent of impacts to wildlife from mineral development would potentially be less than under Alternative A. Areas with the highest potential for impacts to wildlife and SSS would include the following important wildlife habitat areas: riparian areas (associated with 409 river miles; 1 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (133,467 acres; 1 percent), and small amounts of moose wintering habitat (8,230 acres; 1 percent), moose calving habitat (5,414 acres; 1 percent), and wood bison range (4,693 acres; less than 1 percent). While the wildlife habitats most likely to be affected would be similar to those under Alternative A, they would include less moose wintering habitat and more caribou wintering habitat and moose calving habitat.

New mines and associated buildings and associated bat habitat would only occur in areas open to locatable and salable mineral development. Because less of the planning area would be available for this resource use, there may be fewer new mines and buildings as compared to Alternative A, although demand for minerals would still likely be the biggest factor in determining the amount of new mineral development.

### ***Effects under Alternative C***

Under Alternative C, the extent of BLM-managed lands that would be withdrawn from locatable minerals (46,953 acres; less than 1 percent of BLM-managed lands in the planning area) and closed to salable minerals (283,509 acres; 2 percent) would be less than under Alternatives A and B. Therefore, the potential for impacts to wildlife and SSS would be greater. More of the planning area (565,488 acres; 4 percent) would be open to locatable mineral development in areas of medium to high mineral potential than under Alternatives A and B, and would include the following important wildlife habitat areas: riparian areas (associated with 1,173 river miles; 4 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (403,146 acres; 4 percent), and small amounts of moose wintering habitat (16,404 acres; 2 percent), moose calving habitat (5,529 acres; 1 percent) and wood bison range (9,672 acres; less than 1 percent). These are generally the same types of important wildlife habitats as those under Alternative A and B but the extent of overlap with areas open to locatable development that have a high potential for future mineral development would be greater than under Alternatives A and B. Therefore, the potential for impacts to important wildlife habitats from mineral development would be greater than under Alternatives A and B.

Similar to Alternatives A and B, the number of new mines and associated buildings that provide habitat for bats would likely increase, dependent on future demand for minerals, but would not occur in portions of the planning area closed to development.

### ***Effects under Alternative D***

Under Alternative D, the extent of BLM-managed lands in the planning area that would be withdrawn from locatable minerals and closed to salable minerals would be identical to that under Alternative C. The potential for impacts to wildlife and SSS would be similar to that under Alternative C, but would likely be greater because the case-by-case category for allowing salable development would not apply under Alternative D. The portion of the planning area that would be open to locatable mineral development in areas of medium to high mineral potential would be identical to that under Alternative C and would also include the same types and extent of important wildlife habitat. Overall, based on land area open to mineral development the potential for impacts to wildlife and SSS and their habitats would be greater than under Alternatives A and B, and similar to those under Alternative C.

Similar to Alternatives A, B, and C, the number of new mines and associated buildings that provide habitat for bats would likely increase, dependent on future demand for minerals, but would not occur in portions of the planning area closed to development. New mines and associated buildings would have the potential to occur over more of the planning area than under the other alternatives based on areas open to development.

## **Wildlife and Special Status Species: Effects from Leasable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Closed to Leasing
- NSO Leasable Designation

Activities associated with leasable minerals have the potential to affect wildlife and SSS habitat through habitat loss, degradation, and disturbance. Noise and human activity at these sites may affect wildlife behavior and breeding success. Seismic surveys may have long-term effects on habitat by removing vegetation and potentially creating new summer and winter OHV routes, which can disturb wildlife and fragment habitat. Exploration can harm small mammals and nesting birds and can temporarily displace larger mammals such as caribou. Because there is a low development potential for leasable mineral resources in the planning area, impacts to wildlife and habitat are also likely to be low, although demand could change in the future.

### ***Effects under Alternative A***

Management under Alternative A would continue to include closures and protective stipulations in certain areas that would reduce impacts to wildlife and SSS from leasable mineral activity in the planning area. A total of 5,202,221 acres (39 percent) of BLM-managed lands in the planning area would be closed to leasing, and 17,521 acres (less than 1 percent) would be designated as NSO leasable. Additionally, there would be special stipulations for grizzly/brown bear denning areas and raptor nesting areas over a small portion of the INHT (unquantified), which would help reduce impacts to these species from leasable mineral actions. Overall, the geographic extent of wildlife habitat covered by management that would help reduce impacts to wildlife from impacts associated with leasable minerals would be less than under the action alternatives, although the geographic extent of land completely closed to leasing would be greater than under Alternatives C and D.

### ***Effects Common to All Action Alternatives***

All action alternatives would include stipulations that provide protections to wildlife and SSS. While numerous stipulations would reduce impacts to wildlife and SSS by protecting resources, there would also be stipulations specific to SSS, Dall sheep habitat, caribou calving/postcalving habitat, raptor nests, trumpeter swans, high-value moose habitat, and active bald eagle nests. These stipulations would help minimize loss of caribou and moose calving and wintering areas, moose and caribou crucial winter habitat, Dall sheep habitat, raptor nesting habitat, and migratory bird habitat in the event of mineral leasing in these areas.

The alternatives would vary in terms of areas of land further protected by being closed to leasing, designated as NSO leasable, or open, subject to special stipulations leasing.

### ***Effects under Alternative B***

Alternative B would increase the proportion of the planning area designated as NSO leasable to 1,597,599 acres (12 percent of BLM-managed lands in the planning area) and would increase the land area closed to leasing to 9,350,881 acres (69 percent). The area of BLM-managed lands in the planning



area open to leasing subject to standard stipulations would be 2,517,414 acres (19 percent), which is less than under Alternatives A, C, and D. Under this alternative, wildlife and SSS habitats over less of the planning area could be subject to impacts associated with leasable minerals activity, and more of the planning area would have a designation that would have highly restrictive lease stipulations necessary to minimize impacts to resources, including wildlife and SSS.

### ***Effects under Alternative C***

Under Alternative C, the area designated as NSO leasable (6,824,035 acres; 51 percent) and closed to leasing (46,953 acres; less than 1 percent) would be less than under Alternative B, and 6,594,906 acres (49 percent) would be open to leasing with standard stipulations. Therefore, this alternative would be less likely to reduce impacts to wildlife and SSS from mineral leasing than Alternative B.

### ***Effects under Alternative D***

Under Alternative D the proportion of the planning area closed to leasing would be identical to that under Alternative C. However, the proportion of the planning area designated as NSO leasable (236,556 acres; 2 percent) would be less than under Alternative B and C, and the proportion designated as open to leasing subject to standard stipulations (13,182,385 acres; 98 percent) would be the greatest out of all the alternatives. The reduction in impacts to wildlife and SSS from management actions pertaining to leasable mineral designations/stipulations would be of lower magnitude and smaller extent than those under Alternatives A, B and C.

## **Wildlife and Special Status Species: Effects from Lands and Realty Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- ROW Exclusion and Avoidance Areas
- Permits and Leases
- Land Acquisitions
- Exchanges and Disposals

Potential impacts on wildlife and SSS habitat from lands and realty management include habitat loss, fragmentation, and degradation; disturbance of or direct mortality to individuals; and loss of species diversity from ROW development and other permitted facilities. Permits and leases are often associated with human uses that increase human presence, which may increase stress on wildlife during breeding, migration, and wintering periods. Land acquisitions may benefit wildlife and SSS by increasing the acres of wildlife habitat in the planning area, including sensitive or key habitats, and creating more contiguous blocks of habitat for management purposes. Conversely, land disposals would reduce the amount of habitat under BLM management. Land withdrawals have the potential to benefit wildlife and SSS if they close BLM-managed lands in the planning area to activities with the potential to impact species and their habitat. Land status changes could result in increases in or loss of wildlife and SSS habitat managed by the BLM. Acquisitions, particularly of high-value habitat, can benefit wildlife by creating more contiguous blocks of habitat for management purposes. Disposals can fragment management of habitat and may impact wildlife if management by the new landowner is less protective of wildlife. Exchanges involve both acquiring land and disposing other lands in transactions involving the BLM and another

land owner. As such, an exchange can have beneficial or detrimental impacts for wildlife and high-value habitat. Habitat value and wildlife impacts are considerations of any decision to go forward with a land exchange.

### ***Effects under Alternative A***

Under Alternative A, all existing ANCSA 17(d)(1) withdrawals would be in place, affecting 12,559,533 acres (93 percent) of the planning area. Alternative A does not provide additional management guidance for lands and realty that would affect wildlife and SSS or their habitats. No ROW exclusion or avoidance areas would be identified. Therefore, future ROW development could occur in important wildlife and SSS habitats throughout the planning area, potentially leading to habitat loss and degradation, and fragmenting habitats or affecting wildlife movements across the landscape. No proposed land acquisitions or disposals have been proposed under this alternative that would change the amount of wildlife habitats on BLM-managed lands in the planning area.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would implement actions to consolidate land management that could affect the amount of wildlife and SSS habitat in the planning area. The BLM would consider objectives to protect wildlife and SSS habitat and reduce habitat fragmentation when making decisions about land disposal, exchange, and acquisition. Additionally, the BLM would attempt to co-locate linear projects within existing ROWs and would require ROWs to provide for unimpeded caribou passage in all caribou connectivity corridors or where crucial winter habitat exists. Additional SOPs/BMPs designed to protect wetlands and streams/water quality and reduce the establishment and spread of NNIS would provide additional protections to wildlife and SSS from actions associated with lands and realty.

The alternatives would vary in terms of acreage of ROW exclusion and avoidance areas, and in acreage of wildlife habitat that is proposed for disposal, exchange, and acquisition.

### ***Effects under Alternative B***

Identification of ROW exclusion and avoidance areas under Alternative B would help minimize habitat fragmentation and degradation in these areas. ROW exclusion areas would occur on 1,464,069 acres (11 percent) of BLM-managed lands in the planning area and would include important wildlife habitat, such as the Innoko Bottoms Priority Wildlife Habitat Area, Northern and South Connectivity Corridors, and the Unalakleet Wild River Corridor. ROW avoidance areas would occur on an additional 8,824,848 acres (66 percent) and would provide some protections to additional areas, including ecosystems that may include rare wildlife habitats. For permits and leases, restrictions on where trapping/subsistence cabins can occur (e.g., in relation to riparian areas and in lands managed for wilderness character) would have a limited effect on wildlife, as they would reduce impacts in these locations but would still be located elsewhere. Areas with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs would be areas outside of ROW exclusion and avoidance areas. Important wildlife habitats with the greatest potential to be affected by ROW development include caribou calving habitat (84,657 acres; 53 percent) and wintering habitat (2,173,376 acres; 21 percent), moose calving habitat (48,746 acres; 13 percent) and wintering habitat (93,264 acres; 10 percent), Audubon Important Bird Areas (44,074 acres; 14 percent), muskox range (843,052 acres; 26 percent), and wood bison range

(736,928 acres; 20 percent). The potential for impacts to important wildlife habitats from ROW development would be less than under Alternative B.

Under Alternative B, the BLM would pursue opportunities to acquire lands within the INHT NTMC, which could result in an increase in wildlife habitat in the planning area. Under this alternative, 342,360 acres (3 percent) of BLM-managed lands in the planning area are available for exchange, which could reduce the current amount of wildlife habitat on BLM-managed lands in the planning area by a small amount (3,278 acres). However, these losses would be offset by wildlife habitat acquired in the exchanges. Table 3.3.3-4 provides a breakdown of available disposals, acquisitions, and exchanges under Alternative B that would affect BLM management of important wildlife habitat in the planning area. While land exchanges represent possible reductions in the high-value wildlife habitats managed by the BLM within the planning area, there could also be increases in high-value wildlife habitats associated with exchanges.

**Table 3.3.3-4: Available Disposals, Acquisitions, and Exchanges under Alternative B, by Indicator**

Indicator	Acres/Miles Available for Disposal or Exchange	Acres/Miles Available for Acquisition	Acres/Miles Available for Exchange Only
Acres of Wildlife Habitat, (essentially the entire planning area)	0 acres	339,082 acres	342,360 acres
Streams (with associated riparian areas)	0 miles	770 miles	802 miles
Caribou Calving Habitat	0 acres	0 acres	0 acres
Caribou Wintering Habitat	0 acres	138,558 acres	222,074 acres
Moose Calving Habitat	0 acres	11,884 acres	64,663 acres
Moose Wintering Habitat	0 acres	23,517 acres	79,179 acres
Innokko Bottoms Priority Wildlife Habitat Area	0 acres	20,417 acres	17,280 acres
Audubon Important Bird Areas	0 acres	0 acres	0 acres
Muskox Range	0 acres	0 acres	0 acres
Wood Bison Range	0 acres	214,058 acres	63,668 acres

### ***Effects under Alternative C***

Alternative C would have a greater risk for habitat fragmentation and degradation than Alternative B, because there would be no ROW exclusion areas. Additionally, a smaller portion of the planning area (7,069,494 acres; 52 percent) would be identified as ROW avoidance area, and ROW avoidance areas in the connectivity corridor would only be for linear realty actions. Areas outside of ROW avoidance areas, with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs would include caribou calving habitat (112,609 acres; 70 percent) and wintering habitat (4,182,673 acres; 41 percent), moose calving habitat (107,684 acres; 28 percent) and wintering habitat (216,665 acres; 24 percent), Audubon Important Bird Areas (87,447 acres; 28 percent), muskox range (1,361,245 acres; 41 percent), and wood bison range (1,231,414 acres; 33 percent). These are the same important wildlife habitats as those with the greatest potential to be impacted under Alternative B, but the geographic extent of their overlap with areas outside of ROW avoidance areas would be much higher

under Alternative C. Therefore, the potential for impacts to important wildlife habitats from ROW development would be greater than under Alternative B, but less than under Alternative A.

Under Alternative C, potential increases in wildlife habitat under BLM management, including high-value wildlife habitats, would be identical to those under Alternative B (Table 3.3.3-5). Potential effects on wildlife habitat associated with disposals and exchanges would likely be similar to those under Alternative B, although the total land area in this category is slightly higher. Similar to Alternative B, there could be reductions or increases in high-value wildlife habitats managed by the BLM as a result of land exchanges under Alternative C.

As with Alternative B, these actions would not affect wildlife and SSS habitat in lands with wilderness characteristics being managed as a priority or connectivity corridors. Overall, this alternative would have a larger adverse impact on wildlife habitat, and potentially SSS habitat, than Alternative B.

**Table 3.3.3-5: Available Disposals, Acquisitions, and Exchanges under Alternative C, by Indicator**

Indicator	Acres/Miles Available for Disposal or Exchange	Acres/Miles Available for Acquisition	Acres/Miles Available for Exchange Only
Acres of Wildlife Habitat, (essentially the entire planning area)	0 acres	339,082 acres	356,942 acres
Streams (with associated riparian areas)	0 miles	770 miles	841 miles
Caribou Calving Habitat	0 acres	0 acres	0 acres
Caribou Wintering Habitat	0 acres	138,558 acres	223,847 acres
Moose Calving Habitat	0 acres	11,884 acres	64,623 acres
Moose Wintering Habitat	0 acres	23,517 acres	86,522 acres
Innoko Bottoms Priority Wildlife Habitat Area	0 acres	20,417 acres	17,280 acres
Audubon Important Bird Areas	0 acres	0 acres	17,530 acres
Muskox Range	0 acres	0 acres	0 acres
Wood Bison Range	0 acres	214,058 acres	63,877 acres

### ***Effects under Alternative D***

Alternative D would have a greater risk for wildlife and SSS habitat fragmentation and degradation than Alternatives B and C, because there would be no ROW exclusion areas, and the acreage of ROW avoidance areas would be the lowest of all the action alternatives (5,130,927 acres; 37 percent). Areas outside of ROW avoidance areas, and outside of areas where ROWs would be permitted on a case-by-case basis, would have the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs. These areas would include riparian areas (associated with 19,151 river miles; 58 percent of total river miles on BLM-managed lands within the planning area), caribou calving habitat (150,380 acres; 94 percent) and wintering habitat (5,924,308 acres; 58 percent), moose calving habitat (130,740 acres; 34 percent) and wintering habitat (282,198 acres; 32 percent), Audubon Important Bird Areas (97,014 acres; 31 percent), muskox range (1,988,298 acres; 60 percent), and wood bison range (2,011,664 acres; 54 percent). Unlike under Alternatives B and C, riparian areas would not be ROW avoidance areas, so species that utilize these habitats would have a higher risk of impacts associated with ROW development. The other important wildlife habitats with the greatest potential to be impacted are

the same as those under Alternatives B and C, but the geographic extent of their overlap with areas open to ROWs would be larger under Alternative D. Therefore, the potential for impacts to important wildlife habitats from ROW development would be greater than under Alternatives B and C, but less than under Alternative A.

Realty actions under Alternative D would have a greater potential to reduce the amount of wildlife habitat managed by the BLM than Alternatives B and C. Because the BLM would not pursue opportunities to acquire public land, there would be no potential increase in wildlife habitat. Additionally, 451,173 acres (3 percent) would be available for disposal or exchange, which could result in the loss of wildlife habitat managed by the BLM with no habitat gained in return (Table 3.3.3-6), and there would be no restriction on areas that could be considered for disposal. Based on potential disposals and exchanges under Alternative D, there could potentially be greater reductions in high-value wildlife habitat than under Alternatives A, B, and C. Overall, this alternative would have the potential for a greater adverse impact on wildlife habitat than the other alternatives.

**Table 3.3.3-6: Available Disposals, Acquisitions, and Exchanges under Alternative D, by Indicator**

Indicator	Acres/Miles Available for Disposal or Exchange	Acres/Miles Available for Acquisition	Acres/Miles Available for Exchange Only
Acres of Wildlife Habitat (essentially the entire planning area)	451,173 acres	0 acres	0 acres
Streams (with associated riparian areas)	1,056 miles	0 miles	0 miles
Caribou Calving Habitat	0 acres	0 acres	0 acres
Caribou Wintering Habitat	238,535 acres	0 acres	0 acres
Moose Calving Habitat	127,925 acres	0 acres	0 acres
Moose Wintering Habitat	278,504 acres	0 acres	0 acres
Innoko Bottoms Priority Wildlife Habitat Area	74,594 acres	0 acres	0 acres
Audubon Important Bird Areas	17,530 acres	0 acres	0 acres
Muskox Range	0 acres	0 acres	0 acres
Wood Bison Range	143,421 acres	0 acres	0 acres

### **Wildlife and Special Status Species: Effects from Recreation and Visitor Services Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- INHT SRMA
- BSWI ERMA – OHV
- Unalakleet Wild River Corridor – Travel Decisions

Recreation can affect wildlife in the planning area by introducing humans into remote areas. The presence of motorized vehicles and humans can disturb wildlife, potentially resulting in increased energy expenditure due to short- and long-term avoidance of the activity, which can potentially lead to reduced reproductive success and increased susceptibility to disease and predation. Disturbance from recreation

may also reduce an area's suitability as nesting or calving habitat. Wildlife may habituate to human presence, which could increase the risk of injury or mortality from human-wildlife interactions. Recreation may also result in degradation or loss of habitat, although there are no recreation facilities in the planning area where concentrated recreation use is likely to occur. OHV use can degrade wildlife habitats through surface disturbance (particularly when soils are not frozen), crush nests and small terrestrial species, and lead to the creation of new trails, which can increase the amount of area disturbed. OHVs may also introduce NNIS, which could adversely impact wildlife habitat. OHVs can also cause direct mortality to subnivean species and damage their habitats. Most recreation in the planning area occurs along the INHT corridor, and wildlife and SSS in this area are the most likely to be affected. Hunting and fishing have a direct impact on wildlife through mortality and reduction in prey species, although because game populations are managed by ADF&G, these impacts are not the focus of this analysis. Recreational berry picking may affect grizzly bears, migratory birds, and other species by resulting in a localized reduction in availability of this food source.

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

#### ***Effects under Alternative A***

Under Alternative A, there would be no specific management actions pertaining to recreation that would affect wildlife and SSS. Under current management, the effects described in the previous paragraph would have the potential to occur throughout the planning area wherever recreation occurs.

#### ***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would implement management actions that apply to the primary recreational use areas in the planning area: the INHT SRMA, the BSWI ERMA, and the Unalakleet Wild River Corridor. Recreation management would have the potential to affect wildlife and SSS and habitat in these areas by influencing the amount of associated human presence and habitat disturbance. As a result of their designation as recreational use areas, the proposed management would allow the BLM to reduce the impacts that recreation may have on wildlife habitats, as described further in the following sections. The BLM would also implement SOPs/BMPs that would help protect streams, water quality, wetlands, and floodplains, as well as associated wildlife and SSS.

Under all action alternatives, the entire planning area would be managed as SRMA or ERMA. More specifics on impacts associated with OHV use are included in the section "Wildlife and Special Status Species: Effects from Travel and Transportation Management Actions."

### **Wildlife and Special Status Species: Effects from Travel and Transportation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Vegetation and Wildlife Travel Management
- Travel Management Decisions (all)

***Effects under Alternative A***

Under Alternative A, BLM-managed lands in the planning area would continue to be managed as undesignated, allowing OHV and over-snow vehicle cross-country use with the exception of the Unalakleet Wild River Corridor, which does not allow casual OHV use. OHV use can result in loss or degradation of wildlife habitat from physical disturbance, can lead to loss of habitat through wildlife avoidance of the area, and can potentially fragment habitat if new trails are created. Use of OHVs and other vehicles is also associated with noise that has the potential to affect the behavior and breeding success of nearby wildlife and SSS.

***Effects Common to All Action Alternatives***

Under all action alternatives, designating all of BLM-managed lands in the planning area as “Limited” would reduce the potential for loss, degradation, and fragmentation of wildlife habitats, as OHV use would be limited to certain areas or specific trails. Additionally, implementing travel management planning would allow the BLM to develop a travel network that meets the needs of subsistence and other users while considering potential impacts to wildlife and SSS habitat in the planning area.

The alternatives would vary in terms of area of land within TMAs and the types of restrictions on OHV use in these areas and in caribou habitat areas.

***Effects under Alternative B***

Under Alternative B, 565,955 acres (4 percent) of BLM-managed lands in the planning area would be within TMAs. Within these areas, there would be additional prohibitions or restrictions on OHV use, such as prohibiting summer casual and subsistence OHV access or limiting these uses to existing trails. These actions would help prevent degradation of habitat and creation of new trails that might fragment habitat, as the risk for these impacts would be greatest during the summer when the ground is thawed. The geographic extent of TMAs under this alternative is the largest of all the action alternatives.

Travel management decisions in caribou habitat under this alternative would include development of management actions if there is evidence of habitat degradation, including OHV use limitations, trail relocation, trail hardening, or trail closure. These actions would help reduce impacts to habitat used by caribou and other wildlife and SSS. In the Innoko Bottoms Priority Wildlife Habitat Area, restrictions on airboats and hovercraft would reduce disturbance impacts to wildlife and SSS and their habitats, including priority raptor nests.

***Effects under Alternative C***

Under Alternative C, 273,242 acres (2 percent) of BLM-managed lands the planning area would be within TMAs, which is half the area under Alternative B. Additionally, prohibitions and restrictions on OHV use in these areas would be less protective than under Alternative B. Therefore, the magnitude and extent of impacts to wildlife and SSS and their habitats from OHV use would potentially be greater than under Alternative B. Management actions in caribou habitat and the Innoko Bottoms Priority Wildlife Habitat Area and associated effects on wildlife would be identical to those under Alternative B.

***Effects under Alternative D***

Under Alternative D, the portion of BLM-managed lands in the planning area within TMAs would be identical to the portion under Alternative C. However, prohibitions and restrictions on OHV use in these areas would be less protective than under Alternative C. Therefore, the magnitude of impacts to wildlife and SSS and their habitats from OHV use would potentially be greater than under Alternatives B and C.

There would be no additional travel management for caribou habitat and the Innoko Bottoms Priority Wildlife Habitat Area, so disturbance impacts to wildlife and SSS in these areas would not be reduced as they would be under Alternatives B and C.

**Wildlife and Special Status Species: Effects from Areas of Critical Environmental Concern Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- ACEC Designations

Generally, special management areas such as ACECs result in increased protection of wildlife and SSS and long-term improvement or maintenance of habitat quality as a result of special management and use restrictions in these areas.

The alternatives would vary in terms of land area within designated ACECs.

***Effects under Alternative A***

Under Alternative A, 1,884,376 acres (14 percent) of BLM-managed lands in the planning area would be designated as ACECs. Management actions that predominantly pertain to water resources, fisheries, and forests and woodlands would reduce the potential for impacts to wildlife and SSS in these areas from human disturbance and habitat loss, degradation, and fragmentation associated with various resource uses. Existing ACEC designations overlap riparian areas (associated with 4,086 river miles; 12 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (1,858,841 acres; 18 percent), moose wintering habitat (151,362 acres; 17 percent), the Innoko Bottoms area (798 acres; less than 1 percent), muskox range (1,492,578 acres; 45 percent) and wood bison range (181,473 acres; 5 percent). For these and other wildlife over the same geographic extent, ACEC management actions would reduce the potential for impacts from various resource uses.

***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives.

***Effects under Alternative B***

Under Alternative B, 3,912,698 acres (29 percent) of BLM-managed lands in the planning area would be designated as ACECs, which is more than double the area under Alternative A. The BLM would implement BMPs/SOPs in ACECs that would provide additional protections to wildlife in these areas. These BMPs/SOPs include actions to reduce the potential for impacts to caribou, Dall sheep, and priority raptor species and their habitats during crucial periods. Additionally, management actions that benefit wildlife and SSS would occur over a larger area than under Alternative A. ACEC designations under this



alternative overlap riparian areas (associated with 9,202 river miles; 28 percent of total river miles on BLM-managed lands within the planning area), caribou wintering habitat (3,710,592 acres; 36 percent); moose calving habitat (49,963 acres; 13 percent) and wintering habitat (693,711 acres; 78 percent), the Innoko Bottoms Area (21,366 acres; 9 percent), Audubon Important Bird Areas (4,687 acres; 1 percent), muskox range (2,207,220 acres; 67 percent) and wood bison range (438,082 acres; 12 percent). In these areas, ACEC management under Alternative B would reduce potential impacts to these wildlife habitats from human disturbance and habitat loss, degradation, and fragmentation associated with various resource uses. The geographic extent of important wildlife habitats affected would be greater than under Alternative A.

### ***Effects under Alternative C***

Under Alternative C, there would be no ACECs designated in the planning area. However; Alternative C would still apply some management actions to areas with identified fish and cultural R&Is that would also minimize impacts to wildlife and SSS. Such as ROW avoidance areas and NSO for mineral leasing and externally proposed structures.

### ***Effects under Alternative D***

Under Alternative C, there would be no ACECs designated in the planning area. Alternative D would not apply any specific management to areas with identified fish and cultural R&Is and would have impacts of greater magnitude and geographic extent to wildlife and SSS than Alternative B and C.

## **Wildlife and Special Status Species: Effects from National Trails Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- INHT NTMC

The INHT supports habitats used by wildlife and SSS. This trail is a focal area for recreation and is associated with increased human presence and motorized uses that have the potential to impact wildlife and SSS. While national trails management generally does not pertain to wildlife, it may help reduce the potential for impacts wildlife and SSS or their habitats from various land uses.

### ***Effects under Alternative A***

Under Alternative A, the INHT would not be designated as a NTMC and would not be subject to associated management. However, the BLM would continue to implement management actions for the INHT that are designed to reduce surface disturbance from other resources uses, including minerals, forestry and woodland products, and livestock grazing. These actions could reduce the potential for impacts to wildlife and SSS in the INHT area from these resource uses.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, effects to wildlife and SSS from disturbance and habitat degradation associated with use of the INHT would be similar to those under Alternative A. However, the BLM would establish the INHT NTMC in the planning area. This designation would include additional management with prescriptions such as exclusion from coal leasing, noise restrictions, and a “Limited”

travel management designation. Additionally, the BLM would implement BMPs/SOPs to limit the spread of NNIS, which could result in minor, typically localized benefits to wildlife and SSS.

The alternatives would vary in terms of acreage designated as the INHT NTMC.

### ***Effects under Alternative B***

Under Alternative B, designation of the INHT NTMC on 288,466 acres (2 percent) of BLM-managed lands in the planning area could reduce the potential for impacts to wildlife and SSS and their habitats over this small portion of the planning area, with slightly reduced impacts relative to Alternative A.

### ***Effects under Alternative C***

Under Alternative C, the INHT NTMC would consist of 273,242 acres (2 percent) of BLM-managed lands in the planning area. Therefore, the portion of the planning area in which potential impacts to wildlife and SSS and their habitats from use of the INHT could be reduced would be similar to, but slightly smaller than, that under Alternative B.

### ***Effects under Alternative D***

Effects under Alternative D would be identical to effects under Alternative C because the INHT NTMC would be the same size.

## **Wildlife and Special Status Species: Effects from Wild and Scenic Rivers Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Travel Management Decisions
- UAS Uses

WSR corridors provide habitat for wildlife and SSS that use stream and riparian habitats. Management to preserve the outstanding natural, cultural, and recreational values in a free-flowing condition promotes wildlife habitat health in these areas. However, human disturbance associated with recreational use of these areas may disturb wildlife and SSS.

### ***Effects under Alternative A***

The only designated WSR corridor under Alternative A would be the Unalakleet Wild River Corridor, which covers 46,953 acres (less than 1 percent) of BLM-managed lands the planning area. Management direction to preserve the environment of the river and river corridor in a natural, primitive condition would limit impacts to riparian wildlife and SSS in this area, including a variety of migratory birds. Alternative A does not include management direction regarding use of UASs or travel management decisions that would pertain to wildlife and SSS or their habitat in WSRs. Additionally, 18 river segments (378,073 acres; 3 percent) have been identified as eligible. In accordance with BLM Manual 6400, projects on BLM-managed lands within the eligible river corridor or on lands that are adjacent to or border eligible rivers must consider guidelines to protect outstandingly remarkable values (ORVs) from activities such as locatable, salable, and leasable mineral development; transportation and

motorized travel; ROW authorization; recreation; wildlife and fish projects; and livestock grazing, which could reduce impacts to wildlife and their habitats within those eligible river corridors from these resource uses, if implemented.

### ***Effects Common to All Action Alternatives***

All action alternatives would include additional management actions in WSR corridors that may reduce impacts to wildlife and SSS from various resource uses, such as acquiring additional lands within designated WSR corridors, which would potentially increase the amount of protected wildlife and SSS habitat, prohibiting or restricting development and some types of uses in these areas with the potential to degrade or fragment habitats, and minimizing noise intrusions that could disturb nesting birds and other wildlife and SSS.

The alternatives would vary in terms of area of land within WSR corridors and in the magnitude of management restrictions pertaining to OHVs and UASs in these areas.

### ***Effects under Alternative B***

Under Alternative B, the Unalakleet Wild River Corridor would remain in place. An additional 378,073 acres (3 percent) have been recommended as suitable for WSR designation. Under Alternative B, the Unalakleet Wild River Corridor and all corridors recommended as suitable would be subject to management actions that could reduce impacts to wildlife from various land uses, as described under Effects Common to All Action Alternatives. Because Alternative B provides actual protections for the 378,073 acres of rivers recommended as suitable, compared with the guidelines that would be considered for those same 378,073 acres determined eligible, Alternative B would have a greater potential to reduce impacts to wildlife from resource uses in these areas compared with Alternative A. Additionally, this alternative includes travel management decisions that would limit OHV use in designated and eligible WSR corridors, which would reduce associated disturbance and habitat degradation. Restrictions on some uses of UASs could also reduce disturbance to wildlife and SSS (predominantly birds).

### ***Effects under Alternative C***

Under Alternative C, 46,953 acres (less than 1 percent) of BLM-managed lands in the planning area would be within WSR corridors (Unalakleet Wild River Corridor), which is identical to the acreage under Alternative A and less than that under Alternative B. Travel management decisions and restrictions and management pertaining to UASs, which would be similar to those under Alternative B, would provide a similar reduction of potential impacts to wildlife and SSS from resource uses in these areas, but the geographic extent of these effects would be less than under Alternative B.

### ***Effects under Alternative D***

Under Alternative D, the land area within WSR corridors (Unalakleet Wild River Corridor) would be identical to the area under Alternatives A and C. Compared to Alternatives B and C, management pertaining to travel management and UASs would be less restrictive (e.g., takeoff and landing of casual use UASs would be allowed in the WSR corridor) and would have slightly less ability to reduce impacts to wildlife and SSS from resource uses in these areas.

## **Wildlife and Special Status Species: Effects from Hazardous Materials and Health and Human Safety Management Actions**

Wildlife and SSS may be affected by the same factors that present risks to human health and safety. Releases of hazardous materials into the environment have the potential to degrade habitat by affecting water quality, soil productivity, and other habitat components. Exposure of wildlife to hazardous materials through dermal contact or ingestion of water, plant materials, or prey items contaminated by toxic substances can lead to mortality or reduced reproductive success. Presence of hazardous materials in the environment may also lead to bioconcentration via the food chain. These impacts generally would have the greatest impact on wildlife and SSS present in the release area, but could migrate beyond the release site, particularly if they are released into water or bioaccumulated by prey species.

Abandoned mine shafts and adits are areas of concern regarding hazardous materials safety in the planning area. However, they also provide habitat for bats. Therefore, closure of these areas could cause a loss of bat habitat, unless the mines are closed in a manner that allows access for bats.

### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to meet all applicable laws, regulations, and policies pertaining to use and storage of hazardous materials, cleanup of spills, and remediation of contaminated sites, among others. The BLM would also continue to implement its Hazard Management and Resource Restoration program. These ongoing actions would reduce the potential for impacts to wildlife and SSS in areas where hazardous materials are used or stored and would help improve or restore habitat in contaminated sites. Cleanup of the Red Devil Mine and the Kolmakof Mine Site would continue, resulting in an improvement in wildlife and SSS habitat in these areas.

### ***Effects Common to All Action Alternatives***

The action alternatives would include numerous SOPs/BMPs pertaining to hazardous materials and wastes that are designed to reduce the risk of releases into the environment, particularly in riparian zones and in the vicinity of waterbodies. These measures would reduce the risk of habitat degradation and exposure of wildlife to hazardous materials. Effects would be greatest in areas where hazardous materials are used or stored.

The alternatives would vary in terms of management actions in areas where complete cleanup of hazardous material spills is not possible.

### ***Effects under Alternative B***

The one difference between Alternative B and the other action alternatives is that the BLM would require use of alternative power or fuel for energy generation at facilities where complete cleanup of hazardous material spills is not possible and would retrofit existing facilities in these areas as a component of the permit/lease/ROW renewal. This management action would reduce the potential for impacts to wildlife and SSS and their habitat in these areas by reducing the potential that petroleum and other fuels would be released into the environment. The extent of areas where complete cleanup of hazardous material spills is not possible would not change under Alternative B, but risks would be minimized in these areas.

***Effects under Alternative C***

Alternative C would be similar to Alternative B, except that there would be no requirement to retrofit existing facilities to use alternative power or fuel. Therefore, there would be no associated reduction in the potential for impacts to wildlife and SSS in the vicinity of existing facilities. The extent of areas where complete cleanup of hazardous material spills is not possible would be the same as under Alternatives A and B.

***Effects under Alternative D***

Under Alternative D, there would be no management pertaining to use of alternative power or fuel for energy generation at facilities in areas where complete cleanup is not possible. Therefore, risks to wildlife and SSS in these areas would be the same as under Alternative A, but with the SOPs and BMPs discussed under Effects Common to All Action Alternatives in place under Alternative D, which would reduce the risk of habitat degradation and exposure of wildlife to hazardous materials. The extent of areas where complete cleanup of hazardous material spills is not possible would be the same as under Alternatives A, B, and C.

**Wildlife and Special Status Species: Effects from Climate Change**

Climate change in the planning area has the potential to impact wildlife and SSS by causing changes in vegetation communities and therefore wildlife habitat types and by causing direct mortality from entrapments, a result of increased temperatures, permafrost thaw, decreased snow cover, sea level rise, and later freeze-up dates. For some species, habitat availability and value may increase (e.g., trumpeter swan) and for other species, habitat is likely to decrease (e.g., wetland species). Climate change may also result in loss or degradation of habitats by contributing to the establishment and spread of NNIS and by causing an increase in the intensity, size, and frequency of wildland fire. However, increased wildland fire frequency could benefit some species, such as moose, by increasing availability of forage species. Key life cycle periods (such as breeding seasons) and migration periods may shift in response to climate change. Outbreaks of parasites and disease are also expected to increase in presence and impact.

***Effects under Alternative A***

Under Alternative A, the BLM would not implement adaptive management or actions to predict and plan for future changes in wildlife distribution and crucial periods. The BLM would continue to meet all applicable laws, regulations, and policies, which would include requirements to minimize impacts to SSS and migratory birds and would consider objectives for improving or maintaining wildlife habitat in its management approach.

***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would consider climate change and future changes to the planning area that have the potential to affect wildlife in its adaptive management approach. Climate change impacts would be considered in project approval and funding and in project design and operation. Adaptive management for vegetation would include modeling to predict changes in vegetation cover types, which would also guide adaptive management for wildlife. Adaptive management would also include the ability to shift proposed timing restrictions to adapt to changes in wildlife and SSS

crucial periods, such as nesting or calving. This management approach would help counteract some, but not all, cumulative climate change impacts to wildlife and SSS and their habitats.

The action alternatives would vary in terms of number of landscape connectivity corridors, and cumulative management actions associated with various resources and resource uses that could provide additional benefits to wildlife.

### ***Effects under Alternative B***

Alternative B would have the greatest effect on wildlife and SSS by creating two connectivity corridors that would maintain landscape connectivity between the Innoko and Yukon Delta NWRs and allow for future movement of wildlife and SSS in response to changing conditions associated with climate change. The combined effect of additional management actions for multiple resources and resource uses under this alternative, as described throughout the wildlife effects analysis, could provide some additional protections in certain habitat types in the planning area that may help counteract climate change impacts to wildlife and SSS in these areas and help maintain their function as wildlife movement corridors. Restrictions on development and other actions in riparian areas and within floodplains could help counteract climate change impacts to wildlife and SSS in these habitats by reducing the potential for impacts to wildlife and SSS from resource uses. In areas with special designations, such as ACECs, lands with wilderness characteristics, and WSRs, management restrictions that reduce impacts to wildlife and SSS may also help counteract climate change impacts to wildlife and SSS.

### ***Effects under Alternative C***

Under Alternative C, the BLM would establish one connectivity corridor, which would maintain landscape connectivity and allow for future movement of wildlife, but would provide fewer options for movement between the Innoko and Yukon Delta NWRs than Alternative B. The cumulative effect of additional management actions for multiple resources and resource uses under this alternative would be less than under Alternative B but could still include a reduction in impacts to wildlife and SSS occurring in areas where the additional management applies. Overall, this alternative would be less effective in counteracting cumulative climate change impacts than Alternative B.

### ***Effects under Alternative D***

Under Alternative D, the BLM would not establish any connectivity corridors for wildlife and SSS in the planning area. While the BLM would continue to implement adaptive management, it would not manage corridors to maintain landscape connectivity in the planning area, and wildlife movement across the landscape could be impeded by future development, although there are no medium or high mineral potential areas located between the two national wildlife refuges. There would also be fewer additional management actions that could reduce potential impacts to wildlife and SSS in certain areas and habitat types, compared to Alternatives B and C. Overall, management actions designed to counteract cumulative climate change impacts under Alternative D would be less effective than those under Alternatives B and C, but more effective than those under Alternative A.

### **Wildlife and Special Status Species: Cumulative Effects**

Table 3.3.3-7 summarizes the results of the cumulative impacts analysis for wildlife and SSS and their habitats for all alternatives.

**Table 3.3.3-7: Cumulative Effects Analysis for Wildlife and Special Status Species**

Trends and Forecasts of Wildlife and Special Status Species in Consideration of Past and Present Actions	Trends and Forecasts of Wildlife and Special Status Species in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Wildlife and Special Status Species in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Wildlife and Special Status Species in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Wildlife and Special Status Species in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Wildlife populations appear to be fluctuating within what is likely a natural range but are variable by species. Both the western Arctic and the Mulchatna Caribou herds are in decline. The other small non-migratory herds near the Kuskokwim River are stable or declining. Other species populations appear stable, such as Alaskan hare and many furbearers. Other populations may be increasing, such as plains bison, brown bear, black bear, and peregrine falcon. Other populations may be decreasing, such as muskox, Dall sheep, olive-sided flycatcher, and other migratory birds. For other species, such as lynx, red fox, and little brown bat, current trends are not known. Migratory bird species appear to be experiencing declines associated with impacts on winter ranges or migration routes outside of Alaska.</p> <p><b>Trend: No change overall for habitat but degrading for some species and improving for others.</b></p>	<p>Reasonably foreseeable future actions with the greatest potential to affect wildlife and SSS, based on likelihood of occurrence or predicted increases from current levels, include the Donlin Gold Project, other mineral exploration and mining and development of transportation corridors. While reasonably foreseeable future actions generally would have localized impacts on wildlife and SSS habitats, climate change would continue to alter habitats throughout the planning area, and cumulative impacts to certain populations or species could occur if key habitats are degraded or fragmented. Under this alternative, adherence to existing regulations and internal BLM guidance would continue to help prevent impacts to sensitive species and habitats.</p> <p><b>Trend: Existing trends would continue, with no trend overall, but degrading for some species and improving for others. With increased development in the planning area, species with affected habitat may experience a trend of increased degradation or lessened improvement.</b></p>	<p>Management under Alternative B would include BMPs/SOPs and additional restrictions that would provide localized protection to wildlife and SSS and habitats. Management specifically designed to prevent cumulative impacts to wildlife and SSS, including cumulative management decisions, adaptive management, and establishment of two connectivity corridors, would help offset landscape-level impacts to wildlife habitats.</p> <p><b>Trend: Improving. It is expected that implementing Alternative B would result in an improved trend for most wildlife and SSS. For species with habitat or populations that are degrading, this alternative would lessen the rate of degradation or stabilize or counter the existing trend. For species with habitat or populations that are improving, this alternative would allow the improvement to continue at a similar or greater rate.</b></p>	<p>Management under Alternative C would include BMPs/SOPs and additional restrictions to provide localized protection to wildlife and SSS and habitats, but to a lesser degree than under Alternative B. More decisions would be on a case-by-case basis than under Alternative B. Management specifically designed to prevent cumulative impacts to wildlife and SSS, including cumulative management decisions, adaptive management, and establishment of one connectivity corridor, would help offset landscape-level impacts to wildlife habitats.</p> <p><b>Trend: Varies between species. It is expected that implementing Alternative C would result in an improved trend for most wildlife and SSS. For species with habitat or populations that are degrading, the degradation may continue but at a lesser rate and could be stabilized. For forest and woodland species and species in areas of medium to high mineral development potential, there could be a trend of increased degradation or lessened improvement. For species with habitat or populations that are improving, this alternative would allow the improvement to continue at a similar or greater rate.</b></p>	<p>Management under Alternative D would include BMPs/SOPs and additional restrictions to provide localized protection to wildlife and SSS and habitats, but to a lesser degree than under Alternative B and for most resources to a lesser degree than under Alternative C. Many decisions would be made on a case-by-case basis, similar to Alternative A. Alternative D would include cumulative management decisions and adaptive management, but no connectivity corridors. In most cases, management would be somewhat more protective than under Alternative A. However, Alternative D would allow more unmanaged commercial woodland harvest and mineral development, which would have the potential to impact forest and woodland-dwelling wildlife, and wildlife occurring in areas of medium to high mineral potential to a greater degree than Alternative A.</p> <p><b>Trend: Varies between stable or declining. For forest and woodland species and species in areas of medium to high mineral development potential, trends could degrade as a result of the cumulative effects of future development, climate change, and fragmentation of habitats. These species would experience a trend of increased degradation or lessened improvement.</b></p>



## 3.4 Cultural Resources

### 3.4.1 Summary

This section describes the effect on cultural from proposed management actions of other resources and resources uses. Potential impacts derived from decisions regarding National Trail designations are described in Section 3.8. However, historic sites associated with the INHT are briefly mentioned in this section where appropriate, as there are certain defined management alternatives that have particular outcomes regarding these specific resources.

The planning area contains evidence of prehistoric and historic land use. Much of what is known about the cultural resources has been identified through project-specific surveys and literature reviews that covered larger portions of the planning area. There are several categories of cultural resources identified, and some, such as Traditional Cultural Properties (TCPs), Sacred Sites, or cultural landscapes, may not always have physical manifestations or tightly defined geographic boundaries. There are places of traditional importance in the planning area, but no formally defined TCPs or cultural landscapes have been identified. Alternative B generally provides a higher level of protection for cultural resources and therefore potential effects would be of lesser magnitude and geographic extent than Alternatives C and D. Management actions that provide beneficial impacts to cultural resources are consistent with DOI's mission to fulfil trust responsibilities and other legal requirements (DOI 2018).

### 3.4.2 Methods of Analysis

Addressing the impacts on cultural resources includes a review of the known resources in the planning area (Appendix M of the BSWI Draft RMP/EIS) that was then overlain with an understanding of the laws pertinent to determining and managing adverse effects on these resources. The information about known resources of the regulations used in evaluating impacts were then compared with each type of management action under each alternative to develop the analysis of actions that may affect known (and potentially discoverable) cultural resources.

### Potential Effects and Indicators

Actions that affect cultural resources can be categorized as direct and indirect, with any surface-disturbing activities having the potential to impact these resources. Direct impacts could result from any proposed management action that would involve surface- or subsurface-disturbing activities that may result in damaging, destroying, or displacing artifacts, features, objects, structures, and buildings, or adversely affecting cultural landscapes, including TCPs. Direct impacts to cultural resources may also include construction of modern facilities that are out of character with historic settings or other management decisions that directly alter any of the aspects of integrity that are determined essential in conveying a particular resource's significance. These disturbances can permanently destroy artifacts and features, historic architectural resources, or spatial relationships among multiple features and can ruin the interpretive value and significance of that resource.

Indirect effects on cultural resources may involve any actions that change the character of a cultural resources site and alter the property's use or the physical features that contribute to its significance. These actions can include introduction of visual, atmospheric, or audible elements that diminish the aspects of integrity deemed essential in conveying the site's significance. For example, development of oil or alternative energy facilities in the planning area could result in placing modern features on an otherwise natural landscape previously devoid of human-made structures, but which could still diminish the visual

setting of a significant cultural resource. Relatedly, any action that results in the potential for increased land use and access would increase the chance of site looting or inadvertent destruction of cultural resources. Transfer of land from BLM management may also indirectly affect cultural resources by removing the federal or State regulatory processes that serve protect them. Actions that may result in landscape reclamation would likely restore natural settings and may have beneficial impacts especially if they more closely resemble the prior historic setting. However, actions taken to achieve reclamation may lead to direct or indirect effects, particularly during the inadvertent discovery of new resources. Conversely, beneficial actions are those that protect more land from development and further use thereby conserving the cultural resources in those areas. Beneficial impacts may also arise from actions specific to identifying and evaluating more cultural resource sites or land use designations that promote cultural resource values over other land uses. Table 3.4.2-1 summarizes the types of effects that can generally occur to cultural resources.

### **Assumptions**

The cultural resource impacts analysis rests on the primary assumption that federal actions that require the identification, evaluation, and consideration of adverse effects and the appropriate mitigation of those effects on cultural resources will remain in effect. Nearly all implementation actions will undergo site-specific analysis regarding the potential impacts on cultural resources before authorization. If adverse effects are identified, mitigation measures, including avoidance, would be assessed and implemented to minimize effects.

Overall, actions associated with other resources that result in removal of lands from surface-disturbing activities would result in beneficial impacts (less chance of disturbance) to any resources that might be present. Conversely, actions that result in the potential for more surface-disturbing activities would result in increasing the probability of adverse effects on cultural resources. Impacts to cultural resources such as historic structures and Alaska Native sacred sites may result from management decisions from non-surface-disturbing activities that create auditory and/or visual effects. Impacts to Alaska Native traditional sites may result from management decisions that restrict traditional access or use of such sites.

The primary limiting factor of this analysis is that much of the planning area has not been surveyed for cultural resources, resulting in large tracts of land where quantifying resources and identifying impacts from site-specific actions is not possible. Therefore, this analysis does not attempt to quantify number of sites affected by specific actions, but rather focuses on resources and management actions under the assumption that there is potential for sites to exist across the landscape. The analysis also assumes that cultural resource sites have physical manifestations in the form of objects, artifacts, features, and geographic boundaries. Sacred sites and TCPs may exist across the landscape; analysis of these site types, effects on them, and appropriate mitigation, are best managed on a case-by-case basis.

### **Standard Operating Procedures and Best Management Practices**

The impact analysis below considers the SOPs and BMPs that could be implemented by the BLM. A comprehensive list of SOPs/BMPs pertaining to cultural resources is provided in the BSWI RMP/EIS.

**Table 3.4.2-1: Types of Effects to Cultural Resources**

Types of Effects	Management Actions	Indicators
Surface-disturbing activity can result in direct and indirect effects to cultural resources. These activities include but are not limited to actions for mineral development, timber harvesting, fire management and wildland fires, OHV use, and hazardous material cleanup. Effects can be demolition or destruction of cultural remains (direct) or creating access to areas with cultural resources that result in looting, vandalism, or inadvertent destruction of these resources (indirect).	<ul style="list-style-type: none"> <li>• Increasing land use that values development actions involving surface-disturbing activities over conservation</li> <li>• Hazardous Material Cleanup Decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres with no or limited land use restrictions that server to limit surface disturbance and protect cultural resources</li> <li>• Acres open to OHV travel, timber use, mineral development, and so forth</li> <li>• Areas subject to hazardous material cleanup</li> </ul>
Removal of existing protections for cultural resources can result in adverse impacts to these resources. For example, Section 106 may not apply to resources that are removed from federal ownership or archaeological investigations may no longer require permitting and curation of artifacts. The lack of permitting or Section 106 review means that direct or indirect effects would not be considered prior to an action, and cultural resources could be destroyed or damaged as a result.	<ul style="list-style-type: none"> <li>• Land transfer out of federal or State management removes ability to use existing legislation and policy to protect cultural resources</li> <li>• Decisions resulting in less restrictive permitting requirements prior to commencing activity may lead to impacts on cultural resources</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of BLM-managed lands identified for acquisition, retention, or disposal</li> <li>• Acres affected by land withdrawals</li> <li>• Acres subject to particular permitting stipulations for land use</li> </ul>
Designating areas to promote cultural resource protection values or further enhancing protections of known sites would advance preservation and public outreach about cultural resources.	<ul style="list-style-type: none"> <li>• Land designations (e.g., ACECs, WSRs, National Register Nominations) that promote scientific use and natural resource conservation values over other land uses</li> </ul>	<ul style="list-style-type: none"> <li>• More or fewer acres with land use restrictions that server to limit surface disturbance and protect cultural resources or result in further resource identification</li> </ul>
Indirect effects (e.g., visual, atmospheric, subsequent erosion, increased access)	<ul style="list-style-type: none"> <li>• Land designations that do not consider visual resource management classifications in areas of known sites (particularly historic buildings and trails)</li> <li>• Actions that introduce the potential for new visual elements in otherwise natural landscapes</li> <li>• Establishment of ROW, recreation facilities, and other actions that result in increased populations and use of an area</li> </ul>	<ul style="list-style-type: none"> <li>• Acres with particular VRM designations near known sites, particularly the INHT NTMC</li> <li>• Acres with no or limited (less restrictive) land use designations regarding development uses</li> </ul>

### 3.4.3 Effects Analysis

A variety of management actions related to resources and resource uses have the potential to adversely and directly or indirectly impact cultural resources. Any management action that preserves more land, and/or restricts land use (e.g., exclusion of areas such as connectivity corridors from mineral development) would have less potential for impacts than the action alternatives with fewer land use restrictions.

Proposed management of the following resources, resource use areas, or programs would have no anticipated effects for all alternatives and are not analyzed further:

- Air Quality and AQRVs
- Soils

- Water Resources and Fisheries
- Vegetation
- Wildlife
- NNIS
- Paleontological Resources

Any management action that has the potential to result in surface disturbance, increased land use and access, or the introduction of new visual, auditory, or atmospheric elements has the potential to impact and adversely affect cultural resources. This analysis targets specific management actions by alternative that could have these impacts.

### **Cultural Resources: Effects from Wildland Fire Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

#### ***Effects under Alternative A***

Under Alternative A, wildland fire management objectives include protection of significant of cultural sites. However, some wildland fire management activities would involve surface disturbance and could impact cultural resources.

#### ***Effects Common to All Action Alternatives***

The following wildland fire management actions have the potential to impact and adversely affect cultural resources:

- Wildfire and Fuels Management
- Suppression Repair and ES&R

Each of these management actions involves surface-disturbing activities and wildland fire itself can directly impact both surface and near-surface resources. Impacts can occur when historic structures burn down, heat-sensitive artifacts are destroyed, or tree-throws of burned trees disturb archaeological deposits. Suppression activities, such as mobilizing heavy equipment and cutting fire lines and fuel breaks, can directly and permanently impact these resources by crushing artifacts or disturbing site features with primitive roads. Additionally, use of fire retardants during fire suppression activities could also affect cultural resources, possibly affecting their radiocarbon dating. Indirect effects may include providing easier access to previously isolated areas and removing vegetation screening that would allow for improved visibility of cultural resources artifacts and features, which could result in increased looting or site vandalism. Wildland fire and burn areas may also result in indirect visual impacts on sites where setting and feeling are important in conveying significance. Both historic buildings/structures and prehistoric artifacts may be more visible post-burn.

Management actions under each alternative would prioritize avoidance and minimization of impacts on known cultural resources, such as targeting fuel reduction actions in areas with known cultural resources or near historic buildings and structures associated with the INHT. Cultural resource evaluations would be required prior to such actions, and minimum impact suppression techniques would be used. Avoiding and

minimizing impacts on cultural resources is an identified supporting objective to reduce adverse effects of wildland fire management activities. These actions would help minimize the destruction of cultural resources by better preventing damage to vehicular travel and surface-disturbing activities that could result from fire suppression actions.

### **Cultural Resources: Effects from Cultural Resources Management Actions**

There are no action alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

#### ***Effects under Alternative A***

Alternative A generally reiterates that Section 106 compliance is required and does not include additional management actions to protect cultural resources.

#### ***Effects Common to All Action Alternatives***

The management actions common to all action alternatives would be largely beneficial. Under all action alternatives, there would be more acres surveyed, sites identified, and resources protected compared to Alternative A. More sites would also be designated for scientific use (except INHT trail segments) and other sites would be considered for public use. High priority areas for survey and protection would be identified under each alternative, and all authorizations for land use would continue to comply with Section 106 of the National Historic Preservation Act of 1966 (NHPA). Potential impacts to significant resources from emergency and planned fire-related actions would be avoided or minimized to the maximum extent possible.

### **Cultural Resources: Effects from Visual Resources Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- INHT (Main Trail) and Iditarod-Anvik Connecting Trail
- Community of Flat
- ACECs

#### ***Effects under Alternative A***

Effects under Alternative A on cultural resources are primarily related to the designations of VRM classes in a 15-mile buffer zone around the community of Flat. Alternative A does not provide any management direction, which may result in indirect impacts to the community's setting resulting from new construction that is not consistent with BMPs aimed at reducing and minimizing visual impacts from new projects in the planning area. The new construction may disrupt site lines or diminish the historic feeling by adding an incongruous and modern building into an otherwise historic setting. This action may result in increased opportunity for adverse effects on the setting and feeling of this historic community. Similarly, no current management direction for ACECs with respect to visual resource management is provided under Alternative A. This lack of VRM classifications in the ACES could also result in indirect visual impacts on cultural resources at those locations.

***Effects Common to All Action Alternatives***

Effects common to all action alternatives may indirectly and positively affect cultural resources. For example, application of the visual management BMPs for all actions will serve to indirectly reduce impacts on cultural resources where setting is an important quality in conveying the resource's significance. The utilization of curvilinear or topographic sloping, retaining existing formations and vegetation, blending new structures into the surrounding environment, avoiding fall line cuts and linear alignments, and required restoration/reclamation all serve to preserve or enhance the natural setting and limit indirect adverse visual impacts. Visual intrusions on historic and natural landscape viewsheds would be reduced by these actions. Indirect visual effects are more common to consider for historic built-environment resources, particularly when the setting, feeling, and location are essential for conveying significance.

***Effects under Alternative B***

Alternative B proposes a VRM Class II designation for the 15-mile buffer around Flat. This action would have fewer impacts from visual intrusions of new projects near the historic community compared to any other alternative because it has the largest geographic scope and highest VRM class designation compared to the other alternatives. This limits the potential for indirect visual impacts on cultural resources.

More land is assigned to ACECs meeting relevance and importance criteria for cultural resources under Alternative B than under Alternative A, C, or D. Increased acreage of VRM Class II for the ACECs for cultural resources total 13 percent of the planning area under this alternative, which reduces the likelihood of adverse effects to the setting and feeling of cultural resources in these areas. This represents more acreage in a higher designation (VRM Class II) status that would minimize impacts on cultural resources in those areas by being more restrictive on the extent and type of new development.

***Effects under Alternative C***

Alternative C proposes a VRM Class III designation for the 15-mile buffer around Flat. This action would result in more impacts than Alternative B (lower VRM designation) but fewer than Alternative D. VRM Class III allows a moderate level of change to the characteristic landscape, which could potentially result in adverse impacts to the historic community at Flat, depending on the nature and type of the development. Alternative C would have the potential to result in more indirect effects to cultural resources from visual impacts than Alternative B, because it would increase the likelihood of introducing new visual elements into the landscape that adversely affect the setting and feeling of cultural resources in those areas.

***Effects under Alternative D***

Alternative D proposes a VRM Class IV designation for the 15-mile buffer around Flat. VRM Class IV allows a high level of change to the characteristic landscape, which would have the potential to result in adverse effects of higher magnitude and extent than Alternatives B and C. It allows for more visually intrusive elements to be introduced into the landscape that could impact the setting and feeling of cultural resources in those locations. Alternative D would have a greater potential to result in visual intrusions from new projects near the historic community at Flat, compared with Alternatives B and C.

No ACECs are proposed under Alternative D, which may result in the opportunity for more indirect impacts on cultural resources compared with Alternatives A and B. Collectively, Alternative D would designate approximately 49 percent of the planning area as VRM Class IV. This action would increase the likelihood of adverse effects and indirect visual impacts on cultural resources in the planning area by allowing for the potential of new visual elements into areas where setting and feeling are important qualities to cultural resource significance, compared with Alternative B and C.

### **Cultural Resources: Effects from Lands with Wilderness Characteristics Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Lands managed to protect wilderness characteristics as a priority over other resources values and multiple uses
- Lands managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics
- Lands managed to emphasize other resource values and multiple uses as a priority over protecting wilderness characteristics

#### ***Effects under Alternative A***

Actions under Alternative A do not address wilderness characteristics within the planning area. The SWMFP aims to maintain natural conditions and opportunities for solitude but does not offer specific management of lands with wilderness characteristics. Direct and indirect impacts on cultural resources under Alternative A are more likely to occur as there are no defined wilderness areas that would limit development in those areas. BMPs would still apply to proposed actions in these areas even without specific wilderness status.

#### ***Effects under Alternative B***

Alternative B would have the lowest potential for adverse impacts on cultural resources. Alternative B would manage roughly 2 percent of the planning area for lands with wilderness characteristics as a priority. These lands would be designated as VRM Class II, prohibit cross-country casual OHV use, and limit summer OHV subsistence use to existing trails, which would limit adverse effects on cultural resources in those areas by reducing the opportunity for direct effects on areas across a larger acreage. Indirect effects would also be limited by actions related to new facility design where native materials are used, which would reduce adverse visual impacts. Acquisition of non-BLM lands and retention of wilderness lands to consolidate holdings and improve management of natural values or primitive settings would also be beneficial for cultural resources, as would the prohibition of actions that may cause direct or indirect effects, such as limiting commercial or personal-use wood cutting and closing areas to salable mineral development.

Alternative B would manage approximately 89 percent of the planning area to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Under this management direction, actions such as leasable and locatable withdrawals would remain permissible, but buffer zones would be established around the INHT at Kaltag Portage,

Farewell Burn, and Rohn. Buffer zones and other restrictions protect against surface-disturbing actions that could damage or destroy cultural resources. NSO provisions would be included at these locations, reducing the potential for direct and indirect effects on the INHT and related resources. The remaining 9 percent of the planning area would not provide any specific management for cultural resources associated with lands with wilderness characteristics.

### ***Effects under Alternative C***

Alternative C would not manage any lands with wilderness characteristics as a priority. Alternative C would manage roughly 60 percent of the planning area to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics, compared to 89 percent under Alternative B. Impacts to cultural resources would be the same as under Alternative B, although to a lesser geographic extent (fewer acres of lands with wilderness characteristics considered), thereby resulting in higher potential for impacts to cultural resources than Alternative B.

### ***Effects under Alternative D***

Alternative D would have the highest potential for impacts on cultural resources, as no lands would be managed for wilderness characteristics. There are no buffers or other activity exclusions that would serve to limit or eliminate the potential for direct or indirect impacts on the INHT and associated sites or other cultural resources in the planning area

## **Cultural Resources: Effects from Forestry and Woodland Products Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Permitted Commercial Woodland Harvesting Areas
- Personal Use and Subsistence Woodland Harvest Areas
- Woodland Harvest in the INHT NTMC
- Woodland Harvest in ACECs
- Forestry BMPs for Commercial Activities

### ***Effects under Alternative A***

Alternative A management actions related to providing for sustained yields of forest resources and continuation of present use levels could directly and indirectly effect cultural resources. Timber harvesting and associated activities, such as constructing timber roads, mobilizing forestry equipment, and cutting trees, disturbs the ground surface and can lead to the destruction and damage of cultural resources. Pre-suppression efforts can also damage sites. These adverse effects are mitigated in part by requiring a permit, which triggers Section 106 of the NHPA, but no special provisions for cultural resources are defined in Alternative A for permitted commercial woodland harvesting.

A similar pattern applies to impacts resulting from personal use and subsistence woodland harvest areas, though the extent (fewer acres subject to harvest) and intensity (more dispersed harvests) are less than commercial timbering. Personal use still represents an action that can impact cultural resources, but again effects would be minimal in comparison to commercial activity



***Effects Common to All Action Alternatives***

Forestry and woodland products management actions include surface-disturbing activities that have the potential to adversely affect cultural resources by directly destroying them, or by resulting in visual landscape changes that adversely alter the viewshed, which might be an important component of a historic site. The actions common to all alternatives serve to reduce and minimize effects on cultural resources by requiring case-by-case surveys of harvest activity locations for sensitive resources in the planning area. All commercial harvesting would require a permit, and the permitted activity would trigger Section 106 of the NHPA.

***Effects under Alternative B***

Commercial woodland harvest management under Alternative B minimizes impacts to cultural resources. Harvesting in the INHT NTMC is prohibited in this alternative, which results in less potential for direct or indirect effects on that resource and associated buildings, structures, and sites. Lands within the Unalakleet Wild River Corridor, 100-year floodplains within HVWs, ACECs, and lands managed for wilderness characteristics as a priority would also be excluded from harvesting. Areas within 15 miles of rivers and 25 miles of communities, as well as burned areas, remain open for commercial woodland harvest by permit, so direct and indirect effects remain possible under this alternative. These riverine locations and areas near communities are also typically the highest potential areas for the identification of cultural resources maintaining the likelihood of adverse effects from commercial operations on cultural resources near rivers and communities. This alternative offers the most land excluded from commercial harvest and avoids and minimizes impacts on cultural resources in those areas.

***Effects under Alternative C***

Direct and indirect effects of commercial woodland harvest under Alternative C are more likely than under Alternative B because more land would be available for harvest. In particular, commercial woodland harvest would be permitted in the INHT NTMC, raising the potential for direct and indirect effects (particularly visual impacts) on the INHT and associated historic sites under Alternative C.

***Effects under Alternative D***

Alternative D has the highest potential for direct and indirect effects from commercial woodland harvest in comparison to the other alternatives. Subsistence study/exchange withdrawals closed to commercial sales under Alternative A would be open for permissible commercial woodland harvest under Alternative D. Relatedly, all of the planning area would be open to personal use and subsistence woodland harvest without a permit. More acreage is available under Alternative D for timber harvest, which represents the largest geographic area where surface-disturbing activities could result in the destruction of cultural resource or lead to substantial landscape-level visual changes that may impact the visual setting and feeling of particular cultural sites.

**Cultural Resources: Effects from Grazing Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Open/Closed to Grazing

- Areas Closed to Grazing

#### ***Effects under Alternative A***

Under Alternative A, areas within the planning area that overlap with the previous SWMFP planning area would remain open to grazing where feasible. There are no specific considerations for the impacts on cultural resources, though site-specific inventories would be performed to determine needs for surface protections. Cultural resources can be trampled by grazing (direct effect) or damaged by increased erosion due to vegetation removal (indirect effect). Construction of support structures and fencing may also directly damage or destroy cultural resources

#### ***Effects under Alternative B***

Alternative B would close all BLM-managed land in the planning area to grazing, resulting in no impacts to cultural resources under this alternative as the types of activities that could affect resources are not permissible.

#### ***Effects under Alternative C***

Alternative C would allow grazing where ecological conditions allow, which includes areas with at least 20 percent lichen cover. While impacts to archaeological resources remain possible from trampling and erosion or the construction of support structures, the NEPA analysis would identify impacts on any identified resources in the grazing permit area.

Alternative C closes areas with important fish and watershed values in the Nulato River watershed, the Unalakleet Wild River Corridor, and the INHT NTMC to grazing. These closures would eliminate the potential for impacts on cultural resources in those locations.

Additionally, under Alternative C, management actions would ensure surface-disturbing rangeland improvements would be subject to applicable site surveys, OHV limitations for TMAs would apply to grazing unless otherwise authorized by the AO, Comprehensive Grazing Management Plans would be required, and rangeland improvements (e.g., line cabins, corrals) would not be allowed in areas managed as NSO for permanent structures associated with surface-disturbing activities. These actions would reduce the potential for impacts on cultural resources by limiting the surface-disturbing activities and subsequent increased erosion that could destroy resources.

#### ***Effects under Alternative D***

Alternative D includes similar protections and management actions to reduce impacts as Alternative C. However, Alternative D specifically allows for grazing in the INHT NTMC only if it does not affect the historical and cultural setting of that specific resource. Other areas would still be open to grazing on a case-by-case basis and subject to NEPA analysis.

No areas would be closed to grazing under Alternative D, which would result in higher potential for direct and indirect effects resulting from trampling and erosion when compared with the other alternatives.

### **Cultural Resources: Effects from Locatable and Salable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Locatable Minerals
- Salable Minerals

#### ***Effects under Alternative A***

Under Alternative A, roughly 294,325 acres of high and medium mineral potential would continue to be open to mineral development. Alternative A has 91,714 more acres open to locatable mineral development that has medium or high mineral potential than Alternative B. However, it has 271,163 fewer acres of medium or high LMP that would be open than Alternative C and D. Therefore, Alternative A has the potential to have more impacts to cultural resources than Alternative B, but less than Alternatives C and D. Mining developments may result in direct site destruction through activities such as mineral excavation, construction of roads and building pads, or changing water courses and leading to increased erosion.

#### ***Effects Common to All Action Alternatives***

Mineral material sales have the potential to directly and indirectly impact cultural resources through damage and destruction of those resources from development or indirect effects associated with alterations to the visual characteristics that may be important aspects of certain cultural resources. Many of the high or medium probability areas for locatable and saleable mineral deposits are proximate to historic mining sites. The historic use of the area for mining and the resultant cultural resources associated with those activities are more susceptible to damage and destruction from current mining activity because of this collocation. This is particularly the case with the INHT and some communities in the planning area (e.g., Flat, Iditarod, Ophir) that date to the historic mining era. Mining activities are often longer duration uses (multiple years vs. a few weeks) and introduce more people into the area, which further increases the opportunity for direct and indirect effects on cultural resources as a result of site vandalism or inadvertent destruction from new vehicle or pedestrian traffic. Placer mining also involves larger areas of surface-disturbing activities and is typically along creeks and rivers. Size and location, when considered with the high-probability locations of historic and prehistoric sites, represents an increased potential for adverse effects on cultural resources at these locations. There is a high potential that mining actions involving surface disturbance, such as dredging, sluicing, and excavating can directly destroy or damage resources.

Lands where mining is proposed would be subject to existing processes and permitting requirements to consider impacts on cultural resources. While representing a small portion of the overall BLM-managed lands in the planning area (4 percent), the potential for impacts on historic and prehistoric sites in high and medium potential areas remains.

#### ***Effects under Alternative B***

Alternative B would have the fewest acreage open to locatable mineral development and salable mineral development. Alternative B would open 202,610 acres of medium or high mineral potential from mineral development, which is less than any other alternative. Therefore, Alternative B would have fewer impacts to cultural resources associated with mineral development activities than any other alternative.

***Effects under Alternative C***

Alternative C has the same acreage open to locatable mineral development and salable mineral development as Alternative D; although approximately half of the area open to salable development is open on a case-by-case basis so the likelihood of development and associated impacts in those areas are less than areas strictly identified as open. This is because areas open on a case-by-case basis would be subject to site-specific decisions and analysis. However, Alternative C would be open to locatable mineral development in all areas of medium or high mineral potential on BLM-managed land in the planning area; the same as Alternative D but more than Alternatives A and B. Alternative C would have higher potential impacts to cultural resources from mineral activity than Alternatives A or B.

***Effects under Alternative D***

Alternative D would have more acreage open to locatable mineral development and salable mineral development than Alternative B but similar to Alternative C as described above. It would have the highest potential to impact cultural resources from mineral activity than any other alternative since salable mineral development, and associated impacts would have a higher likelihood to occur under Alternative D as described above.

**Cultural Resources: Effects from Leasable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Leasable Minerals
- Areas Identified as Closed to Leasing and Open to NSO Leasing

***Effects under Alternative A***

Under Alternative A, existing actions would continue, with limited exclusions. There is a specific exclusion for the portion of the INHT in the Lime Village block to protect the integrity of the trail and associated historic sites.

***Effects Common to All Action Alternatives***

The development of leasable minerals holds the potential to directly and indirectly impact cultural resources through damage and destruction of those resources from development or indirect alterations to the visual characteristics that may be important aspects of a resource's historic significance, such as the INHT. The entire planning area is open to leasable minerals actions. All actions would be subject to NEPA and NHPA analysis, which would identify and mitigate impacts to some level to cultural resources on a case-by-case basis. Overall, while the potential for leasable minerals remains low over the entire planning area, potential for impacts on cultural resources do remain wherever the actions may occur.

***Effects under Alternative B***

Under Alternative B, approximately 9,350,881 (69 percent) acres would be closed to mineral leasing, 1,597,599 acres (12 percent) would be open to mineral leasing subject to NSO, and about 2,517,414 acres (19 percent) would be open to leasing subject to standard stipulations. Impacts to cultural resources would be avoided in areas closed to mineral leasing because surface disturbance would not occur here. For areas open subject to NSO, impacts would be minimized and avoided due to highly restrictive lease

stipulations. However, directional drilling could occur, if technologically and economically feasible, which could damage or destroy sub-surface resources. The INHT would be closed to mineral leasing. More acreage is closed to mineral leasing under Alternative B than any other alternative, resulting in a smaller geographic extent where impacts are possible.

### ***Effects under Alternative C***

Under Alternative C, roughly 46,953 acres (<1 percent) would be closed to mineral leasing, approximately 6,824,035 acres (51 percent) would be open to mineral leasing subject to NSO, and about 6,594,906 acres (49 percent) would be open to leasing subject to standard stipulations. Alternative C would have a higher potential to affect cultural resources from leasable mineral activity than Alternative B because it would have fewer areas closed or subject to highly restrictive lease stipulations and would also include more areas where only standard terms and conditions would be required. More restrictive lease applications allow for a more detailed review for resources of concern in the lease areas. The INHT NTMC would be open subject to NSO.

### ***Effects under Alternative D***

Under Alternative D, roughly 46,953 acres (<1 percent) would be closed to mineral leasing, 241,155 acres (2 percent) would be open to mineral leasing subject to NSO, and 13,177,785 acres (98 percent) would be open to leasing subject to standard stipulations. Alternative D would have the highest potential to affect cultural resources from leasable mineral activity than Alternatives B and C because it would have fewer acres closed or subject to highly restriction lease stipulations and would include the most acres where only standard terms and conditions would be required. The INHT NTMC would be open subject to standard stipulations and could be damaged or destroyed by construction or infrastructure development and indirect effects related to the introduction of new visual elements that could diminish the historic setting and feeling.

## **Cultural Resources: Effects from Lands and Realty Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Retention or Revocation of Land Withdrawals
- Land Tenure Decisions for the INHT
- Occupancy Leases
- ROW Exclusion and Avoidance Areas
- Land Acquisition and Disposals

### ***Effects under Alternative A***

Generally, Alternative A provides no direction regarding lands and realty management actions. The SWMFP states that some historic sites within the INHT may be suitable for renovation and adaptive use, but that permanent occupancy would be discouraged, resulting in the potential for direct and adverse impacts to these sites, as new construction or reuse of historic sites may diminish the qualities of those sites that make them historically significant. Section 106 processes would apply in terms of considerations for renovations and adaptive uses. The SWMFP also includes objectives for land disposal

to provide for the continuing adjustment of land ownership to make each agency's lands as manageable as possible. These management actions present the potential for adverse effects to cultural resources because they may result in the removal of land from BLM management. Without federal management, the laws and policies that guide the consideration of impacts on cultural sites would no longer apply, and resources could be looted, collected, vandalized, or destroyed.

### ***Effects Common to All Action Alternatives***

The authorization of new ROWs may result in new surface-disturbing activities that would directly and adversely impact cultural resources by construction and improvements within the ROW that could lead to destruction of cultural resources. There is also the potential for indirect effects. New access to areas made possible through new ROWs that were previously inaccessible may result in increased use of an area and subject sites there to intentional or unintentional impacts such as looting or trampling.

Land transfers out of federal management would result in the removal of federal regulations protecting cultural resources. Transfers to the State of Alaska retain some level of protections under State law, and there are agreements between BLM and the State, such as the Programmatic Agreement Under the National Historic Preservation Act for Land Transfers to the State of Alaska, that govern the consideration of impacts resultant from land conveyance. If lands are transferred to private entities or Native corporations, municipalities, or individuals, no such protections or considerations would be retained, and the potential for impacts due to lack of oversight on cultural resources increases.

All action alternatives proposed revoking land withdrawals that may subsequently lead to lower levels of protections on resources within the withdrawal areas being revoked, as these lands would be open to other uses (e.g., mineral leasing) with their effects previously noted.

### ***Effects under Alternative B***

Alternative B represents the lowest potential for adverse effects on cultural resources. The BLM would establish a 1,000-foot-wide buffer around the INHT in Farewell Burn and Kaltag Portage that would withdraw it from salable, locatable, and leasable minerals, avoiding direct or indirect visual impacts from mineral development on sites in those areas. The withdrawal would also include the Bear Creek Cabin and access trail and the entire Rohn parcel. All lands in the INHT NTMC would be retained by BLM. Alternative B also includes ROW exclusion areas and avoidance areas that would serve to protect cultural resources; the INHT NTMC would be excluded from new ROWs and wind energy development, and occupancy leases would be more restrictive, such as not allowing cabins within 300 feet of riparian areas. This would lower the number of people in particular areas and decrease the opportunity for indirect effects related to vandalism or looting. The BLM would pursue opportunities to acquire land in the INHT NTMC. Areas available for land exchange would be limited and exclude lands managed for wilderness characteristics as a priority, ACECs, and connectivity corridors. Collectively, these actions would reduce the potential for direct and indirect effects on cultural resources by maximizing acreage in the planning area with restricted land uses and lowering the acreage available for development.

### ***Effects under Alternative C***

Alternative C offers similar management decisions as Alternative B. For example, the BLM would continue to retain current lands and pursue land acquisitions within the INHT NTMC. A FLPMA withdrawal would be established on a 1,000-foot-wide buffer around the INHT in Farewell Burn and

Kaltag Portage; however, the determination on whether the FLPMA withdrawal would include salable, leasable, and/or locatable minerals would be determined when the withdrawal is proposed. The withdrawal would also include the Bear Creek Cabin and access trail and the entire Rohn parcel, as with Alternative B. There are no ROW exclusion areas, and the INHT NTMC would be managed as a ROW avoidance area, a less protected status than an exclusion area. Only slightly more acreage would be available for exchange in Alternative C (roughly 356,942 acres; 3 percent) compared with Alternative B (roughly 342,360 acres; 3 percent). This alternative represents a higher likelihood for direct and indirect adverse impacts on cultural resources than Alternative B, but less likelihood than Alternatives A and D based on the acreage subject to the various land use designations that would limit surface-disturbing effects.

#### ***Effects under Alternative D***

Alternative D includes management decisions with the highest likelihood of direct and indirect adverse effects on cultural resources. There would be no ROW exclusion areas, and the avoidance areas are substantially less than in the other action alternatives. ROWs would be authorized in the INHT NTMC if consistent with the historic values for which the corridor is managed. Permits and leases are less restrictive, no lands would be pursued for acquisition, and more lands would be available for disposal or exchange than those available for exchange under Alternative B and C. In effect, more acreage is available under Alternative D for uses that involve surface-disturbing activities and there are less resource-specific considerations for the INHT and associated historic sites.

### **Cultural Resources: Effects from Recreation and Visitor Services Management Actions**

#### ***Effects under Alternative A***

Under Alternative A, impacts to cultural resources could result from intentional or unintentional trampling, looting, or vandalism of sites by visitors. Due to the lack of recreation facilities in the planning area, the potential for impacts to cultural resources from recreation management remains low under this alternative.

#### ***Effects Common to All Action Alternatives***

Many of the effects of recreation and visitor services apply directly to the use of the INHT NTMC, and those effects are covered in more detail in Section 3.8, "National Trails." Effects common to all action alternatives have the potential to directly or indirectly cause adverse impacts on cultural resources. Much of the recreation activity in the planning area, including the activity conduction under SRPs, involves overland travel via plane, OHV, or snowmobile. The impacts of recreation activity vary based on the method of transportation used. Direct effects can occur from the construction of new facilities (e.g., airstrips), signage, and trail improvements to support recreation and public access. Recreation facilities are also often located in areas of known prehistoric and historic sites, increasing the potential for adverse effects on these resources at or near developed recreation sites. Any increase in access may result in damage to cultural sites by increasing accessibility and use in given areas, which can lead to intentional, or unintentional trampling, looting, or vandalism of sites by visitors. Litter, multiple camp locations, braided trails, and the presence of more people all represent activities that can indirectly affect the setting, feeling, and other aspects important to the significance of historic and prehistoric sites in an area. More people also increases the possibility for inadvertent fire damage resulting from uncontrolled fires started

by campfires. Effects of these actions would be minimized in part by prohibiting users from constructing permanent and semi-permanent tent platforms, camp sites, and hunting blinds unless permit approved.

Generally, management decisions at the recreation unit level address items such as the permitting required for users, length of stay, number of allowable persons, and managing multi-use conflict. Decisions about density and intensity of allowable use have the potential to increase or decrease potential effects to cultural resources in particular areas, as do decisions about transportation allowed for particular recreation activities.

### ***Effects under Alternative B***

Recreation along the INHT would be managed within the INHT SRMA to achieve desired outcomes, benefits, and setting, thereby reducing the potential for direct and indirect effects. Managing Community Focus Zones (CFZs) to promote subsistence use will limit use within these areas, thereby limiting potential for destruction, looting, or inadvertent damage to cultural resources in those areas. There would be a 3-day stay limit on public shelter cabins for casual use, and only use of dead or downed trees would be allowed for wood stoves in the cabin, which would preserve the integrity of the setting.

### ***Effects under Alternative C***

Impacts to cultural resources from recreation management decisions would be the same as Alternative B.

### ***Effects under Alternative D***

Under Alternative D, there would be no CFZs and no restrictions on woodcutting for use in stoves. Therefore, Alternative D would provide less protection to cultural resources, including the INHT, than Alternative B and C.

## **Cultural Resources: Effects from Travel and Transportation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- All Lands Not Managed as TMAs or Conservation System Units
- Unalakleet Wild River Corridor Travel Management Decisions
- INHT NTMC TMA
- Rohn Site Travel Decisions
- Lands Managed for Wilderness Characteristics TMA
- Travel Management in ACECs

### ***Effects under Alternative A***

Under Alternative A, the entire planning area is managed as “undesigned” with the exception of the Unalakleet Wild River Corridor which does not allow casual OHV use. Therefore, impacts to cultural resources from erosion and surface disturbance from OHV use would have a greater potential to impact cultural resources in the vast majority of the planning area.



***Effects Common to All Action Alternatives***

Management decisions common to all alternatives for motorized travel (e.g., OHVs, snowmobiles) help reduce the potential for direct and indirect impacts on cultural resources and in some cases have beneficial outcomes. For example, areas known to have high OHV use would be prioritized for natural and cultural resources surveys to assess levels of destruction or erosion on these resources. This action would lead to increases in acres surveyed, more acres subject to probability analysis of sites, increased number of sites identified and evaluated, and improved understanding of resource types and locations in the planning area. Similarly, the majority of BLM-managed lands in the planning area would be designated as “limited” for motorized travel, which reduces the potential for adverse effects related to erosion along trails. Much of the planning area is seldom accessed, so impacts on cultural sites would be generally limited to the areas identified for regular use. While much access occurs in winter, which naturally reduces impacts to surface and near-surface sites, fall and spring use of OHVs is also common, which has a much higher potential to affect cultural resources. Maintaining areas as “limited” would keep OHVs on existing routes and minimize the potential to damage cultural resources. Importantly, most of the planning area has not been surveyed for cultural resources. Existing routes in limited areas and in areas where cross-country travel is allowed may contain cultural resources that are already being impacted by these uses.

Pedestrian use would not be prohibited throughout the entire planning area. This action may result in effects on cultural resources, such as inadvertent trampling, but given the limited acreage that would be traveled by foot within the entirety of the planning area, these impacts would be minor.

***Effects under Alternative B***

Erosion and surface disturbance from cross-country summer travel could impact cultural resources. Under Alternative B, casual OHV use and subsistence OHV use would be prohibited for roughly 565,955 acres (4 percent) and 241,512 acres (<2 percent), respectively. OHV access would be limited to existing trails on approximately 12,899,939 acres (96 percent) for casual use and about 324,443 acres (3 percent) for subsistence use, which would protect cultural resources by limiting vehicular travel to previously disturbed areas with existing trails. Additionally, the INHT NTMC would be managed as a TMA, which would prohibit both casual and subsistence cross-country OHV use, thereby better protecting cultural resources from increased traffic and volumes of people that could result in destruction of sites and features. More acreage is protected from surface-disturbing activity under Alternative B than the other alternatives.

***Effects under Alternative C***

Under Alternative C, OHV use and subsistence casual OHV use would be prohibited for approximately 225,925 acres (2 percent). OHV access would be limited to existing trails on roughly 13,239,969 acres (98 percent) for casual use and no acres for subsistence use. Additionally, the INHT NTMC would be managed as a TMA and have the same management as Alternative B. Overall, Alternative C would have fewer acres with restrictions to OHV cross-country travel than Alternative B and more potential for impacts to cultural resources.

### ***Effects under Alternative D***

Under Alternative D, casual cross-country OHV use would be prohibited for approximately 225,925 acres (2 percent); subsistence use would not be prohibited. OHV access would be limited to existing trails on roughly 46,953 acres for casual use and about 225,925 acres (2 percent) for subsistence use. Additionally, the INHT NTMC would be managed as a TMA, which would prohibit casual OHV use and only allow subsistence OHV use on existing trails. Overall, Alternative D would have fewer acres with restrictions to OHV cross-country travel than Alternatives B and C and more potential for impacts to cultural resources.

### **Cultural Resources: Effects from Areas of Critical Environmental Concern Management Actions**

Designation of ACECs provides management actions that protect cultural R&Is and reduces potential impacts on cultural resources. Uses within ACECs are purposefully limited specifically to protect and prevent irreparable damage to important historic, cultural, or scenic values.

Potential impacts from the following management topics were considered:

- ACEC Actions by Alternative – Cultural Resource Management Decisions

### ***Effects under Alternative A***

Alternative A would maintain the current ACEC designations on BLM lands; there would be no changes to current ACECs or the addition of new ACECs. Alternative A generally prescribes a cultural resource survey prior to BLM-permitted activities in ACECs, which helps minimize impacts on identified resources. The Drainages of the Unalakleet ACEC is the only existing ACEC with defined relevant and important cultural values. This roughly 403,378-acre area would benefit from cultural resource surveys to protect relevant and important cultural values.

### ***Effects under Alternative B***

Alternative B has the most total acreage designated as ACECs in the planning area (29 percent) compared with Alternative A (14 percent) and Alternative C and D (both 0 percent). Alternative B would best protect cultural resources within those ACECs. Alternative B includes four potential ACECs that meet the relevance and importance criteria for cultural resources and have specific cultural resource management decisions described for them. These include the Anvik Traditional Trapping Area ACEC, the Sheefish ACEC, the Tagagawik River ACEC, and the Unalakleet River Watershed ACEC. Alternative B would avoid and minimize impacts to more acreage in ACECs than the other alternatives, and the new designations have cultural resource-specific values that would be promoted with these designations. ACECs would be managed as NSO for any externally proposed structures. This would lead to more acres where impacts from surface-disturbing activity would be avoided that might destroy or damage cultural resources, or an increase in the number of sites identified through survey work in the ACECs. Newly identified sites could then be better managed and protected and would otherwise likely not have been identified without the ACEC designation.

### ***Effects under Alternative C***

Alternative C does not have any acreage managed as ACECs and thus along with Alternative D has the highest likelihood of direct and indirect effects on cultural resources as it has the fewest acres designated for this use.

***Effects under Alternative D***

Alternative D does not have any acreage managed as ACECs and would have the same impacts as Alternative C.

**Cultural Resources: Effects from National Trails Management Actions**

Each action alternative (B, C, and D) would establish the INHT NTMC within the planning area; however, the acres for those areas vary by alternative. The status of the INHT NTMC and its size affect the impacts on cultural resources. More acreage in the INHT NTMC would minimize and avoid impacts on cultural resources in more areas, and fewer acres would increase the potential for adverse impacts to sites not in the NTMC.

***Effects under Alternative A***

The INHT NTMC would not be designated under Alternative A. The INHT would continue to be managed to maintain its integrity and associated historic and cultural sites in compliance with the National Trails System Act and the INHT Comprehensive Management Plan (BLM 1981b).

***Effects Common to All Action Alternatives***

Management actions for the national trails prescribe the creation of the INHT NTMC, which includes three geographic areas at Farewell Burn, Kaltag Portage, and Rohn. The creation of the INHT NTMC provides beneficial impacts on cultural resources. Use activities that might affect the INHT and associated historic features and/or structures are restricted in this scenario. For example, coal leases would not be issued on federal lands within the National System of Trails, and new audible and atmospheric effects would not exceed current levels in the NTMC. Actions that may result in new audible and atmospheric effects would be limited to those that cause short-term, minimal impacts to the INHT. Reservations for the INHT would be made if land conveyance to another entity occurs, and other activities such as winter subsistence OHV use would be prohibited. Standing structures, such as the public shelters and historic roadhouses along the INHT NTMC, would be prioritized for fire protection. Collectively, these management actions reduce the likelihood of adverse impacts on the INHT and associated cultural resources. Each alternative provides for the same acreage for the Kaltag Portage portion of the NTMC and offers the same level of protection for that culturally significant route and any other cultural resources in that geography.

***Effects under Alternative B***

Under Alternative B, there are a total of approximately 288,466 acres (2 percent) established as INHT NTMC within the planning area. This includes the Farwell Burn (46,951 acres), the Kaltag Portage (241,512 acres), and the Rohn (363 acres) sections of the trail. These sections account for more acreage than would be designated under Alternatives C or D. Alternative B represents the least likely to have adverse effects on cultural resources as it protects the most acreage within the NTMC and limits uses that could have an adverse impact on the trail or associated cultural resources.

***Effects under Alternative C***

Alternative C designates slightly less acres (273,242; 2 percent) than Alternative B, and the difference is at the Farewell Burn area, which is 31,367 acres under Alternative C. This alternative is more likely to

have adverse impacts on cultural resources as slightly less land is designated within the NTMC protected area. Those impacts would be limited to the Farewell Burn area.

### ***Effects under Alternative D***

Alternative D is the same as C.

### **Cultural Resources: Effects from Wild and Scenic Rivers Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Improvements within the Unalakleet Wild River Corridor

### ***Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor would remain and 18 river segments (roughly 222,584 acres) have been identified as eligible for WSR designation. The Unalakleet National Wild River Management Plan (BLM 1983) includes an objective to ensure preservation of historic and archeological values. Additionally, Action 11.1 of the plan states that inventories will be conducted prior to surface-disturbing projects and will be oriented toward finding sites representative of early prehistoric occupation and sites representing the theme of transportation and trade. According to BLM Manual 6400, projects on BLM-managed lands within the river corridor or on lands that are adjacent to or border eligible rivers must consider guidelines to protect ORVs for activities such as locatable, salable, and leasable mineral development; transportation and motorized travel; ROW authorization; recreation; and livestock grazing, which could protect cultural resources from associated surface-disturbing activities or increased erosion resulting from these activities.

### ***Effects Common to All Action Alternatives***

Similar to the designations of ACECs in the planning area, increased acreages designated as WSR throughout the planning area will minimize the likelihood of direct or indirect effects on cultural resources by designating more acreage under a protected status. There is less potential for management actions that involve surface-disturbing activities that could destroy cultural resources. The major variance between the alternatives is how many rivers are designated as WSR and what other permitting and use restrictions are managed within designated WSR areas. Management actions and associated impacts related to travel management, visual resource management and improvements, and UAS uses would be minimized within WSR corridors.

### ***Effects under Alternative B***

Under Alternative B, the Unalakleet Wild River Corridor would remain in place. Additionally, roughly 332,176 acres (2 percent) have been proposed as suitable for WSR designation. Alternative B would have the lowest potential for adverse impacts on cultural resources because it protects the most acreage under a WSR designation that would in turn protect cultural resources in the corridors.

### ***Effects under Alternatives C and D***

Alternatives C and D would have higher potential for adverse impacts on cultural resources compared with Alternatives A and B, because only the Unalakleet Wild River Corridor would be a WSR corridor.

There would be no noticeable difference between Alternatives C and D in terms of acreage designated; both alternatives would protect fewer acres than Alternative B for this resource. As a result, more surface-disturbing activities that could lead to site destruction are permissible under these two alternatives.

### **Cultural Resources: Effects from Hazardous Materials and Health and Human Safety Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

#### ***Effects under Alternative A***

Alternative A does not include any specific management actions that would impact cultural resources.

#### ***Effects Common to All Action Alternatives***

Management actions for all alternatives include the BLM prioritizing cleanup of hazardous materials sites with eminent or existing discharge where that activity would affect cultural resources. This action has the beneficial effect of identifying more cultural resources in the planning area, completing additional survey for cultural resources, and defining methods of minimizing impacts on those resources. In some cases, hazardous materials may be present at historic sites related to mining or military activity. Clean up actions may adversely impact these sites.

### **Cultural Resources: Effects from Support for BSWI Communities Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Cultural Landscape Reports
- Providing Assistance for Cultural Tourism

#### ***Effects under Alternative A***

Alternative A includes the objective to protect and preserve cultural sites from damage or destruction based on the SWMFP under the management action of Cultural Landscape Reports. This action would have beneficial effects on cultural resources. This action relies on application of current federal law which aims to avoid or minimize effects on cultural resources.

There is no management action for providing assistance with cultural tourism.

#### ***Effects Common to All Action Alternatives***

Management actions related to the relocation of communities, use of timber for biomass projects, development of local energy sources, construction of emergency shelter cabins, and other actions that may involve surface-disturbing activities all have the potential to directly and indirectly adversely affect cultural resources. Generally, effects from BLM support for communities are minor. Specific impacts of OHV use, forestry management, and other topics addressed in actions common to all alternatives are addressed specifically in the resource-specific sections of this report.

***Effects under Alternative B***

Alternative B specifically provides for the development of Cultural Landscape Reports in collaboration with local communities. This alternative would target two to three high priority villages for cultural landscape reports. This action represents beneficial impacts on cultural resources and would result in increased acreage surveyed for sites, increased number of sites identified, and a broader understanding of site types and frequencies within the communities identified for these reports.

Alternative B provides opportunities for the BLM to support communities with cultural tourism based on BLM's cooperation and collaboration with the American Indian Alaska Native Tourism Association (AIANTA). This action would have beneficial effects on the public outreach and understanding of Native heritage throughout the planning area.

***Effects under Alternative C***

Cultural Landscape Reports would be developed for four to six priority villages in the planning area under Alternative C. This action provides more beneficial impacts for cultural resources than Alternative A and Alternative B. Cultural tourism assistance is the same as under Alternative B.

***Effects under Alternative D***

Alternative D has the most potential for positive impacts on cultural resources, as the entire planning area would be reviewed for Cultural Landscapes. This action would add knowledge of sites beyond just select communities and have a planning area-wide beneficial impact on the knowledge of cultural resources and landscapes.

More cultural tourism assistance is provided under Alternative D than Alternative A, as BLM would receive requests from BSWI communities, seek funding, and provide technical assistance to increase cultural tourism capacity. This alternative would provide more beneficial impacts on cultural resources when compared with Alternatives B and C.

**Cultural Resources: Effects from Climate Change**

Effects of climate change span all alternatives, including Alternative A. Cultural resources are subject to direct and indirect effects from climate change. The warming trends and impacts on permafrost thaw and increases in wildland fires can directly damage or destroy cultural resources, including historic structures and prehistoric sites. The same warming trends and increases in wildland fires can deepen the active solid layer. Deepening of the active layer absent erosional forces promotes decomposition and could adversely affect organic cultural materials. Where soils could experience higher rates of erosion, cultural resources could be indirectly impacted as adjacent lands are degraded and subject to more erosional forces and the rate of future erosion is expected to be faster and potentially more damaging. This is particularly true along coastal and river areas where melting is causing banks to slump into the water. Increased frequency of strong storms also increases shoreline erosion that could directly and adversely affect cultural resources.

***Effects under Alternative A***

Alternative A does not include any management actions that could counteract impacts from climate change on cultural resources.

***Effects Common to all Action Alternatives***

Management actions under all action alternatives would include monitoring to prevent impacts to soils impaired by climate change and avoid permafrost areas, which would counteract some impacts to cultural resources in areas with impaired soils and erosion.

**Cultural Resources: Cumulative Effects**

Table 3.4.3-1 summarizes the results of the cumulative effects analysis for cultural resources for all alternatives.

**Table 3.4.3-1: Cumulative Effects Analysis for Cultural Resources**

Trends and Forecasts of Cultural Resources in Consideration of Past and Present Actions	Trends and Forecasts of Cultural Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Cultural Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Cultural Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Cultural Resources in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Past and present actions in the planning area are primarily related to historic mining throughout the planning area in the Iditarod Mining District and other areas. Increased population based on mining also resulted in the accelerated use of natural resources to support the growing communities, particularly forest resources used for construction and heating. The increase in exploration and development of mines (and other resources) led to further infrastructure development, such as roads connecting population centers to mining areas and local roads and trails serving hunting and resource allocation for local communities. These actions created many of the cultural resources that are now being analyzed for impacts, such as historic mine remains and historic trails, like the INHT. These activities also likely resulted in adverse impacts on cultural resources, but the degree of these effects is not quantifiable.</p> <p>Recreation and subsistence activities are the most prevalent current land use in the planning area. Use of the INHT has increased over time and has contributed both to an increased knowledge of the trails historic significance and to more direct and adverse effects on the trail and associated historic resources, such as shelter cabins and roadhouses.</p> <p><b>Trend: Degrading</b></p>	<p>Reasonably foreseeable future actions that may affect cultural resources are primarily related to the ongoing development of the Donlin Gold Project and the potential for additional exploration and development of locatable minerals in the planning area. Many of the locatable minerals are co-located with mining districts that contain sites, artifacts, objects, and features related to historic mining in the region. This type of development has the potential for direct and indirect impacts on cultural resources due to the inherent surface-disturbing nature of these activities.</p> <p>Infrastructure developments to communities also present a high potential for impacts on cultural resources. Any development of roads and other transportation routes would result in additional surface disturbance. This would include direct impacts on cultural resources, and indirect impacts, such as visual impacts of a new road corridor in an area that previously had no visible development. The proposed ROW corridors are long and pass through areas known to contain cultural resources.</p> <p><b>Trend: Degrade at a greater rate</b></p>	<p>Cumulative impacts to cultural resources can occur through incremental degradation of the overall resource base throughout the planning area from any of the management actions and decisions that have the potential to impact cultural resources as described in this section. While loss of one or two sites may have an immeasurably low impact on the entire resource base, there would likely be ongoing activity across the resource area that would cumulatively and adversely affect the resource base. Cultural resources are non-renewable; once damaged, the information value of the sites could be severely or totally destroyed. Any resource or resource use that has been evaluated as causing direct or indirect impacts on cultural resources will contribute to the cumulative degradation of these resources over time.</p> <p>Impacts that may seem minor after only one individual occurrence can cumulatively lead to larger direct effects over time. For example, one individual visiting a historic cabin or walking through a prehistoric surface lithic scatter may appear to have no effect on that resource. However, repeated visits over time will likely result in destruction and loss of that resource. Site looting is another example of cumulative site-specific impacts. One visitor may only take one artifact, but over time, if each visitor takes away a part of the site, long-term and irreversible impacts may occur to that site. Resource uses, such as recreation planning, that may result in increased use of an area may inadvertently cause long term effects on cultural resources.</p> <p><b>Trend: Resource condition would degrade but at a lesser rate than Alternative A</b></p>	<p>Cumulative impacts and resource trend on a planning area scale would be similar to Alternative B although resource condition would degrade at a slightly greater rate due to a higher level of potential development.</p> <p><b>Trend: Resource condition would degrade but at a lesser rate than Alternative A and greater than Alternative B.</b></p>	<p>Cumulative impacts and resource trend on a planning area scale would be the same as Alternative B. Although resource condition would degrade at a slightly greater rate than Alternatives B or C because of a higher level of potential development.</p> <p><b>Trend: Resource condition would degrade but at a lesser rate than Alternative A and greater rate than Alternatives B and C.</b></p>



## **3.5 Locatable and Salable Minerals**

### **3.5.1 Summary**

This section describes the potential impacts on the locatable and salable minerals resources in the planning area from six BLM management actions, climate change, and cumulative effects under Alternatives A through D.

Under all of the action alternatives, some BLM-managed land in the planning area could be withdrawn from locatable mineral entry, subject to valid existing rights, or possibly closed to salable minerals development, and some existing mineral withdrawals would be revoked. Although current data from the 2017 Mineral Potential Report indicates that locatable and salable minerals development is low in the planning area, efforts to increase the mineral potential knowledge of the area would align with the U.S. Department of Interior's goal of ensuring access to mineral resource (DOI 2018). Climate change could lead to permafrost thaw, glacial retreat, and altered water availability in the planning area. Permafrost thaw could adversely impact mining activities and overland travel by creating wetter surface areas and eroding water shorelines. Glacial retreat could expose additional areas with locatable and salable minerals. Changes to water availability could impact hazardous material controls at mine sites, dust abatement activities, and other mining activities. Impacts would last beyond the duration of the planning period.

Under all alternatives, the management and use of locatable and salable minerals would be subject to and protected by the laws, regulations, and policies described in Appendix E of the BSWI Draft RMP/EIS. All action alternatives would be subject to requirements in Guidance on Reclamation Bonding for Plans and Notices on BLM Managed Lands in Alaska (AK IM-2015-001) (BLM 2015b).

The demand for locatable and salable resources on BLM-managed land in the planning area are predicted to be low in the reasonably foreseeable future based on the relatively low LMP and the lack of demand and low economic feasibility of extracting salable materials. Therefore, the cumulative impact of the management decisions related to locatable and salable mineral resources combined with past, present, and reasonably foreseeable future actions would be small although some mineral resource exploration could be expected if and where long-standing withdrawals from mineral entry would be lifted. Salable mineral development on BLM-managed lands would be most likely to occur in association with projects that require these minerals for supporting infrastructure, such as access road development.

### **3.5.2 Methods of Analysis**

This section describes the potential impacts on locatable and salable minerals in the planning area from the management actions for other resource and resource use programs. Where possible, the analysis uses quantitative data to describe impacts on locatable and salable minerals from management actions associated with other resources and resource use programs. Qualitative information is also used to support quantitatively based analysis or when numerical data do not exist.

Impacts on locatable and salable minerals development would result from the withdrawal or closure of an area to mining development because the mineral resources in that area would not be able to be accessed and extracted. The withdrawal or closure represents an impact on the potential discovery, development, and use of these resources by decreasing the availability of mineral resources.

### 3.5.3 Nature and Types of Effects

The alternatives would affect locatable mineral exploration and development by varying the amount of federal land under each alternative that would be withdrawn from mineral entry. Federal land that is withdrawn from mineral entry is not open to the location of mining claims and would prohibit future mineral exploration and development. Closing, segregating, or withdrawing lands to claim and subsequent development would reduce domestic production of our mineral needs and higher dependence on foreign sources of those minerals, reduced economic development on the regional and local levels, and loss of tax revenues to all levels of government that would have resulted from the development of the encompassed minerals. This effect is proportional to the degree that the lands withdrawn are practically valuable for locatable mineral development.

Withdrawal or closing an area to mining development removes the possibility of mineral resources in that area from being accessed and extracted other than through valid existing rights. This represents an impact on the potential discovery, development, and use of those resources by decreasing the availability of mineral resources on federal mineral estate.

The alternatives would affect salable mineral disposals by various limits on the amount of land available for disposal sites. The value of most salable minerals is closely tied to the proximity of the source to the final place of use which is the major consideration in the evaluation of salable mineral resources in this planning area. Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted.

The types of effects to locatable and salable minerals that could result from management actions, and the indicators used to evaluate them are shown in Table 3.5.3-1.

**Table 3.5.3-1: Summary of Effects to Locatable and Salable Minerals**

Types of Effects	Management Actions	Indicators
Reduction of the land that is available for mineral resource activities would result in a reduction of the quantity of minerals available for extraction.	<ul style="list-style-type: none"> <li>Locatable Mining and Minerals Decisions within HVWs, the INHT NTMC, and the Unalakleet Wild River Corridor</li> <li>Locatable and salable minerals development decisions in wildlife habitat areas and connectivity corridors</li> </ul>	<ul style="list-style-type: none"> <li>Acres of land or river miles withdrawn from the total number of acres or river miles of locatable minerals identified in the planning area, when available.</li> <li>Acres of land or river miles of salable minerals in the planning area closed to development, when available.</li> </ul>
Reduction in the number of qualified applicants to use the Alaska Statewide Bond Pool by changing the requirements for mining operations to qualify.	<ul style="list-style-type: none"> <li>Requirements for reclamation bonding for on BLM Managed Lands</li> </ul>	<ul style="list-style-type: none"> <li>Number of operations able to maintain compliance without the assistance of the Alaska Statewide Bond Pool for reclamation.</li> </ul>

### Assumptions

The following assumptions were used in the assessment of the effects on locatable and salable minerals.

- Existing mining claims with valid existing rights will not be affected by the proposed withdrawals or closures in the RMP. All others will be impacted.
- SOPs and BMPs will be implemented.
- There will be no major regulatory changes in federal or State statutes, regulations, policies, or guidance that govern exploration and development of minerals.
- Surface-disturbing and other disruptive activities at authorized mining operations could continue.

- Mineral operations will be in compliance with all relevant federal, State, and local permits.
- Mineral exploration and development may occur with valid existing rights. Otherwise, exploration and development will not occur in areas that are identified as withdrawn or closed to mineral entry except for those activities that are undertaken to better understand the geological setting and mineralization of the withdrawn lands to better inform long-term management decisions. Mine operators will implement the guidelines and requirements on placer mine reclamation, revegetation, and wildlife habitat rehabilitation for upland mines that are in the following BLM Instruction Memoranda:
  - Placer Mining Baseline Environmental Information Guidance and Reclamation Effectiveness Monitoring for Alaska Placer Mined Streams (IM-AK-2017-009)
  - Reclamation Effectiveness Monitoring Implementation Guide (AK IM-2017-010)
  - Revegetation and Wildlife Habitat Rehabilitation Criteria for Upland Mine Reclamation on BLM-Managed Lands in Alaska (IM-AK-2017-011)

### **Standard Operating Procedures and Best Management Practices**

The impact analysis takes into account the SOPs and BMPs that could be implemented by the BLM. See the BSWI RMP/EIS for a list of the SOP and BMPs.

#### **3.5.4 Effects Analysis**

The locatable and salable minerals management actions that are proposed for the following resources, resource uses, and special designations would not result in effects to locatable and salable minerals:

- Air Quality and AQRVs
- Cultural Resources
- Forestry and Woodland Products
- Soils
- Grazing
- Hazardous Materials and Health and Human Safety
- Leasable Minerals
- Lands with Wilderness Characteristics
- NNIS
- Paleontological Resources
- Recreation and Visitor Services
- Support for BSWI Communities
- Travel and Transportation
- Vegetation
- Visual Resources
- Wildland Fire

## **Locatable and Salable Minerals: Effects from Water Resources and Fisheries Habitat Management Actions**

There are no water resources or fisheries habitat management actions common to all action alternatives that would impact locatable and salable minerals.

Potential impacts from the following management topics were considered:

- Minerals Decisions within HVWs
- Locatable Mining

### ***Effects under Alternative A***

Under Alternative A, the continued management of BLM-managed land in the planning area would result in no additional withdrawals from locatable minerals or closures to salable mineral development associated with water resources and fisheries habitat management actions. The SWMFP would continue to direct the BLM to mitigate fishery conflicts in fisheries-based ACECs through the use of seasonal restrictions, area withdrawals, and other measures. Alternative A would have no effect on locatable and salable minerals beyond those that are already occurring.

### ***Effects under Alternative B***

Under Alternative B, HVWs would be withdrawn from locatable mineral entry and closed to salable mineral development (8,294,053 acres). Locatable withdrawals under Alternative B include existing withdrawals that would be retained as well as new proposed withdrawals. Of the HVWs, 2,776,883 acres are within existing PLOs that are withdrawn to locatable mineral entry. Therefore, Alternative B would result in up to an additional 5,517,170 acres of locatable mineral withdrawals compared to Alternative A.

However, most of the HVWs are associated with tributaries to the Yukon River in the Anvik Mining District and do not include areas with medium or high LMP (areas with medium or high LMP are located primarily in the Aniak, Iditarod, McGrath, Innoko, and Ruby Mining Districts). Although salable minerals are likely to be present in closed areas, the demand for these salable minerals is low due to the long distance between source locations and population centers that would use the materials. However; there is some potential for salable mineral development if needed to support projects (such as access road development) that could occur outside of population centers. Additionally, there are few placer deposits in BLM-managed lands.

The impact of HVW management decisions on locatable and salable minerals under Alternative B would be small.

### ***Effects under Alternative C***

Under Alternative C, HVWs would be open to saleable mineral development on a case-by-case basis and would remain open to locatable mineral entry unless other restrictions apply for other resource protections common to all alternatives. The case-by-case review under this alternative means that applications for salable mineral permits would be reviewed to evaluate alternative locations and consider impacts based on the specific location proposed.

However, the impact of Alternative C on locatable minerals would be small because the areas with medium or high LMP are not in HVWs. Additionally, impacts to salable mineral development would also be small because the distance between salable mineral locations in the watersheds and population centers

that would use the materials is too great for cost-effective development. However, there is some potential for salable mineral development if needed to support projects that could occur outside of population centers. The case-by-case review in Alternative C does provide site specific review to mitigate impacts from salable mineral development if it were to occur.

### ***Effects under Alternative D***

Under Alternative D, like Alternative C, the 4,891,935 acres in HVWs would be open to locatable mineral entry. These acres would also be open to salable minerals development without the case-by-case review described in Alternative C. Of the HVWs, 1,214,021 acres are within existing PLOs that are withdrawn to mineral entry. Therefore, water resources and fisheries management of Alternative D would reduce the number of acres withdrawn from mineral entry by up to 1,214,021 acres.

The impact of Alternative D on locatable minerals would be small because the areas with medium or high LMP are not in HVWs. Additionally, impacts to salable mineral development would also be small due to the same reasons listed under Alternative C.

### **Locatable and Salable Minerals: Effects from Wildlife Management Actions**

There are wildlife management actions common to all action alternatives that would impact locatable and salable minerals. These include reclamation requirements following locatable and salable mineral development as well as any surface-disturbing activities within moose calving and wintering areas and caribou caving grounds.

Potential impacts from the following management topics were considered:

- Wildlife – Caribou and Moose
- Innoko Bottoms Priority Wildlife Habitat Area
- Connectivity Corridors
- Migratory Birds

### ***Effects under Alternative A***

Under Alternative A, no existing management actions associated with wildlife would result in locatable minerals withdrawals or closures to salable mineral development on BLM-managed land in the planning area.

### ***Effects under Alternative B***

Under Alternative B, locatable and salable minerals development would be allowed in caribou and moose calving and wintering areas subject to the wildlife actions common to all alternatives. Seasonal restrictions on construction in moose and caribou calving habitat (May–June) and in crucial winter habitat areas (November–February) would apply. The seasonal restrictions may change based on changes in caribou or moose habitat use associated with climate change or other factors.

Although BLM-managed land in the Innoko Bottoms Priority Wildlife Habitat Area would be withdrawn from locatable mineral entry and closed to salable mineral development under Alternative B, impacts would be small because no areas with medium or high LMP have been identified within the Innoko Bottoms Priority Wildlife Habitat Area. Additionally, the Innoko Bottoms Priority Wildlife Habitat Area

would be a ROW exclusion area so the likelihood of projects requiring salable minerals in the area would be small.

Under Alternative B, 845,670 acres of BLM-managed land in the planning area would be withdrawn from locatable mineral entry and closed to salable mineral development to protect resources in and wildlife movement through the North and South Connectivity Corridors. Impacts would be small because no areas with medium or high LMP have been identified in the North and South Connectivity Corridors. Additionally, the North and South Connectivity Corridors would be ROW exclusion areas so the likelihood of projects requiring salable minerals in those areas would be small.

Under Alternative B, migratory birds would be protected on BLM-managed land in the planning area by prohibiting mineral leasing in riparian areas. The restriction would affect primarily placer mining and sand and gravel mining operations.

### ***Effects under Alternative C***

Under Alternative C, locatable and salable minerals development would be allowed in caribou and moose calving and wintering areas subject to the wildlife actions common to all alternatives and the seasonal restriction on construction under Alternative B. The seasonal restriction may change based on changes in caribou or moose habitat use associated with climate change or other factors.

BLM-managed land in the Innoko Bottoms Priority Wildlife Habitat Area and the South Connectivity Corridor would be open to locatable minerals development. The Innoko Bottoms Priority Habitat Area would be closed to salable minerals development and the South Connectivity Corridor would be open to salable mineral development on a case-by-case basis. Impacts to locatable minerals would be small because no areas with medium or high LMP have been identified in the Innoko Bottoms Priority Wildlife Habitat Area or the South Connectivity Corridor. Impacts to salable mineral development would also be small because demand depends upon proximity to the end use.

Under Alternative C, the same protections to migratory birds that would affect locatable and salable mineral development would apply.

The impact of Alternative C on locatable and salable minerals would be small.

### ***Effects under Alternative D***

Under Alternative D, as with Alternative C, locatable and salable minerals development would be allowed in caribou and moose calving and wintering areas subject to the wildlife actions common to all alternatives. No seasonal restrictions on construction would apply.

Similar to Alternative C, BLM-managed land in the Innoko Bottoms Priority Wildlife Habitat Area would be open to locatable mineral development but closed to salable mineral development,

Under Alternative D, the BLM would not manage any connectivity corridors and therefore there would be no associated minerals management actions for connectivity corridors.

Under Alternative D, migratory birds would be protected from mineral development activities with appropriate avoidance and/or mitigation on a case-by-case basis to minimize impacts.

The impact on locatable and salable minerals development from wildlife management actions under Alternative D would be small.

## **Locatable and Salable Minerals: Effects from Locatable and Salable Minerals Management Actions**

In addition to the management actions common to all action alternatives, potential impacts from the following management decisions were also considered:

- Locatable Minerals
- Bonding
- Salable Minerals

### ***Effects under Alternative A***

As of December 2016, there were four active placer mines, one active lode mine, and two temporary placer mine closures on BLM-managed land in the planning area.

The potential for future mineral exploration on BLM-managed land in the planning area is high due to the lack of information of the geological setting and mineralization potential of the area. Development of mineral resources in the planning area is low due to the lack of known economical deposits. The potential for future development of salable minerals (crushed rock, sand and gravel) on BLM-managed land in the planning area is also considered low because local demand for salable minerals is generally being met by nearby producers on private or State-owned lands. However, salable mineral development on BLM-managed lands could occur in association with projects that require these minerals, such as road development.

Under Alternative A, all lands in the planning area would be managed as undesignated. Under Alternative A, 4,804,488 acres would remain withdrawn from locatable mineral entry and closed to salable minerals development in the 13.5 million acres of BLM-managed land in the 62.3-million-acre planning area. There are 271,164 acres with medium to high LMP withdrawn, of which 6,354 acres are considered to have high LMP.

No management direction related to the Alaska Statewide Bond Pool under Alternative A is currently identified.

### ***Effects Common to All Action Alternatives***

Under all of the action alternatives, some BLM-managed land in the planning area could be withdrawn from locatable mineral entry or possibly closed to salable minerals development. The Unalakleet Wild River Corridor would remain designated under all action alternatives, and there would continue to be no locatable or salable mineral activity allowed within the 46,953-acre corridor. Although the mineral potential of some of the planning area is low, the impacts of management actions associated with all the action alternatives could be moderate to high considering the potential for increased exploration and possible development of newly identified deposits. In areas such as the Nulato Hills, where there is little information about mineral potential, any restrictions would impact the potential for future exploration. All action alternatives would be subject to the requirements in Guidance on Reclamation Bonding for Plans and Notices on BLM Managed Lands in Alaska (IM-AK-2015-001). With the recent signing of the Donlin Gold EIS ROD, increased demand for gravel adjacent to the proposed natural gas pipeline route is highly likely, resulting in a potential increase in resource-related impacts.

***Effects under Alternative B***

Under Alternative B, management actions associated with other resources discussed in this section would result in the withdrawal of 9,842,497 acres from locatable mineral entry (retained existing withdrawals and new proposed withdrawals) and the closure of 9,842,497 acres to salable minerals development in the 13.5 million acres of BLM-managed land in the planning area. Under Alternative B, 362,878 acres with medium or high LMP would be withdrawn. The 362,878 acres equates to 8 percent of the medium or high LMP areas in the planning area but 64 percent of the medium or high LMP areas on the BLM-managed land in the planning area. The 362,878 acres includes 25,631 acres with high LMP and 337,247 acres with medium LMP.

Because the potential for locatable and salable minerals development on BLM-managed land in the planning area is considered low, the impact of management actions associated with Alternative B would be small although the management actions would reduce incentives to further investigate lands for mineral potential.

All existing and new mining operations would be bonded using an individual financial guarantee or other acceptable means as defined in 43 CFR 3809.500. Use of the Alaska Statewide Bond Pool would be restricted to operations that have a record of 5 or more years of successful reclamation of mined lands with no substantial compliance issues. Application of this requirement would be contingent on changes, modification, or supersedence of the 2015 and 2016 Reclamation Instruction Manuals. Bonding type/action would remain fully at the discretion of the AO.

***Effects under Alternative C***

Under Alternative C, management actions associated with other resources discussed in this section would result in the withdrawal of 46,943 acres from locatable mineral entry and the closure of 288,109 acres to salable minerals development in the 13.5 million acres of BLM-managed land in the planning area. Under Alternative C, no acres with medium to high LMP would be withdrawn; 522,825 acres of medium LMP and 42,663 acres of high LMP would be open to locatable mineral development.

Because the potential for locatable and salable minerals development on BLM-managed land in the planning area is considered low, the impact of management actions associated with Alternative C would be small and less than Alternative B. Some additional geological investigation to better assess mineral potential could be expected because the limited amount of mineral resource information contributes to the low mineral potential assessment. This additional geologic and mineral potential information would align with the U.S. Department of the Interior's goal of ensuring access to mineral resources (DOI 2018).

All Notice- and Plan-level placer operations that meet the criteria that would make them subject to the 2015 Reclamation Cost Estimate Instruction Manual would comply with all conditions in the manual. Otherwise, the Alaska Statewide Bond Pool may be accepted in accordance with 43 CFR 3809 and the BLM-ADNR Bond Pool Agreement. Bonding type/action would remain fully at the discretion of the AO.

***Effects under Alternative D***

Under Alternative D, management actions associated with other resources discussed in this section would result in the withdrawal of 46,953 acres from locatable mineral entry and the closure of 288,109 acres to salable minerals development in the 13.5 million acres of BLM-managed land in the planning area. Under Alternative D, no acres with medium or high LMP would be withdrawn. Like Alternative C, 522,825 acres of medium LMP and 42,663 acres of high LMP would be open to locatable mineral development.



Alternative D would have the least impact to locatable and salable minerals compared to Alternatives B and C. Like Alternative C, some additional locatable mineral exploration could be expected to gather information to refine or confirm mineral potential assessments.

All operations would have the option to use the Alaska Statewide Bond Pool unless excluded by the provisions in the BLM-ADNR Bond Pool Agreement.

### **Locatable and Salable Minerals: Effects from Lands and Realty Action**

There are lands and realty management actions common to all action alternatives that would impact locatable and salable minerals. These include retained withdrawals for purposes managed by the DOD, FERC, FAA, and the BLM for specific purposes like rural airports. These withdrawals often close lands to mineral entry, although the restrictions can vary among the withdrawals depending upon the specific purposes of the withdrawals.

Potential impacts from the following management topics were considered:

- Decision to revoke ANCSA Section 17(d)(1) withdrawals.

#### ***Effects under Alternative A***

Under Alternative A, no withdrawals would be revoked, and no new lands opened for mineral entry or salable mineral development. Under Alternative A, 264,810 acres of medium LMP and 6,354 acres of high LMP remain open for mineral entry.

#### ***Effects under Alternative B***

Under Alternative B, ANCSA 17(d)(1) withdrawals totaling approximately 4,931,465 acres would be revoked. These actions when combined with other management actions described under Alternative B would allow 258,015 acres of medium LMP and 36,310 acres of high LMP on BLM-managed land in the planning area to be open for locatable mineral development.

As with Alternatives C and D, the impacts to salable mineral develop remain small because salable minerals, unlike locatable minerals, have little economic or practical value unless the minerals occur close to the potential end use.

#### ***Effects under Alternative C***

Existing ANCSA 17 (d)(1) withdrawals totaling approximately 13,461,531 acres would be revoked, opening lands to mineral entry or salable mineral development,

These actions, when combined with other management actions described under Alternative C, would allow all 522,825 acres of medium LMP and 42,663 acres of high LMP on BLM-managed land in the planning area to be open to locatable mineral entry. The impacts to salable mineral development would be small because salable minerals have little economic or practical value unless the minerals occur close to the potential end use.

#### ***Effects under Alternative D***

Under Alternative D, ANCSA 17(d)(1) withdrawals totaling approximately 13,461,531 acres would be revoked opening lands to mineral entry or salable mineral development,

The impact on locatable and salable minerals development from lands and realty management actions under Alternative D would be very similar to Alternative C as both alternatives would open all 522,825 acres of medium LMP and 42,663 acres of high LMP on BLM-managed land to locatable mineral entry.

### **Locatable and Salable Minerals: Effects from Areas of Critical Environmental Concern Management Actions**

The potential impacts from the management topics described below were considered.

- Minerals Decisions

#### ***Effects under Alternative A***

Under Alternative A, there would be 1,884,376 acres of BLM-managed land in the planning area that are managed as ACECs. Many of the existing ACECs would remain closed to mineral leasing and non-metalliferous mineral entry because they are in existing PLOs that are withdrawn from such activity but would remain open to mining for metalliferous minerals. Minerals decisions for existing ACECs are discussed in Chapter 2, Table 2.2.2-1. Additional detail is also included in the ACEC report prepared for the planning area (BLM 2018). The acres of withdrawals and closures discussed in the section “Locatable and Salable Minerals: Effects from Locatable and Salable Minerals Management Actions” incorporate minerals decisions for ACECs.

#### ***Effects under Alternative B***

All nominated ACECs, 3,912,698 acres, under Alternative B would be withdrawn from locatable mineral development and closed to salable mineral development. Because the potential for locatable and salable minerals development on BLM-managed land in the planning area is considered low, the impact of management actions associated with Alternative B would be small.

#### ***Effects under Alternative C***

Under Alternative C, no land would be managed as ACECs. Therefore, there would be no impacts to locatable and salable minerals operations and development from ACEC management actions under Alternative C.

#### ***Effects under Alternative D***

Under Alternative D, no land would be managed as ACECs. Therefore, there would be no impacts to locatable and salable minerals operations and development from ACEC management actions under Alternative D.

### **Locatable and Salable Minerals: Effects from National Trails Management Actions**

There are no national trails management actions common to all action alternatives. Potential impacts from the following management topic were considered:

- Minerals Decisions in the INHT NTMC

#### ***Effects under Alternative A***

Under Alternative A, the INHT would not be designated an NTMC and no additional withdrawals from locatable mineral entry or closures to salable minerals development in areas adjacent to the trail would

occur. Existing guidelines in the SWMFP would continue to protect the federally managed portion of the INHT and associated historic sites from damage or disturbance due to other resources use.

### ***Effects under Alternative B***

Under Alternative B, 288,466 acres would be designated as the INHT NTMC to protect the federally managed portion of the INHT and associated historic sites from damage or disturbance due to other mineral resource use. The designation of the INHT NTMC would withdraw 288,466 acres from locatable mineral exploration and development and salable mineral development, and the INHT NTMC would be closed to seismic exploration. There are no acres with medium to high LMP within the INHT NTMC under Alternative B.

Development plans for locatable and salable minerals would be authorized if the AO determines that direct and cumulative impacts associated with the action would not conflict with the nature and purpose of the INHT.

Because the potential for locatable and salable minerals development on BLM-managed land in the planning area is considered low, the impact of management actions associated with Alternative B would be small.

### ***Effects under Alternative C***

Under Alternative C, 273,242 acres would be designated as the INHT NTMC. Unlike Alternative B, the INHT NTMC would be open to locatable mineral exploration and development and open for salable mineral development. Approximately 273,242 acres of the INHT NTMC would be closed to seismic exploration under Alternative C. There are no acres with medium to high LMP within the INHT NTMC under Alternative C.

Development plans for locatable and salable minerals would be authorized as described for Alternative B.

Because the potential for locatable and salable minerals development on BLM-managed land in the planning area is considered low, the impact of management actions associated with Alternative C would be small.

### ***Effects under Alternative D***

Under Alternative D, 273,242 acres would be designated as the INHT NTMC. Similar to Alternative C, the 273,242 acres within the INHT NTMC would be open to locatable mineral exploration and development and open for salable mineral development. There are no acres with medium to high LMP within the INHT NTMC under Alternative B. The INHT NTMC would be open for seismic exploration under Alternative D. Development plans for locatable and salable minerals would be authorized as described for Alternatives B and C.

The impact of national trails management actions under Alternative C would be small.

## **Locatable and Salable Minerals: Effects from Wild and Scenic Rivers Management Actions**

### ***Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor would remain (46,953 acres) and 18 river segments (331,120 acres) have been identified as eligible. There are no management actions specific to locatable and salable minerals for the Unalakleet Wild River Corridor or the 331,120 acres of eligible

WSR corridors. According to BLM Manual 6400, projects on BLM-managed lands within the river corridor or on lands that are adjacent to or border eligible rivers must consider guidelines to protect ORVs. There are no specific guidelines that prohibit locatable mineral development for the 331,120 acres of eligible WSR corridors; although through the use of BMPs activities would minimize surface disturbance, sedimentation and pollution, and visual impairment. Because all eligible WSR corridors are eligible wild rivers, new disposal of salable mineral material or the extension or renewal of existing contracts would be avoided if possible. Therefore, salable mineral activity would be limited within those eligible corridors.

### ***Effects Common to All Action Alternatives***

The Unalakleet Wild River Corridor would remain designated under all Action Alternatives and there would continue to be no locatable or salable mineral activity allowed within the 46,953-acre corridor. Because the potential for locatable and salable minerals development on BLM-managed land in the planning area is considered low, the impact of management actions associated with Alternative C would be small.

### ***Effects under Alternative B***

Under Alternative B, the 18 river corridors recommended as eligible Wild Rivers (331,120 acres) would not have any specific management actions for locatable and salable minerals. However, as with Alternative A, projects on BLM-managed lands within the river corridor or on lands that are adjacent to or border suitable rivers must consider guidelines to protect ORVs. These guidelines are the same as those described above under Alternative A; therefore, Alternative B would have the same potential impacts and limitations to locatable and salable mineral development as Alternative A.

### ***Effects under Alternative C and D***

Effects under Alternative C and D are described above under “Effects Common to All Action Alternatives.”

## **Locatable and Salable Minerals: Effects from Climate Change**

Climate change could lead to permafrost thaw, glacial retreat, and altered water availability in the planning area. Permafrost thaw could adversely impact mining activities and overland travel by creating wetter surface areas and eroding water shorelines. Glacial retreat could expose additional areas with locatable and salable minerals. Changes to water availability could impact hazardous materials controls at mine sites, dust abatement activities, and other mine operations. The BLM would continue to work with permittees to monitor climate change impacts on mining and adjust individual plan requirements, as needed, to address any such impacts.

## **Locatable and Salable Minerals: Cumulative Effects**

The results of the cumulative effects analysis for locatable and salable minerals are presented in Table 3.5.4-1.

**Table 3.5.4-1: Cumulative Effects Analysis for Locatable and Salable Minerals**

Trends and Forecasts of Locatable and Salable Minerals in Consideration of Past and Present Actions	Trends and Forecasts of Locatable and Salable Minerals in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Locatable and Salable Minerals in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Locatable and Salable Minerals in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Locatable and Salable Minerals in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Although some attempts at mining started as early as the 1830s, there was no widespread mining for many decades. Most of it is concentrated in upland areas and lowlands in the immediate vicinity of the uplands. The planning area contains 2,480 mining claims, of which 207 are under federal management. There are four active placer mines, one active lode mine, and two temporary placer mine closures on BLM-managed land in the planning area. <b>Trend: Continues at a similar rate</b></p>	<p>Less than 1 percent of the total acreage taken up by mining claims and prospecting sites in the planning area are under federal management. Exploration and mining on non-BLM-managed areas adjacent to BLM land (e.g., Donlin Gold Project) may necessitate management decisions to prevent unnecessary disturbance to BLM-managed land in the planning area by ROW corridors, roads, and development on these adjacent lands. <b>Trend: Degrades (requires active management by federal agencies)</b></p>	<p>Same as Alternative A</p>	<p>Very similar to Alternative A although there may a slight increase in staking claims or in developing mining operations with the small (approximately 6,000-acre increase of high LMP lands as compared to Alternative A.</p>	<p>Very similar to Alternative A although there may a slight increase in staking claims or in developing mining operations with the small (approximately 6,000-acre increase of high LMP lands as compared to Alternative A</p>
<p>The majority of the mining and mineral exploration is taking place on lands owned by the State of Alaska, Native Corporations, or other private lands. A total of 13 salable minerals production sites were reported to be active in 2008 in Southwest Alaska, which includes the planning area. <b>Trend: Continues at a similar rate</b></p>	<p>Because most of the mining and mineral exploration is not taking place on federal lands and because of the lack of areas with high LMP on unencumbered BLM-managed land in the planning area, there is likely to be a low level of interest in staking claims or in developing mining operations on unencumbered BLM-managed land in the planning area for the reasonably foreseeable future. <b>Trend: No contribution</b></p>	<p>Same as Alternative A</p>	<p>If more lands in the planning area were open to mineral entry there could be expanded exploration and mapping of the mineral potential of unencumbered BLM land. Current understanding of the mineral potential of the BLM unencumbered land is currently low but the potential for new mining claims and development is moderate due to the potential for new unexplored lands being available. <b>Trend: Potential contribution</b></p>	<p>If more lands in the planning area were open to mineral entry there could be expanded exploration and mapping of the mineral potential of unencumbered BLM land. Current understanding of the mineral potential of the BLM unencumbered land is currently low but the potential for new mining claims and development is moderate due to the potential for new unexplored lands being available. <b>Trend: Potential contribution</b></p>
<p>There are currently no pending requests to develop sand and gravel on BLM-managed land in the planning area. <b>Trend: Continues at a similar rate</b></p>	<p>Local demands are being met by sand and gravel producers on private or State-owned lands, which is unlikely to change in the near future due to lack of appropriate BLM-managed land in the planning area near population centers that require sand and gravel. However, there is some potential for salable mineral development if needed to support projects outside population centers. <b>Trend: No contribution to resource trend</b></p>	<p>More areas would be closed to salable mineral development than Alternative A so requests to develop sand and gravel on BLM-managed land in the planning area would remain low. <b>Trend: No contribution to resource trend.</b></p>	<p>More areas would be open to salable mineral development than Alternative A. Although demand isn't expected to increase substantially, there could be an increase in requests to develop sand and gravel on BLM-managed land in the planning area to support projects requiring such resources. <b>Trend: Potential contribution</b></p>	<p>Same as Alternative C</p>

## **3.6 Lands and Realty**

### **3.6.1 Summary**

Management actions that impact the lands and realty program are those that change the amount of BLM-managed lands or that increase or decrease the BLM's ability to accommodate demand for new land use authorizations (e.g., ROWs and leases). Conveyances to the State of Alaska and the ANCSA corporations will continue and will affect BLM long-term management when selections rights are rejected or relinquished, and the lands are not segregated from the public land laws by State and ANCSA selections. Alternative A would have the least impact on the BLM's ability to accommodate demand for new land use authorizations. Greater restrictions on land use authorizations under Alternative B would have a higher magnitude of impact on lands and realty than Alternative A. The identification of more lands for disposal or exchange under Alternative D could reduce the amount of BLM-managed lands compared to Alternative A, but land tenure adjustments can also increase management efficiency and benefit the lands and realty program by consolidating tracts and disposing of parcels that are costly and of little or no value. This supports the DOI's mission to modernize organization and infrastructure for the next 100 years by reducing administrative and regulatory burden (DOI 2018). Alternative B, compared to all other alternatives, would manage the largest portion of the planning area as ROW exclusion; many of those lands would be managed for avoidance under Alternative C. Alternative C is similar to Alternative A but has fewer restrictions on ROW areas and allows more flexibility for adaptive management and would revoke more existing withdrawals. Alternative D would impact lands and realty similarly to Alternative A but would revoke more withdrawals (as would Alternative C), which would directly impact land status in the planning area by changing ownership, if the revoked withdrawal areas are conveyed under ANCSA or the Statehood Act or disposed of by BLM.

### **3.6.2 Methods of Analysis**

The nature and types of potential impacts on lands and realty from proposed actions under each alternative were based on data gathered during the planning process, the BLM interdisciplinary team's knowledge of the resource, and input provided during the public scoping process. Where possible, this analysis uses quantitative data to describe impacts on lands and realty from proposed management actions associated with other resources and resource use. Qualitative information is also used to support quantitatively based analysis or where numerical data does not exist. In all cases, best professional judgment is used in evaluating effects on the lands and realty program.

### **3.6.3 Potential Effects and Indicators**

The lands and realty program is affected by actions that change the land status in the planning area. This includes parcels of land that are conveyed, acquired, or disposed of during the planning period. Management actions that can influence land status are those that identify parcels for acquisition, retention, or disposal. These actions change the number of acres directly owned or managed by the BLM. Lands that are disposed of would no longer be subject to BLM management, limiting BLM's ability to protect resources and accommodate future activities.

Other changes in the lands and realty program occur when parcels are withdrawn, as described in Appendix M of the BSWI Draft RMP/EIS. The creation of new withdrawals, maintenance of existing withdrawals, or revocation of existing withdrawals would have implications on land use and resource

protections, such as changing land status and limiting BLM's ability to accommodate future resource extraction.

Additionally, ROW exclusion and avoidance areas could limit economic opportunities and preclude the BLM from accommodating future ROW demands.

The types of effects to lands and realty that could result from management actions and the indicators used to evaluate them are shown in Table 3.6.3-1.

**Table 3.6.3-1: Summary of Effects to Lands and Realty by Management Action**

Types of Effects	Management Actions	Indicators
Land status changes could impact land ownership by changing the number of acres directly owned or managed by the BLM.	<ul style="list-style-type: none"> <li>• Land Tenure Decisions for the INHT NTMC and INHT SRMA</li> <li>• Land Acquisition</li> <li>• Lands made available for lease or sale under the R&amp;PP Act</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of BLM-managed lands identified for acquisition, retention, or disposal</li> <li>• Acres affected by land withdrawals</li> </ul>
Lands that are disposed of would no longer be subject to BLM management, limiting BLM's ability to protect resources and accommodate future activities.	<ul style="list-style-type: none"> <li>• FLPMA Withdrawals</li> <li>• Land Tenure Decisions for the INHT NTMC</li> <li>• Disposals</li> <li>• Lands made available for lease or sale under the R&amp;PP Act</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of BLM-managed lands identified for acquisition, retention, or disposal</li> <li>• Acres affected by land withdrawals</li> </ul>
Creation of new withdrawals, maintenance of existing withdrawals, or revocation of existing withdrawals would have implications on land use and resource protections, such as changing land status and limiting BLM's ability to accommodate future resource extraction.	<ul style="list-style-type: none"> <li>• Buffers for Surface-disturbing BLM-permitted Activities</li> <li>• Minerals Decisions</li> <li>• Lands with wilderness characteristics</li> <li>• PLOs Withdrawing Land Under the Authority of ANCSA 17(d)(1)</li> <li>• Transportation and Travel Management Decisions</li> <li>• Lands Managed for Wilderness Characteristics TMA</li> <li>• Proposed WSRs</li> </ul>	<ul style="list-style-type: none"> <li>• Acres or river miles affected by land withdrawals</li> <li>• Total VRM Class Acreages</li> </ul>
ROW exclusion and avoidance areas could limit economic opportunities and preclude the BLM from accommodating future ROW demands.	<ul style="list-style-type: none"> <li>• Wildlife migration and connectivity corridors</li> <li>• Lands with wilderness characteristics</li> <li>• ROW Exclusion and Avoidance Areas</li> <li>• Transportation and Travel Management Decisions</li> <li>• Lands Managed for Wilderness Characteristics TMA</li> <li>• Communications Sites ROW</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of BLM-managed surface ownership affected by ROW lease or permit restrictions (i.e., avoidance or exclusion, no surface occupancy)</li> <li>• Acres or river miles open to locatable and leasable minerals, which may result in the need for lands and realty actions</li> <li>• Total VRM Class Acreages</li> <li>• Acres of ROW exclusion or avoidance areas</li> </ul>

## Assumptions

The following assumptions were used to assess effects associated with lands and realty:

- Land status will change slightly over the course of the planning period as lands are conveyed. Analysis is based on the most current GIS land status data and most current master title plats.
- ROW avoidance areas would only be impacted if no other ROW option was available.

- Changes in land use would be assessed under the specific resource being impacted. For the purpose of this analysis, this section only focuses on land status.
- All land not specifically identified for disposal or exchange is classified for retention.
- Retaining access to BLM-managed lands for public use and administrative purposes will continue to be a priority of the lands and realty program.
- The BLM will continue to periodically review its withdrawals to see if they are still applicable and serve the BLM interests and whether the lands should be returned to the full spectrum of public land laws. Withdrawals held by other agencies would remain unless those other agencies requested a relinquishment.
- Stipulations may be applied for ROW lease or permit approval at the project level.

The effects analysis for lands and realty is limited due to incomplete or unavailable information, including:

- Location and number of unauthorized trapping or subsistence cabins and other unauthorized structures.

### **Standard Operating Procedures and Best Management Practices**

The impact analysis below takes into account the SOPs and BMPs that could be implemented by the BLM. A comprehensive list of SOPs/BMPs pertaining to lands and realty is provided in the BSWI RMP/EIS.

#### **3.6.4 Effects Analysis**

Management actions proposed for the following resources, resource uses, and special designations would not result in effects to lands and realty:

- Air Quality and AQRVs
- Soils
- Vegetation
- NNIS
- Wildland Fire
- Cultural Resources
- Paleontological Resources
- Grazing
- Hazardous Materials and Health and Human Safety

### **Lands and Realty: Effects from Water Resources and Fisheries Habitat Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Minerals Decisions within HVWs



***Effects under Alternative A***

Under Alternative A, some spawning habitat could be withdrawn (if greater than 5 acres) from mineral location and FLPMA sales and leases. These withdrawals include portions of the North Fork Unalakleet River, Kateel River, and the Gisasa River. These restrictions limit the BLM's ability to accommodate future sales in these areas, which is a long-term direct impact.

***Effects Common to All Action Alternatives***

For all alternatives, permanent structures and disturbance greater than 5 acres would be avoided within the 100-year floodplain areas of streams. These restrictions would prevent BLM from addressing permits and leases requests in these areas, which may include permits for scientific work as well as permitting unauthorized structures or addressing public demand for leases and permits.

***Effects under Alternative B***

Under Alternative B, HVWs would be closed to salable minerals entry, closed to mineral leasing, and withdrawn from locatable mineral entry. If the recommended locatable withdrawal is not approved, locatable development would comply with all other management under this alternative. These restrictions would limit the BLM's ability to accommodate future resource extraction in these areas, a long-term indirect impact, although impacts would be minimal because there is little to no known leasable mineral potential during the expected life of the plan. These restrictions could impact up to 21,382 river miles.

***Effects under Alternative C***

Under Alternative C, HVWs would be open to salable minerals entry on a case-by-case basis, NSO for leasable minerals, and open to locatable mineral entry. These restrictions would limit the BLM's ability to accommodate future resource extraction in these areas, a long-term indirect impact, although impacts would be minimal because there is little to no known leasable mineral potential during the expected life of the plan. Locatable mineral entry opening would mean that more acres would be affected, and more permits issued. These restrictions could impact up to 14,888 river miles.

***Effects under Alternative D***

Under Alternative D, all 12,982 river miles within HVWs could be open to salable minerals entry, have standard stipulations for leasable minerals, and open to locatable mineral entry, with the same types of impacts as Alternative C. There would be no impact to lands and realty.

**Lands and Realty: Effects from Wildlife Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Leasable Minerals
- Locatable and Salable Minerals
- Mineral Decisions
- Connectivity Corridors

***Effects under Alternative A***

For leasable minerals, impacts are currently mitigated through stipulations for seasonal use or NSO in crucial habitat areas. Additionally, no connectivity corridors would be managed. There would be no direct or indirect impact on lands and realty in the planning area.

***Effects Common to All Action Alternatives***

For all action alternatives, the Plan of Development for linear project ROWs must address caribou passage in all known caribou connectivity corridors. For areas other than the ROW avoidance areas specified under each alternative, applicants must provide scientifically defensible information to demonstrate that their proposed linear facility would not impede caribou migration to support the site-specific NEPA analysis. This restriction would affect the location of potential ROWs in the planning area.

***Effects under Alternative B***

Alternative B would have more restrictions on land use and development, particularly mineral development, than Alternatives C and D. These restrictions limit the BLM's ability to accommodate future resource extraction in these areas, which is a long-term direct impact to land use, but would not impact land status.

To protect migratory birds, riparian areas would be ROW avoidance areas. These ROW avoidance areas may prevent BLM from issuing ROW in these areas, which may add to the economic costs of ROWs and may prevent BLM from addressing public proposals in these areas.

Activities and development in caribou and moose calving and wintering habitats, the Innoko Bottoms Priority Wildlife Habitat Area, North and South Connectivity Corridors, and riparian areas would be limited by allowing only NSO for leasable minerals. The Innoko Bottoms Priority Wildlife Habitat Area and North and South Connectivity Corridors would also be NSO for BLM-permitted activities. (Note: all acres in HVWs are closed to mineral leasing.) The BLM would also pursue withdrawal from locatable mineral entry in the Innoko Bottoms Priority Wildlife Habitat Area and connectivity corridors.

***Effects under Alternative C***

Under Alternative C, there would be fewer restrictions on future resource extraction and surface-disturbing activities and development than Alternative B. As with Alternative B, riparian areas would be ROW avoidance areas.

For the Innoko Bottoms Priority Wildlife Habitat Area, restrictions for leasable and salable mineral development would be the same as under Alternative B, but the area would be open to locatable development. Salable mineral development for the South Connectivity Corridor would open on a case-by-case basis unlike Alternative B, and locatable mineral development would be allowed. The South Connectivity Corridor would also be a ROW avoidance area for linear ROWs. There would be no North Connectivity Corridor managed under Alternative C; therefore, that area would not have any development restrictions associated with wildlife management actions.

There would be seasonal restrictions on leasable or salable operations in caribou calving habitat, and NSO for leasable minerals would also be allowed in caribou and moose calving and wintering habitats.

Leases and permits dealing with occupancy (including trapping cabins) in CSUs and lands managed as wilderness would be done on a case-by-case basis, which increases BLM's ability to respond to public proposals compared to Alternative B.

***Effects under Alternative D***

Alternative D would have fewer restrictions on land use and development than Alternatives B and C. Under Alternative D, mineral leasing would be allowed in calving and wintering habitats under standard stipulations, and locatable and salable minerals development would be allowed subject to management common to all alternatives. Avoidance or mitigation actions to minimize impacts on migratory birds would be determined on a case-by-case basis. There would be no impacts to lands and realty. Impacts from mineral decisions for the Innoko Bottoms Priority Wildlife Habitat Area would be the same as under Alternative C, and connectivity corridors would be managed the same as under Alternative A. Permits and leases would be allowed in wilderness areas and in CSUs on a case-by-case basis. The BLM's ability to issue such permits and leases allows for more opportunity to address public proposals for land use authorizations.

**Lands and Realty: Effects from Visual Resources Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Total VRM Class Acreages

***Effects under Alternative A***

Alternative A would continue to manage parts of the planning area as VRM Class I or II (total number of acres is unspecified). New ROW development, particularly those for high-visibility features such as trails and pipeline ROWs, would conflict with VRM objectives in these areas and likely be approved only if re-located or designed to minimize impacts on desired visual resource conditions.

***Effects Common to All Action Alternatives***

Under all alternatives, the BLM would manage resource and resource uses consistent with applicable VRM class objectives. Objectives for VRM Class I and II, which respectively specify preservation and retention of existing landscape characteristics, would have a greater likelihood of limiting the location and/or applying mitigation measures to ROWs and other land use authorizations. Fewer restrictions would be likely in VRM Classes III and IV.

***Effects under Alternative B***

Alternative B would manage approximately 7,825,858 acres, or 58 percent, of the BLM-managed lands in the planning area, as VRM Class I or II, which would affect the location and types of land use authorizations allowed in those areas. The remainder of the planning area would be designated VRM Class III and IV. Objectives for VRM Class III and IV would support new or expanded ROW development within these areas, particularly within VRM Class IV areas.

***Effects under Alternative C***

Alternative C would manage approximately 2,818,182 acres, or 21 percent BLM-managed lands in the planning area as VRM Class I or II, which would affect the location and types of land use authorizations allowed in those areas. The remainder of the planning area would be designated as VRM Class III or IV. Alternative C would designate over twice as many acres of land managed as VRM Class III or IV and therefore more areas would be available to support expanded ROW development.

***Effects under Alternative D***

Alternative D would manage approximately 725,506 acres, or 5 percent, of the BLM-managed lands in the planning area, as VRM Class I or II, which would affect the location and types of land use authorizations allowed in those areas. The remainder of the planning area would be designated as VRM Class III or IV. Alternative D would designate almost four times as many acres of land as VRM Class III or IV and therefore more areas would be available to support expanded ROW development than Alternative B or C.

**Lands and Realty: Effects from Lands with Wilderness Characteristics Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Management of Lands with Wilderness Characteristics

***Effects under Alternative A***

Current management of lands with wilderness characteristics would not impact lands and realty.

***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would acquire non-BLM lands to consolidate and improve management of natural values or primitive settings, through exchange, willing sellers, or other suitable means. This requirement would directly affect the land status of the planning area.

Additionally, the BLM would withdraw all allocated lands with wilderness characteristics lands from locatable mineral entry and close the areas to salable mineral permits and free use mineral material development. There would be NSO to leasable development with no exceptions, waivers, or modifications. These restrictions would limit the BLM's ability to accommodate future sales in these areas, which is a long-term direct impact.

***Effects under Alternative B***

Management actions associated with lands with wilderness characteristics under Alternative B would impact land status more than under Alternatives C and D. The BLM would retain all areas managed for wilderness characteristics as a priority that are in BLM ownership, which may affect lands that are identified for disposal. Under Alternative B, approximately 277,489 acres (2 percent of BLM-managed lands in the planning area) would be managed for wilderness characteristics as a priority. Additionally, approximately 12,040,490 acres would be managed for wilderness characteristics for mid-level protections, meaning that they would be managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Although development restrictions are greater for Mid-Level Protection Areas than Low-Level Protection Areas, they would not affect land status or BLM's ability to convey or dispose of those lands. Management of remaining lands in the planning area would emphasize other resource uses as a priority over wilderness characteristics, having no effect on land status or BLM's ability to accommodate future resource extraction.

Under Alternative B, approximately 294,053 acres would be managed as HVWs, included below in the discussion of ROW exclusion and avoidance areas in Effects from Lands and Realty Management Actions. The 100-year floodplain within HVWs would be closed to commercial woodland harvest.

### ***Effects under Alternative C***

There would be no lands managed for wilderness characteristics as a priority and approximately 8,105,979 acres managed for wilderness characteristics for mid-level protections. Management of the remaining approximately 5,360,024 acres would emphasize other resource uses as a priority over wilderness characteristics, having no effect on land status or resource extraction. Alternative C would result in fewer impacts to land status and BLM's ability to accommodate future resource extraction than Alternative B.

Under Alternative C, approximately 5,560,642 acres would be managed as HVWs, included below in the discussion of ROW exclusion and avoidance areas in "Lands and Realty: Effects from Lands and Realty Management Actions."

### ***Effects under Alternative D***

Under Alternative D, the entire planning area would be managed to emphasize other resource uses as a priority over wilderness characteristics, having no effect on land status or resource extraction. Alternative D would not impact land status and BLM's ability to accommodate future resource extraction or address public demand for lands and realty actions.

## **Lands and Realty: Effects from Forestry and Woodland Products**

Under all alternatives, certain activities for woodland harvest would require a personal use land use permit, commercial harvest woodland harvest permit, or other applicable land use permits under the forestry and woodland products programs.

## **Lands and Realty: Effects from Locatable and Salable Minerals Management Actions**

Management actions associated with locatable and salable minerals, such areas proposed for withdrawal for locatable minerals and areas closed to salable minerals, would affect lands and realty. However, those management actions are included in the following management topics and described in those respective subsections: Water Resources and Fisheries, Wildlife, Lands with Wilderness Characteristics, ACECs, National Trails, and WSRs.

## **Lands and Realty: Effects from Leasable Minerals Management Actions**

Lands currently under selection by the State of Alaska and Native corporations are segregated from mineral leasing to avoid potential encumbrances on selected lands prior to conveyance.

### ***Effects under Alternative A***

Alternative A would continue the current management of leasable minerals with a goal of providing opportunities for leases and sales on federal lands where environmentally feasible and where compatible with management objectives. Under Alternative A, the following areas, totaling 5,202,221 acres, would be closed to all mineral leasing.

- Unalakleet Wild River Corridor withdrawal

- Eight RNAs
- All subsistence withdrawal study areas (except linear withdrawals)
- Withdrawal/Exchange lands
- Existing PLOs

This management action could indirectly impact the BLM's ability to accommodate leasable development in the planning area.

### ***Effects Common to All Action Alternatives***

The following actions would be common to all alternatives and would guide where leasable mineral development would be allowed by BLM, indirectly affecting lands and realty in the planning area.

- The entire planning area would be open to oil and gas leasing, but any locations proposed for withdrawal from locatable mineral entry would also be NSO for oil and gas.
- All BLM-managed public lands within the planning area subject to leasing would open to coal exploration and study.
- Oil shale and non-energy leasable minerals would be leased on a case-by-case basis.
- Unless already closed, the entire planning area would be open to development of other leasable minerals/products (e.g., geothermal). Issuance of these mineral leases would be determined on a case-by-case basis.

Management actions for other alternatives regarding leasable minerals are discussed in resource sections, as appropriate.

### **Lands and Realty: Effects from Lands and Realty Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- PLOs Withdrawing Land Under the Authority of ANCSA 17(d)(1)
- FLPMA Withdrawals
- Land Tenure Decisions for the INHT NTMC
- Locatable and Leasable Mineral Withdrawals (see section above)
- FLPMA ROW Exclusion and Avoidance Areas
- Wind Energy Development
- Permits and Leases
- Land Acquisition
- Disposals

***Effects under Alternative A***

No current management objectives are established by the BLM for FLPMA withdrawals, land tenure decisions for the INHT NTMC, ROW exclusion and avoidance areas, or wind energy development that would affect lands and realty.

Alternative A would not identify any specific lands for disposal, acquisition, or exchange but would continue adjustment of land ownership boundaries and jurisdiction to make each agency's lands as manageable as possible. This action could directly impact land status in the planning area by changing the number of acres directly owned or managed by the BLM.

Regarding permits and leases under Alternative A, some historic sites within the ROW of the INHT may be suitable for use as trapping cabins under caretaker agreements, but permanent occupancy of historic sites would be discouraged. Structures used in conjunction with hunting, trapping, and fishing would be consistent with resource management principles. There would be no effects to lands and realty.

There would be no effects to lands and realty under Alternative A unless there were to be acquisitions and/or disposals of land, which would have direct, long-term impacts to land status in the planning area.

***Effects Common to All Action Alternatives***

Under all action alternatives, lands would be made available for lease or sale to benefit local communities per the criteria for Recreation and Public Purposes (R&PP) Act (1926). The BLM would also consider specific lands for disposal, exchange, and acquisition as laid out in Section 2.8.16 of the BSWI Draft RMP/EIS. The BLM would only pursue acquisitions in the event there is a willing seller and available funds to support acquisition. All action alternatives include provisions for developing new ROWs or making changes to existing ROWs. Any lands disposed, exchanged, or acquired would directly impact the land status of the planning area.

Land acquisition and disposal by the BLM ensures the effective administration of BLM lands and serves the public interest by consolidating land patterns, improving resource management, maintaining access to BLM-managed lands, and supporting community development on adjacent non-BLM-managed lands.

Disposal of BLM-managed lands improves the effectiveness of BLM land management when disposed lands have little or no resource value and disposal would consolidate land patterns, improvement resource management on retained lands, and allow for community and/or agricultural development on adjacent non-BLM-managed lands. Any land exchange or disposition not specifically anticipated in this RMP would be supported by additional NEPA analysis on a case-by-case basis.

Trespass limits the effectiveness of BLM land management and would be addressed on a case-by-case basis to resolve properly. Existing trespass cabins would be removed, put under permit, or turned into government administrative sites. These actions would be determined at the site-specific implementation level.

The alternatives considered in the EIS may consider new withdrawals for specific purposes. These proposed new withdrawals may limit the BLM's ability to address land and realty proposals in the future.

***Effects under Alternative B***

Under Alternative B, there would be approximately 9,795,543 acres of proposed FLPMA withdrawals, approximately 8,530,066 acres of existing ANCSA 17(d)(1) withdrawals that would be retained, and approximately 4,931,465 acres of existing ANCSA 17(d)(1) withdrawals that would be revoked. Because

withdrawals differ in their purpose and mechanism, there is overlap between proposed, retained, and revoked withdrawals. See Map 2-37 of the BSWI Draft RMP/EIS, which shows the complete withdrawal status for Alternative B.

Under Alternative B, all lands within the INHT NTMC would be retained and would also be excluded from wind energy development. There would be no direct or indirect impacts to lands and realty except for not being able to respond to wind development proposals.

### **Withdrawals Enacted Using the Authority of ANCSA (d)(1)**

Alternative B would revoke existing ANCSA 17(d)(1) withdrawals, except in those areas within HVWs, areas proposed for management of wilderness characteristics as a priority, and within a 1,000-foot-wide buffer centered on the existing INHT treadway at the Farewell Burn unit (2,732 acres) and the Kaltag Portage unit (1,897 acres). ANCSA 17(d)(1) withdrawals protecting these resources would be retained until a new withdrawal for the stated purpose is completed. Any revocation or retention of withdrawals could have direct impacts to the land status in the planning area. A complete list of current withdrawals can be found in Appendix M of the BSWI Draft RMP/EIS.

### **FLPMA Withdrawals**

Alternative B would establish new FLPMA withdrawals to prohibit salable, locatable, and leasable minerals for on the existing INHT treadway at the Farewell Burn unit (2,732 acres), the Kaltag Portage unit (1,897 acres), and the Rohn Site (363 acres). Map 2-36 of the BSWI Draft RMP/EIS illustrates the location of these sites. There would be potential direct impacts to land use by limiting BLM's ability to accommodate future resource extraction.

### **FLPMA ROW Exclusion and Avoidance Areas**

Subject to valid existing rights, there would be approximately 1,464,069 acres of ROW exclusion areas and approximately 8,824,848 acres of FLPMA ROW avoidance areas under Alternative B. FLPMA ROW exclusion areas preclude BLM from accommodating future ROW demands in those areas, and FLPMA ROW avoidance areas limit BLM's ability to do so, both resulting in long-term direct impacts.

### **Permits and Leases**

Under Alternative B, occupancy leases or trapping/subsistence cabin permits would not be allowed within 300 feet of riparian areas. Trapping cabins would not be permitted within 30 trail miles of ANCSA 14c(3) lands or a city. This distance may be altered based on identified resource damage or user conflict. No permits or leases would be granted for construction of structures within conservation system units and lands managed for wilderness characteristics as a priority. There would be a direct impact on BLM's ability to respond to public demand for leases and permits and to permit unauthorized structures in these areas.

### **Disposals and Exchanges**

Under Alternative B, the same areas available for disposal under Alternative D would be available for exchange, except the following:

- Lands with Wilderness Characteristics Managed as a Priority
- ACECs



- Connectivity Corridors

Under Alternative B, approximately 342,360 acres would be available for exchange, but not for disposal. Appendix F of the BSWI Draft RMP/EIS lists lands considered for exchange or disposal. These acres are estimated based on GIS data. Details on these parcels and their legal descriptions are found in Appendix F. Any exchanged lands would have direct impacts to the land status of the planning area. Criteria for land exchanges would be the same as for Alternative D disposals or exchanges (see below) but would exclude lands with wilderness characteristics managed as a priority, ACECs, and connectivity corridors.

### ***Effects under Alternative C***

Under Alternative C, there would be approximately 4,991 acres of proposed FLPMA withdrawals. All 13,461,531 acres of existing ANCSA 17(d)(1) withdrawals would be revoked. Because withdrawals differ in their purpose and mechanism, there is overlap between proposed and revoked withdrawals. Map 2-38 of the BSWI Draft RMP/EIS, shows the complete withdrawal status for Alternative C.

As with Alternative B, under Alternative C all lands within the INHT NTMC would be retained and would also be excluded from wind energy development. There would be no direct or indirect impacts to lands and realty other than BLM's ability to respond to wind development proposals.

### **Withdrawals Enacted Using the Authority of ANCSA 17(d)(1)**

Alternative C would revoke all ANCSA 17(d)(1) withdrawals.

A complete list of current withdrawals based on based available data can be found in Appendix M of the BSWI Draft RMP/EIS, Table 3.5.4-4.

### **FLPMA Withdrawals**

FLPMA withdrawals under Alternative C would have the same impacts as under Alternative B.

### **FLPMA ROW Exclusion & Avoidance Areas**

Under Alternative C, there would be no ROW exclusion areas. Subject to valid existing rights, there would be approximately 7,069,494 acres of FLPMA ROW avoidance areas and 576,038 acres of ROW avoidance for linear ROWs (South Connectivity Corridor). Map 2-41, of the BSWI Draft RMP/EIS, shows all FLPMA ROW avoidance areas under Alternative C. FLPMA ROW avoidance areas could limit the BLM's ability to accommodate future ROW demand in these areas, which would be a long-term, indirect impact. Alternative C would result in fewer limitations to future ROW demand than Alternative B.

### **Permits and Leases**

Under Alternative C, the distance between occupancy leases such as trapping cabins would be determined on a case-by-case basis based on documented conflict. Granting of permits and leases in CSUs would be determined on a case-by-case basis based on the compatibility of the permits and leases with management goals of these areas and the requirements of ANILCA.

### **Disposals and Exchanges**

Under Alternative C, the same areas available for disposal under Alternative D would be available for exchange, except that parcels in ACECs and the South Connectivity Corridor and watersheds with important fish or cultural values. Under Alternative C, approximately 356,942 acres would be available for exchange but not for disposal. These acres are estimated based on GIS data. Appendix M of the BSWI Draft RMP/EIS lists lands considered for exchange or disposal. Details on these parcels and their legal descriptions are found in Appendix F. Any exchanged lands would have direct impacts on the land status of the planning area.

### ***Effects under Alternative D***

Under Alternative D, there would be 0 acres of proposed FLPMA withdrawals. All 13,461,531 acres of existing ANCSA 17(d)(1) withdrawals would be revoked. Map 2-39 of the BSWI Draft RMP/EIS shows the complete withdrawal status for Alternative D.

There would be no specific management direction pertaining to wind development under Alternative D, and there would be no impact to lands and realty.

### **Withdrawals Enacted Using the Authority of ANCSA 17(d)(1)**

Alternative D would revoke all ANCSA 17(d)(1) withdrawals, which would directly impact land status in the planning area. A complete list of current withdrawals based on best available data can be found in Appendix M of the BSWI Draft RMP/EIS.

### **FLPMA Withdrawals**

FLPMA withdrawal for the 1,000-foot-wide buffer centered on the existing INHT treadway would not be pursued, and the area would remain NSO for locatable and leasable minerals and closed to salable mineral entry under Alternative D, which would not have any direct or indirect impacts to lands and realty.

### **FLPMA ROW Exclusion and Avoidance Areas**

Under Alternative D, there would be no FLPMA ROW exclusion areas. Subject to valid existing rights, there would be approximately 5,130,927 acres of FLPMA ROW avoidance areas. Additionally, ROWs would be authorized on a case-by-case basis on approximately 100,644 acres within the planning area (in permafrost areas and the INHT NTMC). Map 2-42 of the BSWI Draft RMP/EIS shows all ROW avoidance areas under Alternative D. FLPMA ROW avoidance areas could limit the BLM's ability to accommodate future ROW demand in these areas, which would be a long-term, indirect impact. In total, Alternative D would have approximately 8,234,323 acres open to ROW location within the planning area, approximately 2,413,961 acres more than Alternative C and approximately 5,024,620 acres more than Alternative B.

### **Permits and Leases**

Under Alternative D, the distance between occupancy leases such as trapping cabins would be determined on a case-by-case basis at the implementation level. Granting of permits and leases in CSUs would be the same as under Alternative C. Permits and leases would be allowed in lands managed for wilderness characteristics.

### **Disposals and Exchanges**

The following categories of parcels in the planning area are available for exchanges or disposal:

- Category 1 includes unselected land in BLM ownership adjacent to State or Native patented lands that are 1.5 townships (34,560 acres) or smaller that the BLM would consider for disposal.
- Category 2 includes State or Native selected lands that are 1.5 townships (34,560 acres) or smaller that, if these selected lands remain in BLM ownership after the conveyance process, the BLM would consider for disposal.
- Category 3 includes unselected lands in BLM ownership that are 1.5 townships (34,560 acres) or smaller that are adjacent to State or Native selected land that, if these selected lands are conveyed, the BLM would consider for disposal.

Under Alternative D, approximately 451,173 acres would be available for exchanges or disposal. Alternative D differs from Alternative B and C in that lands are available for exchanges and disposals, whereas Alternative B and C identified lands only for exchange and not disposal, Table 3.5.4-3 in Appendix M of the BSWI Draft RMP/EIS lists lands considered for exchange or disposal. Details on these parcels and their legal descriptions are found in Appendix F of the BSWI Draft RMP/EIS. Any disposed lands would have long-term direct impacts on the land status of the planning area.

### **Lands and Realty: Effects from Recreation and Visitor Services Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- INHT SRMA

#### ***Effects under Alternative A***

There would continue to be no proposed activities that would restrict or promote lands and realty actions and therefore no effects from management of recreation and visitor services on lands and realty under Alternative A.

#### ***Effects Common to All Action Alternatives***

Under all of the action alternatives, the INHT would be an SRMA.

#### ***Effects under Alternative B***

Alternative B, the BLM would retain all lands within the INHT SRMA that are in BLM ownership, which may affect land status in the planning area. Under Alternative B, the INHT SRMA would be approximately 355,799 acres.

#### ***Effects under Alternative C***

Under Alternative C, the BLM would retain all lands within the INHT SRMA that are in BLM ownership, which may affect land status in the planning area. Under Alternative C, the INHT SRMA would be approximately 340,574 acres.

#### ***Effects under Alternative D***

Under Alternative D, effects would be the same as under Alternative C.

## **Lands and Realty: Effects from Travel and Transportation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Vegetation and Wildlife Travel Management
- All BSWI Lands Not Designated as CSUs or Sensitive Resource Areas
- Unalakleet Wild River Corridor Travel Management Decisions
- INHT NTMC TMA
- Rohn Site Travel Decisions
- Lands Managed for Wilderness Characteristics TMA

### ***Effects under Alternative A***

Under Alternative A, there would be no lands in the planning area managed as designated TMAs. There would be no impacts to lands and realty under this alternative.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, the majority of BLM-managed lands in the planning area would be designated as “Limited” to motorized travel. For overland travel by the public in limited designations, realty authorizations for travel over the limited designations may be necessary, which would require an authorization from the BLM and have a direct impact on the land and realty program.

### ***Effects under Alternative B***

Under Alternative B, if monitoring shows observable or quantifiable degradation of certain vegetation habitats due to OHV use, then appropriate management actions would be developed and implemented. The actions may include rerouting or closing unauthorized OHV trails to aid in restoring ecosystem health. This action could limit the BLM’s ability to accommodate future ROW demand in these areas, which would be a long-term, indirect impact.

Under Alternative B, the BLM would develop travel management plans identifying travel routes and corridors between communities. There would be two TMAs: INHT NTMC TMA and Lands Managed for Wilderness Characteristics TMA. As a result of the travel management plans, there could be access provided via ROWs or easements for travel corridors. This management action would have a direct impact on land status in the planning area. There could also be areas of ROW restriction, limiting the BLM’s ability to accommodate future ROW demands in certain areas, which would be an indirect impact.

### ***Effects under Alternative C***

Impacts under Alternative C would be the same as under Alternative B, except the Lands Managed for Wilderness Characteristics TMA is not included in Alternative C.

### ***Effects under Alternative D***

Under Alternative D, there would be no limitations on OHV use and no limitations or restrictions on overland travel or casual use. There would be no impacts to lands and realty from travel management

actions under Alternative D in lands not managed as TMAs or CSUs. Under Alternative D, impacts from travel management plans would be the same as identified under Alternative C.

### **Lands and Realty: Effects from Areas of Critical Environmental Concern Management Actions**

Potential impacts from the following management topics were considered:

- Lands and Realty Decisions
- Minerals Decisions
- Transportation and Travel Management Decisions
- VRM Decisions

#### ***Effects under Alternative A***

Alternative A would continue the current ACEC designations on BLM lands; there would be no changes to current ACECs or the addition of new ACECs. Therefore, there would be no changes to land status under Alternative A. The existing ACECs are listed below in Table 3.6.4-1.

**Table 3.6.4-1: Alternative A ACECs Affecting Lands and Realty**

<b>ACEC</b>	<b>Acres</b>	<b>Lands and Realty Decisions</b>
Anvik River ACEC	114,386	The existing Anvik River ACEC occurs within lands withdrawn by PLO 5180. Portions of the ACEC not covered by this PLO are open to public land laws. PLO 5180 withdrew lands (subject to valid existing rights) from all forms of appropriation under the public land laws, including selections by the State of Alaska under the Alaska Statehood Act, from location and entry under existing mining laws (except locations for metalliferous minerals), and from leasing under the Mineral Leasing Act. The lands were reserved for study to determine the proper classification of the lands under ANILCA 17(d)(1). The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements (BLM 1981a).
Gisasa River ACEC	278,055	This ACEC occurs within lands withdrawn by PLO 5173 and PLO 5180, which withdraw lands from all forms of appropriation and from location, entry, and leasing of minerals. Prior to conveyances of selected lands, the Secretary of the Interior could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements. The lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements, except for an identified 300-foot NSO setback zone on the Gisasa River.
Inglutalik ACEC	71,713	This ACEC occurs within lands withdrawn by PLO 5180, which withdrew lands from all forms of appropriation and from location, entry, and leasing of minerals. The lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements.
Kateel River ACEC	568,083	This ACEC occurs within lands withdrawn by PLO 5173, PLO 5179, PLO 5180, and PLO 5184, which withdraw lands from all forms of appropriation and from location, entry, and leasing of minerals. Prior to conveyances of selected lands, the Secretary of the Interior could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements. The lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements, although FLPMA sales and leases are not allowed within a 300-foot setback zone on the Kateel River.
Shaktoolik River ACEC	192,591	This ACEC occurs within lands withdrawn by PLO 5180, which withdrew lands from all forms of appropriation and from location, entry, and leasing of minerals. The lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements.
Ungalik River ACEC	112,719	ACEC occurs within lands withdrawn by PLO 5180, which withdraws lands from all

ACEC	Acres	Lands and Realty Decisions
		<p>forms of appropriation and from location, entry, and leasing of minerals.</p> <p>The lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements although FLPMA sales. Leases are not allowed within a 300-foot setback zone on the Kateel River.</p>
North River ACEC	132,200	<p>The existing Drainages of the North River ACEC occur within lands withdrawn by PLO 5180. PLO 5180 withdrew lands identified by legal description (subject to valid existing rights) from all forms of appropriation under the public land laws, including selections by the State of Alaska under the Alaska Statehood Act and from location and entry under the mining laws (except locations for metalliferous minerals) and from leasing under the Mineral Leasing Act. The lands were reserved for study to determine the proper classification of the lands under ANCSA section 17(d)(1).</p> <p>The lands are currently managed under the 1981 SWMFP and the 1986 CYRMP and are open on a case-by-case basis to permits, leases, ROWs, and easements, although FLPMA sales and leases are not allowed within a 300-foot North River corridor setback identified in the CYRMP.</p>
Drainages of the Unalakleet	403,378	<p>The existing Drainages of the Unalakleet River ACEC occur within lands withdrawn by PLO 5180, PLO 5179, and PLO 5173. PLO 5180 withdrew lands identified by legal description (subject to valid existing rights) from all forms of appropriation under the public land laws, including selections by the State of Alaska under the Alaska Statehood Act and from location and entry under the mining laws (except locations for metalliferous minerals) and from leasing under the Mineral Leasing Act. The lands were reserved for study to determine the proper classification of the lands under ANCSA section 17(d)(1).</p> <p>PLO 5179 withdrew identified lands by legal description (subject to valid existing rights) from all forms of appropriation under the public land laws including selections by the State of Alaska under the Alaska Statehood Act and from location and entry under the mining laws (which includes locations for metalliferous minerals) and from leasing under the Mineral Leasing Act. PLO 5179 also withdrew the lands from selections by regional corporations under section 12 of ANCSA. The lands were reserved for study and possible recommendations to the Congress as additions or creation as a unit of the National Park, Forest, NWR, and National System.</p> <p>PLO 5173 withdrew lands identified by legal description (subject to valid existing rights) from all forms of appropriation under the public land laws, including selections by the State of Alaska under the Alaska Statehood Act and from location and entry under the mining laws and from leasing under the Mineral Leasing Act. The lands were reserved for selection by village corporations. Upon conclusion of village selections, the regional corporations could select the lands under Section 12 of ANCSA. Prior to conveyances, the Secretary of the Interior could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements. Applications for mineral leasing would be rejected until the PLO is modified or the lands appropriately classified to permit mineral leasing.</p> <p>Portions of this ACEC are not covered by the above withdrawals. Areas not covered by withdrawals are open to the full spectrum of the public land laws including mining and leasing.</p> <p>The lands are currently managed under the 1981 SWMFP, the 1986 CYRMP and the 1983 Unalakleet River Management Plan and are open on a case-by-case basis to permits, leases, ROWs, and easements although FLPMA sales and leases are not allowed within that portion of the CYRMP in the Unalakleet Wild River Corridor and 300-foot setback zones on the North Fork of the Unalakleet.</p>
Box River Treeline RNA	13,592	<p>The existing Box River Treeline RNA occurs within lands withdrawn by PLO 5180. PLO 5180 withdrew lands identified by legal description (subject to valid existing rights) from all forms of appropriation under the public land laws, including selections by the State of Alaska under the Alaska Statehood Act and from location and entry under the mining laws (except locations for metalliferous minerals) and from leasing under the Mineral Leasing Act. The lands were reserved for study to determine the proper classification of the lands under ANCSA section 17(d)(1).</p> <p>The lands are currently managed under the 1986 CYRMP and are open on a case-by-case basis to permits, leases, ROWs, and easements.</p>
Peregrine Falcon Nesting Habitat ACEC	6,354	<p>The existing Peregrine Falcon Nesting Habitat ACEC occurs within lands withdrawn by PLO 5184 and PLO 5179. A small portion of the ACEC is not covered by a PLO, and the lands are open to the public land laws. PLO 5184 withdrew lands (subject to valid existing rights) withdrawn by section 11 of the A from all forms of appropriation under the public land laws and from location and entry under the mining laws (which includes locations for metalliferous minerals) and from leasing under the Mineral Leasing Act.</p>

ACEC	Acres	Lands and Realty Decisions
		<p>PLO 5184 also withdrew these lands from selections by the State of Alaska under the Alaska Statehood Act until 1975. PLO 5184 also allowed the Secretary of the Interior to administer the lands under applicable laws and regulations and granted the authority to enter contracts, as well as grant leases, permits, ROWs, or easements.</p> <p>PLO 5179 withdrew identified lands by legal description (subject to valid existing rights) from all forms of appropriation under the public land laws including selections by the State of Alaska under the Alaska Statehood Act and from location and entry under the mining laws (which includes locations for metalliferous minerals) and from leasing under the Mineral Leasing Act. PLO 5179 also withdrew the lands from selections by regional corporations under section 12 of ANCSA. The lands were reserved for study and possible recommendations to the Congress as additions or creation as a unit of the National Park, Forest, NWR, and National System.</p> <p>The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements.</p>
Kuskokwim River Raptor Nesting Habitat ACEC	4,896	<p>The existing Kuskokwim River Raptor Nesting Habitat ACEC occurs within lands withdrawn by PLO 5184. PLO 5184 withdrew lands (subject to valid existing rights) withdrawn by section 11 of the ANCSA from all forms of appropriation under the public land laws and from location and entry under the mining laws (which includes locations for metalliferous minerals) and from leasing under the Mineral Leasing Act. PLO 5184 also withdrew the lands from selections by the State of Alaska under the Alaska Statehood Act until 1975. The lands were reserved for study and review by the Secretary of the Interior for the purpose of the classification or reclassification of any lands not conveyed pursuant to ANCSA section 14. PLO 5184 also withdrew lands by section 11 of ANCSA lying between 58 degrees north and 64 degrees north latitude and 161 degrees west longitude not withdrawn as any part of the NWR, subject to valid existing rights from all forms of appropriation under the public land laws, including selections by the State of Alaska under the Statehood Act and entry under the mining laws and from leasing under the Mineral Leasing Act. The lands were reserved for study and review by the Secretary of the Interior for the purpose of the classification or reclassification of any lands not conveyed pursuant to section 14 of the ANCSA. PLO 5184 also allowed the Secretary of the Interior to administer the lands under applicable laws and regulations and granted the authority to enter contracts, as well as grant leases, permits, ROWs, or easements.</p> <p>The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements.</p>
<b>Total</b>	<b>1,884,376</b>	

There are seven areas that are nominated for an ACEC under Alternatives B. The management of those areas under Alternative A would not change. These include the following:

- The Anvik Traditional Trapping Area ACEC (nominated 21,366 acres). Lands are currently managed under the SWMFRP (BLM 1981a) and are open on a case-by-case basis to leases, permits, ROWs, and easements. Some parts occur within lands withdrawn by PLO 5184, which withdrew lands from all forms of appropriation and from location, entry, and leasing of minerals. Prior to conveyances of selected lands, the Secretary of the Interior could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements.
- Anvik River Watershed ACEC (nominated 248,872 acres). Lands are currently managed under the SWMFRP and are open on a case-by-case basis to leases, permits, ROWs, and easements. Some parts occur within lands withdrawn by PLO 5180, which withdrew lands from all forms of appropriation under public laws and from location and entry under the mining laws. The lands were reserved for study to determine classification under Section 17(d)(1) of ANCSA.
- Nulato River ACEC (nominated 344,183 acres). Lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements. Some parts occur within lands withdrawn by PLO 5173, PLO 5180, and PLO 5184, which

withdraw lands from all forms of appropriation and from location, entry, and leasing of minerals. Prior to conveyances of selected lands, the Secretary could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements.

- Sheefish ACEC (nominated 696,902). Lands are currently managed under the SWMFP (BLM 1981a) and are open on a case-by-case basis to permits, leases, ROWs, and easements. Some parts occur within lands withdrawn by PLO 5180, which withdrew lands from all forms of appropriation and from location, entry, and leasing of minerals.
- Swift River Whitefish Spawning ACEC (nominated 220,032 acres). Lands are currently managed under the SWMFP (BLM 1981a) and are open on a case-by-case basis to leases, permits, ROWs, and easements. Some parts occur within lands withdrawn by PLO 5180 and PLO 5184, which withdraw lands from all forms of appropriation and from location, entry, and leasing of minerals. Prior to conveyances of selected lands, the Secretary could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements.
- Tagawik River ACEC (nominated 301,044 acres). Lands are currently managed under the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements. Some parts occur within lands withdrawn by PLO 5180, which withdrew lands from all forms of appropriation and from location, entry, and leasing of minerals.
- Unalakleet River Watershed ACEC (nominated 733,995). Lands are currently managed under the SWMFP (BLM 1981a) and the CYRMP (BLM 1986a) and are open on a case-by-case basis to permits, leases, ROWs, and easements. Some parts occur on lands withdrawn by PLO 5180 and 5184, which withdraw lands from all forms of appropriation and from location, entry, and leasing of minerals. Prior to conveyances of selected lands, the Secretary could administer the lands and make contracts, as well as grant leases, permits, ROWs, or easements.

### ***Effects under Alternative B***

Alternative B would include all the ACECs in Alternative A except for the North River ACEC, the Drainages of the Unalakleet ACEC, the Box River Treeline RNA, the Peregrine Falcon Nesting Habitat ACEC, and the Kuskokwim River Raptor Nesting Habitat. However, substantial acres within the existing Anvik River ACEC, North River ACEC, and Drainages of the Unalakleet ACEC are included in proposed ACECs under Alternative B and would be managed according to those management decisions (Table 3.6.4-2). The Box River Treeline RNA, Peregrine Falcon Nesting Habitat ACEC, and the Kuskokwim River Raptor Nesting Habitat ACEC were not found to meet Relevance and Importance criteria in an analysis performed in 2016 (BLM 2018). Alternative B would also increase the acreage of some of the existing ACECs and, in some cases, include management decisions that would affect lands and realty. Table 3.6.4-2 summarizes all of the ACECs that would remain or be proposed under Alternatives B.



**Table 3.6.4-2: Alternative B ACECs Affecting Lands and Realty**

ACEC	Alternative B Proposed Acres	Existing Acres	Additional Lands and Realty Decisions under Alternative B
Anvik Traditional Trapping Area ACEC	21,366	N/A	ROW avoidance area. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel.
Anvik River Watershed ACEC	248,872	115,106	ROW avoidance area. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel. Visual resources: Managed as VRM Class III. Includes 100,948 acres of the existing Anvik River ACEC.
Gisasa River ACEC	278,247	278,057	ROW avoidance area. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel. Visual resources: Managed as VRM Class III.
Inglutalik ACEC	70,891	71,716	ROW avoidance area. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel. Visual resources: Managed as VRM Class III.
Kateel River ACEC	692,659	568,083	ROW avoidance area. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel. Visual resources: Managed as VRM Class III.
Nulato River ACEC	344,183	N/A	ROW avoidance area within the ACEC upstream of the Village of Nulato. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel. Visual resources: Managed as VRM Class III. Includes portions of the existing North River ACEC (649 acres) and Drainages of the Unalakleet ACEC (868 acres).
Shaktoolik River ACEC	191,725	192,591	ROW avoidance area. Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry. Limits and/or restrictions on subsistence travel and casual use travel. Visual resources: Managed as VRM Class III. Includes 1,621 acres of the existing North River ACEC.

ACEC	Alternative B Proposed Acres	Existing Acres	Additional Lands and Realty Decisions under Alternative B
Sheefish ACEC	696,902	N/A	<p>ROW avoidance area.</p> <p>Coordinate with the State of Alaska on potential land exchanges to obtain all HUC 6 watershed acreage along the Big River and Middle Fork of the Kuskokwim.</p> <p>Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry.</p> <p>Withdrawal from mineral entry portion of the Big River and the Middle Fork Kuskokwim River to include the river bed and a 1,000-foot buffer on each side of bank full width.</p> <p>Total withdrawal would be 4,996 acres.</p> <p>Limits and/or restrictions on subsistence travel and casual use travel.</p> <p>Visual resources: Managed as VRM Class II.</p>
Swift River Whitefish Spawning ACEC	220,032	N/A	<p>ROW avoidance area.</p> <p>Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry.</p> <p>Limits and/or restrictions on subsistence travel and casual use travel.</p> <p>Visual resources: Managed as VRM Class III.</p>
Tagagawik River ACEC	301,044	N/A	<p>ROW avoidance area.</p> <p>Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry.</p> <p>Limits and/or restrictions on subsistence travel and casual use travel.</p> <p>Visual resources: Managed as VRM Class II.</p>
Unalakleet River Watershed ACEC	733,995	552,534 <sup>1</sup>	<p>ROW avoidance area.</p> <p>Prioritize cooperation with the State of Alaska and Native Village of Unalakleet to develop coordinated strategy for management of the Unalakleet River corridor within the ACEC.</p> <p>Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry.</p> <p>Limits and/or restrictions on subsistence travel and casual use travel.</p> <p>Visual resources: Managed as VRM Class II.</p> <p>Includes portions of the existing North River ACEC (65,635 acres) and Drainages of the Unalakleet ACEC (299,968 acres).</p>
Ungalik River ACEC	113,455	112,719	<p>ROW avoidance area.</p> <p>Closed to salable minerals, would be closed to leasable minerals, and would be withdrawn from locatable mineral entry.</p> <p>Limits and/or restrictions on subsistence travel and casual use travel.</p> <p>Visual resources: Managed as VRM Class III.</p>
<b>Total</b>	<b>3,912,698</b>	<b>1,338,272</b>	
1. The Unalakleet River Watershed ACEC is nominated under Alternative A, but not designated.			

All proposed ACECs under Alternative B would be managed as ROW avoidance areas, which would limit the BLM's ability to accommodate future leasable development in these areas and limit BLM's ability to accommodate land use authorizations.

Any locations within the planning area proposed for withdrawal from locatable mineral entry would also be NSO for oil and gas. These restrictions would limit the BLM's ability to accommodate future oil and gas development in these areas.

Objectives for VRM Class II would have a greater likelihood of limiting the location and/or applying mitigation measures to ROWs and other land use authorizations. Fewer restrictions would be likely in VRM Class III.

### ***Effects under Alternative C***

Under Alternative C, the proposed ACEC restrictions on land and realty authorizations would be removed, thereby increasing BLM's ability to address land and realty demands from the public and reduce the economic burden of these proposals to meet ACEC limits on realty authorizations. Alternative C impacts are therefore the same as Alternative D with respect to ACEC management actions.

### ***Effects under Alternative D***

Under Alternative D, there would be no ACECs. The proposed ACEC restrictions on land and realty authorizations would be removed thereby increasing BLM's ability to address land and realty demands from the public and reduce the economic burden of these proposals to meet ACEC limits on realty authorizations.

## **Lands and Realty: Effects from National Trails Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- INHT NTMC
- Mineral Decisions in the INHT NTMC

### ***Effects under Alternative A***

Under Alternative A, the INHT would be managed to maintain the integrity of the INHT and associated historic and cultural sites in compliance with the National Trails System Act (1968) and the INHT Comprehensive Management Plan (BLM 1981b).

### ***Effects Common to All Action Alternatives***

Under all of the action alternatives, the BLM would establish an NTMC for the INHT within the planning area. The establishment of an NTMC could limit the BLM's ability to accommodate future ROW demand in certain areas, which would be an indirect impact. The geographic areas comprising the INHT NTMC would consist of three geographically distinct areas:

- Farewell Burn – located south of Nikolai
- Kaltag Portage – located between Unalakleet and Kaltag
- Rohn – located southeast of Nikolai

Within the planning area, the BLM holds a National Trail System Act reservation for some INHT segments on blocks of land conveyed to the State of Alaska. These segments of trail would not be managed as part of the NTMC and would not be subject to the prescriptions described in this section.

Similarly, these segments would not be managed as TMAs and/or for surface travel management, nor would they be managed as an SRMA. If the INHT is located within any lands where a withdrawal is revoked and if the State of Alaska or an ANCSA corporation desires conveyance of the parcels, at the time of any future conveyance, a reservation would be made for the INHT under the National Trails System Act. This would be a long-term, direct impact to the land status of the planning area.

The INHT would be designated as a TMA for route designation during a travel management planning process as described above in the section “Lands and Realty: Effects from Travel and Transportation Management Actions.” Additionally, if casual or subsistence OHV use results in degradation of the resources or prevents effective trail maintenance, then this would be prohibited in affected areas. This restriction could limit the BLM’s ability to accommodate future ROW demand in these areas, which would be an indirect impact.

There would be no coal leases issued within the National System of Trails.

### ***Effects under Alternative B***

Under Alternative B, the acres of the geographic areas comprising the INHT NTMC would be as follows:

- Farewell Burn: 46,591 acres
- Kaltag Portage: 241,512 acres
- Rohn: 363 acres

The INHT NTMC would be withdrawn and closed to mineral entry and for leasable and salable mineral development. Because there are no medium or high LMP areas within the INHT NTMC, this is not expected to have a noticeable impact on the BLM’s ability to accommodate leasable development in the planning area.

To manage the INHT NTMC, FLPMA reservations issued to BLM for a 1,000-foot-wide corridor centered on the existing INHT centerline would be established as described above in the section “Lands and Realty: Effects from Travel and Transportation Management Actions.”

### ***Effects under Alternative C***

Under Alternative C, the acreage of the geographic areas comprising the INHT NTMC would be the same as in Alternative B, except for the Farewell Burn, which would be 31,367 acres.

The INHT TNMC would be open for locatable mineral exploration and development, NSO for leasable development, and open for salable mineral development. There could be impacts to lands and realty from new leases and sales.

To manage the INHT NTMC, FLPMA reservations issued to BLM for a 1,000-foot-wide corridor centered on the existing INHT centerline would be established as described above as described above in the section “Lands and Realty: Effects from Travel and Transportation Management Actions.”

### ***Effects under Alternative D***

The acreage of the geographic areas comprising the INHT NTMC under Alternative D would be the same as under Alternative C.

The INHT TNMC would be open for locatable mineral exploration and development, open with standard stipulations for oil and gas leasing, and open for salable mineral development. There could be impacts to lands and realty from new leases and sales.

### **Lands and Realty: Effects from Wild and Scenic Rivers Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Proposed WSRs

#### ***Effects under Alternative A***

Alternative A would continue the current management of the 46,953-acre Unalakleet Wild River Corridor and an additional 18 river segments (331,120 acres) have been identified as eligible. The 18 eligible river segments would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM Manual 6400 (BLM 2012). However, BLM Manual 6400 does not include any guidelines for withdrawals that would be applicable to the 18 eligible river segments. Therefore, there would be no effects to lands and realty from WSR management under Alternative A.

#### ***Effects Common to All Action Alternatives***

Under all the action alternatives, the BLM would seek to acquire any Native allotments available from willing sellers within the designated wild river corridors. This action would directly impact the land status of the planning area.

The BLM would also maintain the withdrawal from mineral entry within the WSR corridors, subject to valid existing rights. This action could indirectly impact the BLM's ability to accommodate leasable development in the planning area.

#### ***Effects under Alternative B***

Under Alternative B, 18 additional river corridors totaling approximately 331,120 acres are recommended as suitable for WSR designation. There would be no specific management actions related to lands and realty for the 18 river corridors recommended as suitable. The Unalakleet Wild River Corridor would be maintained.

#### ***Effects under Alternative C***

Effects from WSR management would be the same as Alternative A.

#### ***Effects under Alternative D***

Effects from WSR management would be the same as Alternative A.

### **Lands and Realty: Effects from Support for BSWI Communities Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Communications Sites ROW

***Effects under Alternative A***

Under Alternative A, communication sites are determined on a case-by-case basis. This action could have an indirect impact on land status in the planning area if there are additional utility ROW and leases required.

***Effects Common to All Action Alternatives***

Under all action alternatives, lands would be made available for lease or sale to benefit local communities under the R&PP Act. The determination to put land up for sale or lease would include objectives like expansion of communities and economic development as criteria for land disposal. The BLM would also consider providing opportunities for community relocation through the use of ROW grants, permitting, exchanges, R&PP lease or sale, leases, or other appropriate permitting actions as determined mutually beneficial for the community and the long-term sustainability of BLM-managed public lands. This action could have a long-term, direct impact on land status in the planning area.

Additionally, the BLM would develop travel management plans identifying travel routes and corridors between communities. Actions would include designation of winter trails system and identification of other safety cabin locations on BLM lands that support inter-village travel, and winter trail system signage. New trails and travel corridors could have an indirect impact on lands and realty if new ROWs are established, impacting lands and realty in the planning area.

***Effects under Alternative B***

Alternative B would allow expanded use of existing microwave towers that would increase safety along inter-village travel routes with appropriate stipulations to ensure minimal environmental changes to existing sites. This action could have an indirect impact on lands and realty in the planning area if there are additional utility ROW and leases required.

***Effects under Alternative C***

Under Alternative C, communications sites would be allowed at strategic locations along inter-village winter travel route corridors to improve communication and safety. Locations would be determined on a case-by-case basis with appropriate required operating procedures and stipulations. This action could have an indirect impact on lands and realty in the planning area if there are additional utility ROW and leases required. No management actions were prescribed for existing communications towers under Alternative C.

***Effects under Alternative D***

Under Alternative D, communications sites would be identified on a case-by-case basis. The BLM would support development of cell phone towers and other communication infrastructure on BLM-managed lands in the planning area that would improve communication and internet connection for rural communities. This action could have an indirect impact on lands and realty in the planning area if there are additional utility ROW and leases required. No management actions were prescribed for existing communications towers under Alternative D.

## **Lands and Realty: Effects from Climate Change**

This section presents the analysis of how management actions would counteract cumulative climate change impacts to lands and realty. Many of the impacts to lands and realty caused by climate change are reflected in the analysis of other resource sections due to the correlation between these resources and the indicators of lands and realty impacts.

### ***Effects under Alternative A***

There would be no impacts from climate change to lands and realty under this alternative.

### ***Effects Common to All Action Alternatives***

The BLM would consider providing opportunities for community relocation as a result of changing coastline from thawing permafrost, higher storm surge, or other effects of climate change. Opportunities would be through the use of ROW grants, permitting, exchanges, R&PP, leases, or other appropriate permitting actions as determined mutually beneficial for the community and the long-term sustainability of BLM-managed public lands in the planning area. This action could have a direct impact on land status in the planning area. There are alternative-specific effects that would counteract climate change impacts.

## **Lands and Realty: Cumulative Effects**

Cumulative impacts on lands and realty are the result of past, present, and reasonably foreseeable future actions within and next to the planning area that increase or decrease demand for land tenure actions and land use authorizations. Table 3.6.4-3 summarizes the results of the cumulative effects analysis for lands and realty for all alternatives.

**Table 3.6.4-3: Cumulative Effects Analysis for Lands and Realty**

Trends and Forecasts of Lands and Realty in Consideration of Past and Present Actions	Trends and Forecasts of Lands and Realty in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Lands and Realty in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Lands and Realty in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Lands and Realty in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Land status changes slowly as lands that are selected by the State or ANCSA corporations are conveyed out of BLM management and to the ownership of the selector.</p>	<p>Conveyance of lands to the State and Native corporations is ongoing and will continue until the process is complete. On a statewide basis, about 98 percent of Native conveyances and 95 percent of State conveyances have been completed. Under Alternative A, this process would likely continue at the current rate. Additionally, the BLM and other landowners have, since conveyance began, exchanged, withdrew, disposed of, and acquired land outside of the conveyance process. Reasonably foreseeable future actions are not anticipated to influence the rate of land status changes within and next to the planning area.</p> <p>The development potential for leasable mineral resources, such as coal, coal bed natural gas, oil and gas, geothermal, peat, and coalbed natural gas in the planning area is low; however, these activities directly impact lands and realty through leases and mining claims.</p> <p>Past and present land uses, such as resource exploration and extraction, management of the INHT, community infrastructure, military activities, research and monitoring, recreation, and subsistence activities can all impact lands and realty if such actions include ROW establishment, lease sales, and transportation corridors. This RMP/EIS does not cover lands not administered by the BLM, including State, ANCSA Native corporation, other federal agencies, private lands, and Native allotments. However, land use for all lands within the planning area can influence the current condition of the resources in the planning area. Impacts from such actions include ROW establishment, lease sales, and surface occupancy. Such impacts indirectly affect lands and realty in the planning area.</p> <p>Potential transportation corridors under review by the State include two road and ROW corridors, both of which would cross BLM-managed land in the planning area. These activities would directly impact lands and realty in the planning area. Reasonably foreseeable future actions are not anticipated to influence the rate of land use changes within the planning area.</p> <p>Therefore, Alternative A in consideration of past, present, and reasonably foreseeable future actions would continue the existing trend of land use.</p>	<p>Alternative B would be the same as Alternative A regarding the status of land conveyance, other land status changes, and overall land use; past, present, and reasonably foreseeable future actions would not influence the rate of land status changes within and next to the planning area. Therefore, Alternative B, in consideration of past, present, and reasonably foreseeable future actions, would continue the existing trend of land use.</p>	<p>Alternative C would be the same as Alternative A regarding the status of land conveyance, other land status changes, and overall land use; past, present, and reasonably foreseeable future actions would not influence the rate of land status changes within and next to the planning area. Alternative C, in consideration of past, present, and reasonably foreseeable future actions, would continue the existing trend of land use.</p>	<p>Alternative D would be the same as Alternative A regarding the status of land conveyance, other land status changes, and overall land use; past, present, and reasonably foreseeable future actions would not influence the rate of land status changes within and next to the planning area. Alternative D, in consideration of past, present, and reasonably foreseeable future actions, would continue the existing trend of land use.</p>



## 3.7 Areas of Critical Environmental Concern

### 3.7.1 Summary

This section describes the potential impacts from management actions on ACEC designations and their relevant and important values (R&Is) within the planning area.

Alternative A includes the 11 existing ACECs in the planning area. In a 2016 evaluation, three of these (the Peregrine Falcon and Kuskokwim River Raptor Nesting Habitat ACECs and the Box River Treeline RNA ACEC) were found to no longer support “Importance” of their nominating values. Management actions differ among the existing ACECs and are currently enacted via regional land management plans and PLO withdrawals. Current protection of resource values is generally less strong than it would be under Alternative B. The exception to this is that the two, small nesting habitat ACECs would become undesignated under all action alternatives and would have no special management directives. The existing Anvik River, Box River Treeline RNA, Drainages of the Unalakleet, and North River ACECs are not included in any of the action alternatives, but most of their existing acreages are included in newly nominated ACECs under Alternative B; these are described in the relevant sections below.

Alternative B would be most protective because it designates 5 existing and 7 newly nominated ACECs and includes management actions to minimize surface disturbance and other activities that could adversely affect fish and cultural resources in the ACECs. One exception is that Alternative B provides a lower prioritization of the creation of Cultural Landscape Reports (which include cultural, fish, and wildlife resources) compared to Alternatives C or D. A higher prioritization would provide qualitative beneficial effects to the understanding and documentation of cultural and fish resources in the ACECs.

Alternative C would not designate ACECs, but some of the same management actions to protect fisheries and cultural values would be enacted in about 78 percent (3,044,746 acres) of Alternative B’s ACEC acreage through other management actions.

No ACECs would be designated under Alternative D. This alternative would have more adverse impacts to cultural and fish resources from surface disturbance or visual impacts than the other alternatives. However, the creation of Cultural Landscape Reports would be prioritized most in this alternative, which would provide a qualitative beneficial impact to cultural and fish ACEC values by increasing understanding and documentation of cultural resource use. In some of the areas not designated as ACECs under Alternative D, VRM management actions from non-ACEC considerations would be more protective than under Alternative A. These include the designated Unalakleet Wild River Corridor, and the INHT and visual buffer of the INHT.

### 3.7.2 Methods of Analysis

For the purposes of this analysis, existing and nominated ACECs being considered for designation in this RMP are referred to as “potential ACECs.” The number of ACECs that would be designated under each alternative and their sizes differ, as do some of management actions for the designated ACECs. To account for this, the “designated” ACEC acreage rows of the summary table below include the size of the ACECs that would be designated in that alternative. The “undesignated” acreage rows show the size of the area affected by a management action that would be an ACEC under one of the *other* alternatives. These values do not include BLM-managed land not considered for ACEC designation.

The analysis area used to analyze impacts on potential ACECs is BLM-managed land within the planning area. Impacts identified for ACECs are based on management action impacts to an ACEC’s relevant and

important values (i.e., fisheries, cultural resources, or both; see Appendix J and Table 3.4.1-1 in Appendix M of the BSWI Draft RMP/EIS. Cumulative impacts analysis for fisheries resource values included ocean areas outside of the planning area, as most of the fish resource species of the ACECs are anadromous.

The analysis considered both the types of uses allowed by management actions under each alternative, and the likely demand for the use and/or likely presence of the resource. For example, opening potential ACECs to reindeer grazing could increase surface disturbance and adversely affect fisheries and cultural resource values; however, the demand for this use is low, so the foreseeable effects are likely small.

### Nature and Types of Effects

**Cultural resources:** All ACECs identified for relevant and important values for cultural resources ACECs except for the Tagagawik River pertain to the INHT. Management activities that permit surface disturbance from activities such as mineral or ROW development could adversely impact cultural resources by allowing land uses that could damage or destroy artifacts and/or cultural sites or alter landscape integrity. Managing areas as closed to mineral or ROW development, NSO for externally proposed structures, commercial woodland harvest, or as limited for travel within ACECs would protect these resources.

Management actions that designate areas managed per VRM Class I or II beneficially impact relevant and important values for cultural resources by limiting surface disturbance and/or development that could affect landscape integrity or damage cultural artifacts. VRM management restrictions along the INHT and its proposed buffers are more protective than those designated for cultural ACECs; therefore, culturally relevant and important values would receive some beneficial impacts from VRM, even under Alternatives C and D where ACECs are not established.

**Fisheries resources:** Management actions that restrict or regulate in-water and surface disturbance provide direct beneficial impacts to fishery resources by protecting spawning habitat and water quality. VRM actions can provide indirect beneficial impacts by limiting the extent of surface-disturbing activities. All of the ACECs, with the exception of Sheefish ACEC, occur in areas of low mineral potential so direct effects from mineral entry are unlikely. Under Alternative B, 528 acres of the Sheefish ACEC would intersect an area with medium mineral potential.

Table 3.7.2-1 below summarizes the nature and types of beneficial or adverse effects that could occur to ACEC R&Is, the proposed management actions that could influence those effects, and the indicators used to measure the potential magnitude and extent of the effects.

**Table 3.7.2-1: Summary of Effects to ACECs by Management Action**

Types of Effects	Management Actions	Indicators
<p><b>Cultural:</b> Surface disturbance and development could impact cultural and historical resources by altering landscape integrity and/or damaging or destructing cultural artifacts.</p>	<ul style="list-style-type: none"> <li>• Minerals decisions</li> <li>• Transportation and travel decisions</li> <li>• Woodland and forest products decisions</li> <li>• Grazing decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres closed to mineral entry in medium-high potential mineral areas</li> <li>• Acres managed as limited for travel</li> <li>• Acres open to commercial timber harvest</li> <li>• Acres designated INHT NTMC</li> <li>• Acres managed as VRM Class I or II</li> <li>• Acres managed for ACEC</li> <li>• Acres managed for WSR</li> </ul>

Types of Effects	Management Actions	Indicators
<b>Cultural:</b> Creation of cultural landscape reports would beneficially impact ACEC cultural resources by improving the understanding and documentation of cultural resources in the planning area.	<ul style="list-style-type: none"> <li>• Cultural Resources Actions</li> <li>• BSWI Communities Actions</li> </ul>	<ul style="list-style-type: none"> <li>• Increased understanding and documentation of cultural resources</li> </ul>
<b>Fisheries:</b> Increased levels of surface disturbance near waterways would adversely impact fisheries resources by increasing the likelihood of sedimentation and subsequent reductions in water quality.	<ul style="list-style-type: none"> <li>• Water resource and fisheries habitat actions</li> <li>• Mineral entry and leasing actions</li> <li>• Transportation and travel management actions</li> <li>• Land and realty ROW actions</li> <li>• Woodland and forest products actions</li> <li>• Grazing actions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres affected by land withdrawals and level of mineral potential</li> <li>• Acres open to commercial woodland harvest and grazing, and demand for this use</li> <li>• Size and route restrictions for summer travel</li> <li>• Designation of ROW exclusion or avoidance areas</li> </ul>
<b>Fisheries:</b> Restrictions on the types and locations of mineral leasing and entry allowed in ACECs would beneficially impact fisheries by preventing in-stream habitat destruction; increased sedimentation from surface disturbance near waterways, and increased likelihood of hazardous materials releases to waterways.	<ul style="list-style-type: none"> <li>• Water resource and fisheries habitat actions</li> <li>• Mineral entry and leasing actions</li> <li>• Transportation and travel management actions</li> <li>• Land and realty ROW actions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres affected by land withdrawals and level of mineral potential</li> <li>• Designation of ROW exclusion or avoidance areas</li> </ul>
<b>Fisheries:</b> Creation of cultural landscape reports would beneficially impact ACEC fisheries resources by improving the understanding and documentation of fisheries resources in the planning area.	<ul style="list-style-type: none"> <li>• BSWI Communities Actions</li> </ul>	<ul style="list-style-type: none"> <li>• Increased understanding and documentation of use of fishery resources</li> </ul>

## Indicators

Indicators used to evaluate impacts to ACECs are as follows:

Acres open to various surface-disturbing activities along with likely demand for those activities (semi quantified).

- Acreage is a quantitative indicator. All acreages should be considered approximate as they are GIS-derived and not surveyed.
- Likely demand for or presence of a resource is a qualitative indicator. It is based on the current demand for resources or current understanding of where resources are located in the planning area.
- Cultural resource understanding and documentation is a qualitative indicator.

## Assumptions

The following assumptions were used to assess effects associated with ACECs:

- Where ACECs are designated under an alternative, the relevant and important values of those ACECs are assumed to be more protected than in undesignated areas.
- Although management actions for most resources and resource uses could have planning area-wide application, ACEC management prescriptions apply only to those lands in each specific ACEC, as outlined.

- Permitted activities are assumed not to impair the relevant and important values for which an ACEC is designated. The exception is locatable minerals: until withdrawn from mineral entry, a mining claim can be filed, and subsequent mining could impact relevant and important values of the ACEC. Specific impacts on relevant and important values would depend on the type of mineral entry activity and effectiveness of subsequent reclamation and its interaction (both spatially and temporally) with that value. With the exception of a small part of the potential Sheefish ACEC, all of the potential ACECs are located in areas of low mineral potential, where demand for entry and leasing is unlikely.
- Impacts resulting from locatable minerals would be subject to 43 CFR 3809, intended to:
  - 1) prevent unnecessary or undue degradation of the land and reclaimed disturbed areas; and
  - 2) provide for maximum possible coordination with State agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation of public lands.
- Leasable mineral potential is low throughout the planning area.
- Under all alternatives, the BLM would continue to require NHPA Section 106 consultation for any project that would impact cultural and historical sites, including those associated with the Anvik Traditional Trapping Area, Sheefish Spawning, Tagagawik River, and Unalakleet Watershed potential ACECs.
- Under all alternatives, BLM and permitted projects would follow applicable State and federal laws, regulations, and planning documents to manage relevant and important values for fisheries and would continue Alaskan Native and public consultations to implement or revise management actions. These include federal protections, such as the Clean Water Act, the ESA, Magnuson-Stevens Fishery Conservation and Management Act and EFH; State Title 16 statutes such as the Anadromous Fish Act (AS 16.05.871-.901) and the Fishway or Fish Passage Act (AS 16.05.841); and management plans including the 1986 CYRMP, the 1981 SWMFP, and the 1983 Unalakleet Wild River Management Plan.

## Data Gaps

The effects analysis for ACECs was not limited due to incomplete or unavailable information. All information necessary for analysis was available. Although not all impacts can be quantified where they pertain to the likely demand for a use or resource, or the benefit of improved cultural landscape understanding and documentation; these represent qualitative assessments rather than a data gap.

## Standard Operating Procedures and Best Management Practices

The impact analysis below considers the SOPs and BMPs that could be implemented by the BLM. BMPs and SOPs for fisheries and cultural resources would also apply to ACECs as they would protect relevant and important values. A comprehensive list of SOPs/BMPs is provided in Appendix K of the BSWI Draft RMP/EIS.

### 3.7.3 Effects Analysis

Management actions proposed for the following resources, resource uses, and special designations would not result in effects on potential ACECs:

- Air Quality and AQRVs
- Climate Change
- Vegetation

- Wildlife
- Non-native Invasive Species
- Wildland Fire Management
- Land with Wilderness Characteristics
- Leasable Minerals
- Recreation and Visitor Services
- Support for BSWI Communities
- Hazardous Materials and Health and Human Safety

Table 3.7.3-1 summarizes acres of potential ACEC under various management decisions for each Alternative. Note that the “designated” ACEC acreage rows of the summary table include the size of the ACECs being considered for that alternative. The “undesigned” acreage rows show the size of potential ACEC not considered under that alternative.

**Table 3.7.3-1: Potential Beneficial or Adverse Impacts on Potential ACECs**

Management Action <sup>1</sup>	Alternative <sup>2,3</sup>			
	A	B	C	D
<b>Anadromous Waters Streams (miles)</b>				
Designated ACECs	819	1,566	0	0
Undesignated ACECs <sup>4</sup>	820	0	1,566	1,566
<b>EFH Streams (miles)<sup>5</sup></b>				
Designated ACECs	783	1,530	0	0
Undesignated ACECs <sup>4</sup>	820	0	1,530	1,530
<b>HVW (acres)</b>				
Designated ACECs	0	2,874,270 (21%)	0	0
Undesignated ACECs <sup>4</sup>	0	0	2,309,536 (17%)	2,286,612 (17%)
<b>VRM Class I (acres)</b>				
Designated ACECs	0	673,980 (5%)	0	0
Undesignated ACECs <sup>4</sup>	0	0	45,633 (<1%)	45,633 (<1%)
<b>VRM Class II (acres)</b>				
Designated ACECs	0	1,775,448 (13%)	0	0
Undesignated ACECs <sup>4</sup>	0	0	1,534,460 (11%)	406,915 (3%)
<b>VRM Class III (acres)</b>				
Designated ACECs	0	1,463,270 (11%)	0	0

Management Action <sup>1</sup>	Alternative <sup>2,3</sup>			
	A	B	C	D
Undesignated ACECs <sup>4</sup>	0	0	1,879,235 (14%)	1,387,466 (10%)
<b>VRM Class IV (acres)</b>				
Designated ACECs	0	0	0	0
Undesignated ACECs <sup>4</sup>	0	0	453,370 (3%)	2,072,680 (15%)
<b>Open to Commercial Woodland Harvest (acres)</b>				
Designated ACECs	0	0	0	0
Undesignated ACECs <sup>4</sup>	770,187 (6%)	0	816,680 (6%)	3,900,106 (29%)
<b>Commercial Woodland Harvest Permits Granted on Case-by-case Basis (acres)</b>				
Designated ACECs	301,470 (2%)	0	0	0
Undesignated ACECs <sup>4</sup>	1,454,640 (11%)	0	3,050,385 (23%)	12,592 (<1%)
<b>Closed to Commercial Woodland Harvest (acres)</b>				
Designated ACECs	1,596,497 (12%)	3,912,698 (29%)	0	0
Undesignated ACECs <sup>4</sup>	12 (<1%)	0	45,633 (<1%)	0
<b>Unavailable for Grazing (acres)</b>				
Designated ACECs	161,317 (1%)	3,912,698 (29%)	0	0
Undesignated ACECs <sup>4</sup>	23 (<1%)	0	564,370 (4%)	0
<b>Recommended for Withdrawal from Locatable Mineral Entry (acres)</b>				
Designated ACECs	227,647 (2%)	3,912,698 (29%)	0	0
Undesignated ACECs <sup>4</sup>	452,264 (3%)	0	45,633 (<1%)	46,633 (<1%)
<b>Salables: Closed to Mineral Materials Disposal (acres)</b>				
Designated ACECs	227,647 (2%)	3,912,698 (29%)	0	0
Undesignated ACECs <sup>4</sup>	452,264 (3%)	0	66,999 (<1%)	66,999 (<1%)
<b>ROW Avoidance (acres)</b>				
Designated ACECs	0	3,402,691 (25%)	0	0
Undesignated ACECs <sup>4</sup>	0	0	3,161,071 (23%)	2,322,480 (17%)
<b>ROW Avoidance for Linear Realty Actions (acres)</b>				
Designated ACECs	0	0	0	0

Management Action <sup>1</sup>	Alternative <sup>2,3</sup>			
	A	B	C	D
Undesignated ACECs <sup>4</sup>	0	0	79,089 (2%)	0
<b>ROW Exclusion (acres)</b>				
Designated ACECs	0	510,007 (4%)	0	0
Undesignated ACECs <sup>4</sup>	0	0	0	0
<b>Travel and Transportation: Areas Open to Cross-Country Travel during Snow-Free Months</b>				
Designated ACECs	1,884,376 (14%)	3,677,284 (27%)	0	0
Undesignated ACECs <sup>4</sup>	2,224,839 (17%)	0	3,854,346 (29%)	3,854,346 (29%)
<b>INHT NTMC (acres)</b>				
Designated ACECs	0	235,414 (2%)	0	0
Undesignated ACECs <sup>4</sup>	0	0	220,189 (2%)	220,189 (2%)
<b>Total ACECs</b>				
<b>Designated ACECs<sup>6</sup></b>	1,884,376 (14%)	3,912,698 (29%)	0	0
Fisheries value	1,873,126 (14%)	3,590,287 (27%)	0	0
Cultural resources value	403,378 (3%)	1,753,306 (13%)	0	0
<b>Undesignated ACECs<sup>4</sup></b>	2,224,839 (17%)	0	3,912,698 (29%)	3,912,698 (29%)
Source: BLM GIS 2018				
Notes:				
<sup>1</sup> All management actions are measures of the three indicators for all potential ACECs, except for Anadromous Waters Streams, EFH Streams, and HWW, which are only applicable to potential ACECs with the fisheries relevant and important value (and do not apply to potential ACECs with only the cultural resources value).				
<sup>2</sup> ACEC boundaries between existing (Alternative A) and their counterparts in Alternatives B may differ because data used to delineate ACECs in Alternatives B differ slightly (at the scale of the planning area) from Alternative A. Alternatives B ACECs were delineated primarily using watershed boundaries, which has improved since Alternative A ACECs were delineated, resulting in some differences.				
<sup>3</sup> Percentages represent the percent of BLM-managed land in the planning area, 13,465,894 acres.				
<sup>4</sup> For purposes of this analysis, undesignated ACECs are considered the geographic boundaries within BLM-managed land in the planning area that were found to contain relevant and important values for fisheries, cultural resources, or both. These geographic areas are equal to the potential ACECs under Alternative B.				
<sup>5</sup> EFH is a subset of, and overlaps with, Anadromous Waters.				
<sup>6</sup> Acres of potential ACECs containing both fisheries and cultural resources values overlap. Some potential ACEC boundaries also overlap.				

The following sections discuss the effects of the alternatives to each potential ACEC. Where a particular management action is not discussed, it would have no or very limited effect on the potential ACEC. Also see Appendix J of the BSWI Draft RMP/EIS, Proposed Special Management for ACECs, for a detailed description of proposed special management for each potential ACEC under Alternative B.

## **Anvik Traditional Trapping Area ACEC**

### ***Effects under Alternative A***

This area is not currently managed as an ACEC. No special management directive to protect cultural resources would occur under Alternative A.

### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

### ***Effects under Alternative B***

Under Alternative B, 21,366 acres (100 percent of the potential ACEC; <1 percent of planning area) would be managed as VRM Class I due to the ACEC's intersection with the INHT NTMC (thereby with the more restrictive VRM Class taking precedence). Commercial woodland harvest would be prohibited, and it would become a ROW avoidance area. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. Collectively, these management actions would result in beneficial impacts to relevant and important values for cultural and historic resources by limiting surface disturbance and prioritizing preservation of the historic landscape.

### ***Effects under Alternative C***

No ACECs would be designated under Alternative C, but there would be management applied to the same area that would become the Anvik Traditional Trapping Area ACEC under Alternative B. 100 percent of the area (21,366 acres) would be managed per VRM Class II. This would be less protective of the historic visual landscape than Alternative B, but more than Alternative A. Surface disturbance or development in VRM II areas would still require change in the characteristic landscape to be low resulting in beneficial impacts to relevant and important values for cultural and historic resources from limited surface disturbance and prioritizing preservation of the historic landscape. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.

### ***Effects under Alternative D***

No ACECs would be established under Alternative D. However, this area would be part of the INHT NTMC and would be managed as VRM Class III. This would provide more protection to relevant and important values identified for cultural resources than Alternative A, although less than Alternative B or C. The area would be open to commercial woodland harvest, ROW, and minerals development under conditions specified in management plans. As the proposed ACEC is located in an area of low mineral potential, mineral entry or leasing is not likely.

## **Anvik River ACEC**

### ***Effects under Alternative A***

The existing 114,386-acre (1 percent of planning area) Anvik River ACEC is managed to protect fisheries (chum salmon) resources. The lands are managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements.



***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

***Effects under Alternative B***

Alternative B does not include the existing Anvik River ACEC. Instead, 100,948 acres (88 percent of potential ACEC; <1 percent of planning area) would be part of the Anvik River Watershed ACEC, discussed below. The remaining 13,438 acres would no longer be managed as an ACEC and would be managed by applicable BLM, State, and other federal regulations and management plans.

***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to the potential Anvik River Watershed ACEC, as described below.

***Effects under Alternative D***

No ACECs would be established under Alternative D; 114,386 acres would no longer be managed as an ACEC and would be managed by applicable BLM, State, and other federal regulations and management plans. HVW would be designated in 108,991 acres (93 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have a beneficial impact to fishery values.

**Anvik River Watershed ACEC*****Effects under Alternative A***

Part of this area (100,948 acres, 41 percent of potential ACEC; <1 percent of planning area) is currently, and under Alternative A would continue to be, managed as part of the existing Anvik River ACEC to protect fisheries (chum salmon) resources as described above. The remainder of the proposed ACEC (147,924 acres, 1 percent of planning area) has no special designation and would be managed under the 1981 SWMFP.

***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

***Effects under Alternative B***

Under Alternative B, 248,872 acres (100 percent of potential ACEC; 2 percent of planning area) would be managed with additional fisheries habitat protections; any proposed floodplain development would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawals were not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. VRM Class I would apply to 58,077 acres (23 percent of potential ACEC; <1 percent of planning area) and Class II would apply to 190,790 acres (77 percent of potential ACEC; 1 percent of planning area). This can provide an indirect fisheries value by limiting activities that have a large ground-disturbance footprint. Commercial woodland harvest would be prohibited, and transportation and travel management decisions would be protective of surface

disturbance that could have adverse impacts on water quality and fisheries habitat. Managing more of the Anvik River Watershed as an ACEC compared to existing conditions (Alternative A) would provide beneficial fisheries impacts by providing added management to avoid or minimize impairments to water quality or habitat.

### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. No acreage would be managed as VRM Class I, and VRM Class II would apply to 4,198 acres. Class III VRM would apply to 244,669 acres (98 percent of potential ACEC; 2 percent of planning area). The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis. These management actions would provide a lower level of indirect benefit to its fisheries value than Alternative B but more than Alternative A.

### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest and ROW development under conditions specified in management plans. Portions of the proposed ACEC are outside of areas withdrawn from minerals development by PLO 5180 and would be open to this use. As the proposed ACEC is located in an area of low mineral potential, mineral development is not likely. HVW would be designated in 241,480 acres (97 percent), and VRM Class III would apply to 242,507 acres (97 percent) of this potential ACEC under Alternative D, which include protections against surface disturbance in floodplains that would have a beneficial impact to fishery values.

## **Gisasa River ACEC**

### ***Effects under Alternative A***

The existing 278,055-acre (99 percent of potential ACEC; 2 percent of planning area) Gisasa River ACEC is managed to protect fisheries (Chinook and chum salmon) resources. The upper portion of the river is closed to mineral leasing and non-metalliferous mineral entry by PLO 5180; the lower portion by PLO 5173/5184. The lands are managed under the CYMP and are open on a case-by-case basis to permits, leases, ROWs, and easements, although FLPMA sales and leases are not allowed in a 300-foot setback zone on the Gisasa River.

### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

### ***Effects under Alternative B***

Under Alternative B, 278,247 acres (100 percent of potential ACEC; 2 percent of planning area) would be managed with additional fisheries habitat protections; the difference in size from Alternative A is due to improved watershed mapping. Any proposed floodplain development would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawals were not approved, suction dredging would be limited to navigable waters and reclamation

of habitat would be required. Commercial woodland harvest would be prohibited, and the ACEC would be a ROW avoidance area. VRM Class II would apply to 62,189 acres (22 percent of potential ACEC; <1 percent of planning area) and Class III would apply to 216,052 acres (78 percent of potential ACEC; 1 percent of planning area) of the ACEC. This can provide an indirect fisheries value by limiting activities that have a large ground-disturbance footprint. Alternative B would provide a beneficial fisheries impact by providing added protections against activities that could impair water quality.

#### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. VRM Class III would apply to the entire ACEC, the area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis, which would provide a lower level of protection from surface disturbance than Alternative B.

#### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and mineral entry and leasing under conditions specified in management plans. As the proposed ACEC is located in an area of low mineral potential, mineral development is not likely. VRM Class III would apply to 18,857 acres (7 percent of potential ACEC), the rest would be managed as VRM Class IV. This alternative would be least protective of fisheries resources. HVW would be designated in 223,162 acres (80 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values compared to Alternative A.

### **Inglutalik River ACEC**

#### ***Effects under Alternative A***

The existing 71,713-acre (100 percent of potential ACEC; <1 percent of planning area) Inglutalik River ACEC is managed to protect fisheries (four salmon species) resources. The ACEC is closed to non-metalliferous mineral entry by PLO 5180. The lands are managed under the CYRMP and are open on a case-by case basis to permits, leases, ROWs, and easements.

#### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

#### ***Effects under Alternative B***

Under Alternative B, 70,891 acres (99 percent of potential ACEC; <1 percent of planning area) would be managed with additional fisheries protection; the difference in size from Alternative A is due to improved watershed mapping. Any proposed floodplain development or travel route designations would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawals were not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. Commercial woodland harvest would be prohibited, VRM

Class III management would apply, and the ACEC would be a ROW avoidance area. Alternative B would provide a beneficial fisheries impact by providing added protections against activities that could impair water quality.

#### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.

#### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW and floodplain development, and mineral leasing under conditions specified in management plans. As the proposed ACEC is located in an area of low mineral potential, mineral development is not likely. This alternative would be least protective of fisheries resources. HVW would be designated in 18,253 acres (25 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected.

### **Kateel River ACEC**

#### ***Effects under Alternative A***

The existing 568,083-acre (82 percent of potential ACEC; 4 percent of planning area) Kateel River ACEC is managed to protect fisheries (Chinook and chum salmon) resources. The upper portion of the river is closed to mineral leasing and non-metalliferous mineral entry by PLO 5180; the lower portion by PLO 5173/5184. The lands are managed under the CYRMP and are open on a case-by case basis to permits, leases, ROWs, and easements. FLPMA sales and leases are not allowed within a 300-foot setback of the Kateel River.

#### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

#### ***Effects under Alternative B***

Under Alternative B, 692,659 acres (100 percent of potential ACEC; 5 percent of planning area) would be managed with additional fisheries habitat protections; the difference in size compared to existing conditions is due mainly to the addition of lands located between the existing Kateel River ACEC (Alternative A) and the Koyukuk National Wildlife Refuge as a result of watershed mapping improvements for the Kateel River watershed. Any proposed floodplain development or travel route designations would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. Commercial woodland harvest would be prohibited, and the ACEC would be a ROW avoidance area. VRM Class II would apply to

55,820 acres of the ACEC (8 percent of potential ACEC; <1 percent of planning area). The remaining 636,839 acres (92 percent of potential ACEC; 5 percent of planning area) would be managed as VRM Class III. Alternative B would provide the largest beneficial fisheries impact by providing added protections against activities that could impair water quality and by including a larger portion of the Kateel River watershed in these protections.

#### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to part of this area. The area covered by management actions to minimize impacts on fisheries would be 48 percent smaller than that covered under Alternative B, and all would be managed as VRM Class III. The remaining 52 percent would be managed as VRM Class IV. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis. Alternative C includes additional anadromous river miles compared to Alternative A (141 compared to 106), as it would extend special management provisions to the boundary of the Koyukuk NWR; however, portions of the upper watersheds of the existing ACEC would be excluded from special management under Alternative C. Because the fisheries habitat resources protections would be stronger and would include more acreage near the river, Alternative C would provide beneficial impacts to fisheries resources compared to Alternative A, although less than Alternative B.

#### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and floodplain development, under conditions specified in management plans. As the area has low mineral potential, mineral development is not likely. The entire undesignated potential ACEC would be managed as VRM Class IV. This would be least protective action Alternative of fisheries resources. HVW would be designated in 300,069 acres (43 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected compared to Alternative A.

### **Nulato River ACEC**

#### ***Effects under Alternative A***

This area is not currently managed as an ACEC. It is located in an area closed to mineral leasing and non-metalliferous mineral entry by PLO 5180, 5173, and 5184. The lands are currently managed under the 1986 CYRMP and are open on a case-by-case basis to permits, leases, ROWs, and easements. FLPMA sales and leases are not allowed within a 300-foot setback of the Nulato River.

#### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

#### ***Effects under Alternative B***

Under Alternative B, 344,183 acres (100 percent of potential ACEC; 3 percent of planning area) would be managed with additional fisheries habitat protections; any proposed floodplain development would be

required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. VRM Class I would apply to 259 acres, and Class II would apply to 245,758 acres (71 percent of potential ACEC; 2 percent of planning area) of the ACEC. The remainder would be managed as VRM Class III. This can provide an indirect fisheries value by limiting activities that have large ground-disturbance footprints. Commercial woodland harvest would be prohibited, and transportation and travel management decisions would be protective of surface disturbance that could have adverse impacts on water quality and fisheries. The ACEC would become a ROW avoidance area. Drinking water quality monitoring would begin for the Village of Nulato, and hazardous materials cleanups would be prioritized when they have the potential to affect water quality. Alternative B would provide beneficial fisheries impacts by providing added protections against activities that could impair water quality.

#### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. VRM Class I would apply to 1 acre, and Class II would apply to 98,452 acres of the ACEC (29 percent of potential ACEC; <1 percent of planning area). Drinking water monitoring and prioritization of hazardous materials cleanup would be implemented as in Alternative B. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis. These actions would provide some but fewer indirect beneficial impacts to fisheries values compared to Alternative B.

#### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and floodplain development under conditions specified in management plans. This alternative would be least protective of fisheries resources. VRM Class I or II would apply to 192 acres and Class III would apply to 196,484 acres (57 percent of potential ACEC; 1 percent of planning area). HWW would be designated in 297,923 acres (87 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected compared to Alternative A, although less than Alternatives B and C.

### **Shaktoolik River ACEC**

#### ***Effects under Alternative A***

The existing 192,591-acre (100 percent of potential ACEC; 1 percent of planning area) Shaktoolik River ACEC is managed to protect fisheries resources (four salmon species). The ACEC is closed to non-metalliferous mineral entry by PLO 5180. The lands are managed under the CYRMP (and extend into the Kobuk Seward Peninsula Planning Area) and are open on a case-by case basis to permits, leases, ROWs, and easements.

#### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

***Effects under Alternative B***

Under Alternative B, 191,725 acres (>99 percent of potential ACEC; 2 percent of planning area) would be managed with additional fisheries habitat protections; the difference in size is due to improved watershed mapping. Any proposed floodplain development or travel route designations would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. VRM Class II would apply to 69,724 acres (36 percent of potential ACEC), and Class III would apply to 121,343 acres (64 percent of potential ACEC). This can provide an indirect beneficial impact to fisheries value by limiting activities that have large ground-disturbance footprints. Commercial woodland harvest would be prohibited, and the ACEC would be a ROW avoidance area. Alternative B would provide beneficial fisheries impacts by providing added protections against activities that could impair water quality.

***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. No portion would be managed as VRM Class II; instead, 191,067 acres would be managed as VRM Class III. This would provide fewer indirect benefits to fisheries than VRM management under Alternative B. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.

***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and floodplain development, under conditions specified in management plans. As the proposed ACEC is located in an area of low mineral potential, mineral development is not likely. VRM Class III would apply to 55,506 acres (29 percent) and the remaining undesignated area would be managed as VRM Class IV. This alternative would be least protective of fisheries resources. HVW would be designated in 124,472 acres (68 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected.

**Sheefish ACEC*****Effects under Alternative A***

This area is not currently managed as an ACEC. It is located in an area closed to mineral leasing and non-metalliferous mineral entry under PLO 5180. The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to permits, leases, ROWs, and easements.

***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

### ***Effects under Alternative B***

Under Alternative B, 696,902 acres (100 percent of potential ACEC; 5 percent of planning area) would be designated an ACEC and managed with additional fisheries and cultural protections.

- **Management affecting fisheries habitat:** Any proposed floodplain development or travel route designations would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. Commercial woodland harvest would be prohibited, and the ACEC would be a ROW avoidance area. Alternative B would provide the largest beneficial fisheries impact by providing added protections against activities that could impair water quality and by including a larger portion of the area in these protections.
- **Management affecting cultural resources:** Under Alternative B, the Farewell Burn INHT NTMC would overlap 46,590 acres of the proposed sheefish ACEC (<1 percent of planning area). This section would be managed as VRM Class I due to its intersection with the INHT NTMC. An additional 195,594 acres (total of both is 35 percent of potential ACEC) would be managed as VRM Class I due to overlap with suitable WSR waterways. The remaining 454,717 acres (65 percent of the potential ACEC) would be managed as VRM Class II due to cultural resource R&Is. Commercial woodland harvest would be prohibited, and it would become a ROW avoidance area. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. These management actions would beneficially impact cultural and historic resources in the ACEC by limiting surface disturbance and prioritizing preservation of the historic visual landscape.

### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. Under Alternative C, special management provisions would cover 194,848 acres (28 percent of potential ACEC; 1 percent of planning area). Lands included would comprise non-contiguous areas and would include lands close to the INHT, the Big River and Blackwater Creek, and the Middle Fork Kuskokwim River.

- **Management affecting fisheries habitat:** The area covered by management actions to minimize impacts to fisheries habitat would be 70 percent smaller than Alternative B. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential (with the exception of 528 acres mapped with medium mineral potential), mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.
- **Management affecting cultural resources:** Under Alternative C, 421,036 acres (60 percent) of the undesignated area would be managed as VRM Class II, 157,025 acres (23 percent) managed as VRM Class III, and 118,840 acres (17 percent) managed as VRM Class IV. The remaining actions pertaining to cultural resource protection would be the same, but the area covered by these protections would be smaller than Alternative B.

### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area within the INHT buffer would be managed as a VRM Class II (177,428 acres, 25 percent) and VRM Class III (315,845 acres, 45 percent). The area would be open to commercial woodland harvest, ROW and floodplain development, and



metalliferous mineral entry under conditions specified in management plans. As the proposed ACEC is not located in an area of known medium or high mineral potential (with the exception of 528 acres), mineral development is not likely. This alternative would be least protective of fisheries and cultural resources. HVW would be designated in 372,385 acres (53 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected compared to Alternative A.

### **Swift River Whitefish Spawning ACEC**

#### ***Effects under Alternative A***

This area is not currently managed as an ACEC. It is located in an area closed to mineral leasing and non-metalliferous mineral entry by PLO 5180 and 5184. The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to permits, leases, ROWs, and easements.

#### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

#### ***Effects under Alternative B***

Under Alternative B, 220,032 acres (100 percent of potential ACEC) would be managed with additional fisheries habitat protections; any proposed floodplain development would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. VRM Class II would apply to 13,504 acres (6 percent of potential ACEC), and Class III would apply to 206,528 acres (94 percent of potential ACEC). This can provide an indirect beneficial impact to fisheries by limiting activities that have large ground-disturbance footprints. Commercial woodland harvest would be prohibited, and transportation and travel management decisions would be protective of surface disturbance that could have adverse impacts on water quality and fisheries. The ACEC would become a ROW avoidance area. Alternative B would provide beneficial fisheries impacts by providing added protections against activities that could impair water quality.

#### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some special management provisions would apply to this area. No portion would be managed as VRM Class II; instead, all 220,032 acres would be managed as VRM Class III. This would provide fewer indirect benefits to fisheries than VRM management under Alternative B. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.

#### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and floodplain development under conditions specified in management plans. About 78,427 acres (36 percent of potential ACEC) would be managed as VRM Class III and 141,604 acres (64

percent of undesignated area) managed as VRM Class IV. This would be least protective of fisheries resources out of the action alternatives. HVW would be designated in 102,478 acres (47 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected compared to Alternative A.

## **Tagagawik River ACEC**

### ***Effects under Alternative A***

This area is not currently managed as an ACEC. It is located in an area closed to mineral leasing and non-metalliferous mineral entry by PLO 5180. The lands are currently managed under the 1986 CYRMP and are open on a case-by-case basis to permits, leases, ROWs, and easements. A 300-foot setback zone on the Tagagawik River is closed to FLMPA sales and leases.

### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

### ***Effects under Alternative B***

Under Alternative B, 301,044 acres (100 percent of potential ACEC; 2 percent of planning area) would be managed with additional fisheries and cultural protections:

- **Management affecting fisheries habitat:** any proposed floodplain development would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. Commercial woodland harvest would be prohibited, and transportation and travel management decisions would be protective of surface disturbance that could have adverse impacts on water quality and fisheries. The ACEC would become a ROW avoidance area. Alternative B would provide beneficial fisheries impacts by providing added protections against activities that could impair water quality.
- **Management affecting cultural resources:** This ACEC would be managed as VRM Class II due to identified cultural R&Is. Commercial woodland harvest would be prohibited, and it would become a ROW avoidance area. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and have NSO leasable minerals development. These management actions would beneficially impact cultural resources in the ACEC by limiting surface disturbance and prioritizing preservation of the visual landscape.

### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.

***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and floodplain development under conditions specified in management plans. This alternative would be least protective of fisheries resources.

Alternative D would include the creation of Cultural Landscape Reports for the entire planning area. This would beneficially impact the understanding and documentation of cultural landscape in the Tagagawik ACEC and would therefore be more beneficial to cultural resources than Alternative A and would provide more understanding and documentation, although less protection against surface disturbance, than Alternatives B and C.

**Ungalik River ACEC*****Effects under Alternative A***

The existing 112,719-acre (99 percent of potential ACEC; 1 percent of planning area) Ungalik River ACEC is managed to protect fisheries (salmon) resources. The ACEC is closed to mineral leasing and non-metalliferous mineral entry by PLO 5180. The lands are managed under the CYMP and are open on a case-by case basis to permits, leases, ROWs, and easements. The river extends into the Kobuk-Seward planning area and that downstream portion is an ACEC under the 2008 Kobuk-Seward RMP.

***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

***Effects under Alternative B***

Under Alternative B, 113,455 acres (100 percent of potential ACEC) would be managed with additional fisheries habitat protections; the difference in size from Alternative A is due to improved watershed mapping. Any proposed floodplain development would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required. The ACEC would be managed as VRM Class III. Commercial woodland harvest would be prohibited, and the ACEC would be a ROW avoidance area. Alternative B would provide a beneficial fisheries impact by providing added protections against activities that could impair water quality.

***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.

***Effects under Alternative D***

No ACECs would be established under Alternative D. The area would be open to commercial woodland harvest, ROW, and floodplain development, and mineral entry and leasing under conditions specified in

management plans. As the proposed ACEC is located in an area of low mineral potential, mineral development is not likely. This alternative would be least protective of fisheries resources. HVW would be designated in 64,809 acres (57 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected.

## **North River ACEC**

### ***Effects under Alternative A***

The existing 137,349-acre (100 percent of potential ACEC; 1 percent of planning area) North River ACEC is managed to protect fisheries resources. It is located in an area closed to mineral leasing and non-metalliferous mineral entry by PLO 5180. The lands are managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements. FLPMA sales and leases are not allowed within a 300-foot setback of the North River.

### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

### ***Effects under Alternative B***

Alternative B does not include the North River ACEC. Instead, the North River would be part of the Unalakleet River Watershed ACEC, discussed below.

### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area, as discussed in the Unalakleet River Watershed ACEC section, below.

### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The 137,349 acres would no longer be managed as an ACEC and would be managed under applicable BLM, State, and other federal regulations and management plans. HVW would be designated in 93,938 acres (68 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected.

## **Drainages of the Unalakleet ACEC**

### ***Effects under Alternative A***

The existing 415,184-acre (100 percent of potential ACEC; 3 percent of planning area) Drainages of the Unalakleet River ACEC is managed to protect fisheries resources. It comprises four non-contiguous areas. The designated Unalakleet Wild River Corridor (46,953 acres, <1 percent of planning area) is located within the ACEC. Most of the ACEC is located in areas closed to mineral leasing and non-metalliferous mineral entry by PLO 5180, 5179, and 5173. Some parts of the ACEC, primarily in the segment along the Chiroskey River, are open to mineral leasing and entry. The lands are managed under the 1981 SWMFP, 1986 CYMFP, and the Unalakleet Wild and Scenic River Plan (BLM 1983).

***Effects Common to All Action Alternatives***

The designated Unalakleet Wild River Corridor (46,953 acres) would remain in place under all action alternatives.

***Effects under Alternative B***

Alternative B does not include the Drainages of the Unalakleet River ACEC. Instead, most of the area would be part of the Unalakleet River Watershed ACEC, discussed below.

***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area, as discussed in the Unalakleet River Watershed ACEC section, below.

***Effects under Alternative D***

No ACECs would be established under Alternative D. The 415,184 acres would no longer be managed as an ACEC and would be managed by applicable BLM, State, and other federal regulations and management plans. HVW would be designated in 244,367 acres (59 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the area affected.

**Unalakleet River Watershed ACEC*****Effects under Alternative A***

More than 60 percent of the proposed Unalakleet River Watershed ACEC area (depending on Alternative) is currently managed for fisheries protection as part of the existing Drainages of the Unalakleet River or North River ACECs, as described above. The designated Unalakleet Wild River Corridor (46,953 acres) is located within the Drainages of the Unalakleet ACEC. Most of the area is located in areas closed to mineral leasing and non-metalliferous mineral entry by PLO 5180, 5179, and 5173. Some parts of the existing ACECs, primarily in the segment along the Chiroskey River, are open to leasing and entry. The lands are managed under the 1981 SWMFP, 1986 CYMFP, and the Unalakleet Wild and Scenic River Plan (BLM 1983).

***Effects Common to All Action Alternatives***

The designated Unalakleet Wild River Corridor (46,953 acres) would remain in place under all action alternatives.

***Effects under Alternative B***

Under Alternative B, 733,995 acres (100 percent of potential ACEC; 5 percent of planning area) would be managed with additional fisheries and cultural protections.

- **Management affecting fisheries habitat:** Any proposed floodplain development or travel route designations would be required to not diminish fish habitat or the ecological function of riparian systems. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. In the event the withdrawal was not approved, suction dredging would be limited to navigable waters and reclamation of habitat would be required.

Commercial woodland harvest would be prohibited, and the ACEC would be a ROW avoidance area. Alternative B would provide beneficial fisheries impacts by providing added protections against activities that could impair water quality.

- **Management affecting cultural resources:** The INHT and buffer, and the designated and eligible WSR waterways in the ACEC would be managed as VRM Class I. These areas overlap, and create a combined total of 352,094 acres (48 percent) in the ACEC managed as class I. The remainder of the ACEC (381,901 acres; 52 percent) would be managed as VRM Class II due to designation as a cultural resource ACEC. Commercial woodland harvest would be prohibited, and it would become a ROW avoidance area. The ACEC would be closed to salable minerals, withdrawn from locatable minerals, and closed to leasable minerals development. These management actions would beneficially impact historic resources in the ACEC by limiting surface disturbance and prioritizing preservation of the visual landscape.

### *Effects under Alternative C*

No ACECs would be established under Alternative C, but some management actions would apply to this area. Under Alternative C, these management actions to minimize impacts on fisheries habitat and cultural resources would comprise 701,952 acres (96 percent of potential ACEC; 5 percent of planning area). The smaller size results primarily from less of the North River Watershed being included in the proposed ACEC. Alternative C would be less protective of fisheries and cultural resources than Alternative B, but more than Alternatives A and D.

- **Management affecting fisheries habitat:** The area covered by management actions protective of fish habitat would be about 5 percent smaller. The area would be NSO leasable, open to locatable minerals, and open to salable mineral development on a case-by-case basis. As this location is an area of low mineral potential, mineral development is not likely. The area would be open to commercial woodland harvest on a case-by-case basis.
- **Management affecting cultural resources:** Under Alternative C, 45,632 acres (6 percent) would be managed as VRM Class I due to overlap with the designated Unalakleet Wild River Corridor, and 688,363 acres (94 percent) would be managed as VRM Class II. The remaining actions pertaining to cultural resource protection would be the same, but the area covered by these protections would be about 5 percent smaller.

### *Effects under Alternative D*

No ACECs would be established under Alternative D. Except for the 46,953-acre designated Unalakleet Wild River Corridor and the INHT, the area would be open to commercial woodland harvest, ROW, and floodplain development, under conditions specified in management plans. As the proposed ACEC is located in an area of low mineral potential, mineral development is not likely.

The Unalakleet Wild River Corridor and the INHT portions would retain VRM management actions under this alternative, which would result in 45,632 acres (6 percent) of Class I, 229,297 acres (31 percent) of Class II, 354,179 acres (48 percent) of Class III, and the remainder as VRM Class IV. Cultural resources protections would increase compared to Alternative A but would be less than those under Alternative B or C. Alternative D would be least protective for fisheries resources of the action alternatives. HVW would be designated in 544,205 acres (74 percent) of this potential ACEC under Alternative D, which includes protections against surface disturbance in floodplains that would have some beneficial impact to fishery values in the areas affected compared to Alternative A.

## **Box River Treeline Research Natural Area ACEC**

### ***Effects under Alternative A***

The existing 13,592-acre (100 percent of potential ACEC; <1 percent of planning area) Box River Treeline RNA ACEC is managed to protect fisheries, wildlife, ecological and geological resources. It is located in an area closed to mineral leasing and non-metalliferous mineral entry by PLO 5180. The lands are managed under the CYRMP and are open on a case-by case basis to permits, leases, ROWs, and easements.

### ***Effects Common to All Action Alternatives***

There are no effects common to all action alternatives for this ACEC.

### ***Effects under Alternative B***

Alternative B does not include the Box River Treeline RNA ACEC. Instead, the entire area would be part of the Kateel River ACEC, discussed above.

### ***Effects under Alternative C***

No ACECs would be established under Alternative C, but some management actions would apply to this area, as discussed in the Kateel River ACEC section, above.

### ***Effects under Alternative D***

No ACECs would be established under Alternative D. The 13,592 acres would no longer be managed as an ACEC and would be managed by applicable BLM, State, and other federal regulations and management plans.

## **Peregrine Falcon Nesting Habitat ACEC**

### ***Effects under Alternative A***

The existing 8,096-acre (100 percent of potential ACEC; <1 percent of planning area) Peregrine Falcon Nesting Habitat ACEC is managed to protect wildlife resources. It comprises four non-contiguous locations near the Yukon River. The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements.

### ***Effects Common to All Action Alternatives***

The Peregrine Falcon Nesting Habitat ACEC would no longer be managed as an ACEC under all action alternatives. As nesting sites had not been confirmed since 1981 and the peregrine falcon is no longer a listed threatened species, the ACEC no longer supports wildlife as an important value. These lands would be managed by applicable BLM, State and other federal regulations and management plans under all alternatives.

## **Kuskokwim River Raptor Nesting Habitat ACEC**

### ***Effects under Alternative A***

The existing 6,072-acre (100 percent of potential ACEC; <1 percent of planning area) Kuskokwim River Raptor Nesting Habitat ACEC is managed to protect wildlife resources. It comprises three non-contiguous locations near the Kuskokwim River. It is located in an area closed to mineral leasing and non-metalliferous mineral entry by PLO 5184. The lands are currently managed under the 1981 SWMFP and are open on a case-by-case basis to leases, permits, ROWs, and easements.

### ***Effects Common to All Action Alternatives***

The Kuskokwim River Raptor Nesting Habitat ACEC would no longer be managed as an ACEC under all action alternatives. As the peregrine falcon is no longer a listed threatened species the ACEC no longer supports wildlife as an important value. These lands would be managed by applicable BLM, State and other federal regulations and management plans under all alternatives.

## **ACECs: Cumulative Effects**

### **Cultural Relevant and Important Values**

Reasonably foreseeable future actions that may affect cultural resources are primarily related to the ongoing development of the Donlin Gold Project and the potential for exploration and development of locatable minerals in the planning area. Infrastructure developments to communities also present potential for impacts on cultural resources. Any development of roads and other transportation routes through the potential ACECs would result in additional surface disturbance.

### **Fish Relevant and Important Values**

Based on past commercial, subsistence, and personal use fisheries harvest data, resident fish production is forecast to remain stable in the planning area. The forecasted extent of disturbance to habitat is expected to remain minimal throughout the majority of the watersheds in the planning area. Activities that occur within the planning area that have the highest potential to affect fish production include placer mining, hard rock mining, gravel mining, timber harvests, and stream crossings of roads, trails, and utility corridors in important fish habitats. All of the potential ACECs are located in areas of low mineral potential where mineral entry or leasing is unlikely.

Outside of the planning area, ocean-based commercial fishing has the largest cumulative impacts on the relevant and important fisheries value. The potential ACECs contain anadromous fish spawning habitat for spawning and rearing young. The fish populations are impacted where they are harvested commercially in the ocean, an indirect effect on the fisheries value. Subsistence fishing and sport fishing directly affect the fisheries value but are not high enough uses to affect the relevant and important fisheries value in any potential ACECs.

Table 3.7.3-2 summarizes the results of the cumulative effects analysis for the potential ACECs within the planning area for all alternatives.



**Table 3.7.3-2: Cumulative Effects Analysis for ACECs**

Trends and Forecasts of the Potential ACECs in Consideration of Past and Present Actions	Trends and Forecasts of the Potential ACECs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of the Potential ACECs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of the Potential ACECs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of the Potential ACECs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>There are 11 ACECs totaling 1,884,376 acres (14 percent of planning area) of BLM-managed lands in the planning area. As three of these ACEC (supporting wildlife and ecological resources) were determined to no longer support their relevant or important nominated values, the trend is that these values are being adversely impacted.</p>	<p>Alternative A continues managing 11 ACECs totaling 1,884,376 acres. It does not designate new ACECs. In undesignated potential ACECs, Alternative A includes some protection from surface-disturbing activities.</p> <p><b>Trend: Fisheries resource values in ACECs would continue to stabilize.</b></p> <p><b>Trend: Cultural resource values in ACECs would continue to degrade.</b></p>	<p>Current trends for cultural resources and fish are as described in Alternative A.</p> <p>Alternative B designates 12 ACECs totaling 3,912,698 acres. Alternative B includes the greatest protection from surface-disturbing activities.</p> <p><b>Trend: Fisheries resource values in potential ACECs would continue to stabilize.</b></p> <p><b>Trend: Cultural resource values in potential ACECs would stabilize.</b></p>	<p>Current trends for cultural resources and fish are as described in Alternative A.</p> <p>Alternative C does not designate ACECs but would include some management actions in areas that would be designated as ACECs under Alternative C to minimize relevant and important fisheries and cultural values. Alternative C includes more protection than Alternative A, but less protection than Alternative B, from surface-disturbing activities.</p> <p><b>Trend: Fisheries and cultural resource values would continue to stabilize, but in a smaller geographic area than Alternative B.</b></p>	<p>Alternative D does not designate ACECs. In undesignated potential ACECs, Alternative D includes some protection from surface-disturbing activities through designation of HVW and NTMC; however, the geographic extent of areas receiving these protections would be less than Alternative C.</p> <p><b>Trend: Fish and cultural would continue to degrade.</b></p>

## **3.8 National Trails**

### **3.8.1 Summary**

The Iditarod National Historic Trail (INHT) is the only national trail within the planning area and is the only National Historic Trail in Alaska. The BLM manages approximately 77 miles of the INHT within the planning area, including 20 miles known as the Farewell Bend, 35 miles between Unalakleet and Kaltag, and 7 miles in the Bonanza Creek area. The National Trails System is the network of scenic, historic, and recreation trails created by the National Trails System Act of 1968. These trails provide for outdoor recreation needs, promote the enjoyment, appreciation, and preservation of outdoor areas and historic resources, and encourage public access and citizen involvement. National historic trails (NHTs) are fragile nonrenewable evidence of recent human history and heritage on the landscape. They are public resources entrusted to the BLM for protection and interpretation, providing a context for present-day land use decisions.

The INHT was designated an NHT due to its history as a trade route connector for Alaska Native villages, a portage during the Alaskan gold rush, and now as a travel and recreation route in contemporary Alaska. Its purpose is to provide an opportunity for contemporary users to experience the natural primitive settings and challenges experienced by gold stamperders a century ago and to test the mettle of users.

Management under Alternatives B, C, and D is designed to support the nature and purpose of the INHT. Under all action alternatives, a National Trail Management Corridor (NTMC) would be established, consistent with BLM's direction provided in Manual 6280 "Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation" and the DOI's conservation stewardship priority. ANILCA does not apply to the NTMC, as the NTMC's are a land management classification under this RMP, rather than an ANILCA CSU, which applies to the Primary Route of the INHT only.

### **3.8.2 Methods of Analysis**

The analysis area is the NTMC, which includes consideration of physiographic breaks and viewsheds in the planning area. Existing information on national trails, including resource condition and trend, was reviewed and summarized in the national trail baseline analysis provided in the BSWI Draft RMP/EIS, Appendix M. To determine impacts from land management decisions, spatial data representing proposed management actions and land uses provided in each alternative were overlaid on the baseline. Where applicable, laws pertinent to determining effects on national trails (e.g., National Trails System Act, NHPA) were also considered.

Impacts were quantified where possible; in the absence of quantitative data, a qualitative analysis was performed. Conclusions were based on assessment of how proposed management actions and land uses may affect known and potentially discoverable INHT resources. A lack of action can, in certain cases, result in deterioration of the trail resource.

Direct impacts on the INHT typically result from actions that disturb the soil or alter characteristics of the surrounding environment. For example, surface-disturbing activities, such as OHV use, that create ruts are considered a direct impact because the trail has never had noticeable vehicle impacts and because ruts created by OHVs increase the snow depth necessary for safe passage by dog sled teams and over snow vehicles on the packed snow trail treadway.

Impacts on characteristics of the surrounding environment include visual elements that are out of character with, or alter, the trail’s physical, social, or administrative setting. Impacts may also include wildland fire damage, such as erosion or downed trees. Indirect impacts are actions that result in data collection and proactive preservation of NHTs (e.g., partnerships that encourage research or a greater understanding of the trail’s historic character). Indirect effects on the INHT could include side trail blockage or degradation outside the NTMC.

The primary natural phenomena directly affecting trail resources are erosion, wildland fire, and changes to the length and intensity of winter weather. A number of historic roadhouses and shelter cabins originally located near waterways are either vulnerable to, or have been washed away by, shifting river and creek beds.

Activities such as ROW authorizations that cross NHT segments or project development, such as wind energy or telecommunication sites, in the trail’s viewshed can contribute to a decrease in overall trail integrity and create a fragmented user experience. These actions may cause a change to the visual or historic character of the trail and possibly destroy important scientific information related to the trail.

Federal actions defined as federal undertakings under Section 106 of the NHPA require the identification, evaluation, and consideration of adverse effects and the appropriate mitigation of those effects. Nearly all implementation actions would be subject to further cultural resource review before site-specific projects are authorized or implemented. If adverse effects are identified, mitigation measures, including avoidance, would have to be considered to minimize or eliminate the effects.

Overall, objectives and actions associated with other resources that result in closure to surface disturbance activities near the INHT would be beneficial due to reduced chance of disturbance of INHT features.

### Potential Effects and Indicators

Table 3.8.2-1 summarizes the types of effects to national trails that could result from implementation of the RMP along with the indicators that were used to evaluate possible impacts from the management actions.

**Table 3.8.2-1: Effects and Indicators for National Trails**

Types of Effects	Management Actions	Indicators
ROW development and project development crossing the INHT could contribute to an overall decrease in trail quality by changing the visual and/or historic character of the INHT, through rutting and trail braiding, or by possibly adversely impacting scientific information related to the trail.	<ul style="list-style-type: none"> <li>• Designation of a NTMC for the INHT within the planning area</li> <li>• Management actions to prevent or reduce surface disturbance <ul style="list-style-type: none"> <li>○ Forestry and woodland harvest decisions</li> <li>○ Grazing limitations</li> <li>○ Minerals decisions</li> <li>○ Travel and transportation management decisions</li> </ul> </li> <li>• ROW development</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the NTMC with direct or indirect impacts resulting in the loss of integrity or destruction of physical remnants of a trail</li> <li>• Acres of the NTMC with direct or indirect impacts resulting in “substantial interference” with the nature and purpose of the INHT</li> </ul>
Surface-disturbing activities, including OHV travel, activities within ROWs, and project development, could directly impact the INHT surface through waterway interception, erosion, and rut creation or trail braiding.	<ul style="list-style-type: none"> <li>• Designation of a NTMC for the INHT within the planning area</li> <li>• Management actions to prevent or reduce surface disturbance <ul style="list-style-type: none"> <li>○ Forestry and woodland harvest decisions</li> <li>○ Grazing limitations</li> <li>○ Minerals decisions</li> <li>○ Travel and transportation management</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the NTMC with direct or indirect impacts resulting in the loss of integrity or destruction of physical remnants of a trail</li> <li>• Acres of the NTMC with direct or indirect impacts resulting in “substantial interference” with the nature and purpose of the INHT</li> </ul>

Types of Effects	Management Actions	Indicators
	decisions <ul style="list-style-type: none"> <li>• ROW development</li> </ul>	
Damage from wildland fire, erosion, introduction of invasive plants, or downed trees could impact the characteristics of the surrounding environment by blocking side trail use and access or altering the visual character or vegetation composition on lands adjacent to and surrounding the trail.	<ul style="list-style-type: none"> <li>• Authorize projects with short-term, minimal adverse impacts on air quality</li> <li>• Actions that prohibit the spread of nonnative invasive plant species</li> <li>• Management actions to prevent or reduce surface disturbance                             <ul style="list-style-type: none"> <li>○ Forestry and woodland harvest decisions</li> <li>○ Travel and transportation management decisions</li> </ul> </li> <li>• Implement emergency stabilization and burned area rehabilitation projects after a fire</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the INHT directly or indirectly affected by change in the cultural landscape that diminish the integrity of the trail's historic character</li> <li>• Change in vegetation community composition (as defined by the REA)</li> </ul>
Activities that produce noise and pollution and introduce visual changes could diminish the integrity of the INHT's historic character by changing the setting and feeling of the trail.	<ul style="list-style-type: none"> <li>• Designation of a NTMC for the INHT within the planning area</li> <li>• Authorize projects with short-term, minimal adverse impacts on air quality</li> <li>• Actions that prohibit the spread of nonnative invasive plant species</li> <li>• Management actions to prevent or reduce surface disturbance                             <ul style="list-style-type: none"> <li>○ Forestry and woodland harvest decisions</li> <li>○ Grazing limitations</li> <li>○ Minerals decisions</li> <li>○ Travel and transportation management decisions</li> </ul> </li> <li>• Implement emergency stabilization and burned area rehabilitation projects after a fire.</li> <li>• VRM decisions</li> <li>• Air safety and night lighting requirements</li> <li>• Restrictions on SRPs</li> </ul>	<ul style="list-style-type: none"> <li>• Acres of the INHT directly or indirectly affected by change in the cultural landscape that diminish the integrity of the trail's historic character</li> <li>• Change in vegetation community composition (as defined by the REA)</li> <li>• Adverse effects on the INHT per the NHPA</li> </ul>

### Assumptions

The following assumptions were used to assess effects associated with national trails.

- National trails and related sites are protected in accordance with federal laws (ANILCA, National Trails System Act, NHPA), State law, BLM regulations and policy, and interagency or partnership agreements. Specifically, BLM Manual 6280 states that the BLM may not permit proposed uses along national trails that would substantially interfere with the nature and purposes of the trail.
- The BLM will follow 36 CFR 800 and Section 106 of the NHPA when addressing federal undertakings; therefore, adverse impacts on the INHT would be appropriately mitigated.
- Degradation of the national trail from natural processes (e.g., erosion) will continue regardless of avoidance of human-caused impacts.
- Potential impacts on an NHT and its setting from subsequent undertakings (implementation of the planning decisions or site-specific project proposals) require separate compliance with the NEPA and Section 106 of the NHPA.
- No motorized and/or mechanical summer use historically occurred on the INHT on BLM-managed lands in the planning area.

- The INHT is vulnerable to effects to the integrity of the trail's historic character.

The effects analysis for national trails is not limited due to incomplete or unavailable information. All information necessary for analysis was available.

### **Standard Operating Procedures and Best Management Practices**

The impact analysis below considers the SOPs and BMPs that could be implemented by the BLM. A comprehensive list of SOPs/BMPs pertaining to national trails is provided in the BSWI RMP/EIS.

#### **3.8.3 Effects Analysis**

Management actions proposed for the following resources and social and economic features would not result in effects on the INHT:

- Soils
- Water Resources and Fisheries
- Vegetation
- Wildlife
- Paleontological Resources
- Support for BSWI Communities
- Hazardous Materials and Health and Human Safety

Table 3.8.3-1 summarizes the potential effects of the alternatives' management actions on the INHT NTMC based on the indicators.

### **National Trails: Effects from Air Quality and Air Quality-related Values Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

#### ***Effects under Alternative A***

Air quality along the INHT is generally good and is not influenced by large industrial facilities or residential emissions, as the BLM-managed portions of the trail are not located near small towns or villages. The exception is smoke from wildland fires during the summer months, which can temporarily adversely impact the nature and purpose of the INHT. Air emissions along the INHT are primarily from snowmobiles in the winter months from subsistence, casual use, and the Iron Dog race. Air quality and AQRVs were not addressed in the CYRMP or SWMFP RMP (BLM 1986a, 1981a). The BLM would continue to authorize projects that could result in short-term, minimal adverse impacts on air quality within the NTMC, impacting the physical setting of the trail.

#### ***Effects Common to All Action Alternatives***

For all action alternatives, only projects that resulted in short-term, minimal adverse impacts on air quality within the NTMC would be authorized.

**Table 3.8.3-1: Potential Effects on the INHT**

Indicators and Their Quantitative Measure	Alternative A (acres)	Alternative B (acres)			Alternative C (acres)			Alternative D (acres)		
		Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn
Acres of the NTMC with direct and/or indirect impacts resulting in the loss of integrity or destruction of physical remnants of a trail.										
Acres of the INHT directly or indirectly affected by change in the cultural landscape that diminish the integrity of the trail's historic character.										
Acres of the NTMC with direct and/or indirect impacts resulting in "substantial interference" with the nature and purpose of the INHT.										
<b>Cultural Resource Management</b>										
Prioritize Cultural Resource Surveys	No current management	46,591	241,512	0	31,367	241,512	0	31,367	241,512	0
Designate High-priority Cultural Resource Areas	No current management	46,591	241,512	0	31,367	241,512	0	31,367	241,512	0
<b>Visual Resource Management</b>										
VRM I	46,953 <sup>2</sup>	46,591	241,511	363	0	46,953	0		46,953	
VRM II	0	0	0.5	0	31,367	194,558	363	31,367	194,558	363
VRM III	0	0	0	0	0	0	0		0.5	
<b>Lands with Wilderness Characteristics</b>										
Managed to protect wilderness characteristics as a priority over other resources values and multiple uses	No current management	0	0	0	0	0	0	0	0	0
Managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics		46,591	241,512	363	31,367	241,512	363	0	0	0
Managed to emphasize other resource values and multiple uses as a priority over protecting wilderness characteristics		0	0	0	0	0	0	31,367	241,512	363

Indicators and Their Quantitative Measure	Alternative A (acres)	Alternative B (acres)			Alternative C (acres)			Alternative D (acres)		
		Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn
<b>Forestry and Woodland Products</b>										
Casual Use Woodland Harvest by Permit Only	All forest lands are open to casual, subsistence, and commercial timber harvest, except for 92,355 acres of the Unalakleet Wild River Corridor that is closed to commercial woodland harvest	46,591	241,512	363	31,367	241,512	363	31,367	241,512	363
Casual Use Woodland Harvest without Permit		0	0	0	0	0	0	0	0	0
Subsistence Woodland Harvest by Permit Only		46,591	241,512	363	0	0	0	0	0	0
Subsistence Woodland Harvest without Permit		0	0	0	31,367	241,512	363	31,367	241,512	363
Non-subsistence House Log Harvest Prohibited		46,591	228,116	0	31,367	188,822	0	0	0	0
Non-Subsistence House Log Harvest on Case-By-Case Basis		0	13,396	363	0	52,690	363	31,367	241,512	363
Closed to Commercial Woodland Harvest		46,591	241,512	363	0	46,953	0	0	0	0
Open to Commercial Woodland Harvest by Permit Only		0	0	0	0	51,369	363	0	0	0
Open to Commercial Woodland Harvest without Permit		0	0	0	0	0	0	31,367	241,512	363
<b>Grazing</b>										
Potentially Open to Grazing on a Case-by-Case Basis	241,512	0	0	0	0	0	0	31,367	241,512	363
Closed to Grazing	46,953 <sup>1</sup>	46,591	241,512	363	31,367	241,512	363	0	0	0

Indicators and Their Quantitative Measure	Alternative A (acres)	Alternative B (acres)			Alternative C (acres)			Alternative D (acres)		
		Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn
<b>Minerals (Locatable and Salable)</b>										
Withdrawn from Locatable	The Unalakleet Wild River corridor is closed to locatable and salable minerals, including 115,623 acres of the Kaltag Portage NTMC. The Farewell Burn area is closed to mining, except for metalliferous minerals.	46,591	241,512	363	0	46,953	0	0	46,953	0
Closed to Salable		46,591	241,512	363	0	46,953	0	0	46,953	0
<b>Minerals (Leasable)</b>										
Closed to Leasing	172,156	46,591	241,512	363	0	46,953	0	0	46,953	0
NSO Leasable	47	0	0	0	31,367	190,780	363	0	0	0
Open to Leasing Subject to Standard Stipulations	69,308	0	0	0	0	0	0	31,367	194,559	363
<b>Lands and Realty</b>										
ROW Exclusion Areas	No current management	46,591	241,512	363	0	0	0	0	0	0
ROW Avoidance Areas		0	0	0	31,367	241,512	363	27,392	145,206	0
ROW Permitted on a Case-by-Case Basis		0	0	0	0	0	0	3,976	96,305	363
FLPMA Withdrawals <sup>3,4</sup>	No current management	2,732	1,897 <sup>5</sup>	363	2,732	1,897 <sup>3</sup>	363	0	0	0
<b>Recreation and Visitor Services</b>										
INHT SRMA Area	No current management	46,591	241,512	363	31,367	241,512	363	31,367	241,512	363
<b>Travel and Transportation Management</b>										
Summer Casual OHV Access Prohibited	All lands are undesignated	46,591	241,512	363	31,367	194,558	0	31,367	194,558	0
Summer Subsistence OHV Access Prohibited		46,591	194,558	363	31,367	194,558	363	0	0	0
Summer Casual OHV Access Limited to Existing Trails <sup>6</sup>		0	0	0	0	46,953	363	0	46,953	0
Summer Casual Cross-Country Summer OHV		0	0	0	0	0	0	0	0	363



Indicators and Their Quantitative Measure	Alternative A (acres)	Alternative B (acres)			Alternative C (acres)			Alternative D (acres)		
		Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn	Farewell Burn	Kaltag Portage	Rohn
Access										
Summer Subsistence OHV Access Limited to Existing Trails <sup>6</sup>		0	46,953	0	0	0	363	31,367	194,558	0
Summer Subsistence Cross Country OHV Access		0	0	0	0	46,953	0	0	46,953	363
Winter Casual Use – Snowmobiles Only		46,591	241,512	363	31,367	241,512	363	31,367	241,512	363
Winter Subsistence Use – Snowmobiles Only		46,591	241,512	363	31,367	241,512	363	31,367	241,512	363
<b>Areas of Critical Environmental Concern</b>										
NTMC overlap with ACECs	141,178	46,590	188,822	0	0	0	0	0	0	0
National Trails										
Establish the INHT NTMC within the Planning Area	No NTMC designated	46,591	241,512	363	31,367	241,512	363	31,367	241,512	363
Lighting in the INHT NTMC Viewshed	No current management	Do not allow structures that require air safety lighting in the NTMC Require hooded surface lighting			Same as Alternative B			Structure lighting restrictions determined on a case-by-case basis		
<b>Wild and Scenic Rivers</b>										
WSR Eligible	30,102 <sup>2</sup>	0	0	0	0	0	0	0	0	0
WSR Recommended Suitable	0	25,090	5,012	0	0	0	0	0	0	0
WSR Designated	46,953 <sup>1</sup>	0	46,953	0	0	46,953	0	0	46,953	0
Total Acres of the INHT Directly or Indirectly Affected by Climate Change										
Change in Vegetation Community Composition (as defined by the REA)	No available data	24,425	126,332	191	16,336	126,332	191	16,336	126,332	191
<sup>1</sup> The proposed Kaltag Portage NTMC overlaps 46,953 acres of the Unalakleet Wild River Corridor. <sup>2</sup> The proposed Kaltag Portage and Farewell Burn segments of the INHT NTMC overlap with 30,102 acres of eligible WSR corridors. <sup>3</sup> 1,000-foot-wide buffer centered on the existing INHT treadway. <sup>4</sup> Establish new FLMPA withdrawals (subject to ANILCA section 1326[a]) for salable, locatable, and leasable minerals for a 1,000-foot-wide buffer centered on the existing INHT treadway. <sup>5</sup> Outside the Unalakleet Wild River Corridor withdrawal. <sup>6</sup> Does not include the INHT which is a winter only trail.										

***Effects under Alternative B***

Under Alternative B, authorizing projects that would not cause more than short-term, minimal adverse impacts on air quality would provide air quality protections on 288,466 acres (corresponding to the NTMC) more than under Alternative A. Preserving air quality along the INHT would maintain the nature and purpose of the INHT.

***Effects under Alternative C***

Under Alternative C, authorizing projects that would not cause more than short-term, minimal adverse impacts on air quality would provide air quality protections on 272,242 acres (corresponding to the NTMC) more than Alternative A. However, Alternative B would provide 16,224 additional acres of protection above Alternative C. Preserving air quality along the INHT would maintain the nature and purpose of the INHT.

***Effects under Alternative D***

Effects to air quality would be the same as discussed under Alternative C.

**National Trails: Effects from Nonnative Invasive Species Management Actions**

The BLM would continue to require the use of certified weed-free straw as part of permit requirements for use of BLM facilities and immediate removal or destruction (by fire) after its use. There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

***Effects under Alternative A***

Nonnative invasive plant species have been observed at Rohn and a few other public shelter cabins. The nonnative invasive plant species were likely transported in hay used as bedding for sled dogs during the Iditarod Trail Sled Dog Race. The BLM has inventoried the extent of invasive colonization along the BLM segments of the INHT, undertaken control efforts, and is monitoring the effectiveness of such efforts (Flagstad and Cortes-Burns 2010; Greenstein 2013). Continued colonization by nonnative species could diminish the landscape character surrounding the INHT and diminish the integrity and the nature and purpose of the INHT. The integrity of the trail would be affected because invasive plants change the plant communities around the NTMC and other areas along the trail, which leads to a degradation of the historic viewshed.

***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would cooperate with other agencies and landowners in the prioritization of treatment areas with known infestations of nonnative invasive plant species, including the INHT NTMC. This action would increase nonnative invasive plant species protection for 288,466 acres under Alternative B and 272,242 acres for Alternatives C and D, compared with no such direct protections under Alternative A. The proposed NNIS management protocol for the NTMC would limit the spread of NNIS along the NTMC and maintain habitat condition and landscape character surrounding the INHT, thereby preserving the integrity, nature, and purpose of the INHT. Therefore, Alternatives B, C, and D would have a beneficial, long-term effect on the INHT.

### **National Trails: Effects from Wildland Fire Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

#### ***Effects under Alternative A***

The BLM manages wildland fire in the planning area according to the goals and objectives of the 2005 wildland fire land use plan amendment environmental assessment (BLM 2005). Management includes preserving cultural sites such as the historic cabins associated with the INHT but does not specify fuels reduction and management around cultural sites. Allowing natural wildland fire maintains the natural landscape, which maintains the landscape character surrounding the INHT and maintains the integrity, nature, and purpose of the INHT.

#### ***Effects Common to All Action Alternatives***

Under all action alternatives, the BLM would prioritize protection of the historic, eligible roadhouses of the INHT NTMC, public shelter cabins, and the Rohn Site. Fuels reduction efforts would provide additional protection for the historically important structures and the public facilities associated with the INHT. Protection would include fuels reduction through prescribed burns and chemical or manual disposal. Fire suppression and fuels reduction would decrease the risk to the historic structures and public shelter cabins along the INHT. Fuels reduction projects and prescribed fire are subject to project-level analysis and NHPA Section 106 process. Any effects could be mitigated to minimize adverse effects on the INHT or associated sites.

Fire management could involve surface-disturbing activities that could also directly affect the INHT's footprint and associated sites by erasing ruts created by sleds and altering the surrounding landscape. All fire management within the INHT NTMC would be implemented without OHVs, heavy equipment, or other surface-disturbing vehicles. Prohibiting the use of surface-disturbing vehicles in the NTMC would limit damage to the INHT and preserve the visual integrity of the trail corridor. However, these limits to suppression could put the INHT and the surrounding landscape at a greater risk of impact from wildland fire.

After a fire, the BLM would implement emergency stabilization and burned area rehabilitation projects. These projects would stabilize soils, reestablish hydrologic function, maintain and enhance biological integrity, promote plant resiliency, limit expansion or dominance of invasive species, and reestablish native species. Rehabilitation and restoration of burned areas would support the restoration of the scenic and historic conditions within the INHT NTMC after fires. However, short-term impacts would visually impact the visual integrity of the trail corridor.

### **National Trails: Effects from Cultural Resources Management Actions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

#### ***Effects under Alternative A***

Portions of the INHT, including the Kaltag Portage, have historically been used by Alaska Native people and during the gold rush to transport goods and people. The Kaltag Portage provided a vital link from the rivers of interior Alaska to the Bering Sea coast used for thousands of years by Native peoples, as well as early Euroamerican explorers.

Currently, the BLM requires NHPA Section 106 consultation for any project that would impact the cultural and historical sites associated with the INHT. If adverse effects are identified, mitigation measures, including avoidance, would have to be considered to minimize or eliminate the effects. Actions for cultural resource protection would support maintaining the character, integrity, nature, and purpose of the INHT.

### ***Effects Common to All Action Alternatives***

Under the action alternatives, the BLM would continue to require NHPA Section 106 consultation for all individual projects and require mitigation measures for any adverse effects. In addition, all action alternatives would prioritize cultural resource surveys currently at risk from climate change (BSWI Draft RMP/EIS, Appendix H and M), including the Farewell Burn and Kaltag Portage NTMCs. These surveys would provide additional information regarding the cultural resources in the NTMCs and provide additional information for NHPA Section 106 consultation for proposed projects in the NTMCs. In addition, the BLM would categorize the Kaltag Portage and Farewell Burn NTMCs and their associated resources as high-priority cultural resource protection areas. These actions would increase cultural resource protection for 288,103 acres under Alternative B and an additional 272,879 acres for Alternatives C and D, compared with Alternative A (Table 3.8.3-1), and would maintain the integrity, nature, and purpose of the trail. Collectively, these actions would be considered beneficial impacts to the INHT.

### **National Trails: Effects from Visual Resources Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- VRM Classification

#### ***Effects under Alternative A***

The CYRMP or SWMFP RMP (BLM 1986a, 1981a) does not prescribe VRM classes to the majority of the INHT NTMC; therefore, no indirect protection from VRM management would occur. The BLM manages the Unalakleet Wild River Corridor as VRM Class I, which includes 46,953 acres of the proposed Kaltag Portage NTMC area. This designation preserves the existing character of the landscape for that portion of the NTMC. Visual impacts on the setting of the INHT would be considered in the NHPA Section 106 process, regardless of VRM designation.

#### ***Effects under Alternative B***

Alternative B would designate the NTMCs as VRM Class I, except for 0.5 acre of the Kaltag Portage NTMC, which would be managed as VRM Class II. This action would improve visual protection compared with Alternative A by designating 241,513 more acres as VRM Class I. Alternative B would provide the strictest visual protection of the INHT NTMC; this alternative would preserve the existing character of the landscape and maintain the isolated and primitive nature of the trail. Visual impacts on the setting of the INHT would be considered in the NHPA Section 106 process, regardless of VRM designation.

***Effects under Alternative C***

Alternative C would designate 226,289 acres of the NTMCs as VRM Class II, which would provide visual protection of 226,289 acres that are currently undesignated. Alternative C would maintain protection of 46,953 acres of the Unalakleet Wild River corridor as VRM Class I, the same as currently managed as VRM Class I under Alternative A. The VRM Class II management objective is to retain the existing landscape character; management activities may be seen but should not attract the attention of the INHT user. This action would preserve the user experience and maintain the integrity, nature, and purpose of the INHT. Visual impacts on the setting of the INHT would be considered in the NHPA Section 106 process, regardless of VRM designation.

***Effects under Alternative D***

Alternative D is the same as Alternative C, except that 0.5 acre of the Kaltag Portage NTMC would be managed as VRM Class III. Impacts would be the same as those described under Alternative C.

**National Trails: Effects from Lands with Wilderness Characteristics Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Lands managed to protect wilderness characteristics as a priority over other resources values and multiple uses

***Effects under Alternative A***

No lands are managed to protect wilderness characteristics, which would not provide additional protection for the NTMC and maintain the risk for disturbance from OHV use or surface-disturbing activities.

***Effects under Alternative B***

Under Alternative B, the proposed NTMC would be managed as lands with wilderness characteristics managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics (Table 3.8.3-1). This designation would provide some management at the implementation level that would avoid or minimize impacts to the integrity, nature, and purpose of the INHT. However, those management actions would be identified as part of implementation.

***Effects under Alternative C***

Under Alternative C, impacts would be similar to those under Alternative B, except the NTMCs classified as lands with wilderness characteristics would total 273,242 acres (Table 3.8.3-1), which is 15,224 acres fewer than under Alternative B. However, this alternative would provide some management to 273,242 acres that would have no protections associated with lands with wilderness characteristics under Alternative A.

***Effects under Alternative D***

Alternative D would not recommend any management specifically to prevent or minimize impacts to wilderness characteristic within the planning area, which would not provide additional protection for the NTMC and would maintain the risk for disturbance from OHV use or surface-disturbing activities.

### **National Trails: Effects from Forestry and Woodland Products Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Casual Use Woodland Harvest by Permit Only
- Casual Use Woodland Harvest without Permit
- Subsistence Woodland Harvest by Permit Only
- Subsistence Woodland Harvest without Permit
- Non-Subsistence House Log Harvest Prohibited
- Non-Subsistence House Log Harvest on Case-By-Case Basis
- Closed to Commercial Woodland Harvest
- Open to Commercial Woodland Harvest by Permit Only
- Open to Commercial Woodland Harvest without Permit

#### ***Effects under Alternative A***

All lands along the INHT are open to casual, subsistence, and commercial woodland harvest, except for 92,355 acres of the proposed Kaltag Portage NTMC that overlaps the current Unalakleet Wild River Corridor, where commercial woodland harvest is prohibited. The INHT and adjacent lands are unaffected by current casual, subsistence, and commercial harvesting because the BLM-managed portions of the INHT are not proximate to the villages and populated areas where these activities generally occur.

#### ***Effects under Alternative B***

Alternative B would require individuals to obtain permits for casual and non-commercial woodland harvesting within the proposed NTMCs. This action would impose controls on harvesting in the INHT NTMC (288,466 acres), compared with Alternative A. In addition, Alternative B would prohibit non-subsistence house log harvesting on 46,591 acres of the Farewell Burn NTMC and 228,116 acres of the Kaltag Portage NTMC, which would restrict house log harvesting on 274,707 acres, compared with Alternative A. Alternative B would also prohibit commercial harvesting in the INHT NTMC, thereby removing an additional 196,111 acres from potential commercial harvest compared with Alternative A (Table 3.8.3-1).

Controls on casual, subsistence, and commercial harvesting would reduce the potential direct and indirect impacts on the three proposed NTMCs, compared with Alternative A. Management actions under Alternative B are intended to prevent woodland harvest activities near the trail that could adversely affect the viewshed, thereby preserving the physical characteristics and historical integrity of the trail. The Kaltag Portage NTMC contains several forested sections of low timber value. Alternative B would require permits prior to any casual or subsistence harvesting from the NTMC, which is intended to prevent clear cutting or overharvesting near the trail, which would adversely impact the viewshed and historical integrity of the trail. The Farewell Burn NTMC is distant from villages and populated areas and is not used for subsistence harvesting as much as the Kaltag Portage. The Rohn Site is used primarily for purposes other than harvesting with the air strip and public shelter cabin providing heavier use than the other NTMCs. Management under Alternative B would preserve the integrity, nature and purpose of the INHT.

***Effects under Alternative C***

Alternative C would require individuals to obtain permits for casual woodland harvesting within the three proposed NTMCs but would allow subsistence harvesting without a permit in the NTMCs. This action would impose controls on casual woodland harvesting on 273,242 acres, compared with Alternative A. In addition, Alternative C would prohibit non-subsistence house log harvesting on 31,367 acres of the Farewell Burn NTMC and 188,822 acres of the Kaltag Portage NTMC, which would restrict house log harvesting on 220,189 acres, compared with Alternative A. Alternative C would prohibit commercial harvesting on 46,953 acres of the Kaltag Portage NTMC and require permits for commercial harvesting on the remainder of the NTMC.

Restrictions on casual and commercial harvesting would maintain low levels of direct and indirect impacts on the three proposed NTMCs, compared with Alternative A. However, current impacts from casual and commercial harvesting are low within the three NTMCs. Subsistence harvesting would continue with the Kaltag Portage NTMC. Management under Alternative C would preserve the integrity, nature, and purpose of the INHT.

***Effects under Alternative D***

Alternative D would require individuals to obtain permits for casual woodland harvesting within the three proposed NTMCs but would allow subsistence harvesting without a permit in the NTMCs. This would restrict casual woodland harvesting on 273,242 acres, compared with Alternative A. Issuing permits for wood cutting in the NTMC is intended to reduce clear cutting or overharvesting near the trail, which would adversely impact the viewshed and historical integrity of the trail, thereby providing some protection of the physical characteristics and historical integrity of the trail. Alternative D would not restrict non-subsistence house log harvest or commercial woodland harvest, which would decrease protection on 92,355 acres, compared within Alternative A (Table 3.8.3-1).

Alternative D would restrict casual woodland harvesting within the NTMCs compared with Alternative A but allow non-subsistence house log harvest and commercial woodland harvest throughout the NTMCs. This would increase the potential for direct and indirect impacts on the NTMCs from heavy equipment and loss of forested lands adjacent to the INHT. However, the probability for commercial woodland harvest adjacent to the INHT is low due to the isolated nature of the three NTMCs. Due to the remoteness of the NTMCs, the likelihood for Alternative D to substantially interfere with the integrity, nature, and purpose of the INHT is low.

**National Trails: Effects from Grazing Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Closed to Grazing
- Areas Open to Grazing on a Case-by-case Basis

***Effects under Alternative A***

BLM policy has been to provide grazing leases for domestic livestock including reindeer and musk oxen where feasible. Currently, the only permitted grazing range within the planning area is in a northern portion of the planning area in the Sagoonick Area (see BSWI Draft RMP/EIS Map 3.3.2-1). The

proposed NTMCs are currently open to grazing, except for 46,953 acres of the proposed Kaltag Portage NTMC that overlaps the current Unalakleet Wild River Corridor.

Map 3.3.2-2 of the BSWI Draft RMP/EIS indicates high lichen cover near the mouth of the Unalakleet River, and vegetation mapping identifies 42,753 acres of lichen and/or dwarf shrub habitat in the proposed Kaltag Portage NTMC, which is considered general caribou habitat. Grazing has not occurred in this area of caribou habitat within the NTMC since before World War II, and no grazing permits have been requested for this area recently. Allowing grazing adjacent to the INHT could impact the integrity of the INHT by concentrating grazing use in localized areas, which can result in eroded soil, vegetation cover reduction, rutting, increased erosion, and other landscape changes that would affect the INHT. Grazing would occur in the summer months; because grazing is not considered a historic use of the INHT, there would be impacts on the visual and historic quality of the landscape.

### ***Effects under Alternative B***

Under Alternative B, the BLM would manage 288,466 acres of the proposed NTMC as unavailable to grazing, an increase of 241,513 acres closed to grazing from Alternative A (Table 3.8.3-1). Potential grazing impacts would be prevented under Alternative B, as there would be no acres of the NTMC open to grazing; current trail conditions would be maintained. Benefits of reduced grazing on the INHT would include less potential for long-term aesthetic changes from overgrazing and the effects of the use of summer OHV's on NTMC lands.

### ***Effects under Alternative C***

Under Alternative C, the BLM would manage 273,242 acres of the NTMC as unavailable to grazing, a decrease of 15,224 acres closed to grazing from Alternative B (Table 3.8.3-1). There would be no acres of the NTMC open to grazing under Alternative C. Effects from livestock grazing management on the INHT would be the same as those described under Alternative B but would occur over a slightly smaller area.

### ***Effects under Alternative D***

Under Alternative D, all lands within the planning area would be open to grazing on a case-by-case basis. This includes the 46,953 acres currently closed to grazing as part of the Unalakleet Wild River Corridor under Alternative A. However, grazing would be permitted in the INHT NTMC only if it is determined that the proposed permitted grazing is consistent with maintenance of the historical and cultural setting of the INHT NTMC. The probability of grazing within the INHT NTMC is low due to the remote nature of the trail, including the Kaltag Portage NTMC. Due to the remoteness of the NTMCs, the likelihood for livestock grazing under Alternative D to substantially interfere with the integrity, nature, and purpose of the INHT is low.

## **National Trails: Effects from Locatable and Salable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Locatable Mineral Exploration
- Salable Mineral Development



***Effects under Alternative A***

Lands within the Unalakleet Wild River Corridor are closed to all mineral entry, which includes a portion of the Kaltag Portage NTMC (BSWI Draft RMP/EIS Map 3.3.5-1). Potential for locatable or salable minerals adjacent to the INHT is low due to low potential for minerals (Map 3.3.3-3) and distance from markets. Currently, the NTMC is not impacted by any mineral exploration or extraction but is open to mineral extraction for those areas outside of the Unalakleet Wild River Corridor. Mineral exploration or extraction could impact the integrity, nature, and purpose of the trail through surface disturbance, viewshed, and noise-related impacts. However, the potential for these impacts is low due to low mineral potential in areas crossed by the NTMC.

***Effects under Alternative B***

All three INHT NTMC units would be withdrawn from locatable mineral exploration and development and closed to salable mineral development through retaining existing withdrawals and new proposed withdrawals. This action would withdraw an additional 172,843 acres from mineral exploration and extraction, compared with Alternative A (Table 3.8.3-1). Excluding these areas from mineral exploration and development would prevent new surface disturbance along the INHT within the NTMC, prevent indirect impacts within the NTMC, such as noise pollution and visual impacts, and preserve the integrity, nature, and purpose of the trail. However, due to the remoteness of the NTMC and because there are no areas of medium or high mineral potential within or adjacent to the INHT NTMC, there is low potential for impact from mineral development under to substantially interfere with the integrity, nature, and purpose of the INHT.

***Effects under Alternative C***

As discussed in Alternative B, due to the remoteness of the NTMC and because there are no areas of medium or high mineral potential within or adjacent to the INHT NTMC, there is low potential for impact from mineral development under to substantially interfere with the integrity, nature, and purpose of the INHT.

***Effects under Alternative D***

As discussed in Alternative B, due to the remoteness of the NTMC and because there are no areas of medium or high mineral potential within or adjacent to the INHT NTMC, there is low potential for impact from mineral development under to substantially interfere with the integrity, nature, and purpose of the INHT.

**National Trails: Effects from Leasable Minerals Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Closed to Leasing
- NSO Leasable
- Open to Leasing Subject to Standard Stipulations

***Effects under Alternative A***

There is low potential for coal, coalbed natural gas, and oil and gas development within the planning area due to the low grade of materials, lack of infrastructure, and high cost to develop. The Unalakleet Wild River Corridor is closed to leasing and includes a large portion of the proposed Kaltag Portage NTMC (172,156 acres). To date, the INHT has not been impacted by leasable mineral exploration or extraction; however, the proposed Farewell Burn and Rohn NTMCs and portions of the Kaltag Portage NTMC are open to leasing with standard stipulations.

***Effects Common to All Action Alternatives***

The INHT NTMC is excluded from coal extraction because coal leases shall not be issued on federal lands within the National System of Trails (see BLM M5280 42. E.6.i). This restriction would protect the INHT from any impacts associated with coal extraction.

Leasable mineral actions would be managed with noise and atmospheric guidelines that would maintain the current remote and isolated trail experience and maintain the integrity, nature, and purpose of the INHT.

***Effects under Alternative B***

Alternative B would close the proposed NTMCs to leasing (Table 3.8.3-1), which would close 116,310 more acres to leasing than Alternative A. Alternative B would prevent impacts on the INHT NTMC from leasable mineral development, thereby preserving the integrity, nature, and purpose of the INHT.

***Effects under Alternative C***

Alternative C would apply NSO restrictions to leasable mineral development within the Farewell Burn NTMC (31,367 acres), the Rohn NTMC (363 acres), and 190,780 acres of the Kaltag Portage NTMC. The remainder of the Kaltag Portage NTMC is within the proposed Unalakleet Wild River Corridor (46,953 acres) and would be closed to leasing (Table 3.8.3-1).

Alternative C would apply NSO restrictions to leasable mineral development on 222,510 acres, including 20,693 acres of the Kaltag Portage NTMC that was not protected under current leasing restrictions for the Unalakleet Wild River Corridor. This action would increase protection of those portions of the INHT NTMC and prevent surface disturbance to the NTMC from leasable mineral development as compared to Alternatives A and B. Alternative C would prohibit surface disturbance within the NTMC from leasable mineral development but would allow disturbance adjacent to the NTMC. Adjacent disturbance could result in noise or viewshed (setting) impacts to the trail, but would not substantially interfere with the integrity, nature, and purpose of the INHT.

***Effects under Alternative D***

Alternative D would close the portion of the Kaltag Portage NTMC within the Unalakleet Wild River Corridor to leasable mineral development (46,953 acres) and allow development with standard stipulations on 226,289 acres. This action would open an additional 226,289 acres to leasable development compared with all other alternatives. Leasable mineral development within the INHT NTMCs would change the landscape around the INHT, potentially adversely impact the trail, and alter the user experience as a result of noise or viewshed-related impacts. The NTMCs are in remote areas with a

lack of existing infrastructure, but the potential to substantially interfere with the integrity, nature, and purpose of the INHT exists.

### **National Trails: Effects from Lands and Realty Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- ROW Exclusion Areas
- ROW Avoidance Areas
- ROW Permitted on a Case-by-Case Basis
- FLPMA Withdrawals
- Rohn Conveyance

#### ***Effects under Alternative A***

Alternative A would allow ROW development within the proposed INHT NTMCs and allow surface disturbance and development adjacent to the INHT. New ROWs could directly and indirectly alter the unique visual and historic characteristics of the NTMC and could substantially interfere with the integrity, nature, and purpose of the INHT.

#### ***Effects Common to All Action Alternatives***

INHT inholdings where no NHT easement reservation exists would be acquired from willing sellers (easement only or entire parcel if the surrounding lands are in federal ownership). Acquiring INHT inholdings from willing sellers would increase the continuity of BLM management; preserve the integrity, nature, and purpose of the INHT; and maintain the user experience resulting in long-term, beneficial impacts to the INHT.

#### ***Effects under Alternative B***

Compared with Alternative A, management under Alternative B would decrease the potential impacts from new ROW development along the INHT. The three geographic units (Farewell Burn, Kaltag Portage, and Rohn; 288,466 acres) would be managed as ROW exclusion areas (Table 3.8.3-1), compared with no ROW exclusion areas in Alternative A. Excluding new ROW development would minimize changes to the unique visual and historic qualities of the INHT and potential for project-level noise impacts resulting in long-term, beneficial impacts to the INHT.

Alternative B would also retain the Rohn parcel as an NTMC under BLM management. This would retain one of the most heavily used sites on the INHT currently under BLM management and ensure the integrity of the site under its protection as a NTMC. The BLM would pursue opportunities to acquire lands or public use easements within the INHT NTMC to support the goals and objectives of the NTMC, which would enhance the user experience by providing consistent management to large portions of the INHT where possible.

#### ***Effects under Alternative C***

The INHT NTMC would be managed as a ROW avoidance area, which would provide additional protection of 273,242 acres, compared with Alternative A. Avoiding new ROW development would

minimize changes to the unique visual and historic qualities of the INHT and potential for project-level noise impacts. The BLM would pursue opportunities to acquire lands or public easements within the INHT NTMC as described under Alternative B and with similar impacts.

### ***Effects under Alternative D***

Under Alternative D, the BLM would grant ROWs within the proposed NTMCs on a case-by-case basis, similar to current management under Alternative A.

### **National Trails: Effects from Recreation and Visitor Services Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- INHT SRMA
- SRPs
- BLM INHT Public Shelter Cabin Use

### ***Effects under Alternative A***

While the INHT Comprehensive Management Plan (BLM 1986b) guides BLM's management of the trail, the plan does not establish a management corridor. Without a defined management corridor, it is difficult to evaluate the potential effects of management actions surrounding the trail. The BLM issues SRPs for races and other uses along the INHT, and those requests have been increasing over the past 10 years. The increase in permit requests requires management controls to reduce recreation conflicts. The increase in SRP requests for the INHT potentially impacts the user experience on the trail with overcrowded conditions, vague management controls that do not afford specific protections, and degradation to the trail surface. Given the current trend, Alternative A could adversely impact the user experience, trails setting, and could substantially interfere with the integrity, nature, and purpose of the INHT.

### ***Effects Common to All Action Alternatives***

All action alternatives establish the INHT SRMA for the three proposed NTMCs. For all action alternatives, INHT SRMA management controls would include, but not be limited to: limits to group size, limits to duration of stay, waste management (human and litter), and permitted activities and commercial filming. Dispersed recreation uses would be lightly managed, with little to no cost to the public.

### ***Effects under Alternative B***

Alternative B allows for casual use of the Rohn Public Shelter Cabin even when occupied by an SRP permittee. It would also restrict wood gathering to dead and down wood. Alternative B prohibits commercial trapping or guide outfitters from using the public cabin. Restrictions under Alternative B would preserve the remote and isolated user experience on the trail resulting in long-term, beneficial impacts to the INHT.

### ***Effects under Alternative C***

Effects of Rohn Public Shelter Cabin guidelines would be the same as those described under Alternative B.

***Effects under Alternative D***

Alternative D allows for the exclusive use of the Rohn Public Shelter Cabin by SRP permittees, which would prevent the casual user from using the public shelter cabin during use of the trail at certain times of the year. This could impact the remote and isolated casual user by creating a potentially dangerous experience due to the possibility of exposure to extreme weather. As a result, some casual users may choose not to use the trail for recreation during the time when cabins are off-limits, which could impact the nature and purpose of the INHT.

**National Trails: Effects from Travel and Transportation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Summer Casual OHV Access Prohibited
- Summer Subsistence OHV Access Prohibited
- Summer Casual OHV Access Limited to Existing Trails
- Summer Subsistence OHV Access Limited to Existing Trails
- Winter Casual Use – Snowmobiles Only
- Winter Subsistence Use – Snowmobiles Only

***Effects under Alternative A***

All lands within the planning area are managed as undesignated, which allows unrestricted OHV use within the proposed NTMCs in summer and winter months. One exception is the portion of Kaltag Portage that intersects with the Unalakleet Wild River Corridor which would be closed to casual OHV travel. Due to the predominance of wetlands in the area, the INHT is highly susceptible to damage from OHV traffic in the summer months due to rutting and erosion. Most, but not all, INHT sections managed by the BLM are far from villages and other population bases and show no signs of summer damage but remain vulnerable to future impacts.

In addition, current regulations do not limit the size and weight of OHVs allowed on the trail. New technology is developing larger, wider vehicles that can traverse the trail in summer and winter months. These larger, heavier vehicles have the potential to create deeper and wider ruts in the trail that increase erosion and interfere with users who require a single-lane, snow-packed treadway in the winter.

With diminishing annual snow, local planning area residents are increasingly using OHVs year-round to drive on frozen tundra or waterways, as well as community roads. Such OHVs also have the potential to create a substantial hazard (via the creation of parallel ruts) to other trail users who rely on a single-lane packed treadway. In addition, noise generated by OHVs interferes with the remote and isolated nature of the trail. Increased OHV use during the winter and summer months could interfere with the user experience due to increased noise levels.

***Effects Common to All Action Alternatives***

All action alternatives would designate the proposed NTMCs as “Limited” to motorized travel and designate the INHT NTMC as a TMA. Identification of specific limitations within the “Limited” designation (e.g., vehicle weight, vehicle width) are implementation-level planning decisions and would

be developed as part of a travel and transportation plan that would be completed by the BLM subsequent to this RMP. Implementation-level planning decisions could prohibit the use of larger, heavier vehicles on the INHT.

All action alternatives would limit casual and subsistence use to the use of snowmobiles only on the NTMC during winter months. New technologies are developing larger and heavier summer OHVs capable of travel in winter conditions. There is no historic precedent for the use of these vehicles on the INHT, and their use may result in substantial changes to the nature of the trail, primarily from trail tread widening and corridor vegetation clearing. Prohibiting these vehicles would prevent rutting along the trails for trail users who rely on a single-lane, snow-packed treadway.

The BLM would monitor winter casual and subsistence OHV use in the INHT NTMC. If the use results in degradation of the resources or prevents trail management that meets requirements of the National Trails System Act, then casual and subsistence winter OHV travel would be prohibited in affected areas.

### ***Effects under Alternative B***

Alternative B would prohibit summer casual OHV use within the three proposed NTMCs and prohibit summer subsistence OHV use within the Farewell Burn and Rohn NTMCs and 194,558 acres of the Kaltag Portage NTMC. The remaining 46,953 acres within the proposed Unalakleet Wild River Corridor would be restricted to existing trails and to ATVs only. This action would restrict OHV use in 241,512 acres compared with Alternative A and maintain the integrity of winter trail surfaces from summer damage to the INHT during the vulnerable summer months. The Kaltag Portage NTMC is located adjacent to the Unalakleet River. This section would be most vulnerable to summer subsistence OHV use and difficult to traverse in the summer months due to extensive wetlands and waterways.

### ***Effects under Alternative C***

Alternative C would prohibit summer casual OHV access within the Farewell Burn NTMC and 194,558 acres of the Kaltag Portage NTMC; 46,953 acres of the Kaltag NTMC and the Rohn NTMC would be restricted to existing trails for summer casual OHV access and with only ATVs. This action would restrict summer casual OHV access on 273,242 acres compared with Alternative A and protect the INHT during the vulnerable summer months. Casual OHV use on existing trails would potentially impact the Kaltag Portage portion of the INHT; however, summer use is limited due to extensive wetlands and waterways.

Alternative C would prohibit summer subsistence OHV access on the Farewell Burn segment of the INHT NTMC and 194,558 acres of the Kaltag Portage segment; the Rohn NTMC would be open to summer subsistence OHV travel on existing trails only. A total of 46,953 acres of the Kaltag NTMC would be open to unrestricted summer subsistence OHV access with only ATVs. This would restrict subsistence OHV access on 273,242 acres compared with Alternative A and protect the INHT during the vulnerable summer months. Unlimited subsistence OHV use on the Kaltag Portage would pose a risk to the INHT, but current travel is almost non-existent in the summer months due to extensive wetlands and waterways.

### ***Effects under Alternative D***

Alternative D would prohibit summer casual OHV access within the Farewell Burn NTMC and 194,558 acres of the Kaltag Portage NTMC; 46,953 acres of the Kaltag Portage NTMC would be restricted to existing trails for summer casual OHV access. Casual OHV use on existing trails would potentially

impact the Kaltag Portage portion of the INHT; however, summer use is limited due to extensive wetlands and waterways.

Alternative D would limit summer subsistence OHV access to existing trails on the Farewell Burn NTMC and 194,558 acres of the Kaltag Portage NTMC with only ATVs. A total of 46,953 acres of the Kaltag Portage NTMC would be open to unrestricted summer subsistence OHV access with ATVs and UTVs. This would restrict subsistence OHV access on 225,925 acres compared with Alternative A and protect portions of the INHT during the vulnerable summer months. Unlimited subsistence OHV use on the Kaltag Portage NTMC would pose a risk to the INHT, but current travel is almost non-existent in the summer months due to extensive wetlands and waterways. In addition, the UTVs have wider wheel bases and are heavier than ATVs and would increase damage to the INHT through multiple deep ruts that could damage the surface of the winter trail treadway and create hazards for trail users.

### **National Trails: Effects from Areas of Critical Environmental Concern Management Actions**

Potential impacts from the following management topics were considered:

- Overlap of the INHT NTMC with Proposed ACECs

#### ***Effects under Alternative A***

The proposed Kaltag Portage segment of the INHT NTMC overlaps with 141,178 acres of the Drainages of the Unalakleet River ACEC. Effects from resource management decisions are included under the other resource-specific headings (e.g., Lands and Realty) and analysis in this section.

#### ***Effects under Alternative B***

Under Alternative B, the Farewell Burn NTMC overlaps 46,590 acres of the proposed Sheefish Spawning ACEC, and the Kaltag Portage NTMC overlaps 1 acre of the Nulato River ACEC and 188,821 acres of the Unalakleet Watershed ACEC. The alternatives include the prescriptions for both the NTMCs and ACECs and use the stricter prescriptions where they overlap, providing beneficial impacts to the nature and character of the NTMCs in these areas. Impacts are discussed under the other resource-specific headings in this section.

#### ***Effects under Alternative C***

No ACECs would be designated in Alternative C; there would be no related beneficial effects on the INHT.

#### ***Effects under Alternative D***

No ACECs would be designated in Alternative D; there would be no related beneficial effects on the INHT.

### **National Trails: Effects from National Trails Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Establishing the INHT NTMC within the Planning Area

- Lighting in the INHT NTMC Viewshed
- Surface-Disturbing Activities

### ***Effects under Alternative A***

The BLM has not designated a NTMC for the INHT within the planning area. The only protection of the INHT is where the proposed Kaltag Portage NTMC overlaps the Unalakleet Wild River Corridor. The lack of an NTMC opens the NHT area to development that would interfere with the trail's integrity and purpose. Effects from resource management decisions are included under the other resource-specific headings (e.g., Lands and Realty) and analysis in this section.

### ***Effects Common to All Action Alternatives***

All action alternatives would designate lands for the INHT NTMC. The alternatives vary in the number and size of NTMCs, as described below.

### ***Effects under Alternative B***

Alternative B designates 288,466 acres of the following NTMCs: Farewell Burn (46,591 acres), Kaltag Portage (241,512 acres), and Rohn (363 acres) (see BSWI Draft RMP/EIS, Map 2-49). This action provides designated protection of 288,466 more acres of the INHT than Alternative A.

Alternative B would not allow structures that require air safety lighting as required by FAA and would require hooded lighting for any night lighting in the NTMCs. These restrictions would maintain the user experience during the dark winter months and preserve the integrity, nature, and purpose of the INHT. However, precluding lighting would mean that BLM would not be able to respond to ROW actions requests with the NTMC. The preclusion of lighting or requirement for hooded lighting may also add to the costs for the public if existing structures need to be relocated or modified.

Alternative B would prohibit surface-disturbing activities within the NTMCs (unless allowed under ANILCA Title XI). Realty actions may be authorized within the INHT NTMC if it is determined by the AO that the activities are not visible from the INHT and impacts associated with the action would be consistent with the integrity, nature, and purpose of the INHT. These restrictions would prevent visible surface disturbance from within the NTMC and would prevent direct impacts on 288,466 acres, compared with Alternative A. Preventing visible surface disturbance in the NTMC would preserve the user experience and maintain the purpose and integrity of the INHT.

### ***Effects under Alternative C***

Alternative C designates 273,242 acres of NTMC: Farewell Burn (31,367 acres), Kaltag Portage (241,512 acres), and Rohn (363 acres) (see BSWI Draft RMP/EIS, Map 2-50). This action provides designated protection of 273,242 more acres than Alternative A.

Alternative C includes the same lighting restrictions and associated impacts as Alternative B.

Alternative C authorizes surface-disturbing activities and other realty decisions within the INHT NTMC if it is determined by the AO that they meet the VRM Class allocations for the disturbance area (Table 3.8.3-1) and impacts associated with the action would be consistent with the integrity, nature, and purpose of the INHT. This would prevent visible surface disturbance from within the NTMC, as Alternative C manages the NTMCs as VRM Class II, which retains the existing landscape character. Preventing visible



surface disturbance in the NTMC would preserve the user experience and maintain the integrity, nature, and purpose of the INHT.

### ***Effects under Alternative D***

Alternative D designates the same NTMC areas as under Alternative C. Under Alternative D, structure lighting restrictions would be determined on a case-by-case basis with site-specific analysis that considers the darkness and winter-time use of the trail and the effect of lighting colors on trail experiences. Potential impacts on the user experience during darkness or winter-time would depend on the results of the site-specific analysis and identified mitigation measures.

Alternative D authorizes surface-disturbing activities and other realty decisions if the AO determines that they would not substantively conflict or interfere with the integrity, nature, and purpose of the INHT. Alternative D preserves the integrity, nature, and purpose of the INHT but would allow surface disturbance within the NTMC that would interfere with the user experience and possibly impact the INHT.

### **National Trails: Effects from Wild and Scenic Rivers Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topic were considered:

- Designation of the WSR Corridors

### ***Effects under Alternative A***

The BLM manages the Unalakleet Wild River Corridor, which overlaps the 46,953 acres of the proposed Kaltag Portage segment of the INHT NTMC. Management of the resources where the proposed NTMC overlaps with the WSR corridor is included under the other resource-specific heading in this section. The proposed Farewell Burn NTMC intersects five eligible WSR corridors, totaling 25,090 acres. The proposed Kaltag Portage NTMC intersects two eligible WSR corridors totaling 51,966 acres, including the existing Unalakleet Wild River Corridor (Table 3.8.3-1). According to BLM Manual 6400, projects on BLM-managed lands within the river corridor or on lands that are adjacent to or border eligible rivers must consider guidelines to protect ORVs, which could also provide protections to the INHT NTMC.

### ***Effects under Alternative B***

Alternative B recommends 18 waterbodies as suitable WSRs (BSWI Draft RMP/EIS, Map 2-51). The proposed Farewell Burn segment of the INHT NTMC intersects five WSR corridors recommended as suitable, totaling 25,090 acres. The proposed Kaltag Portage NTMC intersects one recommended suitable WSR corridor totaling 5,012 acres, and the designated Unalakleet Wild River Corridor (46,953 acres) (Table 3.8.3-1). The alternatives include the prescriptions for both the NTMCs and WSR corridors and utilize the stricter prescriptions where they overlap. Management of resources in the intersecting areas is included under the other resource-specific headings in this section.

### ***Effects under Alternative C***

Alternative C maintains the Unalakleet Wild River Corridor but does not recommend any additional waterbodies for inclusion in the National System. The Unalakleet Wild River Corridor intersects 46,953 acres of the proposed Kaltag Portage NTMC. Management of resources in the intersecting areas is included under the resource-specific headings in this section.

***Effects under Alternative D***

Effects would be the same as those described under Alternative C.

**National Trails: Effects from Climate Change**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are discussed in combination below.

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Increased Wildfire Intensity, Size, and Frequency
- Decreased Snow Cover
- Increase in NNIS Presence/Spread
- Change in Vegetation Community Composition (as defined by the REA)

***Effects under Alternative A***

Wildland fire is expected to increase in frequency, size, and intensity as a result of climate change. Current management identifies historic structures on the INHT for protection but does not designate them for fuels treatment or reduction.

A substantial shortening of the winter travel season on the trail appears to have occurred in the last 15 years. Current management allows for undesignated OHV travel along the INHT during the summer and winter months. The use of ATVs on the INHT during the winter prior to sufficient snow cover for snowmobiles has the potential to create a major hazard to other trail users who rely on a single-lane packed treadway due to the creation of parallel ruts. Because most segments of the BLM-managed trail are located far from local communities, this use has not presented a problem to date, but is being monitored.

No data to measure changes in vegetation community composition are available for Alternative A.

***Effects Common to All Action Alternatives***

All action alternatives would prioritize historic structures along the INHT for preservation during wildland fires and include fuels reduction and treatment to further protect the structures.

All action alternatives would restrict both casual and subsistence winter OHV use to snowmobiles only. This would eliminate the risk of rutting from the use of ATVs or UTVs on the trail prior to sufficient snow cover and preserve the historic use of the INHT by those who rely on the single-lane packed treadway. In addition, the BLM would monitor winter casual and subsistence OHV use in the NTMC. If the use results in degradation of the resources or prevents trail management that meets requirements of the National Trails System Act, then casual and subsistence winter OHV travel would be prohibited in affected areas.

Based on potential changes in climate, the BLM would promulgate supplementary rules, consistent with the INHT's comprehensive management plan, to implement time-of-use rules related to winter use beginning and ending dates that reflects the actual yearly beginning and ending dates of sufficient snow cover.

Under all action alternatives, the BLM would cooperate with other agencies and landowners in the prioritization of treatment areas with known infestations of nonnative invasive plant species, including the INHT NTMC. The integrity of the trail would be affected because invasive plants change the plant communities around the NTMC and other areas along the trail, which leads to a degradation of the historic viewshed and the integrity of the trail.

***Effects under Alternative B***

Based on the REA, 150,948 acres of vegetation community composition would change under Alternative B, including 24,425 acres in the Farewell Burn NTMC, 126,332 acres in the Kaltag Portage NTMC, and 191 acres in the Rohn NTMC (Table 3.8.3-1). Comparison to Alternative A cannot be made due to lack of corresponding Alternative A data.

***Effects under Alternative C***

Based on the REA, 142,859 acres of vegetation community composition would change under Alternative B, including 16,336 acres in the Farewell Burn NTMC, 126,332 acres in the Kaltag Portage NTMC (the same as Alternative B), and 191 acres in the Rohn NTMC (the same as Alternative B) (Table 3.8.3-1). Comparison to Alternative A cannot be made due to lack of corresponding Alternative A data.

***Effects under Alternative D***

Effects would be the same as those described under Alternative C.

**National Trails: Cumulative Effects**

Table 3.8.3-2 summarizes the results of the cumulative effects analysis for the INHT in the planning area for all alternatives.

**Table 3.8.3-2: Cumulative Effects Analysis for the INHT**

Trends and Forecasts of the INHT in Consideration of Past and Present Actions	Trends and Forecasts of the INHT in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of the INHT in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of the INHT in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of the INHT in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>The primary natural phenomena directly affecting trail resources are erosion, wildland fire, and changes to the length and intensity of winter weather. A number of historic roadhouses and shelter cabins originally located near waterways are either vulnerable to or have been eroded or flooded by shifting river and creek beds. Historic structures, historic trail landforms, and contemporary public facilities are also vulnerable to loss from wildland fire.</p> <p><b>Trend: Degrading; not achieving the congressionally identified nature and purpose of the INHT.</b></p>	<p>Alternative A continues the current management for the INHT. It does not designate NTMCs for the INHT and does not include additional protection from unrestricted OHV travel in summer and winter; grazing; commercial woodland harvest; locatable, salable, or leasable mineral development; or surface-disturbing activities. Increased use could occur as a result of increased number of permit requests, and the INHT could experience additional impacts from use of larger and heavier OHVs from new technologies.</p> <p><b>Trend: Continue to degrade the resource at a similar rate to current conditions as it extends the current management practice. Not achieving the congressionally identified nature and purpose of the INHT.</b></p>	<p>Alternative B designates two NTMCs associated with the INHT and includes the greatest protection from OHV travel, both during the summer and winter months; withdraws the NTMCs from locatable and salable mineral development; closes the NTMCs to leasable mineral development; closes the NTMCs to grazing and commercial woodland harvest; designates the NTMCs as VRM Class I areas; and prohibits surface disturbance that would be visible or audible by INHT users.</p> <p><b>Trend: Counter the existing degradation trend and moving forward maintaining and conserving the condition of the INHT and associated NTMCs and moves toward achieving the congressionally identified nature and purpose of the INHT.</b></p>	<p>Alternative C designates three NTMCs associated with the INHT and includes additional protection compared with Alternative A but to a lesser extent; closes the NTMCs to grazing and a small portion to commercial woodland harvest; closes the NTMCs to locatable mineral development and a portion to salable mineral development; restricts leasable mineral development to NSO; designates the NTMCs as VRM Class II areas; and prohibits surface disturbance that would be visible or audible by INHT users.</p> <p><b>Trend: counter the existing degradation trend and maintain and conserve the condition of the INHT and associated NTMCs in some cases. In other instances, degradation could be accelerated, but to a lesser extent that Alternative B. Moves toward achieving the congressionally identified nature and purpose of the INHT.</b></p>	<p>Alternative D designates three NTMCs. Alternative D would provide less protection to the INHT and adjacent NTMCs compared with Alternative A. It would restrict OHV travel compared with Alternative A but would leave the INHT NTMCs open to grazing; commercial woodland harvest; locatable, salable, and leasable minerals; and surface-disturbing activities.</p> <p><b>Trend: Continue to degrade the INHT and associated NTMCs at a similar or greater rate than current conditions, and not achieve congressionally identified nature and purpose of the INHT.</b></p>

## 3.9 Wild and Scenic Rivers

### 3.9.1 Summary

This section describes the potential impacts from management actions on WSRs within the planning area. The planning area contains one designated WSR and 18 rivers determined eligible for inclusion in the National System (BLM 2018b). These rivers, which are tributaries to the Unalakleet, Anvik, and Kuskokwim Rivers, were assigned tentative classifications of “wild” by BLM. Collectively, these eligible river corridors measure 332,176 acres. Of the 18 rivers, 12 include ORVs for fish, four include ORVs for fish and historic resources, one includes ORVs for fish and cultural resources, and one includes ORVs for cultural resources (see Appendix M of the BSWI Draft RMP/EIS). The eligible rivers are proposed as suitable under Alternative B. Under all action alternatives, BLM management decisions would recognize that Alaska Natives rely upon the resources of the Unalakleet Wild River Corridor and study rivers to support their subsistence lifestyle. Under all action alternatives, the Unalakleet would continue to be accessible for subsistence use. Measures to protect and enhance fisheries and resources within the Unalakleet Wild River Corridor would result in indirect impacts to BSWI communities by ensuring a sustainable resource base.

Under all alternatives, the 46,953 acres of the Unalakleet Wild River Corridor would continue to be managed as part of the National System per the Unalakleet National Wild River Management Plan (BLM 1983). As such, the river would continue to be managed to protect and enhance free-flowing condition, water quality, wild river classification, and ORVs. Resource-specific management actions associated with soils, water resources and fisheries, cultural resources, VRM, forestry and woodland products, and grazing would contribute to the protection of ORVs, water quality, and wild river classification by maintaining resource integrity and landscape character. Management decisions for minerals (locatable and salable) and lands and realty would result in beneficial direct impacts by prohibiting or limiting surface-disturbing activities that could affect river values.

Under Alternative A, eligible rivers would continue to be managed per the SWMFP and CYRMP, as applicable. Free-flowing condition, water quality, wild river classification, and ORVs would be managed per guidelines provided in BLM Manual 6400 (BLM 2012) until a decision on their suitability is made. Accordingly, no direct impacts to these river values would result from Alternative A. Protections from BLM (2012a) would be applied consistently across all eligible rivers.

Under Alternative B, eligible rivers would be recommended as suitable for inclusion in the National System. If designated, these rivers would receive the same protections as described for the Unalakleet Wild River Corridor. These rivers would be managed per the same VRM designation as the Unalakleet Wild River Corridor. Management of these corridors as VRM Class I would serve as a tool to limit direct impacts to water quality, wild river classification, and ORVs that could result from surface-disturbing activities. Additional protections would be applied through HVW, cultural resources, and NHT actions that could further protect these river values. All suitable rivers are located in areas of low mineral potential, further reducing the potential for direct impacts from these actions. Free-flowing condition, water quality, wild river classification, and ORVs would be managed per guidelines provided in BLM Manual 6400 (BLM 2012) until a decision on designation is made by Congress. Alternative B could result in beneficial direct impacts to BSWI communities should rivers recommended as suitable for inclusion in the National System be designated from increased protections of water quality and fish and cultural ORVs.

Under Alternatives C and D, eligible rivers would be determined to be not suitable for inclusion in the National System. No protections of free-flowing quality would be extended under these options.

Under Alternative C, the former study rivers would continue to receive protection where vacated corridors overlap HVWs (31,578 acres) and VRM Class I or II (148,998 acres). Overlap with these management actions would contribute to protection of water quality and ORVs for up to 45 percent of the vacated study corridors.

Under Alternative D, the former study rivers would continue to receive protection where vacated corridors overlap HVW (31,578 acres) and VRM Class I or II (73,952 acres). Overlap with these management actions would contribute to protection of water quality and ORVs for up to 22 percent of the vacated study corridors.

### 3.9.2 Methods of Analysis

This section describes methods used to identify potential impacts from proposed management under each alternative to identified river values for eligible and designated rivers and other resources and resource uses. Where impacts were quantifiable, they were based on an assumed half-mile buffer on each side of the eligible river. The baseline conditions for the designated Unalakleet Wild River Corridor and rivers determined to be eligible for inclusion in the National System are described in Appendix M of the BSWI Draft RMP/EIS and the 2018 WSR Study (BLM 2018b). Approximate length, acreage, ORVs, and tentative classification for eligible rivers are summarized below in Table 3.9.2-1.

**Table 3.9.2-1: Rivers Identified as Eligible (Alternative A) and Recommended as Suitable (Alternative B) within the Planning Area**

Watercourse	Approximate Length on BLM Lands (miles)	Acreage within Eligible WSR corridor (acres)	Outstandingly Remarkable Value(s)	Tentative Classification
Anvik River	119	61,100	Fish, Cultural	Wild
Bear Creek (Nikolai)	41	17,224	Fish, Historic	Wild
Big River	35	21,859	Fish	Wild
Blackwater Creek	12	7,617	Fish	Wild
Canyon Creek	16	8,233	Fish	Wild
Middle Fork Kuskokwim River	52	23,212	Fish	Wild
North Fork Unalakleet River	48	28,987	Fish	Wild
Otter Creek (Anvik)	35	20,130	Fish	Wild
Otter Creek (Tuluksak)	5	3,247	Fish	Wild
Pitka Fork Middle Fork Kuskokwim River	62	24,921	Fish, Historic	Wild
Salmon River (Nikolai)	21	10,536	Fish, Historic	Wild
Sheep Creek	36	15,861	Fish	Wild
Sullivan Creek	22	9,192	Fish, Historic	Wild
Swift River (Anvik)	31	16,381	Fish, Historic	Wild
Tatlawiksuk River	17	8,975	Fish	Wild
Theodore Creek	15	7,384	Fish	Wild
Yellow River	70	28,409	Fish	Wild
Yukon River	13	18,908	Cultural	Wild

The total area within all eligible WSR corridors is approximately 332,173 acres. This represents less than 3 percent of the planning area.

### Potential Effects and Indicators

One designated Wild River Corridor, the Unalakleet, exists in the planning area, and would continue to be managed as part of the National Wild and Scenic River System under all alternatives. Resource pressures on the Unalakleet Wild River Corridor are low and are not forecasted to substantially increase. While the alternatives have some differences in WSR management among them (generally most protective of WSR values under Alternative B, and least protective under Alternative D), the beneficial or adverse impacts of these actions on the designated Unalakleet Wild River are likely to be small given the remoteness of the area, low mineral potential, and low demand for travel or resource use.

In 2016, the BLM determined that 18 additional waterways meet WSR eligible criteria. Under Alternatives C and D, future development that lessens WSR values could occur near those waterways. However, because most of the waterways are very remote and are located within low mineral potential areas, and because travel and resource pressure are very low, such development is not currently foreseen. The specific types of effects to free-flowing condition, ORVs, water quality, and wild river classification that could result from management actions and other resources and resource uses are summarized in Table 3.9.2-2 and discussed below.

**Table 3.9.2-2: Summary of Effects to Wild and Scenic Rivers by Management Action**

Types of Effects	Management Actions	Indicators
Development and/or surface disturbance in riparian zones or floodplains could cause impacts wild river classification, water quality, and ORVs.	<ul style="list-style-type: none"> <li>• Soils management actions</li> <li>• Water resources decisions (HVW)</li> <li>• ROW decisions</li> <li>• Commercial woodland harvest decisions</li> </ul>	Impacts to wild river classification, free-flowing condition water quality and ORVs, as measured by: <ul style="list-style-type: none"> <li>• Acres of HVW intersecting designated, eligible, or suitable rivers</li> <li>• Acres open to ROW development intersecting designated, eligible, or suitable rivers</li> <li>• Acres open to commercial woodland harvest intersecting designated, eligible, or suitable rivers</li> </ul>
Road development or other access improvements and/or surface-disturbing activities could adversely affect wild river classification.	<ul style="list-style-type: none"> <li>• Travel and transportation management actions</li> <li>• Land and realty ROW exclusion/avoidance zone actions</li> </ul>	<ul style="list-style-type: none"> <li>• Change in preliminary or designated classification (wild, scenic, or recreational)</li> </ul>
Road development or other access improvements and/or surface-disturbing activities could adversely affect wild river classification.	<ul style="list-style-type: none"> <li>• Travel and transportation management actions</li> <li>• Land and realty ROW exclusion/avoidance zone actions</li> </ul>	<ul style="list-style-type: none"> <li>• Change in preliminary or designated classification (wild, scenic, or recreational)</li> </ul>
Lands disposed within a WSR study corridor would no longer be managed by the BLM, thereby limiting the BLM's ability to protect ORVs or other attributes per the BLM (2012).	<ul style="list-style-type: none"> <li>• Land and realty actions</li> </ul>	<ul style="list-style-type: none"> <li>• Acres open for disposal</li> </ul>

### Assumptions

The following assumptions were used to assess effects associated with WSRs:

- In implementing the mandate of the WSR Act, it is BLM’s responsibility to manage all eligible, suitable, or designated WSRs “so as to protect, enhance, and not degrade the free-flowing character, water quality, and identified ORVs” (BLM 2012).
- Rivers identified as eligible (Alternative A) or suitable (Alternative B) would continue to be managed per guidelines provided in BLM Manual 6400 “Wild and Scenic Rivers: Policy and Program Direction for Identification, Evaluation, Planning, and Management” (BLM 2012). These guidelines are applicable to minerals, transportation, authorized ROW, recreation development, motorized travel, vegetation management, livestock grazing, invasive species management, and water resources and hydroelectric projects. Guidelines would protect free-flowing condition, water quality, wild river classification and ORVs until a decision is made regarding their suitability, or in the case of suitable rivers, until Congress designates the river or releases it for other uses. The BLM would exercise discretionary authority on a case-by case basis, through project-level decision making and the NEPA processes, not to impact river values or make decisions that might lead to a determination of ineligibility or non-suitability.
- If WSR designation is not provided (i.e., if rivers are not found suitable and are released from further study under the WSR Act), provisions could still remain to protect these rivers and relevant ORVs through existing plans, policies, and other management actions considered in this RMP.
- Although the geographic extent of management actions for most resources and resource uses is planning area-wide, WSR management prescriptions apply only to the designated WSR corridor or study corridor (1/2 mile on each side).
- Permitted activities will not be allowed to impair the outstandingly remarkable values for which the WSRs are designated.
- WSR designation provides protection and focused management for ORVs beyond that provided through general management of the parent resource as a result of the “protect and enhance” mandate.
- Management of designated, eligible, and suitable WSR is included in other resource and resource use management decisions (e.g., travel restrictions in WSRs are brought forward in travel management) and will be recognized during future travel management planning.

### **Standard Operating Procedures and Best Management Practices**

The impact analysis below takes into account the SOPs and BMPs that would be implemented by the BLM. A comprehensive list of SOPs/BMPs pertaining to WSRs is provided in Appendix K of the BSWI Draft RMP/EIS.

#### **3.9.3 Effects Analysis**

Management actions proposed for the following resources, resource uses, and special designations would not result in effects to eligible or designated WSRs:

- Air Quality and AQRVs
- Vegetation
- Wildlife
- Non-native invasive species
- Wildland Fire



- Paleontological Resources
- Land with Wilderness Characteristics
- Hazardous Materials and Health and Human Safety

## **Wild and Scenic Rivers: Effects from Soils Management Actions**

### ***Effects under Alternative A***

Under Alternative A, the BLM would continue to protect floodplains wherever they may be impacted by a BLM action. Such protections would result in beneficial impacts to designated and eligible rivers by managing surface-disturbing activities within these areas and contributing to the protection of water quality and ORVs.

Under Alternative A, free-flowing condition, water quality, wild river classification, and river values (no ORVs identified) of the Unalakleet Wild River Corridor would continue to be protected under the SWMFP, the CYRMP, the Unalakleet National Wild River Management Plan (BLM 1983), and mandates of the WSR Act. The WSR attributes of rivers identified as eligible would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012), as described in the subsection “Assumptions” above. Consequently, beneficial impacts from soils management would be greatest in areas where these protections were applied outside the corridor boundary, where existing management provisions for eligible and designated WSR do not apply.

Soils management described in Alternative A would contribute to existing provisions that protect water quality and ORVs. There would be no effect on free-flowing condition or wild river classification.

### ***Effects Common to All Action Alternatives***

There are no management actions common to all action alternatives that would result in direct or indirect impacts to eligible, designated, or suitable WSRs.

### ***Effects under Alternative B***

Under Alternative B, any BLM-permitted surface-disturbing activity within the 100-year floodplain would require detailed reclamation plans and use of overburden materials. No surface-disturbing activities would be allowed within 100 feet of a natural spring. These actions would contribute to protection of water quality and ORVs in designated rivers and those rivers recommended as suitable for inclusion in the National System by ensuring integrity of floodplains was restored following surface disturbance.

As in Alternative A, free-flowing condition, water quality, wild river classification, and river values of the Unalakleet Wild River Corridor would continue to be protected under the Unalakleet National Wild River Management Plan (BLM 1983) and mandates of the WSR Act. Eighteen rivers recommended as suitable would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012).

Consequently, beneficial impacts to ORVs from Alternative B would be greatest in areas along the 18 suitable rivers, where existing management provisions do not apply.

### ***Effects under Alternative C***

Under Alternative C, rivers identified as eligible would be determined not to be suitable for inclusion in the National System. Water quality and ORVs of these vacated study rivers would continue to receive protections provided through BLM review of surface-disturbing activities in floodplains. The general

protections provided through existing federal, state, and local laws would be applied to rivers eliminated from further consideration for inclusion in the National System.

Determination of BLM-permitted surface-disturbing activities in the vicinity of floodplains and natural springs would be authorized on a case-by-case basis. These actions would contribute to protection of water quality and ORVs in designated rivers by ensuring potential impacts from land uses proposed outside the WSR corridor that could affect water quality impacts were reviewed. This management action would complement provisions of the Unalakleet National Wild River Management Plan (BLM 1983) and mandates of the WSR Act and could contribute to the protection of water quality and river values.

Alternative C would contribute to existing provisions that protect water quality and river values. There would be no protection on free-flowing condition or wild river classification.

### ***Effects under Alternative D***

Impacts to WSRs from Alternative D would be identical to Alternative C for soils management actions.

### **Wild and Scenic Rivers: Effects from Water Resources and Fisheries Management Actions**

This analysis considered HVW designations, which are independent of WSR actions. As a result, even under Alternatives C and D, where the currently eligible waterways would have no special WSR designation, the fisheries ORVs of parts of the currently eligible river corridors would receive some additional protections. Table 3.9.3-1 summarizes the approximate acreages affected; the effects are discussed in the alternatives sections below.

**Table 3.9.3-1: WSR Intersections with Proposed HVWs (all alternatives)**

<b>Watercourse</b>	<b>Alternative A acres</b>	<b>Alternative B acres</b>	<b>Alternative C acres</b>	<b>Alternative D acres</b>
Anvik River	0	61,100	59,589	59,589
Bear Creek (Nikolai)	0	16,947	15,922	15,922
Big River	0	21,837	21,315	21,315
Blackwater Creek	0	227	198	198
Canyon Creek	0	8,233	8,233	8,186
Middle Fork Kuskokwim	0	20,751	19,858	19,858
North Fork Unalakleet	0	28,704	28,396	28,396
Otter Creek (Anvik)	0	19,968	19,968	19,968
Otter Creek (Tuluksak)	0	3,247	3,218	3,218
Pitka Fork Middle Fork Kuskokwim River	0	22,921	22,069	22,069
Salmon River (Nikolai)	0	10,269	10,269	10,269
Sheep Creek	0	9,241	121	121
Sullivan Creek	0	9,192	9,123	9,123
Swift River (Anvik)	0	16,381	16,381	16,381
Tatlawiksuk River	0	8,975	8,792	8,792
Theodore Creek	0	7,384	514	514
Unalakleet Designated WSR	0	34,808	31,578	31,578
Yellow River	0	28,168	27,680	27,478
Yukon River	0	5,030	5,022	0
<b>Total</b>	<b>0</b>	<b>333,483</b>	<b>305,279</b>	<b>302,975</b>

***Effects under Alternative A***

Under Alternative A, HVWs would not be designated. Consequently, no additional protection of water quality and/or ORVs would be applied to the designated Unalakleet River or eligible WSRs through this mechanism.

Under Alternative A, free-flowing condition, water quality, wild river classification, and river values of the Unalakleet Wild River Corridor would continue to be protected under the SWMFP, the CYRMP, the Unalakleet National Wild River Management Plan (BLM 1983), and mandates of the WSR Act. These WSR attributes of rivers identified as eligible would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012).

Alternative A would not contribute to these existing provisions that protect or enhance free-flowing condition, water quality, wild river classification, and protection of ORVs; however, it would not degrade the condition of these attributes.

***Effects Common to All Action Alternatives***

Management actions common to all action alternatives include measures to protect water quality and quantity within the planning area. Additional management standards would restrict land development to those actions that would not adversely impact aquatic and riparian systems and would manage habitat to support self-sustaining populations of priority species. These measures would serve to protect and enhance free-flowing nature, water quality, and ORVs within the designated and suitable WSRs.

***Effects under Alternative B***

Under Alternative B, HVWs would be designated in the planning area. HVWs are established to protect water quality and quantity, and fisheries resources in areas classified as High, Medium-High, or Medium resource value. In areas designated as HVWs, any proposal to use or develop the lands, waters, or resources within the 100-year floodplain would be required to demonstrate that the condition and ecological functions of aquatic and riparian systems (water quality, stream flow, groundwater hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function) would not be adversely affected. Land use proposals would also be required to demonstrate that the quality and diversity of habitats needed to sustain the production of fish and wildlife populations at their natural potential would not be diminished. Commercial woodland harvest would be prohibited within the 100-year floodplains of HVWs. Under Alternative B, HVW overlaps all of the suitable river corridors; exact acreage is not available as floodplain areas have not been determined for these rivers.

Direct beneficial impacts to WSR water quality and fish ORVs would result from these use restrictions where the suitable rivers intersect with HVWs. These land use restrictions could also indirectly beneficially impact cultural and historic ORVs (Anvik River, Bear Creek [Nikolai], Pitka Fork Middle Fork Kuskokwim River, Salmon River [Nikolai], Sullivan Creek, and Yukon River) by limiting surface disturbance. Table 3.9.3-2 summarizes the intersections of designated and suitable WSRs with the HVWs as proposed under Alternative B.

**Table 3.9.3-2: Suitable WSR Intersections with Proposed HVWs (Alternative B)**

Watercourse	River Miles in Proposed HVW	High Classification (RM & %)	High-Medium Classification (RM & %)	Medium Classification (RM & %)
Anvik River	118	117 (99%)	0	<1
Bear Creek (Nikolai)	41	41 (100%)	0	0
Big River	35	35 (100%)	0	0
Blackwater Creek	0	0	0	0
Canyon Creek	16	16 (100%)	0	0
Middle Fork Kuskokwim	52	52 (100%)	0	0
North Fork Unalakleet	48	48 (100%)	0	0
Otter Creek (Anvik)	35	35 (100%)	0	0
Otter Creek (Tuluksak)	5	5 (100%)	0	0
Pitka Fork Middle Fork Kuskokwim River	61	61 (100%)	0	<1
Salmon River (Nikolai)	21	21 (100%)	0	0
Sheep Creek	22	0	0	22 (100%)
Sullivan Creek	22	21 (95%)	0	0
Swift River (Anvik)	31	32 (100+%)	0	0
Tatlawiksuk River	17	17 (100%)	0	0
Theodore Creek	15	<1	0	15 (100%)
Unalakleet Designated WSR	65	65 (100%)	0	<1
Yellow River	69	69 (100%)	0	0
Yukon River	7	0	7 (100%)	0

Under Alternative B, free-flowing condition, water quality, wild river classification, and river values of the Unalakleet Wild River Corridor would continue to be protected under the Unalakleet National Wild River Management Plan (BLM 1983) and mandates of the WSR Act. The WSR attributes of rivers recommended as suitable would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012).

Alternative B would include the most measures protect and enhance free-flowing condition, water quality, wild river classification, and protection of ORVs in the designated and suitable rivers.

### ***Effects under Alternative C***

Under Alternative C, the designated Unalakleet Wild River would intersect HVW classified as High (31,578 acres). It does not intersect any High-Medium value HVW, and less than 1 acre would intersect Medium-value HVW. Where the designated Unalakleet Wild River Corridor intersects HVW, land use rules would have direct beneficial impacts to protect and enhance water quality and ORVs for fish. The HVW land use restrictions could indirectly impact cultural and historic ORVs by limiting surface disturbance.

None of the rivers that are eligible under Alternative A or recommended as suitable under Alternative B would retain WSR status under Alternative C. Protecting their free-flowing and wild characteristics would

not be prioritized. However, 92 percent of the WSR acreage designated HVW under Alternative B would still be designated HVW under Alternative C, which would minimize impacts to water quality, fish, and cultural ORVs because of additional regulations of surface disturbance, commercial woodland harvest and ROW actions in HVW.

### ***Effects under Alternative D***

The types of impacts to WSR from Alternative D would be the same as Alternative C, except that a slightly smaller area would be designated as HVW, amounting to 91 percent of WSR acreage under Alternative B.

## **Wild and Scenic Rivers: Effects from Cultural Resources Actions**

### ***Effects under Alternative A***

Management actions for historic resources pertain to management of the INHT NTMC. Impacts for the INHT NTMC are discussed below in the section “Wild and Scenic Rivers: Effects from National Trails.”

### ***Effects Common to All Action Alternatives***

Under all action alternatives, cultural resources would continue to be protected under existing federal, State, and local laws. Cultural resources would continue to be surveyed and monitored. The BLM would work collaboratively with other federal agencies, State of Alaska, tribes, Native corporations, and private landowners for documentation, stewardship, and protection of cultural resources. The BLM would also prioritize nomination of contributing properties of the INHT on the NRHP and consult with tribes to identify TCPs of use areas.

Collectively, these actions would result in direct beneficial impacts by supporting preservation of cultural ORVs of the Unalakleet Wild River Corridor or of identified eligible rivers, regardless of their inclusion in the National System. These measures would result in direct beneficial impacts to cultural resource values associated with the Unalakleet Wild River Corridor through increased awareness and preservation.

### ***Effects under Alternative B***

Under Alternative B, six rivers with cultural and/or historic ORVs would be recommended for inclusion in the National System: Anvik River, Bear Creek (Nikolai), Pitka Fork Middle Fork Kuskokwim River, Salmon River (Nikolai), Sullivan Creek, and the Yukon River. Direct beneficial impacts to these rivers' ORVs would result from management actions for cultural resources through increased awareness and preservation.

Cultural resource surveys for the Anvik and Yukon Rivers would be prioritized, further ensuring focus on these rivers and associated cultural ORVs. Under Alternative B, these rivers are recommended as suitable for inclusion in the National System. Prioritizing cultural resource surveys would contribute to protection of cultural ORVs identified for these rivers.

Under Alternative B, the free-flowing character, water quality, wild river classification, and ORVs of rivers recommended as suitable would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012).

Management actions for historic resources pertain to management of the INHT NTMC. Impacts for the INHT NTMC are discussed below in the section “Wild and Scenic Rivers: Effects from National Trails.”

***Effects under Alternative C***

Under Alternative C, eligible rivers would be determined to be not suitable for inclusion in the National System. Consequently, these rivers would not receive protection from management guidance provided in BLM Manual 6400 (BLM 2012). Cultural and historic ORVs of these vacated study corridors would continue to receive protection described in management actions common to all, and as described for the Anvik and Yukon Rivers under Alternative B.

Management actions for historic resources pertain to management of the INHT NTMC. Impacts for the INHT NTMC are discussed below under the heading “Wild and Scenic Rivers: Effects from National Trails.”

***Effects under Alternative D***

Under Alternative D, eligible rivers would be determined to be not suitable for inclusion in the National System. Impacts to cultural and historic ORVs of these vacated study corridors would be the same as described under Alternative C.

Management actions for cultural resources pertain to management of the INHT NTMC. Impacts for the INHT NTMC are discussed below in the section “Wild and Scenic Rivers: Effects from National Trails.”

**Wild and Scenic Rivers: Effects from Visual Resources Management Actions**

This analysis considered VRM designations that would be triggered either by WSR actions or by other management actions, such as those stemming from the INHT NTMC or ACEC designations. As a result, even under Alternatives C and D, where the currently eligible waterways have no special WSR designation, the wild character and/or cultural ORVs of parts of the rivers would receive some additional protections. Table 3.9.3-3 summarizes the approximate acreages affected; the effects are discussed in the sections below.

**Table 3.9.3-3: WSR Intersections with VRM actions**

Watercourse	VRM Class	Acres under A	Acres under B	Acres under C	Acres under D
Anvik River	I	0	61,100	0	0
	II	0	0	177	0
	III	0	0	60,922	61,100
Bear Creek (Nikolai)	I	0	17,224	0	0
	II	0	0	17,224	17,224
	III	0	0	0	0
Big River	I	0	21,859	0	0
	II	0	0	21,044	0
	III	0	0	710	8,223
Blackwater Creek	I	0	7,617	0	0
	II	0	0	198	0
	III	0	0	7,419	7,617
Canyon Creek	I	0	8,233	0	0
	II	0	0	0	0
	III	0	0	3,502	3,502

Watercourse	VRM Class	Acres under A	Acres under B	Acres under C	Acres under D
Middle Fork Kuskokwim	I	0	23,212	0	0
	II	0	0	19,988	0
	III	0	0	874	12,174
North Fork Unalakleet	I	1,057	28,987	1,057	1,057
	II	0	0	27,930	8,032
	III	0	0	0	19,899
Otter Creek (Anvik)	I	0	20,130	0	0
	II	0	0	0	0
	III	0	0	6,420	3,622
Otter Creek (Tuluksak)	I	0	3,247	0	0
	II	0	0	0	0
	III	0	0	1,733	1
Pitka Fork Middle Fork Kuskokwim River	I	0	24,921	0	0
	II	0	0	23,885	13,307
	III	0	0	1,036	11,614
Salmon River (Nikolai)	I	0	10,536	0	0
	II	0	0	10,536	10,536
	III	0	0	0	0
Sheep Creek	I	0	15,861	0	0
	II	0	0	15,861	14,605
	III	0	0	0	1,256
Sullivan Creek	I	0	9,192	0	0
	II	0	0	9,192	9,192
	III	0	0	0	0
Swift River (Anvik)	I	0	16,381	0	0
	II	0	0	0	0
	III	0	0	9,668	7,238
Tatlawiksuk River	I	0	8,975	0	0
	II	0	0	0	0
	III	0	0	858	858
Theodore Creek	I	0	7,384	0	0
	II	0	0	0	0
	III	0	0	3,860	3,860
Unalakleet Designated WSR	I	46,953	46,953	46,953	46,953
	II	0	0	0	0
	III	0	0	0	0
Yellow River	I	0	28,409	0	0
	II	0	0	0	0
	III	0	0	4,933	4,933
Yukon River	I	0	18,908	0	0
	II	0	0	1,906	0
	III	0	0	17,002	18,908

***Effects under Alternative A***

Under Alternative A, the upper 65 river miles of the Unalakleet River would continue to be managed as a WSR per the SWMFP, the CYRMP, the Unalakleet National Wild River Management Plan (BLM 1983), and mandates of the WSR Act. The designated classification of “wild” established for the river in the Unalakleet National Wild River Management Plan (BLM 1983) would continue. While no ORV for scenery is identified for the Unalakleet Wild River Corridor in the management plan, the WSR corridor is managed to preserve the environment and the ecosystems of the river and to protect its free-flowing character and unpolluted waters.

The CYRMP currently manages the 46,953 acres of the Unalakleet Wild River Corridor as VRM Class I. The objective of VRM Class I is to preserve the existing character of the landscape; any permitted change to the landscape should be very low and must not attract attention. Consequently, Alternative A would result in direct beneficial impacts to the Unalakleet Wild River Corridor by limiting developments that could dominate the landscape, thereby protecting the wild river classification. Because VRM can also be used to manage surface disturbance, Alternative A could result in indirect impacts by limiting development that may result in diminished water quality or river values.

Under Alternative A, no VRM designations exist outside the Unalakleet Wild River Corridor and Seen Area of the Unalakleet River; consequently, no VRM-related management actions would apply to eligible rivers, and this mechanism could not be used as a tool to manage surface disturbance, development, or other actions that may affect wild river character, water quality, or ORVs.

The WSR attributes of eligible rivers would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012).

Alternative A would contribute to protection of water quality, wild river classification, and river values of the Unalakleet Wild River Corridor. Alternative A would not contribute to the protection of these attributes of eligible rivers; however, it would not diminish these attributes.

***Effects Common to All Action Alternatives***

Under all action alternatives, the 46,953-acre designated Unalakleet Wild River Corridor would be managed as VRM Class I, which would provide the same direct and indirect beneficial impacts as described for Alternative A.

***Effects under Alternative B***

Under Alternative B, the combined 332,176-acre study corridors for eligible rivers would be proposed as suitable for inclusion in the National System and managed per VRM Class I. Consistent with Alternative A, management of designated and suitable rivers as VRM Class I would result in direct beneficial impacts that protect visual values of those areas by limiting developments that could dominate the setting and impact the wild character of the landscape. Indirect beneficial impacts to water quality, river values (of the Unalakleet River), and ORVs may result from this protective land use standard.

Under Alternative B, free-flowing condition, water quality, wild river classification, and river values of the Unalakleet Wild River Corridor would continue to be protected under the Unalakleet National Wild River Management Plan (BLM 1983) and mandates of the WSR Act. These WSR attributes of suitable rivers would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012).



Alternative B would be most protective of water quality, wild river classification, and river values of the Unalakleet Wild River Corridor, as well as free-flowing and wild character, water quality, and ORVs of rivers recommended as suitable.

### ***Effects under Alternative C***

The 18 rivers in the planning area identified as eligible would be determined not suitable for inclusion in the National System and would be eliminated from further consideration. No VRM designation would be applied specifically to these study corridors; however, 147,941 acres (45 percent) of the vacated study corridors would be managed per VRM Class I or II due to protection for other resources. VRM classes provide protections to the wild character of the landscape and to cultural ORVs; however, free-flowing characteristics would not be protected and any benefit to fish ORVs would be indirectly derived from limitations of surface disturbance that would have visual impacts.

### ***Effects under Alternative D***

As in Alternative C, the 18 rivers in the planning area identified as eligible would be determined as not suitable for inclusion in the National System and would be eliminated from further consideration as eligible. No VRM designation would be applied specifically to these study corridors; however, 72,896 acres (22 percent) of the vacated study corridors would be managed per VRM Class I or II to protect other resources. Direct impacts in these areas would be similar to those described above for Alternative C.

## **Wild and Scenic Rivers: Effects from Forestry and Woodland Products Management Actions**

### ***Effects under Alternative A***

Under Alternative A, commercial woodland harvesting would be permitted within the Unalakleet Wild River Corridor, and ongoing subsistence activities, including house log and fuel wood harvesting, would be allowed to continue per management standards provided in the Unalakleet National Wild River Management Plan (BLM 1983). Because subsistence-related house log and fuel wood harvesting activities within the Unalakleet Wild River Corridor are currently compatible with allowable uses and, if necessary, would be regulated through permits issued by the BLM, the potential for impacts from forestry and woodland product management actions within the WSR corridor would be small. This standard would protect water quality, wild river classification, and river values (no ORVs identified) of the Unalakleet River.

Eligible rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a) until a decision on suitability is made by Congress. This guidance and legal protections would contribute to the preservation of water quality and ORVs. Most eligible rivers are also located in remote portions of the planning area and are not near populated communities; therefore, pressure for this resource use is assumed to be low.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, harvest activities that include surface disturbance would require surveys for sensitive resources that could be affected by the surface disturbance. Implementation-level surveys such as this could protect ORVs by ensuring that minimization or avoidance measures were taken, as needed.

***Effects under Alternative B***

Under Alternative B, commercial woodland harvest would be prohibited within the 46,953-acre Unalakleet Wild River Corridor. Because ongoing subsistence-related activities in the Unalakleet Wild River Corridor are currently compatible with allowable uses (including house log and fuel wood harvesting) and because the BLM could regulate these activities using a permit system if necessary, the potential for impacts to the Unalakleet Wild River Corridor from forestry and woodland product management actions would likely be small. These standards would contribute to the protection of free-flowing conditions, water quality, wild river classification, and river values of the Unalakleet River.

Areas within 15 miles of the 18 rivers recommended as suitable for WSR designation would be open for commercial woodland harvest unless they overlap with ACECs, lands managed for wilderness characteristics as a priority, 100-year floodplains of HVW, or the INHT NTMC. Areas with these designations include about 301,922 acres (80 percent of suitable corridors under Alternative B) and overlap all of the corridors except for the Yukon. Because the majority of these rivers are located in remote portions of the planning area and not near populated communities, there is little demand for this resource and impacts are expected to be small. This standard would not protect or enhance free-flowing conditions, water quality, wild river classification, and ORVs of these rivers.

***Effects under Alternative C***

As with Alternative B, commercial woodland harvest would be prohibited within the 46,953 acres of the Unalakleet Wild River Corridor under Alternative C. The potential for impacts within the Unalakleet Wild River Corridor would be small for the same reasons described for Alternative B.

Rivers considered eligible for inclusion in the National System would be eliminated from further consideration and would have no special WSR designation. However, commercial woodland harvest would be prohibited within the designated Unalakleet Wild River.

***Effects under Alternative D***

Under Alternative D, commercial woodland harvest (including timber, mushrooms, berries, bark, and other forest products) would be permitted within the Unalakleet Wild River Corridor. If management actions under Alternative D were to permit commercial woodland harvest activities at levels substantially higher than current levels, those management actions would be inconsistent with the current protections for the Unalakleet River included in the Unalakleet National Wild River Management Plan (BLM 1983). Adverse effects to the wild character of the corridor could result from increased demand for roads or trails associated with commercial harvest. However, no demand for substantially higher commercial woodland products harvest in the Unalakleet Wild River Corridor is foreseen.

Rivers considered eligible for inclusion in the National System would be eliminated from further consideration.

**Wild and Scenic Rivers: Effects from Grazing Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Areas Open to Grazing
- Areas Closed to Grazing

***Effects under Alternative A***

Under Alternative A, the entire Unalakleet River, including the WSR corridor and major tributaries, would be excluded from grazing permit areas. This measure would contribute to the protection of water quality, wild river classification, and ORVs of these rivers by preventing sedimentation or erosion associated with an increase in grazing animals.

Grazing would be permitted within the study corridors of the eligible rivers per the SWMFP. Eligible rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a) until a decision on suitability is made. These values would also continue to receive protection through existing federal, State, and local laws.

Collectively, the effects from grazing management actions on the Unalakleet Wild River Corridor and rivers eligible for WSR designation under Alternative A would be small because the WSRs are located in remote areas where demand for permitted grazing areas is low or absent.

***Effects under Alternative B***

Under Alternative B, all BLM-managed lands within the planning area would be closed to grazing, including BLM-managed lands near the rivers identified as eligible for WSR designation. No adverse impacts from grazing management actions would occur under Alternative B within the Unalakleet Wild River Corridor or rivers recommended as suitable for inclusion in the National System. This measure would contribute to the protection of water quality, wild river classification, and ORVs of these rivers by preventing sedimentation or erosion associated with an increase in grazing animals. These values would also continue to receive protection through existing federal, State, and local laws.

***Effects under Alternative C***

Under Alternative C, the Unalakleet Wild River Corridor would be closed to grazing. No impacts to free-flowing character, water quality, wild river classification or ORVs from grazing are expected to result from Alternative C. Similar to Alternative B; this measure would contribute to the protection of water quality, wild river classification, and ORVs of the Unalakleet River by preventing sedimentation or erosion associated with an increase in grazing animals.

Under Alternative C, eligible rivers would be eliminated from further consideration for inclusion in the National System. The ORVs for which these rivers were recognized could be protected through other management actions (e.g. HVW, which would be closed to grazing until grazing standards and guidelines for riparian health were identified) and through existing federal, State, and local laws. Most of the eligible river segments are located in remote parts of the planning area without demand for grazing permit areas, so any adverse WSR impacts from this allowed use are likely to be small.

***Effects under Alternative D***

Under Alternative D, grazing would be permitted in the Unalakleet Wild River Corridor only if it is determined that the proposed grazing is consistent with provisions of the WSR Act. Consistent with the Act, grazing would be required to protect or enhance free-flowing conditions, water quality, wild river classification, and ORVs of the Unalakleet River.

Under Alternative D, eligible rivers would be eliminated from further consideration for inclusion in the National System. As in Alternative C, the ORVs for which these rivers were recognized could be protected through existing federal, State, and local laws. Most of the eligible river segments are located in

remote parts of the planning area without demand for grazing permit areas, so any adverse WSR impacts from this allowed use are likely to be small.

## **Wild and Scenic Rivers: Effects from Locatable Minerals Management Actions**

### ***Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor would be closed to mineral entry. An additional 36,725 acres in eligible river corridors is withdrawn from locatable mineral entry. This measure would contribute to the protection of free-flowing conditions, water quality, wild river classification, and ORVs of these rivers by limiting the potential for impacts (e.g., contamination, sedimentation, noise, visual) to these attributes from mineral development.

Most areas of the eligible rivers would be open to mineral entry per the SWMFP (BLM 1981a), with exclusions coinciding with certain resource areas. Where eligible or designated rivers are open, Alternative A would not contribute to the protection of free-flowing conditions, water quality, wild river classification, or ORVs. Where eligible rivers overlap exclusion zones (e.g., Anvik River), Alternative A would contribute to protection of these attributes. Impacts to eligible rivers from locatable mineral development are expected to be small due to the remote locations of eligible river corridors and association with low mineral potential areas. Eligible rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a) until a decision on suitability is made. These values would also continue to receive protection through existing federal, State, and local laws.

### ***Effects Common to All Action Alternatives***

Under all action Alternatives, WSR corridors would be withdrawn from locatable mineral entry, subject to valid existing rights. Impacts to the Unalakleet Wild River would be the same as described under Alternative A.

### ***Effects under Alternative B***

Under Alternative B, the Unalakleet Wild River Corridor and 98 percent of river corridors identified as suitable for inclusion in the National System would be withdrawn from locatable mineral entry and closed to salable mineral development. This action would contribute to the protection of free-flowing conditions, water quality, wild river classification, and ORVs by limiting the potential for impacts (e.g., contamination, sedimentation, noise, visual) to these attributes from mineral development.

Suitable rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a). Direct impacts to suitable WSRs from locatable minerals are expected to be small due to the remote locations of these rivers and their classification as areas of low mineral potential. These values would also continue to receive protection through existing federal, State, and local laws.

### ***Effects under Alternative C***

Under Alternative C, eligible rivers would be determined to be not suitable and eliminated from further consideration for inclusion in the National System. The ORVs for which these rivers were recognized could be protected through other management actions (e.g., HVWs), and in locations where the vacated study corridors intersect the INHT NTMC (see “Wild and Scenic Rivers: Effects from National Trails”).

Direct impacts to these rivers from locatable mineral development are expected to be small due to the remote locations of these rivers and their association with areas of low mineral potential. The WSR values would also continue to receive protection through existing federal, State, and local laws.

### ***Effects under Alternative D***

Impacts from locatable minerals management actions would be the same as Alternative C.

## **Wild and Scenic Rivers: Effects from Salable Minerals Management Actions**

### ***Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor (46,953 acres) would be closed to salable mineral entry. This measure would contribute to the protection of free-flowing conditions, water quality, wild river classification, and ORVs of this river by limiting the potential for adverse impacts (e.g., contamination, sedimentation, noise, visual) to these attributes from mineral development.

Eleven percent (26,725 acres) of the area in eligible river corridors would also remain closed to salable entry under current withdrawals. The remainder of eligible river corridors would be open to salable mineral entry per the SWMFP (BLM 1981a).

Where eligible rivers are open for leasing, Alternative A would not contribute to the protection of free-flowing conditions, water quality, wild river classification, and ORVs. Where eligible rivers overlap an exclusion zone (e.g., Anvik River), Alternative A would contribute to the protection of these attributes. Direct adverse impacts to eligible rivers from salable mineral development are expected to be small due to their remote location and association with low mineral potential areas.

Eligible rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a) until a decision on suitability is made. These values would also continue to receive protection through existing federal, State, and local laws.

### ***Effects under Alternative B***

Under Alternative B, the designated Unalakleet River would be closed to salable minerals. For suitable corridors, 324,220 acres (98 percent) would also be closed to salable minerals. This management action would result in beneficial direct impacts to the corridors by limiting potential for development that could affect water quality, ORVs, and wild river classification (e.g., contamination, sedimentation, noise, visual).

Direct impacts to suitable WSRs from mineral development actions are expected to be small due to the remote locations of these rivers and their association with areas of low mineral potential. Where these rivers intersected the INHT, management actions to protect the INHT would benefit suitable WSRs by limiting the potential for the same impacts to water quality, ORVs and wild river classification described above (e.g., contamination, sedimentation, noise, visual) from leasable mineral development (see “Wild and Scenic Rivers: Effects from National Trails”). Additionally, suitable rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a).

These values would also continue to receive protection through existing federal, State, and local laws.

***Effects under Alternative C***

Under Alternative C, eligible rivers would be determined to be not suitable and eliminated from further consideration for inclusion in the National System. Other management actions would result in 7,801 acres (2 percent) of the corridors closed to salable, 286,614 acres (86 percent) open on a case-by-case basis, and 36,704 acres (11 percent) open under standard conditions. Adverse impacts to these rivers from mineral development (lessening of wild character, increased surface disturbance leading to reductions in water quality and fish ORVs) are expected to be small given their locations in areas of low mineral potential.

The ORVs for which these rivers were recognized could be protected through other management actions (e.g. HVWs), and also in locations where the vacated study corridors intersect the INHT NTMC (see “Wild and Scenic Rivers: Effects from National Trails”). These values would also continue to receive protection through existing federal, State, and local laws.

***Effects under Alternative D***

Under Alternative D, eligible rivers would be determined to be not suitable and eliminated from further consideration for inclusion in the National System. Salable entry would be closed in 9,824 acres of these areas, while standard entry would be permitted in the remaining 321,296 acres. This alternative would be least protective of ORVs in currently eligible corridors.

**Wild and Scenic Rivers: Effects from Leasable Minerals Management Actions*****Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor (46,953 acres) would be closed to leasable mineral entry. This measure would contribute to the protection of free-flowing conditions, water quality, wild river classification, and ORVs of this river by limiting the potential for adverse impacts (e.g., contamination, sedimentation, noise, visual) to these attributes from mineral development.

Thirty-eight percent (127,277 acres) of the eligible river corridors would also remain closed to leasable entry under current withdrawals. The remainder of eligible river corridors would be open to mineral entry per the SWMFP (BLM 1981a).

Where eligible rivers are open for leasing, Alternative A would not contribute to the protection of free-flowing conditions, water quality, wild river classification, and ORVs. Where eligible rivers overlap an exclusion zone (e.g., Anvik River), Alternative A would contribute to the protection of these attributes. Direct adverse impacts to eligible rivers from leasable mineral development are expected to be small due to their remote location and association with low mineral potential areas.

Eligible rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a) until a decision on suitability is made. These values would also continue to receive protection through existing federal, State, and local laws.

***Effects under Alternative B***

Under Alternative B, the designated Unalakleet River would be closed to leasing. For suitable corridors, 315,906 acres (95 percent) would be closed to leasing with most of the remainder open to NSO leasing. This management action would result in beneficial direct impacts to the corridors by limiting potential for development that could affect water quality, ORVs, and wild river classification (e.g., contamination, sedimentation, noise, visual).

Direct impacts to suitable WSRs from leasable mineral development actions are expected to be small due to the remote locations of these rivers and their association with areas of low mineral potential. Where these rivers intersected the INHT, management actions to protect the INHT would benefit suitable WSRs by limiting the potential for the same impacts to water quality, ORVs and wild river classification described above (e.g., contamination, sedimentation, noise, visual) from leasable mineral development (see “Wild and Scenic Rivers: Effects from National Trails”). Additionally, suitable rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a).

These values would also continue to receive protection through existing federal, State, and local laws.

### ***Effects under Alternative C***

Impacts from leasable minerals management actions affecting the Unalakleet Wild River Corridor would be the same as described for Alternative B.

Under Alternative C, eligible rivers would be determined to be not suitable and eliminated from further consideration for inclusion in the National System. NSO leasing would be permitted in 294,587 acres of these areas, while standard leasing would be permitted in the remaining 36,532 acres. Adverse impacts to these rivers from leasable mineral development (lessening of wild character, increased surface disturbance leading to reductions in water quality and fisheries ORVs) are expected to be small given their locations in areas of low mineral potential.

The ORVs for which these rivers were recognized could be protected through other management actions (e.g. HVWs), and also in locations where the vacated study corridors intersect the INHT NTMC (see “Wild and Scenic Rivers: Effects from National Trails”). These values would also continue to receive protection through existing federal, State, and local laws.

### ***Effects under Alternative D***

Under Alternative D, eligible rivers would be determined to be not suitable and eliminated from further consideration for inclusion in the National System. NSO leasing would be permitted in 9,824 acres of these areas, while leasing subject to standard stipulations would be permitted in the remaining 321,296 acres. This alternative would be least protective of ORVs in currently eligible corridors.

## **Wild and Scenic Rivers: Effects from Lands and Realty Management Actions**

This analysis considered ROW decisions that would be triggered either by WSR actions or by other management actions, such as those stemming from the INHT NTMC or ACEC designations. This means that even under Alternatives C and D, where the currently eligible waterways would have no special WSR designation, the wild character and/or fishery and cultural ORVs of parts of the rivers would receive some additional protections. Table 3.9.3-4 summarizes the approximate acreages affected; the effects are discussed in the sections below.

**Table 3.9.3-4: WSR Intersections with ROW Actions**

Watercourse	ROW Zone	Acres under A	Acres under B	Acres under C	Acres under D
Anvik River	Exclusion	0	61,100	0	0
	Avoidance	0	0	60,057	59,589
Bear Creek (Nikolai)	Exclusion	0	17,224	0	0
	Avoidance	0	0	16,453	15,922
Big River	Exclusion	0	21,859	0	0
	Avoidance	0	0	21,315	21,315
Blackwater Creek	Exclusion	0	7,617	0	0
	Avoidance	0	0	198	198
Canyon Creek	Exclusion	0	8,233	0	0
	Avoidance	0	0	8,233	8,186
Middle Fork Kuskokwim	Exclusion	0	23,212	0	0
	Avoidance	0	0	19,858	19,858
North Fork Unalakleet	Exclusion	0	28,987	0	0
	Avoidance	0	0	28,568	28,396
Otter Creek (Anvik)	Exclusion	0	21,130	0	0
	Avoidance	0	0	19,968	19,968
Otter Creek (Tuluksak)	Exclusion	0	3,247	0	0
	Avoidance	0	0	3,218	3,218
Pitka Fork Middle Fork Kuskokwim River	Exclusion	0	24,921	0	0
	Avoidance	0	0	22,833	22,069
Salmon River (Nikolai)	Exclusion	0	10,536	0	0
	Avoidance	0	0	10,536	10,269
Sheep Creek	Exclusion	0	15,861	0	0
	Avoidance	0	0	1,708	121
Sullivan Creek	Exclusion	0	9,192	0	0
	Avoidance	0	0	9,192	9,123
Swift River (Anvik)	Exclusion	0	16,381	0	0
	Avoidance	0	0	16,381	16,381
Tatlawiksuk River	Exclusion	0	8,975	0	0
	Avoidance	0	0	8,792	8,792
Theodore Creek	Exclusion	0	7,384	0	0
	Avoidance	0	0	7,308	514
Unalakleet Designated WSR	Exclusion	0	46,953	0	0
	Avoidance	0	0	46,953	46,953
Yellow River	Exclusion	0	28,409	0	0
	Avoidance	0	0	27,680	27,478
Yukon River	Exclusion	0	18,903	0	0
	Avoidance	0	0	13,336	7,801
<b>Total</b>	<b>Exclusion</b>	<b>0</b>	<b>378,073<sup>1</sup></b>	<b>0</b>	<b>0</b>
	<b>Avoidance</b>	<b>0</b>	<b>0</b>	<b>341,540<sup>1,2</sup></b>	<b>325,095<sup>1</sup></b>
Notes:					
<sup>1</sup> 1,057 acres of the eligible North Fork Unalakleet overlaps with the designated Unalakleet River. This acreage is only counted once.					
<sup>2</sup> 313,144 acres are designated ROW Avoidance, and 28396 acres are designated Avoidance for Linear Realty Actions					



***Effects under Alternative A***

No current management direction for eligible or designated WSRs exists for ROW exclusion and avoidance areas under Alternative A. Lands within the Unalakleet Wild River Corridor would continue to be retained by the BLM.

Under Alternative A, free-flowing condition, water quality, wild river classification, and river values of the Unalakleet Wild River Corridor would continue to be protected under the Unalakleet National Wild River Management Plan (BLM 1983) and mandates of the WSR Act. These WSR attributes of eligible rivers would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012). These values would also continue to receive protection through existing federal, State, and local laws.

***Effects Common to All Action Alternatives***

Lands within the Unalakleet Wild River Corridor would be retained under all action alternatives.

***Effects under Alternative B***

Under Alternative B, 46,953 acres within the Unalakleet Wild River Corridor and the 18 rivers within the planning area (332,176 acres) proposed as suitable for inclusion in the National System would be designated as ROW exclusion areas subject to ANILCA and valid existing rights. Designation as ROW exclusion zones would beneficially impact the protection of the free-flowing condition, water quality, wild river classification, river values (of the Unalakleet Wild River Corridor), and ORVs by restricting the construction and operation of ROW and potential surface disturbance that could be associated with such action.

Suitable rivers would continue to be managed for free-flowing condition, water quality, tentative classification, and ORVs per BLM (2012a).

***Effects under Alternative C***

Under Alternative C, 46,953 acres within the Unalakleet Wild River Corridor would be designated as a ROW avoidance area. Impacts from lands and realty management actions under Alternative C would not be expected to adversely impact the Unalakleet Wild River Corridor, as actions would be required to protect and enhance the free-flowing condition, water quality, wild river classification, and river values of this designated river. The Unalakleet Wild River Corridor would continue to be managed under the Unalakleet National Wild River Management Plan (BLM 1983) and the WSR Act.

Although, under Alternative C, the 18 currently eligible river corridors would no longer have any special WSR designation, 294,587 acres of that area (89 percent of ROW exclusion for B) would be designated ROW avoidance areas on the basis of other management actions, such as those pertaining to ACECs or the INHT NTMC. This would limit surface disturbance that has adverse effects on water quality, fish ORVs, and cultural ORVs. The free-flowing and wild attributes of the currently eligible corridors would not be prioritized.

***Effects under Alternative D***

Under Alternative D, impacts from lands and realty management actions within the Unalakleet Wild River Corridor would be the same as described for Alternative C, but the ROW avoidance area from other management directives would be smaller. Under Alternative D, 278,142 acres of currently eligible river corridors (84 percent of ROW exclusion for B) would be designated ROW avoidance areas on the basis of

other management actions, such as those pertaining to the INHT NTMC. This would limit surface disturbance that has adverse effects on water quality, fish ORVs, and cultural ORVs. The free-flowing and wild attributes of the currently eligible corridors would not be prioritized.

### **Wild and Scenic Rivers: Effects from Travel and Transportation Management Actions**

In addition to management actions common to all action alternatives, potential impacts from the Unalakleet Wild River Corridor Travel Management Decisions were considered.

#### ***Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor would be continued to be managed per 43 CFR 36.11, which prohibits casual OHV use. There would be no restrictions for rivers within the planning area identified as eligible for WSR designation. Impacts to eligible WSRs could result if OHV use continued to increase in the planning area and/or impacts were exacerbated from OHV use during permafrost thaw. Alternative A would not contribute to protection of free-flowing character, water quality, wild river classification, or protection of ORVs.

#### ***Effects under Alternative B***

Under Alternative B, casual summer OHV access to the Unalakleet Wild River Corridor would be prohibited. Subsistence summer OHV access would be limited to existing trails, primitive roads, and roads and would include ATVs only. Winter cross-country OHV access would be allowed for snowmobiles only. These actions would contribute to the protection of water quality, wild river classification, and river values associated with the Unalakleet Wild River Corridor by minimizing impacts from sedimentation, damage to riparian resources, or creation of OHV ruts within the corridor.

Under Alternative B, no protections would be applied to study corridors for those rivers identified as suitable for inclusion in the National System. These areas would be managed per guidelines provided in BLM Manual 6400 (BLM 2012). The Unalakleet Wild River Corridor and suitable rivers would continue to receive protection from existing federal, State, and local laws.

#### ***Effects under Alternative C***

Under Alternative C, casual summer OHV access to the Unalakleet Wild River Corridor would be limited to existing trails, primitive roads, and roads (as shown in the BLM's current route inventory) and would include ATVs only. Subsistence cross-country summer OHV access would be allowed and would include ATVs only. Winter cross-country OHV access would be allowed for snowmobiles only. As with Alternative B, BLM-managed lands near rivers identified as eligible for WSR designation would be subject to the travel and transportation management decisions in the SWMFP. While the seasonal access and vehicle use restrictions under Alternative C would be less restrictive than those described for Alternative B, impacts to the Unalakleet Wild River Corridor from travel and transportation management actions under Alternative C would still be relatively small because of the remoteness of these areas and the low demand for increased OHV use.

The Unalakleet Wild River Corridor and vacated study rivers would continue to receive protection from existing federal, State, and local laws.

***Effects under Alternative D***

Under Alternative D, casual summer OHV access to the Unalakleet Wild River Corridor would be limited to existing trails, primitive roads, and roads (as shown in the BLM's current route inventory) and would include both UTVs and ATVs. Subsistence cross-county summer OHV access would be allowed and would include both UTVs and ATVs. Winter cross-county OHV access would be allowed and would include snowmobiles. While the seasonal access and vehicle use restrictions under Alternative D would be less restrictive than those described for Alternatives B and C, impacts to the Unalakleet Wild River Corridor from travel and transportation management actions under Alternative D would still be relatively small because of the remoteness of these areas and the low demand for increased OHV use.

The Unalakleet Wild River Corridor and vacated study rivers would continue to receive protection from existing federal, State, and local laws.

**Wild and Scenic Rivers: Effects from Areas of Critical Environmental Concern Management Actions**

In addition to management actions common to all action alternatives, potential impacts from ACEC-specific designations and their overlap with WSR study corridors were considered.

Table 3.9.3-5 summarizes the WSR intersections with ACECs.

**Table 3.9.3-5: WSR Intersections with ACECs**

<b>Watercourse</b>	<b>Alternative A Acres</b>	<b>Alternative B acres</b>	<b>Alternative C acres</b>	<b>Alternative D Acres</b>
Anvik River	61,100	56,500	0	0
Bear Creek (Nikolai)	0	17,224	0	0
Big River	0	21,859	0	0
Blackwater Creek	0	7,617	0	0
Canyon Creek	0	0	0	0
Middle Fork Kuskokwim	0	23,212	0	0
North Fork Unalakleet	0	28,209	0	0
Otter Creek (Anvik)	400	375	0	0
Otter Creek (Tuluksak)	0	0	0	0
Pitka Fork Middle Fork Kuskokwim River	0	24,625	0	0
Salmon River (Nikolai)	0	10,213	0	0
Sheep Creek	0	15,861	0	0
Sullivan Creek	0	9,192	0	0
Swift River (Anvik)	200	600	0	0
Tatlawiksuk River	0	0	0	0
Theodore Creek	1,000	600	0	0
Unalakleet Designated WSR	0	45,633	0	0
Yellow River	80	0	0	0
Yukon River	0	0	0	0

***Effects under Alternative A***

The Unalakleet Wild River Corridor is fully located within the boundaries of the existing Drainages of the Unalakleet River ACEC. Although management actions associated with the WSR would take precedence over those assigned to the ACEC, direct beneficial impacts to the Unalakleet Wild River Corridor could result from added protection of ORVs for fisheries, as the ACEC occupies a larger geographic area than the designated corridor, with more of a watershed approach to management.

Under Alternative A, direct beneficial impacts to eligible WSRs would result from overlap with existing ACECs, where ORVs correspond to the relevant and important values for which the ACEC was designated. Beneficial impacts would be greatest where overlapping acreage is the largest. Acreage values listed in Table 3.9.3-6 are based on GIS layers and should be considered approximate. Table 3.9.3-6 summarizes the intersections of eligible WSRs with existing ACECs.

**Table 3.9.3-6: Intersections of Eligible WSRs with Existing ACECs (Alternative A)**

Watercourse	Existing ACEC	Eligible River Miles in ACEC	Percent of Eligible Waterway in ACEC	Size of ACEC (acres)
Anvik River	Anvik	118	99%	114,386
North Fork Unalakleet	Drainages of the Unalakleet	48	100%	403,378
Otter Creek (Anvik)	Anvik	Less than 2	4%	114,386
Swift River (Anvik)	Anvik	Less than 2	4%	114,386
Theodore Creek	Anvik	Less than 4	24%	114,386
Yellow River	Anvik	3	4%	114,386

***Effects under Alternative B***

Impacts to the Unalakleet Wild River would be the same as described under Alternative A, although it would intersect with the potential Unalakleet Watershed ACEC rather than the existing Drainages of the Unalakleet ACEC.

Under Alternative B, eligible rivers would be considered as suitable for inclusion in the National System. Direct beneficial impacts of overlap of suitable rivers with potential ACECs would result from added protection of relevant and important values for fish and/or cultural resources, as applicable, if the ACECs are designated. Table 3.9.3-7 summarizes the suitable WSR intersections with potential ACECs.

**Table 3.9.3-7: Suitable WSR Intersections with Potential ACECs (Alternative B)**

Watercourse	Potential ACEC	Eligible River Miles in Potential ACEC	Percent of Eligible Waterway in ACEC	Size of Potential ACEC (acres)
Anvik River	Anvik River Watershed	117	98%	248,872
Bear Creek (Nikolai)	Sheefish	41	100%	696,902
Big River	Sheefish	35	100%	696,902
Blackwater Creek	Sheefish	12	100%	696,902
Canyon Creek	Anvik River Watershed	Less than 1	Less than 1%	248,872
Middle Fork Kuskokwim	Sheefish	52	100%	696,902
North Fork Unalakleet	Unalakleet Watershed	39	81%	733,995
Otter Creek (Anvik)	Anvik River Watershed	Less than 1	Less than 1%	248,872
Pitka Fork Middle Fork Kuskokwim River	Sheefish	61	98%	696,902

Watercourse	Potential ACEC	Eligible River Miles in Potential ACEC	Percent of Eligible Waterway in ACEC	Size of Potential ACEC (acres)
Salmon River (Nikolai)	Sheefish	20	95%	696,902
Sheep Creek	Sheefish	36	100%	696,902
Sullivan Creek	Sheefish	22	100%	696,902
Swift River (Anvik)	Anvik River Watershed	Less than 1	Less than 1%	248,872
Theodore Creek	Anvik River Watershed	Less than 1	Less than 1%	248,872

### ***Effects under Alternative C***

Under Alternative C, no ACECs would be designated and eligible rivers would not be carried forward for inclusion in the National System. Therefore; there would be no impacts from ACEC management to designated or eligible rivers under Alternative C, and the wild or free-flowing character of the currently eligible waterways would not receive protections under Alternative C.

### ***Effects under Alternative D***

Under Alternative D, the eligible rivers would retain no special management designation. The Unalakleet Wild River Corridor would continue to be managed under the Unalakleet National Wild River Management Plan (BLM 1983) and the WSR Act. The Unalakleet Wild River Corridor and vacated study rivers would continue to receive protection from existing federal, State, and local laws.

## **Wild and Scenic Rivers: Effects from National Trails Actions**

### ***Effects under Alternative A***

Under Alternative A, no INHT NTMC would be established and, consequently, there would be no beneficial direct impacts to WSRs from management actions associated with this designation.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, a NTMC would be established in three geographically distinct areas: Kaltag Portage, Farewell Burn, and Rohn. The Unalakleet Wild River Corridor would intersect the Kaltag Portage in all action alternatives, with the only difference being the number of acres allocated across each of the alternatives. Under all action alternatives, lands within the WSR corridor are managed per equal or more restrictive management actions. Consequently, there would be no impact from management of NHTs.

### ***Effects under Alternative B***

Under Alternative B, the entire Unalakleet Wild River Corridor (46,953 acres) would intersect the INHT NTMC in the Kaltag Portage segment. Because the WSR entails more restrictive management actions than the NTMC, there would be no impact to the Unalakleet Wild River Corridor from management actions associated with NHTs, as described in the section “Effects Common to All Action Alternatives” above.

Under Alternative B, study corridors for rivers identified as suitable for inclusion in the National System also intersect the NTMC, for approximately 5,012 acres in the Kaltag Portage Segment (North Fork of the

Unalakleet) and 25,090 acres in the Farewell Burn Segment (Pitka Fork Middle Fork Kuskokwim River), Salmon River (Nikolai), Bear Creek (Nikolai), and Sheep Creek.

In the portions of these study rivers that overlap the INHT corridor, study rivers would receive protections from mineral decisions, and surface disturbance that could result in direct impacts to study rivers by protecting water quality, ORVs, and wild river classification (see Section 3.8, “National Trails”). Rivers recommended as suitable for inclusion in the National System would also continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012) and existing federal, State, and local laws.

### ***Effects under Alternative C***

Under Alternative C, the entire Unalakleet Wild River Corridor (46,953 acres) would intersect the INHT NTMC. There would be no impact to the Unalakleet from management actions associated with NHTs, as described in the section “Effects Common to All Action Alternatives” above.

Under Alternative C, eligible rivers would be determined to be not suitable and eliminated from consideration for the National System. Water quality and ORVs in portions of the vacated study rivers that overlap the NTMC would be protected by land management decisions associated with the INHT NTMC where they intersect the management corridor. Free-flowing condition would not be prioritized. These added protections could result in direct beneficial impacts by protecting water quality, ORVs, and wild river characteristics (see Section 3.8, “National Trails”). Rivers would also continue to be managed per existing federal, State, and local laws.

### ***Effects under Alternative D***

Impacts would be the same as those described for Alternative C.

## **Wild and Scenic Rivers: Effects from Wild and Scenic Rivers Management Actions**

In addition to management actions common to all action alternatives, potential impacts from improvements within the Unalakleet Wild River Corridor (recreation and visitor services actions) were considered.

### ***Effects under Alternative A***

Under Alternative A, the Unalakleet Wild River Corridor would continue to be managed under the SWMFP, the CYRMP, and the Unalakleet National Wild River Management Plan (BLM 1983). The SWMFP excludes the WSR corridor from oil and gas leasing and other types of entries (BLM 1981a). The SWMFP also includes the goal to “identify and recommend for designation any rivers in the planning area that are suitable for designation as components of the National WSR System.” This goal was accomplished as part of the BSWI RMP planning process through the WSR Study (BLM 2018b). Management direction in the Unalakleet National Wild River Management Plan (BLM 1983) includes management actions for subsistence, facilities, visitor management, surface transportation, publicity, private lands (Native allotments), fisheries habitat management, local involvement, navigability, fire management, and cultural resources. Alternative A would protect and enhance the free-flowing condition, water quality, wild river classification and ORVs of the Unalakleet Wild River Corridor based on management objectives and actions provided in the Unalakleet National Wild River Plan (BLM 1983).

Under Alternative A, rivers identified as eligible would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012). These guidelines would protect free-flowing condition, water quality, wild river classification, and ORVs.

### ***Effects Common to All Action Alternatives***

Under all action alternatives, the Unalakleet Wild River Corridor would continue to be managed under the Unalakleet National Wild River Management Plan (BLM 1983). The management objectives would protect and enhance the free-flowing condition, water quality, wild river classification, and ORVs of the Unalakleet Wild River Corridor by improving manageability (through land acquisition); limiting potential for development that could result in visual, noise, or water quality impacts (withdrawals, commercial development, restrictions on air travel); managing resources (prohibiting harvest of house logs except for subsistence use); and maintaining wild character (travel-related decision that maintain semi-primitive motorized travel).

### ***Effects under Alternative B***

Under Alternative B, the Unalakleet Wild River Corridor would continue to be managed under the Unalakleet National Wild River Management Plan (BLM 1983) and as described for Alternative A. Additional restrictions on improvements (landing areas, campsites, interpretive sites, or toilets) and UASs would be applied under Alternative B. Clearing of vegetation near shelter cabins would be limited to the minimum needed for fire protection. These restrictions would ensure that development that could affect the wild river classification would not occur, and that potential noise-related impacts from UASs would not occur. Collectively, these management actions would protect and enhance free-flowing condition, water quality, wild river classification and ORVs.

Rivers identified as eligible for inclusion in the National System would be recommended as suitable under Alternative B. These rivers would continue to be managed per guidelines provided in BLM Manual 6400 (BLM 2012) to protect free-flowing condition, water quality, wild river classification, and ORVs, until a decision is made regarding their inclusion in the National System. In addition, all of the suitable corridors would be managed as VRM Class I. Management of these corridors as VRM Class I would serve as a tool to limit direct impacts to water quality, wild river classification, and ORVs that could result from surface-disturbing activities.

If designated as WSRs, these rivers would be managed as described above for the Unalakleet, which includes restrictions on improvements (landing areas, campsites) and UASs. If designated, these management actions would protect and enhance free-flowing condition, water quality, wild river classification, and ORVs.

Impacts to WSRs from travel management and visual resource management decisions are described in the subsections “Wild and Scenic Rivers: Effects from Travel and Transportation Management,” and “Wild and Scenic Rivers: Effects from Travel and Visual Resource Management.”

### ***Effects under Alternative C***

Under Alternative C, the Unalakleet Wild River Corridor would continue to be managed under the Unalakleet National Wild River Management Plan (BLM 1983) as described for Alternative A. Construction or formal improvement of landing areas, campsites, interpretive sites or toilets would occur only as needed to maintain those facilities for use. These improvements would be compatible with the primitive setting and ORVs for which the WSR was designated and consistent with VRM Class I. As in Alternative B, takeoff and landing of casual use UASs would be prohibited, and administrative use would be permitted on a case-by-case basis. Management actions specific to Alternative C would protect wild river classification and ORVs by limiting development that would change access or character and ensuring protection of ORVs. Collectively, these management actions would protect and enhance free-

flowing condition, water quality, wild river classification, and ORVs of the Unalakleet Wild River Corridor.

Under Alternative C, eligible rivers would be determined to be not suitable and eliminated from further consideration for inclusion in the National System. Water quality and ORVs would continue to receive protections through existing federal, State, and local laws. While not afforded the additional protections provided by a recommendation as suitable or subsequent WSR designation, impacts to these rivers are likely to be limited due to these existing protections and the remoteness of these rivers, which has precluded demand for development of facilities.

Protections for ORVs of fish (all eligible rivers, except the Yukon River), cultural resources (Anvik and Yukon Rivers), and historic resources (Bear Creek [Nikolai], Pitka Fork Middle Fork Kuskokwim River, Salmon River [Nikolai], Swift River [Anvik], and Sullivan Creek) for vacated study rivers would still be applied through existing federal, State, and local laws.

#### ***Effects under Alternative D***

Under Alternative D, the Unalakleet Wild River Corridor would continue to be managed under the Unalakleet National Wild River Management Plan (BLM 1983) as described for Alternative A. Construction or formal improvement of landing areas, campsites, interpretive sites, or toilets would be allowed within the Unalakleet Wild River Corridor if they do not substantively conflict with the ORVs for which the WSR was designated and are compatible with VRM Class I. Management actions specific to Alternative D would protect wild river classification and ORVs by limiting development that would change access or character and evaluating impacts to ORVs on a case-by-case basis.

Under Alternative D, eligible rivers would be eliminated from further consideration for inclusion in the National System. Impacts to these rivers would be identical to Alternative C.

### **Wild and Scenic Rivers: Effects from Support for BSWI Communities Management Actions**

Impacts to WSRs from Support for BSWI Communities are analyzed below and in the following relevant sections:

- “Wild and Scenic Rivers: Effects from Grazing Management Actions”
- “Wild and Scenic Rivers: Effects from Water Resources and Fisheries Management Actions”
- “Wild and Scenic Rivers: Effects from Travel and Transportation Management Actions”
- “Wild and Scenic Rivers: Effects from Forestry and Woodland Products Management Actions”

In addition to management actions common to all action alternatives, potential impacts from Cultural Landscape Reports were considered.

#### ***Effects under Alternative A***

Under Alternative A, land under the SWMFP (1981) is managed per objectives to protect and preserve cultural sites from damage or destruction. No specific management actions are identified; however, the planning area would be managed per existing federal and State laws and regulations developed to protect cultural resources. Existing laws and regulations would contribute to the protection of cultural and historic ORVs. Alternative A would not impact free-flowing condition, water quality, wild river classification, or ORVs of eligible or designated WSRs; however, it would not degrade these values.



***Effects under Alternative B***

Under Alternative B, the BLM would support BSWI villages by working collaboratively with rural communities in the planning area and other partners to develop Cultural Landscape Reports. These documents would utilize traditional and other knowledge to give a contemporary picture of resources uses (cultural, fisheries, and wildlife) and their social and historical context and would help villages in their own planning efforts, as well as allow the BLM and other agencies to assess impacts of proposed projects and plans. Under Alternative B, Cultural Landscape Reports would be developed for 2 to 3 high-priority villages but may not be relevant to the Unalakleet Wild River Corridor or those rivers recommended as suitable for inclusion in the National System if they are not proximate to the high-priority village selected for study.

***Effects under Alternative C***

Under Alternative C, the BLM would also develop Cultural Landscape Reports; this effort would be applied to 4 to 6 high-priority villages in the planning area. Therefore, beneficial impacts to cultural and fisheries ORVs could be greater than Alternative B but may not be relevant to the Unalakleet Wild River Corridor or those rivers recommended as suitable for inclusion in the National System if they are not proximate to the high-priority village selected for study.

***Effects under Alternative D***

Under Alternative D, the BLM would also develop Cultural Landscape Reports; however, this effort would be applied the entire planning area. Cultural Resource Reports would result in beneficial impacts to designated WSRs and those rivers recommended as suitable for inclusion in the National System through increased knowledge and documentation of cultural and fisheries ORVs. Beneficial impacts from development of Cultural Landscape Reports would be higher under Alternative D than Alternatives B or C.

**Wild and Scenic Rivers: Effects from Climate Change Actions**

WSRs could be subject to direct and indirect effects of climate change through changes to the occurrence, quantity, distribution, movement, and quality of water. These changes could affect ORVs for fish by reducing production and survival. Warming trends, permafrost thaw and increases in wildland fire can directly damage or destroy cultural resources, including historic structures, by deepening the active soil layer. Deepening of the active layer (absent erosional forces) promotes decomposition and could adversely affect organic paleontological and cultural materials. Where soils could experience higher rates of erosion, cultural resources could be indirectly impacted as adjacent lands are degraded and subject to more erosional forces. The rate of future erosion is expected to be faster and potentially more damaging. Increased frequency of strong storms also increases shoreline erosion that could directly and adversely affect cultural and paleontological resources.

Climate change is not expected to affect free-flowing condition or river classification of WSRs.

***Effects Common to all Action Alternatives***

WSR management under all alternatives would not counteract potential climate change impacts to water quality, free-flowing conditions, and ORVs of WSRs.

### **Wild and Scenic Rivers: Cumulative Effects**

Currently, the Unalakleet Wild River Corridor is the only designated WSR within the planning area. Management direction for the Unalakleet Wild River Corridor is provided in the Unalakleet National Wild River Management Plan (BLM 1983), which includes specific management actions for subsistence, facilities, visitor management, surface transportation, publicity, private lands (Native allotments), fisheries habitat management, local involvement, navigability, wildland fire management, and cultural resources. These values remain stable for the Unalakleet Wild River Corridor. The levels of activity and demand for access within the Unalakleet Wild River Corridor are expected to remain stable. No existing plans or pressure for increased access to the WSR that could affect its classification as a wild river have been identified. The corridor continues to be used for primitive recreation opportunities, including recreational boating and the Iditarod Race. Historic and archeological values, wildlife/wildlands use, and water quality remains stable largely due to the remoteness of the WSR corridor.

The recently completed BSWI WSR Study (BLM 2018b) identified an additional 18 watercourses within the planning area (primarily tributaries to the Unalakleet, Anvik, and Kuskokwim Rivers) that were determined by BLM to be eligible for inclusion in the National System. Eligible rivers in the planning area were identified for fish, cultural, and historic ORVs. These resources are protected to varying degrees by existing federal, State, and local laws and existing ACEC designations. The rivers are generally remote and currently experience low use and resource pressure.

As part of the WSR Study (BLM 2018b), reasonable foreseeable future uses of these rivers were assessed to determine if these uses would be enhanced, curtailed, or foreclosed. Only one use was identified that could be curtailed or foreclosed if these rivers were designated: the currently permitted Donlin Gold Project pipeline ROW intersects the Big River. If this river were designated as a WSR, it would be managed as a ROW exclusion (Alternative B) or ROW avoidance (Alternative C) zone. WSR values of all rivers would be enhanced by inclusion in the National System; however, this designation would complement existing protections provided by existing federal, State, and local laws.

Table 3.9.3-8 summarizes the effects of the cumulative effects analysis for WSR for all alternatives.

**Table 3.9.3-8: Cumulative Effects Analysis for Wild and Scenic Rivers**

Trends and Forecasts of WSRs in Consideration of Past and Present Actions	Trends and Forecasts of WSRs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of WSRs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of WSRs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of WSRs in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Designated and eligible rivers experience generally low use, with little pressure on water quality, free-flowing condition, wild river character, and ORVs. These qualities are expected to remain stable due to the remoteness of the rivers.</p>	<p>The Unalakleet Wild River would be the only river within the planning area managed as a WSR. In the Unalakleet Wild River, free-flowing condition, wild river classification, ORVs, and water quality would be managed to protect and enhance these attributes.</p> <p>Eligible rivers would continue to receive added protection of these river attributes per BLM (2012a) until a decision on their suitability was made.</p> <p><b>Trend: Continues to improve</b></p>	<p>Inclusion of additional rivers in the National System would ensure that free-flowing condition, wild river classification, ORVs, and water quality were managed to protect and enhance these attributes in a similar manner to the designated Unalakleet Wild River.</p> <p><b>Trend: Continues to improve</b></p>	<p>The Unalakleet Wild River would be the only river within the planning area managed as a WSR. In the Unalakleet Wild River, free flowing condition, wild river classification, ORVs, and water quality would be managed to protect and enhance these attributes.</p> <p>Rivers eliminated from consideration in the National System could benefit from other protections applied to HVWs and/or lands managed as wilderness characteristics as a priority, in addition to management actions for VRM.</p> <p><b>Trend: Stabilizes</b></p>	<p>Protections from other management actions for watershed-level protections would be less than B or C but greater than A. Protections of free-flowing condition and wild character would be less than A, B or C.</p> <p><b>Trend: Stabilizes</b></p>

### **3.10 Support for BSWI Communities**

This section describes the potential impacts on socioeconomics, environmental justice, and support for BSWI communities. A discussion of the existing conditions, which is the basis of this analysis, is found in the BSWI Draft RMP/EIS Appendix M.

#### **3.10.1 Economic Conditions**

##### **Summary**

This section addresses the extent to which the alternatives would affect economic conditions in the planning area, including how management of other resources and resource uses may impact household livelihoods and overall economic viability. Management actions under the alternatives are consistent with BLM's priorities for ensuring energy and economic security for the United States.

##### **Methods of Analysis**

This section provides qualitative analysis of impacts of the alternatives on socioeconomic conditions in the planning area. In particular, the analysis estimates how each alternative would contribute to the rural-mixed economy, including market and non-market values. Given the planning area's strong rural mixed economic composition, it would not be practical or useful to estimate economic effects using IMPLAN or another input-output model. The ratings and qualitative descriptions will be based on considerations of how management actions may influence risk to household livelihoods reliant upon cash and subsistence incomes relative to Alternative A. Public comments and effects to other resources inform the analytical approach, narrowing the scope of indicators to those that may reflect a meaningful measure of change in risk to household livelihoods and community vitality.

##### ***Potential Effects and Indicators***

The types of effects to the rural-mixed economy that could result from management actions in the RMP include effects to market and non-market values (Table 3.10.1-1). Market values include economic conditions defined by such measures as jobs and labor income. Due to the planning area's remote location and the existing low level of infrastructure development, there are few economic development opportunities where communities in the planning area have a competitive advantage. Such opportunities to leverage a competitive advantage are related to unique resource values and recreation opportunities afforded in the planning area. The direct and indirect effects of this project contribute to the economic structure of households and communities in the planning area.

Three general types of management actions that may affect market values or economic development opportunities in the planning area include grazing, minerals management, and the management of special recreation permits. Areas open to grazing would provide opportunities for BSWI communities to take advantage of emerging technologies in the processing, packaging, and distribution of reindeer meat, which would provide new economic development opportunities that create jobs and increase labor income in rural communities. Withdrawals or closures of areas from locatable, leasable, and saleable mineral development would restrict the utilization of marketable resources in these areas and therefore limit future economic development opportunities. Restrictions placed on SRPs related to where guide outfitters are allowed to operate in relation to communities and may affect the amount of expenditures in rural communities and hiring of local residents for support services. This may in turn affect the number of job opportunities and the amount of labor income in local communities.

Non-market values considered in the socioeconomic analysis relate to subsistence resource values that contribute to household incomes and to some extent reduce monetary household income requirements needed to provide for food, clothing, shelter, and heat. Management actions that reduce risks to natural resource conditions important to support the maintenance and reproduction of subsistence resources may reduce risks to subsistence incomes. Management actions, such as the designation of wildlife protection areas, HVWs, WSRs, ACECs, and caribou avoidance areas, protect terrestrial and aquatic habitats that contribute to sustaining subsistence resources.

It is not only the effects on the maintenance and reproduction of subsistence resources that is considered in this analysis but also how management actions may affect access to subsistence resources. Barriers to access that may be affected by management actions would be those that would affect the distance required to access subsistence resources, as this would affect the income requirements of households related to fuel costs to procure subsistence resources. This may be a considerable barrier for some households given the high cost of fuel in the planning area and the large percentage of household classified as low-income.

Management actions that may affect access to subsistence resources in this respect include designations affecting where OHV and OSV travel is allowed, where subsistence woodland gathering is allowed, and where outfitter-guides are allowed to operate in relation to communities. In respect to SRP administration, management actions that reduce the potential for competition between resident and visitor populations for subsistence resources near villages may reduce the potential travel requirements and associated costs for securing subsistence resources. In summary, management actions that reduce risk to terrestrial and aquatic habitats, do not hinder travel and transportation, and reduce competition for subsistence resources would have a positive effect on subsistence incomes within the planning area.

**Table 3.10.1-1: Summary of Effects to Economic Conditions by Management Action\*\*\***

Type of Effects	Management Action	Indicators
<b>Non-Market Values</b>		
Protection of sensitive areas that support the reproduction and maintenance of subsistence resources would reduce risks to subsistence incomes.	Designation of wildlife protection areas	<ul style="list-style-type: none"> <li>• Acres of Innoko Bottoms Priority Wildlife Habitat Area</li> <li>• Acres of caribou connectivity corridors</li> </ul>
	Designation of HVWs	<ul style="list-style-type: none"> <li>• River miles of HVW</li> </ul>
	Proposed WSRs	<ul style="list-style-type: none"> <li>• Acres of WSR designations</li> </ul>
	Designation of ACECs	<ul style="list-style-type: none"> <li>• Acres of ACECs</li> </ul>
	Lands with Wilderness characteristics	<ul style="list-style-type: none"> <li>• Acres of lands managed to protect wilderness characteristics as a priority</li> </ul>
Unrestricted domestic grazing in sensitive areas that support the reproduction and maintenance of subsistence resources would pose risks to subsistence resources.	Areas closed to grazing	<ul style="list-style-type: none"> <li>• Acres open for commercial grazing</li> </ul>

Type of Effects	Management Action	Indicators
Management of SRP Permittees may affect competition for subsistence resources near villages, which in turn may affect access to subsistence resources and/or increase the economic burden on households in terms of increased fuel costs due to greater distances travelled to secure subsistence resources.	SRP management and administration	<ul style="list-style-type: none"> <li>• Authorization of Special Recreation Permits within Community Focus Zones.</li> </ul>
Affects availability and ease of access to subsistence resources, such as firewood, which reduces household costs for heating oil.	Personal use and subsistence woodland harvest areas	<ul style="list-style-type: none"> <li>• Acres of woodland harvest land open for subsistence use</li> <li>• Percent of land where commercial woodland harvest is permitted</li> <li>• Permit requirements for subsistence collection of woodland harvest</li> </ul>
Affects access to subsistence resources and economic burden on households related to fuel costs.	Travel and transportation management	<ul style="list-style-type: none"> <li>• Acres where summer subsistence OHV is prohibited.</li> <li>• Acres where summer subsistence OHV access is limited to existing trails.</li> <li>• Acres where winter subsistence use (snowmobiles only) is allowed</li> </ul>
<b>Market Values</b>		
Factors influencing economic development opportunities and related jobs and labor income that may be generated.	FLPMA Withdrawals Lands open/closed to leasable mineral development Lands open/closed to salable mineral development	<ul style="list-style-type: none"> <li>• Acres of land withdrawn to locatable minerals</li> <li>• Acres of land closed to leasable minerals</li> <li>• Acres of land closed to salable minerals</li> </ul>
Lands where domestic grazing is allowed will create economic development opportunities providing jobs and labor incomes for rural communities.	Areas open to grazing	<ul style="list-style-type: none"> <li>• Acres open for commercial grazing</li> </ul>
SRP permit administration that would allow outfitter guides who have demonstrated consideration of community relations and are allowed to operate within 10 miles of villages may increase the likelihood of expenditures in rural communities and hiring of local residents for support services and may thereby increase opportunities for jobs and labor income in local communities.	SRP management and administration	<ul style="list-style-type: none"> <li>• Authorization of SRPs within 10-mile radius of communities</li> </ul>

***Assumptions***

The following assumptions were used to assess impacts associated with economic conditions in the planning area:

- The BLM has the potential to contribute to economic activity in the planning area through management actions that allow or restrict access to the rural mixed economy.

- Subsistence incomes are not included in measures that assess poverty or low-income status. Subsistence incomes include but are not limited to food, safe drinking water, shelter, and heating fuel.
- In households that are highly reliant upon subsistence incomes some level of cash income is required to purchase capital and consumable goods, such as snowmobiles and fuel, which support subsistence incomes.
- The alternatives may differ in terms of their risk reduction to non-market resources, such as reduction in risk to wildlife and fisheries habitats. These resources are valued, but not bought or sold through markets.
- Direct and indirect effects from management actions on subsistence and cash incomes are speculative, and as such, are described in terms of changes in likelihood or risk.
- Management actions that would reduce the likelihood of direct competition for subsistence resources on BLM-managed lands among visitors and residents of the planning area near villages would reduce risks to subsistence incomes.
- People classified as living in poverty are disproportionately affected by increases in the amount of fuel required to access subsistence resources.
- It is assumed that the closer to rural communities that commercial game hunting is allowed, the higher the likelihood of job creation and increased labor income in rural communities.
- It is assumed that the closer to rural communities that commercial game hunting is allowed, the higher the likelihood for increased competition for subsistence game species and therefore increased risk to subsistence incomes in rural communities.

### ***Standard Operating Procedures and Best Management Practices***

The effects analysis below takes into account SOPs and BMPs that could be implemented by the BLM (see the BSWI RMP/EIS). Several examples are presented below. The SOPs or BMPs most important for reducing risk of adverse impacts to economic conditions include the following:

- The permit of a Special Recreation Permittee convicted of trespass or subject to a civil judgment in trespass where the trespass occurred while under a BLM SRP may be suspended.
- Pipelines and roads will be designed to allow the free movement of wildlife and the safe, unimpeded passage of the public while participating in traditional subsistence activities. Listed below are the currently accepted design practices:
  - Aboveground pipelines will be elevated a minimum of 7 feet as measured from the ground to the bottom of the pipeline at vertical support members.
  - In areas where facilities or terrain may funnel caribou movement, ramps over pipelines, buried pipelines, or pipelines buried under roads may be required by the AO after conferring with federal, State, and local government regulatory and resource agencies as appropriate, based on agency legal authority and jurisdictional responsibility.
  - Where feasible, road and pipelines should be co-located.

### **Effects Analysis**

Management actions proposed for Air Quality, Wildland Fire, Paleontological Resources, and Visual Resources would not result in a measurable impact to economic conditions that differ by alternative;

however, each would contribute to the sustained flow of benefits and services associated with market and non-market resources.

***Economic Conditions: Effects to Non-Market Values from Cultural Resources***

**Effects Common to All Alternatives**

All alternatives would include management measures to support partnerships with Native corporations, State of Alaska, tribes, and private landowners for the documentation, stewardship and protection of cultural resources. The preservation of cultural resources may indirectly affect sustaining subsistence incomes by protecting historic and contemporary cultural uses of the landscape that help inform the foundation of traditional livelihood strategies and the cultural values associated with them.

***Economic Conditions: Effects to Non-Market Values from Soils***

**Effects Common to All Alternatives**

All alternatives would adopt management activities to protect permafrost and mitigate surface-disturbing activities. Damage to permafrost is expected to increase costs associated with infrastructure maintenance and repair. Permafrost carbon feedback – that is, carbon released from permafrost that contributes to accelerated climate change – is expected to contribute to global economic costs, including infrastructure damage, changes in agricultural productivity, and adverse human health effects.

***Economic Conditions: Effects to Non-Market Values from Non-native Invasive Species***

**Effects Common to All Alternatives**

Under all alternatives, permittees would be responsible for eradication costs of NNIS introduced by their permitted activity. Permittees must also use certified weed-free materials. These management actions would increase operating costs for permittees but would decrease risks to non-market values from nonnative invasive species management. There is no variation in NNIS management actions across alternatives.

***Economic Conditions: Effects to Market Activity from National Trails***

**Effects Common to All Alternatives**

All alternatives establish the INHT NTMC in the planning area. The INHT NTMC provides recreational, cultural, and transportation opportunities in the planning area. The non-market values of the INHT NTMC—identified in the trail’s “nature and purpose” document as including cultural, historic, and ecological values—would be protected under all alternatives. Market activity due to INHT NTMC would continue and be the same under all the alternatives.

***Economic Conditions: Effects to Market and Non-Market Values from Grazing***

While recent history has shown that domestic grazing has not directly or indirectly affected market or non-market values in the planning area, new efforts to address limiting factors related to infrastructure needs that would support commercial grazing are being developed that address these barriers and may afford market opportunities for domestic reindeer grazing.



**Effects under Alternative A**

Alternative A would provide the greatest amount of opportunity for grazing and would provide the greatest likelihood of contributing to the creation of jobs and increased labor income from grazing for communities in the planning area. Conversely, Alternative A, while providing the greatest opportunity for grazing, would also pose the greatest amount of risk of resource degradation, such as impacts to water quality and therefore would have the highest risk to subsistence values reliant upon high water quality.

**Effects under Alternative B**

Alternative B closes all BLM-managed public lands within the planning area to grazing and would therefore not afford communities the opportunity to use these lands for domestic reindeer grazing. Alternative B would not contribute to the creation of jobs or increase labor income for communities in the planning area from grazing. Conversely, Alternative B would provide the greatest level of assurance of risk reduction to subsistence values from potential resource impacts related to grazing.

**Effects under Alternative C**

Alternative C would provide for grazing opportunities and could contribute to the creation of jobs and increased labor income but less so than Alternatives A and D. Alternative C, however, would limit where grazing is permitted to locations where ecological conditions could support grazing and ensure separation between domestic and wild animals, thereby avoiding adverse effects to resource conditions and risks to subsistence resources. This is the only alternative in which a substantial amount of acreage (HVWs) is closed until standards are developed for appropriate use.

**Effects under Alternative D**

Alternative D provides the greatest amount of land where grazing is permitted and thereby provides the greatest opportunity for the creation of jobs and increasing labor income due to grazing activities. Alternative D would allow for grazing in specially designated areas, such as the Unalakleet WSR corridor and the INHT NTMC, however, the proposed grazing must be consistent with maintaining the resource values for which they were designated. Alternative D would pose the highest risk of all the alternatives to resource conditions that may impact subsistence resources given that protecting resource conditions will be dependent upon careful consideration in permit administration, monitoring of grazing impacts to outstanding resource values and effective enforcement or adaptive management response should violations occur. Without a grazing management plan or range management plan, evaluating proposed permits and effectively administering grazing permits that would not put sensitive subsistence resources at risk within the Unalakleet WSR corridor would be challenging. In addition, Alternative D has the highest utilization rate of the action alternatives. At 75 to 100 percent of primary forage species utilized, Alternative D may have adverse impacts to soils causing erosion and sedimentation of water resources resulting to impacts to fisheries habitat, which could adversely affect the maintenance of subsistence resources.

***Economic Conditions: Effects to Non-Market Values from Water Resources and Fisheries Habitat***

Table 3.10.1-2 summarizes acres of HVW by alternative. Associated impacts to non-market values from water resources are described in the subsections below.

**Table 3.10.1-2: River Miles of HVW by Alternative**

Management Decision	Alternative A	Alternative B	Alternative C	Alternative D
HVW – Medium Value	0	6,494	0	0
HVW – Medium - High Value	0	1,906	1,906	0
HVW – High Value	0	12,982	12,982	12,982

**Effects Common to All Alternatives**

All alternatives would follow total maximum daily load recommendations on 303(d) listed streams, incorporate best management practices and floodplain buffers, and manage fisheries for self-sustaining populations of priority species. All alternatives are expected to support non-market values associated with clean water and fish for subsistence and recreational use.

**Effects under Alternative A**

Alternative A would not define any criteria to identify or propose HVW. No HVWs are identified in Alternative A to protect water or fish resource values. Alternative A does, however, include roughly 10 percent of the planning area designated as ACECs, which provides some protection for water and fish resources. Alternative A would pose the greatest risk to non-market values associated with water resources and fisheries from surface-disturbing activities.

**Effects under Alternative B**

Alternative B includes the broadest criteria for identifying three levels of HVW, which results in the largest number of acres of HVW at approximately 21,000 river miles. This alternative would enhance reclamation requirements for mining and buffers for surface-disturbing activities within the 100-year floodplain across the entire planning area. Alternative B would close salable mineral development and recommend withdrawal from locatable mineral entry within HVW. Alternative B would not permit commercial woodland harvest on public lands managed by the BLM within the Unalakleet Wild River Corridor, 100-year floodplains within HVW, lands managed for wilderness character as a priority, INHT NTMC, or ACECs. Alternative B provides the greatest reduction of risk to water quality and the fishery resource that are vital to non-market values in the planning area.

**Effects under Alternative C**

Alternative C includes criteria for identifying HVW, which results in the second largest number of acres of HVWs and approximately 15,000 river miles. This alternative would enhance reclamation requirements for mining and buffers for surface-disturbing activities within the 100-year floodplain within HVWs, which is less than Alternative B. HVWs would be open to salable and locatable mineral development under Alternative C. Alternative C would allow commercial woodland harvest on a case-by-case basis, which would provide for a site-specific analysis prior to allowing development, which would help minimize impacts in HVWs from commercial woodland harvest, but to a lesser extent than Alternative B. Overall, Alternative C provides less resource protection to protect water quality and the fishery resource than that of Alternative B, however, it provides more than Alternatives D in respect to reducing risk to non-market values in the planning area.

### **Effects under Alternative D**

Alternative D includes criteria for identifying HVW, which results in approximately 13,000 river miles of HVWs, the least among the action alternatives but more than Alternative A. Related to mineral development, Alternative D does not require that a plan for water recycling be submitted, nor is concurrent reclamation required prior to developing a new area. Therefore, Alternative D would not reduce risk to water quality or fishery habitat to the same degree as Alternatives B and C. Surface disturbance would be allowed within the 100-year floodplain subject to case-by-case interpretation on requirement to “minimize sediment delivery.” Alternative D provides for the most flexibility for mining operations; it is the only action alternative that allows for suction dredging within HVW on a case-by-case basis. Alternative D does not include any restrictions on commercial woodland harvest within the 100-year floodplain of HVW, or the Unalakleet Wild River Corridor. Alternative D allows for the greatest amount of disturbance and would pose the greatest risk to water quality and fish resources of all of the action alternatives and provides only slightly more protection to non-market values than does Alternative A.

### ***Economic Conditions: Effects to Non-Market Values from Wildlife***

Table 3.10.1-3 summarizes acres of wildlife habitat for important subsistence game species by alternative. Associated impacts to non-market values from wildlife are described in the subsections below.

**Table 3.10.1-3: Wildlife Habitat for Important Subsistence Game Species**

<b>Wildlife Habitat</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Connectivity Corridors	--	845,670	576,038	--
Innoko Bottoms Priority Wildlife Habitat Area	--	236,556	236,556	236,556

### **Effects under Alternative A**

Alternative A would continue current management related to wildlife habitat, of which there is little explicit management direction on habitat for important subsistence species such as caribou and moose. Alternative A would be less likely to protect priority wildlife habitat areas, as such, disturbance to wildlife habitat is more likely under Alternative A compared to the action alternatives. Disturbance to wildlife habitat may affect non-market values associated with wildlife, including existence values and opportunities for subsistence, recreational hunting, and wildlife viewing.

### **Effects under Alternative B**

Alternative B would provide the greatest level of resource protection for priority wildlife habitat areas through the designation of connectivity corridors and the Innoko Bottom Priority Wildlife Habitat Area. Conservation of habitat would be prioritized by pursuing withdrawal from locatable mineral entry, closing the area for salable mineral development, and having NSO requirements for surface-disturbing BLM-permitted activities. Alternative B also outlines explicit management direction for travel management and ROW exclusions within wildlife habitat areas. The management direction within Alternative B provides the greatest restrictions on activities that could disturb wildlife habitat as compared to the other action alternatives. This alternative would be the most likely of the alternatives to protect wildlife habitat for species important for subsistence, recreation, and wildlife viewing.

**Effects under Alternative C**

The effects under Alternative C would be the same as those described under Alternative B for the Innoko Bottoms Priority Wildlife Habitat Area. However, Alternative C would only manage one connectivity corridor and would allow locatable mineral development and salable mineral development on a case-by-case basis. Additionally, it would not restrict construction in moose and caribou essential winter habitat areas, nor does it exclude any ROWs but rather identifies these as ROW avoidance areas. Alternative C reduces risks to priority wildlife habitat for subsistence game species through limiting activities in these areas more than Alternative A and D, but less so than Alternative B.

**Effects under Alternative D**

Alternative D would adopt fewer restrictions on surface-disturbing activities near wildlife habitat than Alternatives B and C. Alternative D does not provide management direction explicit for connectivity corridors, nor does it provide seasonal limitations on construction in moose and caribou calving and essential winter habitats. Management direction for the Innoko Bottoms Priority Wildlife Habitat Area, however, is consistent with the direction in Alternative C. This alternative would pose a higher risk to non-market values for opportunities for subsistence hunting than the other action alternatives given that disturbance in crucial reproductive periods is not restricted and that the connectivity corridors are not identified as ROW exclusion or avoidance areas.

***Economic Conditions: Effects to Non-Market Values from Lands with Wilderness Characteristics*****Effects under Alternative A**

Alternative A would not address lands with wilderness characteristics. This alternative would not actively conserve non-market values associated with wilderness characteristics.

**Effects under Alternative B**

Alternative B would manage 277,489 acres to protect wilderness characteristics as a priority and 12.0 million acres would be managed to emphasize other resource values while applying management restrictions to reduce impacts to wilderness characteristics. This alternative would manage the largest share of the planning area for wilderness characteristics. Wilderness characteristics support non-market values related to maintaining the naturalness of an area and opportunities for solitude. Due to the remoteness and very low population density across the planning area, opportunities for solitude are abundant.

**Effects under Alternative C**

Alternative C would not manage any lands to protect wilderness characteristics as a priority. Approximately 8.1 million acres would be managed to emphasize other resource values while applying management restrictions to reduce impacts to wilderness characteristics. This alternative would manage the second-largest share of the planning area to reduce impacts to wilderness characteristics. Wilderness characteristics support non-market values the naturalness of an area and opportunities for solitude. However, due to the remoteness and very low population density across the planning area, opportunities for solitude are abundant.

### **Effects under Alternative D**

Alternative D would not manage any lands for wilderness characteristics. The effects of this alternative would be consistent with Alternative A.

### ***Economic Conditions: Effects to Market Activity from Locatable, Salable, and Leasable Minerals***

Table 3.10.1-4 below summarizes acres of land open to mineral entry by alternative. Associated impacts to non-market values from locatable, salable, and leasable minerals are described in the subsections below.

**Table 3.10.1-4: Acres identified by Alternative as Open to Mineral Entry**

<b>Management Decision</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Open to Locatable Mineral Development	8,661,406	3,623,397	13,418,941	13,418,941
Open to Salable Mineral Development	8,661,406	3,623,397	6,645,750	13,182,385
Open to Salable Mineral Development on a Case-by-Case Basis	0	0	6,536,635	0
Open to Leasable Mineral Development with Standard Stipulations	8,246,152	2,517,414	6,594,906	13,182,385

### **Effects under Alternative A**

Alternative A would maintain existing management direction, including existing withdrawals and lands closed to salable mineral development. As a result of those withdrawals, Alternative A would have more areas open to locatable and salable mineral development than Alternative B but less than Alternative C or D. However; Alternative A would have more acres open to leasable mineral development with standard stipulations than Alternative C and D. Areas open to mineral development would provide future economic opportunities that would generally be more than Alternative B and less than Alternative C and D, particularly due to the low potential for leasable minerals in the planning area.

### **Effects under Alternative B**

Under Alternative B, locatable mining activities would be withdrawn in the INHT NTMC and on Wild and Scenic River corridors through retaining existing withdrawals and proposing new withdrawals, which could increase the number of acres withdrawn should the proposed suitable river segments be designated as WSRs. This alternative would reduce economic opportunities associated with locatable and salable minerals relative to current conditions because fewer areas would be open for development. Relative to Alternative A, Alternative B reduces the profitability of mining activities in the planning area for private industries.

Alternative B would designate the most ROW exclusion and avoidance areas among the range of alternatives. The increase in exclusion and avoidance areas may increase the cost of infrastructure development in the planning area. Alternative B creates the least favorable conditions for minerals development among the range of alternatives.

### **Effects under Alternative C**

Alternative C considerably increases the amount of land open to locatable and saleable mining as compared to Alternative A when considering areas open case-by-case. Alternative C would designate ROW avoidance areas, but no exclusion areas. Alternative C is less likely to increase the operating costs of mining for private industry in the planning area.

Alternative C provides more favorable conditions than Alternatives A and B for mineral development.

### **Effects under Alternative D**

The effects of Alternative D are similar to the effects of Alternative C. Alternative D would revoke all ANCSA 17(d)(1) withdrawals on locatable minerals and provide the greatest level of support for locatable minerals development than all other alternatives. Alternative D would designate fewer ROW avoidance areas than Alternative C. Due to the relatively small acreage designated as ROW avoidance areas under Alternative D, this alternative is not expected to increase the cost of infrastructure development in the planning area. Alternative D would provide the most favorable management platform for locatable and saleable mineral development.

### ***Economic Conditions: Effects to Market Activity & Non-Market Values from Recreation and Visitor Services***

Table 3.10.1-5 below summarizes SRP management decisions by alternative. Associated impacts to market activity and non-market values from recreation and visitor services are described in the sub-sections below.

**Table 3.10.1-5: Special Recreation Permit Measures Affecting Non-Market Values**

<b>Management Decision</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Community Focus Zone applied around communities, where SRPs for hunting guide-outfitters are not authorized.	0	10-mile zone (818,395 acres)	5-mile zone (95,307 acres)	No Community Focus Zones; SRPs determined on case-by-case basis

### **Effects Common to All Alternatives**

A 5-year study on the economic impacts from guided hunting found that guide expenditures on goods and services are mainly determined by where the guide lives and where the hunt occurs (McDowell 2014). None of the alternatives are expected to drive sizeable changes in where hunting guide-outfitter choose to live, therefore the economic contributions to rural communities from hunting guide-outfitters is largely limited to opportunities for local jobs and income to support hunting guide-outfitting services, subsistence meat donated to communities, and incidental expenditures by visitors in local communities.

### **Effects under Alternative A**

Alternative A would continue to support recreational visitation consistent with current management. Alternative A is the least restrictive alternative providing little management direction on activities occurring near communities. A variety of motorized and non-motorized recreation opportunities would be available to residents and visitors. Commercial occupancy of cabins and shelters would be allowed, providing economic opportunities for commercial guides. Hunting guide-outfitters would continue to operate in the area and earn income associated with recreational use in the planning area. Exclusive

commercial use of the shelters may inhibit use for subsistence purposes and pose risks to subsistence users. The low level of management restrictions on hunting outfitter-guides is likely to provide relatively favorable conditions for commercial hunting activities and related economic contributions in rural communities, more so than Alternatives B and C.

### **Effects under Alternative B**

Alternative B would implement a 14 day stay limit for dispersed camping and at BLM Public Use Shelters within the ERMA within a 28-day period and impose 3-day limits at BLM INHT Public Shelter Cabins. Guided hunts would not occur within 10 miles of communities within the CFZ, which could increase costs for outfitter guides. This cost would likely be passed along to the client and would be nominal in respect the total cost or expenditures visitors are willing to pay for big game hunting experiences. This would decrease the likelihood of competition for big game between subsistence and commercial hunts within 10 miles of villages, decreasing the likelihood of competition for subsistence game and therefore decreasing risks to households in villages reliant upon the subsistence economy. Alternative B may limit the economic contributions to rural communities within the CFZ from hunting guide-outfitter activities more so than the other alternatives given that commercial hunting would not be allowed within 10 miles of communities.

### **Effects under Alternative C**

Alternative C, like Alternative B, would implement a 14 day stay limit for dispersed camping and at BLM Public Use Shelters within the ERMA within a 28-day period, and impose 3-day limits at BLM INHT Public Shelter Cabins. Guided hunts would not occur within 5 miles of communities within the CFZ, which could increase costs for outfitter-guides, but less than Alternative B. Such cost would likely be passed along to the client and would be nominal in respect the total cost or expenditures visitors are willing to pay for big game hunting experiences. Limitations on guided hunts close to villages could also decrease the likelihood of direct competition for subsistence game species and therefore decrease risk to subsistence incomes, less so than Alternative B but more so than Alternatives A and D. Alternative C may limit the economic contributions to rural communities from hunting guide-outfitter activities more so than Alternatives A and D, but less so than Alternative B given that CFZ would be half the size.

### **Effects under Alternative D**

Alternative D allows for the greatest length of stay for dispersed camping, general BLM Public Shelter Cabins, and BLM INHT Public Shelter Cabin. Alternative D would not apply CFZs and therefore would not limit hunting guide-outfitter SRPs in proximity to communities in the planning area. This alternative may enable more residents in rural communities to earn an income as hunting guide-outfitters in the planning area than Alternatives B and C given that hunting guide-outfitters would be allowed to operate in closer proximity to communities. Alternative D is likely to result in similar economic effects as Alternative A. Alternative D is also likely to result in a greater amount of competition for subsistence game species within proximity to villages, which may put subsistence incomes at a higher risk than Alternatives B and C.

### ***Economic Conditions: Effects to Non-Market Values from Forestry and Woodland Products***

Table 3.10.1-6 summarizes acres of land open for subsistence and casual use by alternative. Associated impact to non-market values from forestry and woodland products are discussed in the subsections below.

**Table 3.10.1-6: Acres of Land Open for Subsistence and Personal Use**

Management Decision	Alternative A	Alternative B	Alternative C	Alternative D
Open for personal use and subsistence harvest on a case-by-case basis	13,465,894	42,445	42,445	--
Open for personal woodland harvest by permit and open for subsistence woodland harvest without permit	--	--	8,291,190	13,465,894
Open for subsistence and personal woodland harvest by permit	--	13,423,449	--	--
Non-subsistence house log harvest prohibited	--	9,427,588	3,044,745	--
Non-subsistence house log harvest on a case-by-case basis	--	--	--	13,465,894
Acres of land where commercial harvesting of forestry and woodland products is permitted	1,644,588	5,017,161	9,811,727	13,423,449
Acres of land where commercial harvesting of forestry and woodland products is permitted on a case-by-case basis	10,237,555	29,829	3,607,214	42,445

### **Effects Common to All Alternatives**

All alternatives would allow commercial harvest of forest products with a permit, which would contribute to economic opportunities to sell wood products. However, given the lack of development of a commercial wood products industry in rural Alaska to date, it is unlikely that changes in the portion of the landscape where commercial harvesting is allowed would lead to a measurable change in labor and employment due to commercial forestry. All alternatives would also enable continued subsistence and personal use collection of firewood and non-timber forest products. Subsistence and personal use of woodland products supplements household income through the provision of fuel and food sources. The high cost of heating fuel in the region makes the availability of firewood particularly important to area residents (Association of Village Council Presidents 2014).

### **Effects under Alternative A**

Alternative A would continue current management, whereby nearly all of the BLM acres are open to commercial woodland harvest by permit either outright or on a case-by-case basis. Economic opportunities associated with forestry would be available in the planning area. Subsistence and personal use collection of firewood and non-timber forest products would be available to contribute to household consumption and support cultural traditions.

### **Effects under Alternative B**

Alternative B would not allow commercial harvest in the Unalakleet Wild River Corridor, ACECs, INHT NTMC, or 100-year floodplains within HVWs. It also has the fewest number of acres open to commercial woodland harvest when considering areas open on a case-by-case basis. This alternative could reduce opportunities for economic activity and increase the operating costs associated with forestry in the planning area. Alternative B would require a permit for subsistence and personal use collection of



firewood and non-timber forest products (e.g., berries). This alternative could increase the difficulty of engaging in subsistence and non-subsistence activities in the planning area; however, it would also contribute to jobs and income in rural communities. This alternative would also increase costs to the BLM for the subsistence and personal use permit program; however, there would be more accurate information available about the demand for special forest products collections and the popular collection locations to provide for a sustained supply.

### **Effects under Alternative C**

Alternative C would not allow commercial harvest in the Unalakleet Wild River Corridor. Alternative C would require a permit for personal use collection of over 10 cords of firewood per household and non-timber forest products (e.g., berries), but would not require a permit for subsistence users. This alternative would be less likely than Alternative B to reduce opportunities for economic activity or to increase the operating costs associated with forestry in the planning area. This alternative would not affect the cost or difficulty of subsistence activities. The requirement that non-local users obtain a permit could reduce conflict and competition for resources among subsistence and non-local users, providing the most benefit to subsistence users as compared to the other alternatives. This alternative has a large proportion of acres open to commercial woodland harvest by permit (second only to Alternative D), but also relies on case-by-case issuance of permits in more sensitive areas.

### **Effects under Alternative D**

Alternative D would allow commercial harvest by permit or on a case-by-case basis throughout the entire planning area. This alternative would be more likely than Alternatives A, B, and C to contribute to economic activity associated with forestry in the planning area due to less restrictions placed on where and what type of collection is allowed. Alternative D would have the similar effects as Alternative C in regard to the subsistence and personal use; however, a permit would not be required for personal use collection of firewood or non-timber forest products.

### ***Economic Conditions: Effects to Non-Market Values from Travel and Transportation Management***

Table 3.10.1-7 summarizes summer and winter subsistence travel decisions by alternative. Associated impacts to non-market values from travel and transportation management are discussed in the subsections below.

**Table 3.10.1-7: Summer and Winter Subsistence Travel Designations**

<b>Management Decision</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Summer Subsistence OHV access Prohibited	46,953	241,512	225,925	0
Summer subsistence OHV limited to existing trails	All lands open to motorized travel.	324,443	363	225,925
Limited winter subsistence use (snowmobiles only)	All lands open to motorized travel.	4,243,914	3,097,798	225,925

### **Effects Common to All Alternatives**

All alternatives would continue to enable people to use lands in the planning area to transport goods and people. Travel and transportation management is important to facilitating economic well-being of area residents and visitors, enabling subsistence use and market activity

### **Effects under Alternative A**

Alternative A would not affect the ability of people and goods to move across the planning area relative to current conditions. Under Alternative A, there are no restrictions on travel across the planning area, unless restricted by a special designation, such as identified in the Unalakleet WSR management plan. Travel and transportation management under this alternative allow for the most flexibility in allowable transportation patterns and vehicle types, which would support market activity and well-being associated with transportation to support subsistence use. Sensitive areas may be impacted by unregulated motorized travel, which may increase risks to subsistence resources.

### **Effects under Alternative B**

All action alternatives contain different areas identified as “limited” to motorized travel. Specific limitations are identified at the implementation-level travel planning and would be evaluated against the same criteria in making decision.

Alternative B may slightly increase the cost, in terms of fuel and time, of travel within the planning area due to restrictions on OHV use. Some of the rural communities within the planning area have exceedingly high rates of poverty. Given the high cost of fuel in rural communities and the high incidence of poverty, even relatively small increases in the amount of fuel and time required for transportation may have a much larger proportional effect on economic activity related to casual use and recreation and transportation for subsistence purposes. While Alternative B would reduce direct risks to the reproduction of important subsistence species, it may also slightly increase risks to communities and households with extremely limited income by increasing fuel costs and thereby could limit subsistence user access to subsistence resources.

### **Effects under Alternative C**

Alternative C would have similar effects to Alternative B.

### **Effects under Alternative D**

Alternative D would have fewer restrictions on summer and winter subsistence travel than Alternatives B and C but is expected to have largely similar effects as Alternative B and C.

### ***Economic Conditions: Effects to Non-Market Values from ACECs***

Table 3.10.1-8 summarizes acres of ACECs by alternative. Associated impacts to non-market values from ACECs are discussed in the subsections below.

**Table 3.10.1-8: Acres of ACECs by Alternative**

Management Decision	Alternative A	Alternative B	Alternative C	Alternative D
ACEC	1,884,376	3,912,698	0	0

### **Effects under Alternative A**

Under Alternative A, 1,884,376 acres (approximately 14 percent of the planning area) are designated as ACECs to protect non-market values such as fisheries, which provide an important source of food and well-being in planning area communities.

**Effects under Alternative B**

Under Alternative B, 3,912,698 acres (approximately 29 percent of the planning area) are proposed as ACECs for protection of fisheries and cultural resources. Alternative B provides the greatest level of protection or risk reduction for fisheries and their related subsistence non-market values.

**Effects under Alternative C**

Under Alternative C, no ACECs would be designated. Alternative C, however, includes more protections than the no action alternative against adverse effects from surface disturbance through the designation of ROW avoidance areas.

**Effects under Alternative D**

Alternative D would not propose any ACECs. This alternative would be least likely to restrict surface-disturbing activities that contribute to economic activity, such as mining. This alternative is less likely to protect fisheries that contribute to subsistence non-market values.

***Economic Conditions: Effects to Non-Market Values from Wild and Scenic Rivers***

Table 3.10.1-9 summarizes acres of WSR corridors by alternative. Associated impacts to non-market values from WSRs are discussed in the subsections below.

**Table 3.10.1-9: Acres of New Wild and Scenic River Corridors by Alternative**

Management Decision	Alternative A	Alternative B	Alternative C	Alternative D
Designated - Wild	46,953	46,953	46,953	46,953
Eligible - Wild	332,176	0	0	0
Recommended - Suitable Wild	0	332,176	0	0

**Effects under Alternative A**

Alternative A would not propose any new WSRs as eligible for designation. This alternative would not affect OHV access for subsistence activities relative to current conditions. However, 18 river segments (332,176 acres) have been identified as eligible wild river corridors. According to BLM Manual 6400, projects on BLM-managed lands within the river corridor or on lands that are adjacent to or border eligible rivers must consider guidelines to protect ORVs for activities such as locatable, salable, and leasable mineral development; transportation and motorized travel; ROW authorization; recreation; and livestock grazing, which could protect cultural and paleontological resources from associated impacts (BLM 2012). Impacts to eligible WSRs could result if OHV use continued to increase in the planning area and/or impacts were exacerbated from OHV use during permafrost thaw, which could contribute to impacts to water quality. Alternative A would be less likely than Alternative B to protect non-market values associated with WSRs related to fish and wildlife habitat.

**Effects under Alternative B**

Alternative B would propose 332,176 acres as suitable for WSR designation, which is the most acres proposed under any alternative. Alternative B is the most likely to affect transportation via OHVs in the planning area WSRs. However, given that the corridors are narrow and associated with rivers (which are impassable by OHVs), this limitation would not change transportation access dramatically. Travel

management actions under Alternative B could protect water quality by minimizing sedimentation and damage to riparian resources. This alternative is also the most likely to protect non-market values associated with WSRs by providing the most restrictions on development within these sensitive areas.

### **Effects under Alternative C**

Alternative C would have similar economic effects to Alternative A, as this alternative would not propose new WSRs as suitable for designation.

### **Effects under Alternative D**

Alternative D would have similar economic effects to Alternative A, as this alternative would not propose new WSRs as suitable for designation.

### ***Economic Conditions: Climate Change***

This section presents analysis of how management actions would counteract cumulative climate change impacts to economic conditions in the planning area. Climate change may impact market and non-market value of resources in the planning area due to any of the following effects, or complex interactions thereof:

- Increased temperatures
- Permafrost thaw
- Decreased snow cover (albedo effect), subnivean species impacts
- Increased wildland fire intensity, size, and frequency
- Increase in NNIS introduction or spread
- Later freeze-up dates (river ice)
- Sea level rise (salt intrusion, transportation changes)

Actions that increase protections of market and non-market values from climate change effects could counteract the impacts of climate change on planning area communities. As such, Alternative B would be the most likely to counteract the effects of climate change on market and non-market values, with lesser degrees of counteraction occurring under Alternatives C and D. Alternative A is likely to provide the lowest degree of counteraction of climate change impacts on market and non-market values under the alternatives.

### ***Economic Conditions: Cumulative Effects***

#### **Past and Present Actions**

The planning area is characterized as a rural-mixed economy where households and communities are reliant upon both the market and non-market values cultivated in the subsistence economy. Planning area communities must rely upon both cash and subsistence sectors of the economy as neither can support communities alone (Fried 2018; Association of Village Council Presidents 2014).

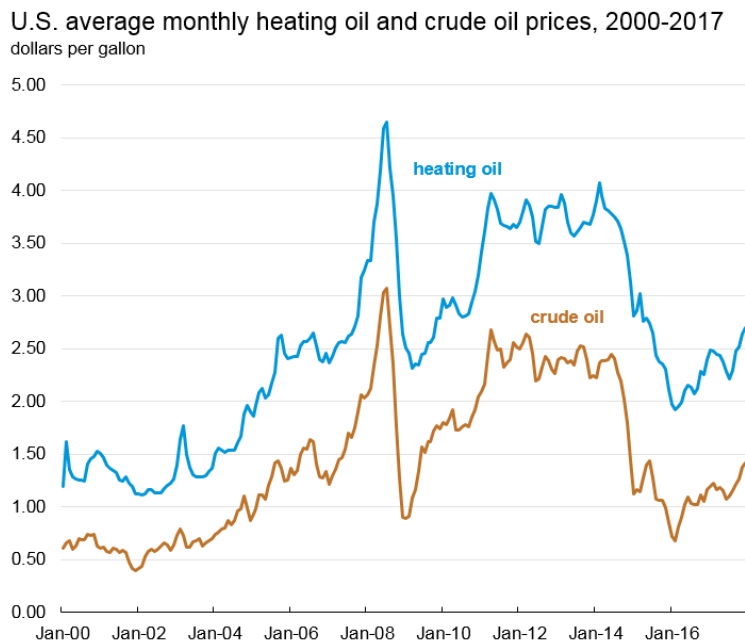
The market or cash economy in the planning area is weak, providing few opportunities for jobs and income generation. Local government accounts for the largest portion of jobs across the analysis area typically between 23 percent in Takotna and 73 percent in Pitkas Point. People employed in the natural

resources and mining sector account for an extremely small portion of jobs in the planning area, with the highest reported amount at 14 percent in Nikolai, followed by McGrath, Holy Cross, and Anvik at 6 percent. Due to the remote location of the planning area to global markets, costs of transportation and infrastructure development are high, and timber and grazing are not competitive commodities. Outside of the Donlin Gold Mine, mineral development potential is also weak in the planning area due to the low grade of minerals in the planning area. Recreation and visitation provide limited opportunities for rural communities to benefit from jobs and income; however, many of the direct economic benefits related to guided big-game hunts, and fly-in fishing lodges and excursions, as well as competitive events benefit the urban communities outside the planning area, such as Anchorage. BLM-managed lands play a limited role in supporting jobs and income in the planning area given the geographic context of the planning area and the unfavorable economic conditions to support commodities markets.

On the other hand, the non-market values provided by the BLM-managed lands, NWR lands, national park lands, State lands, and Native lands play a substantial role in the subsistence economy of planning area communities. The subsistence economy reduces the cash burden for households in the planning area where the cost of food is roughly twice as the cost in Anchorage, Alaska, and fuel costs for transportation and heating also well exceed the State and national averages.

### **Reasonably Foreseeable Future Actions**

Changes in the price of diesel, gasoline, and heating oil are largely driven by changes in the cost of crude oil determined through global market conditions that are beyond the influence of the planning area communities. Given the volatility of market prices for crude oil over the past 18 years, as illustrated in Figure 3.10.1-1, it is reasonable to assume that prices for petroleum-based fuel will continue to fluctuate unpredictably and demonstrate an overall upward trend in price.



Note: Heating oil price is the retail price including taxes. Crude oil price is the composite refiner acquisition cost of crude oil.

Source: U.S. Energy Information Administration, *Short Term Energy Outlook and Petroleum Marketing Monthly*, March 2018



**Figure 3.10.1-1: U.S. Average Monthly Prices for Crude Oil and Heating Oil, 2000-2017**

It is anticipated that the Donlin Gold Project will be in construction for 4 years, at the end of which, mining operation will commence and continue over the life of the plan. See BSWI Draft RMP/EIS Chapter 2 for more information.

Climate change is expected to shift cliomes in the region at varying rates. Climate change effects on precipitation and snowfall are expected to be relatively minor, affecting the shoulder winter months of April and October. Communities that are located further west are expected to see a large change in snow days for all winter months. The frequency of fires in the planning area is not expected to change substantially in the planning area. Across the planning area, vegetation types vary; however, are generally expected to change, with declining representation of black and white spruce forest, while an increasing portion of the land base is expected to be deciduous forest.

Jobs and income in the planning area are heavily influenced by federal and State funding for education, social, and medical assistance programs. Congressional budget allocations are beyond the influence of the planning area communities, and there is uncertainty of continued funding and what level these programs will be funded.

### **Incremental Cumulative Impacts – All Alternatives**

Limited opportunities to increase jobs and income in the planning area in the face of volatile global market conditions related to the cost of crude oil that belays the importance of maintaining a strong subsistence economy to support household livelihoods and community vitality. In times of rising oil prices, households will rely increasingly on subsistence resources that can be gathered and produced with a low over-head cost for petroleum-based fuel products. Management under Alternative B is the most restrictive (and Alternative D is the least restrictive) to activities that would adversely affect subsistence resources.

While Alternatives A provides the least amount of restriction regarding where travel is allowed and thereby affords the greatest opportunity for people to minimize travel distances, it also includes few measures to guard against potential risks to subsistence resources caused by the development of the Donlin Mine and related infrastructure. Alternative B would provide the greatest measure of protection for the maintenance and perpetuation of subsistence resources indirectly affected by the development of the Donlin gold mine and the associated natural gas pipeline.

The development of ancillary facilities, temporary access roads, and airstrips developed in association with the pipeline may result in unintended development along this corridor, which coincides with the subsistence gathering regions. Designations that provide measures of protections for aquatic and terrestrial habitats, such as HVW, ACEC, WSR, and areas managed to preserve wilderness characteristics, will reduce risk to sensitive areas important for subsistence values. Alternatives A and D would do little to afford protection against unintended development associated with the development of the pipeline corridor.

Overall, the market activity related to jobs and income is not expected to differ measurably among alternatives. With an estimated 2,500 workers required to construct the mine and 650 estimated to construct the pipeline, the population in the immediate vicinity of the mine and along the pipeline corridor would increase substantially over the construction period. With many of these workers being fly-in/fly-out commuters, the social characteristic of the communities immediately surrounding the mine and pipeline corridor would also be impacted.

Being that subsistence economies are reliant upon on social systems that exercise systems of reciprocity, this change in the social make-up of the communities may affect community social dynamics and systems of reciprocity. Increased population and longer-term commuters, those who stay for a week or more, may also increase pressure on large-game and fish subsistence resources, which would increase risk to subsistence incomes. Alternative B provides the greatest level of protection to minimize risks related to direct competition for subsistence resources by restricting hunting outfitter-guide operations within 10 miles of communities within CFZs.

Changes in snowfall patterns and frequency, forest type, and overall shifting cliomes would likely drive changes in subsistence resource distribution related to plants, fish, wildlife, and timber. Such changes would increase economic insecurity to communities in the planning area reliant upon subsistence incomes due to increased time and fuel costs to locate resources or to cultivate new methods to secure subsistence livelihoods closer to their villages. When the effects of Alternative B are considered in context with the cumulative effects of climate change, measures to reduce direct and indirect stressors on ecological systems that support important subsistence species may lend to a higher level of ecological resilience in responding to changing climate. Alternative B may increase ecological resilience to climate change, which could result in decreased risk to households and communities reliant upon subsistence resources.

### **3.10.2 Social Conditions**

#### **Summary**

This section addresses the extent to which the alternatives affect social conditions in planning area communities, including impacts to environmental justice communities. Management actions under the alternatives are consistent with BLM's priorities for enabling expanded access and use of public lands while maintaining a balance between conservation and utilization of the lands, energy and mineral resources, waters, fish and wildlife, and other natural and cultural resources.

#### **Methods of Analysis**

This section analyzes the impacts of the alternatives on social conditions in planning area communities qualitatively and summarizes the effects using a simple rating system. The ratings and qualitative descriptions are based on information from the Subsistence analysis (Section 3.11), other resource analyses, and public comments on the preliminary alternatives. Some actions pertinent to Support for BSWI Communities management (see Chapter 2 of the BSWI Draft RMP/EIS) are unique to social conditions and not described as actions under the subsistence, economy, or other resource sections. For these actions, new analyses were conducted. Impacts also are identified in the economic conditions analysis in the preceding section, which also describes the effects of the alternatives to non-market values related to subsistence use. The environmental justice analysis considers social and economic impacts to determine if there will be disproportionate impacts to low-income or minority communities.

#### ***Potential Effects and Indicators***

The RMP could have several types of effects on social conditions in planning area communities. Management actions and designation of special resource protection areas may increase protection of community subsistence resources from other potentially degrading resource uses (e.g., minerals development). However, some management actions and designation of special resource protection areas also could affect access to community subsistence resources. Additionally, the alternatives would

implement varying degrees of management intended to reduce conflicts with other uses, collect additional information about community use areas and values, and/or increase coordination and collaboration between BLM and planning area communities.

The following indicators were used to analyze impacts to social conditions in the planning area:

- Level of protection for subsistence species and habitats (i.e., greater, less, or the same). This overall rating was developed using the impact analyses from the sections on ACECs, watershed protection, and locatable minerals.
- Level of access to subsistence resources (i.e., greater, less, or the same). This overall rating was developed using the impact analyses from the section on travel management and forest and woodlands management.
- Level of potential conflict with sport hunters and other users (i.e., greater, less, or the same). This overall rating was developed using the impact analyses from the sections on recreation, travel management, and special permit management.
- Level of coordination and collaboration with communities (i.e., greater, less, or the same). This overall rating was developed using the descriptions in Chapter 2 of the BSWI Draft RMP/EIS on BLM support for planning area communities, including level of coordination with BSWI communities, level of monitoring of coordination efforts, and level of information to be collected about community subsistence uses and landscape meanings.
- The global rating for economic effects, both market and non-market, based on the economic condition analysis. Effects on market opportunities, which provide potential for jobs, income, or reduced expenses, are a crucial component of life in bush villages. Effects on non-market resource values are also essential to subsistence and village lifestyles.
- The rating for effects on environmental justice populations (i.e., greater, less, or the same) was developed using information from the other socioeconomics indicators and effects analyses.

Table 3.10.2-1 summarizes the type of effects that could occur to social conditions by management action, the management actions that could result in those effects, and the indicators used to measure those effects.

**Table 3.10.2-1: Summary of Effects to Social Conditions by Management Action**

Type of Effects	Management Action	Indicators
Resources and habitats support subsistence lifestyles and the rural mixed economy. They can be adversely affected by development, climate change, and other actions or conditions.	Actions designed to address impacts and risks to subsistence resources, including wildlife protection areas, HVWs, ACECs, management for wilderness characteristics, or areas withdrawn from locatable mineral entry.	Level of protection of subsistence resources and habitats; acres designated or otherwise receiving special protection
Access to subsistence resources and species can be adversely affected by competition with other resource users, conditions, or BLM management actions that make access more costly or cumbersome.	Management of SRP permittees, management of overland and trail motorized uses within the planning area, management of woodland harvest.	Level of access to and competition for subsistence resources.
Communities have expressed a desire to work more closely with the BLM and have more of a say in management of BLM lands of value to community residents.	Actions in the Support for BSWI Communities alternative theme that are designed to address coordination and collaboration between the BLM and communities.	Level of coordination and collaboration with communities.



Type of Effects	Management Action	Indicators
Opportunities for jobs and income are scarce in bush communities so there is community desire for BLM management to facilitate or at least not impede economic development opportunities.	Actions that have the potential to preclude economic development (such as mining withdrawals) or that are designed to facilitate economic development as described in the Support for BSWI Communities alternative theme.	Level of effect on opportunities for jobs and income.
All of the communities in the planning area are considered environmental justice communities due to their low-income or Alaska Native status, or both. Communities should not be disproportionately, adversely affected by BLM management actions.	The net effects of all of the above actions on communities in the planning area.	Level of effects on environmental justice populations.

### ***Assumptions***

The following assumptions were used to assess impacts associated with social conditions and environmental justice.

- The analysis of impacts to economic conditions concluded that “BLM managed lands play a limited role in supporting jobs and income in the planning area...the market activity related to jobs and income is not expected to differ measurably between alternatives.”
- The indicator “Level of protection for subsistence species and habitats” in the social conditions analysis is most closely linked to how the alternatives affect non-market values.
- For the purpose of environmental justice, all of the identified communities are low-income and/or minority environmental justice populations qualifying for a consideration of environmental justice issues.
- The differences among alternatives described in this and other resource sections are described relative to one another. However, in many cases, it is difficult to tell if these differences would be meaningful in regard to actual social conditions. For example, one alternative may more acres protected than another—but it is not known to what degree this additional protection is actually needed given current and potential future threats to the protected resources. The assumption is that greater resource protection would provide greater benefits to social conditions, but it is difficult to factor in any trade-offs that exist. Specifically, Alternatives C and D reflect an adaptive approach in which many decisions are made on a case-by-case basis; Alternative C provides more structure than Alternative D for making these decisions. Although the case-by-case approach provides greater uncertainty regarding the outcome of each individual decision, the flexibility allows managers to consult with affected communities, increasing the chances that a given decision will be able to balance desired resource protection with desired economic development opportunities as they arise.

The impact analysis for social conditions is limited due to incomplete or unavailable information, including the following:

- The scale of the analysis of impacts to subsistence and other resources is the planning area, with no analysis of impacts to the community groups; therefore, the results presented here are at the same broad scale. Some communities will be affected more, and some less, depending on their orientation to the resource, location relative to BLM-managed lands, population size, and other variables.
- Changes to noise levels, noise-producing activities, and associated impacts throughout the planning area would depend on actual activities and projects implemented in the planning area.

Therefore, a detailed noise analysis is not included in this document and instead would be performed at the project level.

### ***Standard Operating Procedures and Best Management Practices***

The impact analysis below takes into account SOPs and BMPs that could be implemented by the BLM (the BSWI RMP/EIS). Because impacts to subsistence and related social values depends on the condition of nearly every other resource described in this document, nearly all of the directions and guidance in the list of SOPs and BMPs are relevant.

### **Effects Analysis**

This section presents analysis of the net effects of actions on social conditions in planning area communities under the alternatives. This analysis is summarized using a rating system that describes the expected change from existing conditions resulting from implementation of an alternative. A rating of “-” indicates that the resource or social condition would be expected to become worse under that alternative; a rating of “=” indicates that the resource or condition would remain about the same (although some aspects or components of that condition could increase/improve and some decrease/become worse); and a rating of “+” indicates that the resource or social condition would be expected to improve under that alternative. In some cases, an extra “+” is added to indicate a larger difference relative to other alternatives.

Table 3.10.2-2 summarizes the expected changes from existing conditions under all alternatives.

**Table 3.10.2-2: Expected Change from Existing Conditions under All Alternatives**

<b>Indicator</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Level of protection for subsistence species and habitats	-	++	+	=
Level of access to subsistence resources	=	=	+	+
Level of potential conflict with sport hunters and other users	-	++	+	=
Level of coordination and collaboration with communities	-	+	++	++
Economic effects	=	+	+	+
Effects on environmental justice populations	-	+	+	=

The following sections provide the basis for the ratings in Table 3.10.2-2.

### ***Social Conditions: Effects of All Other Actions under Alternative A***

This alternative represents existing management mandated by current land use plans for the planning area. The following management actions would affect social conditions in the planning area.

- Alternative A does not propose to designate any HVWs. The BLM has designated 11 ACECs covering 1,884,376 acres within the planning area. Alternative A would not provide any additional protection of lands with wilderness characteristics or work to create connectivity

corridors. The other alternatives all presume that some additional level of protection is necessary to address possible threats to resources over the next 20 years, so this alternative is not responsive to community demands for ensured, sustainable protection of subsistence resources. This alternative also has the second-most acres of proposed or retained locatable mineral withdrawals that overlap with medium or high potential areas for locatable minerals (about 271,000 acres). While this provides additional protection for resources and habitats, it also poses the greatest restrictions to possible future mining activities that could bring jobs and additional income to some community residents. That is why locatable mineral withdrawals can be controversial in communities. People want to see jobs, as evident by support for the Donlin Gold Mine, but also do not want to see subsistence resources and access damaged by the mine and associated development, including the natural gas pipeline corridor that will bring energy to the Donlin operation. Alternative A has the fewest open acres where commercial woodland harvest allowed by permit, instead relying primarily on issuance of permits on a case-by-case basis.

- Alternative A manages all lands in the planning area as undesignated, with no limitations on winter cross-country travel for subsistence (or casual use) and restrictions on subsistence and casual winter cross-country travel within the Unalakleet Wild River Corridor only. Alternative A does not require a permit for subsistence collection of firewood and non-timber forest products (e.g., berries). Subsistence and casual use would continue under the management to which people are accustomed but would not address any issues where they exist now or would be likely to develop under this alternative.
- There would be no new attempts to restrict guides in areas near communities or to require any additional training on sport-subsistence conflicts. Currently, many residents point out that sport hunting can conflict with subsistence use and that communities do not necessarily reap possible benefits of sport hunting occurring near communities. Thus, the alternative would not be responsive to this concern.
- None of the new efforts proposed for coordinating and collaborating with communities would be instituted. Existing levels and types of coordination would continue. No more ACECs would be designated, including those proposed by communities and tribes, which could discourage future collaboration. The BLM would not seek out opportunities to provide assistance with cultural tourism activities to communities or to work collaboratively to develop Cultural Landscape Reports or similar analyses that describe how communities use BLM-managed and other lands. Community leaders and residents have expressed the desire for the BLM to be a good neighbor, part of which is how effectively the BLM coordinates and collaborates with communities and whether communities feel that their input and views are being considered and applied by the BLM. Alternative A would not meet these community needs.
- Alternative A would lead to adverse effects on low-income and minority populations because no new actions would be taken to provide additional protection for subsistence resources, reduce conflicts with other uses, collect additional information about community use areas and values, or increase coordination and collaboration with communities. The other three alternatives address these issues in to varying degrees. No other populations of users or stakeholders would be similarly affected, so this level of impact is considered a disproportionate, adverse effect on environmental justice populations.

### ***Social Conditions: Effects Common to All Action Alternatives***

The three action alternatives contain a variety of measures to protect subsistence uses of BLM-managed lands and address community demands for protection of and increased participation in management of resources and opportunities. These and other actions will reduce the risk to subsistence resources.

The action alternatives generally pose fewer restrictions on OHV use and routes for subsistence use than for casual use, maintaining access while reducing potential conflict. The travel management goal for all alternatives is to “Maintain the BSWI planning area in such a manner that local communities retain unfettered access to the land.” When the BLM develops travel management plans, it will consider travel routes and corridors among the communities and how to meet connectivity and destination goals for the communities. These travel management actions will help to meet community needs for travel, including access to subsistence resources.

The action alternatives also contain many measures designed to reduce conflicts with hunting guides and outfitters, and other users. In addition to allocation decisions, these include supporting community efforts to train local residents as guides, considering community concerns when making decisions about allocation, and encouraging permitted hunting guide-outfitters to coordinate activities with local communities. Such actions should decrease conflicts and improve community-guide relations.

All of the alternatives allow for ROW permitting for essential community infrastructure including communication sites. Actions common to all action alternatives include making lands available for lease or sale to benefit local communities per the criteria for R&PP Act and considering land exchange and other mechanisms on a case-by-case basis to benefit public interests including community expansion or relocation. This will ensure communities that BLM-managed lands will not hinder development of needed infrastructure and allow the BLM to address impacts from climate change.

As funding permits, the BLM would continue to hire employees stationed in planning area communities. This could include implementing a program similar to the USFWS Refuge Information Technician system, whereby community residents are hired as BLM employees (or through a similar mechanism) coordinate management activities and conduct outreach between the BLM and the rural communities. This would establish a closer link between the BLM and communities, paving the way for better relationships, trust, and collaboration on management activities.

### ***Social Conditions: Effects of All Other Actions under Alternative B***

This alternative emphasizes reducing the potential for competition between recreational and subsistence resources by designating key areas for additional protections of long-term resource values within the planning area. The following Alternative B management actions would affect social conditions in the planning area.

- Alternative B designates more miles as HVWs and generally provides more conservation in HVWs than do the other two action alternatives. Seven new ACECs would be established, resulting in just under 4 million acres protected with this designation. Alternative B would also provide the greatest protection of lands with wilderness characteristics and would provide two connectivity corridors. As a result, this alternative is the one most likely to protect species and habitats valuable for subsistence, and to successfully address current and future threats. This alternative also has the most acres of proposed or retained locatable mineral withdrawals that overlap with medium or high potential areas for locatable minerals (about 363,000 acres). While this provides additional protection for resources and habitats, it also poses the greatest restrictions to possible future mining activities that could bring jobs and additional income to some community residents. This alternative also has a substantially greater number of acres closed to commercial woodland harvest, which does not pose an immediate barrier given the history of little harvest but could limit future opportunities.
- Alternative B has only a small amount of acreage (about the same as Alternative C) where summer subsistence OHV access would be prohibited, and there would be no limitations on

winter cross-country travel for subsistence. This alternative generally is the most restrictive of casual OHV use, thereby reducing potential conflict with subsistence use. As a result, Alternative B would be expected to benefit travel to subsistence resources more than any other. However, Alternative B is the only alternative under which the BLM would require a permit for subsistence collection of firewood and non-timber forest products (e.g., berries), which would be a concern for many residents who are used to collecting without a permit. Many commenters talked about how difficult it was to accept having to obtain a permit from an agency to do something they have always done. The associated conflict could be reduced somewhat because the system would be administered by hiring a local in a targeted area to issue permits and collect use information, but enforcement could be difficult. Access to affected subsistence resources could be more difficult due to this permit and to the many protective resource measures, which could make access more costly or difficult in some situations.

- Alternative B would add several measures designed to reduce conflicts with guided sport hunting, including the strictest limits on numbers and location near communities of any alternative. Therefore, Alternative B would be the most likely alternative to address conflicts to the satisfaction of community residents.
- For nominated ACECs not found to be relevant and important for cultural resources, the BLM would work with tribes to gather more information on the particular areas and resources. The BLM would provide assistance with cultural tourism activities to communities requesting assistance. The BLM would support rural BSWI communities by working collaboratively with rural communities in the planning area and other partners to develop Cultural Landscape Reports for a small number of communities. These actions represent a concerted effort to increase coordination and collaboration with communities, a goal heard many times during community meetings. The BLM would have a greater presence in the communities, allowing for better relationships and trust to develop. This would improve the BLM's ability to manage its resources and make it more likely that management would be consistent with community needs.
- Alternative B would lead to positive effects on low-income and minority populations—essentially all of the residents of planning area communities. This is because many new actions would be taken to provide additional protection for subsistence resources, reduce conflicts with other uses, collect additional information about community use areas and values, and increase coordination and collaboration with communities.

### ***Social Conditions: Effects of All Other Actions under Alternative C***

This alternative emphasizes adaptive management at the planning level to protect the long-term sustainability of resources while providing for multiple resource uses. The following Alternative C management actions would impact social conditions in the planning area.

- Alternative C designates more miles as HVWs than Alternative D but fewer than Alternative B and generally provides a level of protection of HVWs that is less stringent than Alternative B. Alternative C would protect lands with wilderness characteristics, though not as priority or to the extent of Alternative B and would establish one connectivity corridor. As a result, this alternative would provide additional protection for subsistence resources. This would not retain any locatable mineral withdrawals that overlap with medium or high potential areas for locatable minerals, thereby opening all areas where mineral development is most likely to occur on BLM-managed land in the planning area. It poses fewer restrictions to possible future mining activities that could bring jobs and additional income to some community residents than Alternative A and B.
- Alternative C has only a small amount of acreage (similar but slightly less than Alternative B) where summer subsistence OHV access would be prohibited, and there would be no limitations

on winter cross-country travel for subsistence. This alternative is generally intermediate (between Alternatives B and D) regarding restrictions of casual OHV use. Alternative C would require a permit for personal use collection of firewood and non-timber forest products (e.g., berries), but would not require a permit for subsistence users. The requirement that non-local users obtain a permit could reduce conflict and competition for resources among subsistence and non-local users in some areas, providing the most benefit to subsistence users as compared to the other alternatives. As a result, Alternative C would improve community access to subsistence plant resources. This alternative has a large proportion of acres open to commercial woodland harvest by permit (second only to Alternative D) but also relies on case-by-case issuance of permits in more sensitive areas.

- Alternative C would add several measures designed to reduce conflicts with guided sport hunting where they occur, including the second strictest limits on numbers and location near communities of the alternatives. Therefore, Alternative C would be likely to address conflicts to the satisfaction of community residents, although not perhaps as well as Alternative B.
- No ACECs would be designated, including those proposed by communities and tribes, which could discourage future collaboration. However, this would provide more opportunity to work with the specific affected communities when the BLM is faced with making a decision, and to tailor resource protections to specific conditions on the ground. The BLM would provide assistance with cultural tourism activities to communities requesting assistance. The BLM would support rural BSWI communities by working collaboratively with them and other partners to develop Cultural Landscape Reports for a number of communities, which is desirable when decisions are being made on a case-by-case basis. Alternative C would therefore increase community opportunities to collaborate in BLM management processes. Community leaders and residents have called for increased ability to participate in decisions that affect their well-being. Alternative C would lead to positive effects on low-income and minority populations—essentially all of the residents of planning area communities. This is because some new actions would be taken to provide additional protection for subsistence resources (with the exception for the elimination of all ACECs and increased locatable and salable mineral development opportunities), reduce conflicts with other uses, collect additional information about community use areas and values, and increase coordination and collaboration with communities.

### ***Social Conditions: Effects of All Other Actions under Alternative D***

This alternative provides additional flexibility at the project-specific implementation level and fewer overarching management restrictions at the planning level. The following Alternative D management actions would affect social conditions in the planning area.

- Alternative D generally provides the least stringent level of protection for HVWs compared with Alternatives B and C. No ACECs would be designated. Alternative D would not provide any additional protection of lands with wilderness characteristics or establish any connectivity corridors. Many decisions about resources and uses would be made on a case-by-case basis. Although this could be viewed as providing lower levels of protection, it provides an opportunity for the BLM to more closely tailor management to individual community needs and situations, rather than relying on broad restrictions and allocations that may or may not be needed in a given situation. It also provides more opportunity to work with the specific affected communities when the BLM is faced with making a decision. However, there is greater uncertainty regarding the outcomes of these case-by-case decisions compared to predetermined allocations or designations, which may be uncomfortable to some. This alternative has no acres of proposed or retained locatable mineral withdrawals that overlap with medium or high potential areas for locatable minerals. While not providing additional protection for resources and habitats, it provides more

opportunities for possible future mining activities that could bring jobs and additional income to some community residents. Nearly all of the acreage is open to commercial woodland harvest by permit.

- Alternative D has no acreage where summer subsistence OHV access would be prohibited, and no limitations on winter cross-country travel for subsistence. This alternative generally is the least restrictive of casual OHV use among the action alternatives. Like Alternative C, Alternative D would require a permit for personal use collection of firewood and non-timber forest products (e.g., berries), but would not require a permit for subsistence users; the effects would be similar to those described under Alternative C and would be acceptable to subsistence users.
- Measures to limit guided sport hunting to address conflict and/or resource impacts would be determined on a case-by-case basis, rather than by predetermining limits. This could end up being just as effective at reducing conflicts and would avoid establishing limits in places or instances where they might not be needed. However, the methods and effectiveness of measures eventually taken to reduce conflict would be more uncertain.
- No ACECs would be designated, including those proposed by communities and tribes, which could discourage future collaboration. However, this would provide more opportunity to work with the specific affected communities when the BLM is faced with making a decision, and to tailor resource protections to specific conditions on the ground. The BLM would provide assistance with cultural tourism activities to communities requesting assistance. The BLM would support rural BSWI communities by working collaboratively with them and other partners to develop Cultural Landscape Reports for all communities, which is desirable when decisions are being made on a case-by-case basis. Alternative D would therefore greatly increase community opportunities to collaborate in BLM management processes. Community leaders and residents have called for increased ability to participate in decisions that affect their well-being.
- Not designating the Sheefish and Whitefish ACECs could negatively impact the sheefish population, as these are the spawning areas for the sheefish population of the larger entire Kuskokwim River. Non-salmon fish species are important subsistence resources due to declines in the salmon returns, and lack of protection of this spawning area could impact communities that use this species for subsistence. Not designating the Sheefish and Whitefish ACECs could negatively affect abundance and availability of this important subsistence resource.
- Alternative D would likely maintain or slightly improve existing effects on low-income and minority populations—essentially all of the residents of planning area communities. This alternative would provide some additional protection for subsistence resources, although not to the extent of the other action alternatives. Reducing conflicts between subsistence and other resource uses would still be a goal, but with many actions taken on a case-by-case basis rather than with predetermined allocations or regulations. Alternative D’s flexible approach would necessitate additional coordination and collaboration with communities, and the actions “common to all” include many community goals. For example, this is the only alternative that calls for a collaborative effort to develop Cultural Landscape Reports or similar analyses for all environmental justice communities.

### ***Social Conditions: Climate Change***

This section describes how management actions would counteract cumulative climate change impacts to populations in the planning area, including environmental justice populations. Climate change may impact availability and distribution of subsistence resources due to any of the following effects, or their interactions:

- Increased temperatures

- Permafrost thaw
- Decreased snow cover (albedo effect), subnivean species impacts
- Increased wildland fire intensity, size, and frequency
- Increase in NNIS introduction or spread
- Later freeze-up dates (river ice)
- Sea level rise (salt intrusion, transportation changes)

Low-lying areas within the planning area are at risk from the effects of flooding due to hydrologic changes of thawing permafrost. This includes almost all of the villages within the planning area, which are located along the Yukon or Kuskokwim Rivers or the ocean coastline.

Winter travel is expected to be adversely affected by continued wintertime warming, reducing the time period for functional travel that requires frozen rivers, frozen wetlands, or ice roads.

Mining infrastructure containing hazardous materials is currently not designed to withstand the future environmental conditions that are expected to change dramatically from current conditions within the upcoming century. This could impede the facilities' ability to function properly.

In general, actions that increase protection of subsistence resources and allow for flexibility of access to these resources could help to counteract the impacts of climate change on planning area communities. As such, Alternative B would be the most likely to provide a buffer against climate change effects on planning area communities, Alternative A is likely to provide the lowest degree of buffer against climate change impacts on planning area communities among the alternatives, with Alternatives C and D somewhere in between. However, all of the action alternatives contain measures designed to benefit communities and make them more resilient.

### ***Social Conditions: Cumulative Effects***

Because the BLM's mission is to manage resources and opportunities on lands it manages, it cannot directly address or attempt to resolve many social issues and trends facing bush communities in the BSWI area. These issues include fuel costs, opportunities for jobs and income, crime and mental health issues, education, or changes in population. However, BLM management can address some of these issues either incrementally or indirectly, including ways described in the economic conditions analysis above.

Opportunities such as the Donlin Gold Project could have a greater effect on jobs than any of the actions contained in the alternatives. The BLM can provide the greatest assistance to communities by protecting subsistence resources and access to them, supporting job and income opportunities where possible, and by taking actions consistent with being a good neighbor. These actions serve as a buffer against the effects of planned and future actions taken by other entities.

Table 3.10.2-3 identifies how management actions under the alternatives would affect both social and economic trends in the planning area.



**Table 3.10.2-3: Incremental Cumulative Impact to Economic and Social Conditions**

Trends and Forecasts of Economic and Social Conditions in consideration of past and present actions	Trends and Forecasts of Economic and Social Conditions in consideration of past and present actions (Alternative A)	Trends and Forecasts of Economic and Social Conditions in consideration of past and present actions (Alternative B)	Trends and Forecasts of Economic and Social Conditions in consideration of past and present actions (Alternative C)	Trends and Forecasts of Economic and Social Conditions in consideration of past and present actions (Alternative D)
<p>Cost of living in the planning area is higher and income is lower than averages for other places in Alaska and much higher than for the United States as a whole. The mixed cash-subsistence economy depends on protection of subsistence resources and access while facilitating and not foreclosing opportunities for jobs and economic development.</p> <p><b>Trend: The BLM has a relatively small amount of influence on social and economic conditions in planning area communities.</b></p>	<p>Alternative A lacks management direction to conserve subsistence values near communities and provides a lower level of resource conservation than the other alternatives. Alternative A does not act to reduce conflicts between subsistence and other resource uses and does not increase coordination with communities to address current or upcoming issues. It also does not provide the BLM with new avenues to work with communities on economic development.</p> <p><b>Trend: Where they exist, current problems with subsistence resources and access on BLM-managed lands would continue. Opportunities for jobs and economic development would not be hampered but they would not be facilitated by the BLM.</b></p>	<p>Alternative B provides the greatest level of protection for subsistence resources, which may mitigate risks associated with changes in cash economy, such as increasing fuel prices or decreasing federal and state budgets affecting employment and income in the planning area. This alternative may make access to some subsistence resources more difficult through required permitting and travel management restrictions, which could increase costs to households in the form of time and fuel but could decrease competition for these resources. Alternative B is slightly less likely than Alternative C to mitigate risk from global market volatility and changes in federal budgets as it has less flexibility in management measures, which may create undue economic burdens on households than Alternatives C or D.</p> <p><b>Trend: Where they exist, current problems with subsistence resources and access on BLM-managed lands would be likely to decrease. Opportunities for jobs and economic development could be hampered due to BLM resource protection but some types of economic opportunities would be facilitated.</b></p>	<p>Alternative C provides a high level of protection for subsistence resources, which may mitigate risks associated with changes in cash economy, such as changing fuel prices and changes in federal and state budgets affecting employment and income in the planning area. Alternative C, is likely to provide a greater level of access to subsistence resources through a reduced burden on permitting and fewer travel management restrictions, which would reduce costs to households in the form of time and fuel resources in comparison to Alternative B. Alternative C is likely to provide the highest level of mitigation from global market and unknowns in government budgets, by protecting subsistence resource values close to communities and providing flexibility in management measures that will not create undue economic burdens on households.</p> <p><b>Trend: Where they exist, current problems with subsistence resources and access would be likely to decrease on BLM-managed lands. The BLM would try to facilitate opportunities for jobs and economic development.</b></p>	<p>Alternative D provides more protection for provisioning of subsistence resources than does Alternative A, but less than Alternative C. Alternative D poses a higher risk to subsistence provisioning in proximity to villages given the lack of commercial guide limitations on quality, number allowed, business practices, and continues to allow for commercial hunting near villages. However, there would be greater potential for economic and other benefits of sport hunting operations to communities. Alternative D mitigates risk from global market volatility and changes in federal budgets slightly more than Alternative A. Making decisions on a case-by-case basis allows for a greater ability to adapt to changing conditions and community needs, but with greater uncertainty over the outcome.</p> <p><b>Trend: Where they exist, current problems with subsistence resources and access on BLM-managed lands would be likely to decrease. The BLM would try to facilitate opportunities for jobs and economic development.</b></p>

## 3.11 Subsistence

### 3.11.1 Summary

This section presents the potential effects from proposed management actions on subsistence activities in the planning area. As described in Appendix M of the BSWI Draft RMP/EIS, the planning area contains rural communities whose residents live a subsistence-based lifestyle that mixes the customary, traditional harvest of natural resources with an economic system that includes share, barter, and cash exchanges. A wide variety of wild fish, wildlife, and vegetation are harvested by subsistence users for myriad purposes, including food, fuel, arts and crafts, tools, and clothing. Management actions with the greatest likelihood to have substantial effects to availability of and access to subsistence resources include locatable mineral decisions, ROW development, and OHV access.

Of the three action alternatives described in Chapter 2 of the BSWI Draft RMP/EIS, Alternative B is the most restrictive and Alternative D is the least restrictive of the activities that would adversely affect subsistence resources. This would generally result in a management approach that would minimize competition and conflict between subsistence and other user groups more than the other alternatives. All alternatives would impact access, abundance, and availability of subsistence resources in some communities; although impacts under Alternative B would be of lesser magnitude and to a smaller geographic extent than the other alternatives. Alternative A, B, and C would also affect access to hunting, fishing, and harvesting subsistence use areas from OHV restrictions; there would be no effects to access from OHV restrictions for Alternative D.

Therefore, Alternative B would result in impacts of lesser magnitude and geographic extent than the other action alternatives. However, Alternative B is more restrictive than Alternatives C and D of overland subsistence travel.

Management actions that would benefit subsistence would further the purposes of Title VIII of ANILCA and align with the U.S. Department of the Interior's strategy of providing stewardship of land, surface water, streams, and shorelines and its goal of supporting tribal self-determination, self-governance, and sovereignty.

### 3.11.2 Methods of Analysis

Impact analyses and conclusions are based on the existing conditions that are described in Appendix M of the BSWI Draft RMP/EIS. The analysis area for subsistence includes the planning area—wholly or in part, Game Management Units 18, 19A, 19B, 27 19C, 19D, 20C, 21A, 21D, 21E, and 22A (BSWI Draft RMP/EIS, Map 3.5.2-1)—and an evaluation of the management decisions that could affect subsistence resources and thereby subsistence harvest practices (e.g., vegetation, fish, large mammals, small furbearers). This analysis uses quantitative and qualitative information to describe impacts on subsistence from other resources. Best professional judgment is used in evaluating effects on subsistence resources.

Additionally, analysis focused on the management actions that were seen as having the most potential for impacts to subsistence. GIS calculations were performed by overlaying available data for subsistence use areas with the following management decisions:

- Areas open to locatable mineral development (in areas of high and medium potential)
- OHV- travel management

- ROW exclusion or avoidance areas (for the alternatives where this was a factor)

Impacts thresholds were established for a quantitative and qualitative review to determine significant impacts (i.e., a positive finding for the ANILCA Section 810 Analysis [Appendix O]) for each community in each alternative. Determinations were then made according to the aggregated subsistence use category and by management decision. For the communities that lacked data or digitized data for a subsistence use category, available subsistence use data from neighboring communities that have similar subsistence use patterns was applied to the analysis. (Kling, 2018; Newell, 2018).

In determining the impacts threshold for quantitative analysis, for management actions (listed above) found to cover 10 percent or greater of the total subsistence use area for the community (regardless of ownership of land); a rebuttable presumption of significance was made. Areas with less than a 10 percent overlap could specifically affect individuals that use those areas but were presumed to have no significant impact. This was confirmed after a qualitative review. Management actions that do not overlap subsistence use areas were assumed to have no significant adverse effect (i.e., no positive finding). For the qualitative analysis a potentially significant impact was determined if the analyzed management action intersects a known travel route; closure would occur during the season in which the resource is harvested; and/or closure would impact a resource that is heavily relied upon by a community.

### **Nature and Types of Effects**

The types of effects to subsistence that could result from implementation of the RMP would be from actions that change rates of subsistence resource harvest, affect the access to subsistence resources, and whether there is resulting increased competition for subsistence resources. Actions could change the number of acres directly owned or managed by the BLM in the planning area. Lands that are disposed of would no longer be subject to BLM management, limiting the BLM's ability to protect resources and accommodate future activities. The creation of new withdrawals could have implications on subsistence resource protections in areas that are withdrawn. The addition of new BMPs and other stipulations and requirements (such as travel management) are also management actions that affect subsistence. The types of effects to subsistence that could result from management actions and the indicators used to evaluate them are shown below in Table 3.11.2-1

Layered protections for subsistence exist in Title VIII of ANILCA and federal and state regulations and are described further in Chapter 1 and Appendix E of the BSWI Draft RMP/EIS.

The nature and types of potential effects on subsistence is closely tied to potential effects on fisheries, vegetation, and wildlife resources used for subsistence purposes. For additional information, please see the discussion of effects in those sections.

**Table 3.11.2-1: Summary of Effects to Subsistence by Management Action**

Types of Effects	Management Actions	Indicators
<p>Impacts to subsistence resources would alter the traditional lifestyles of rural residents.</p>	<ul style="list-style-type: none"> <li>• Minerals Decisions in HVWs</li> <li>• Locatable Mineral Withdrawals</li> <li>• Areas Closed to Salable Minerals</li> <li>• Seeding and Planting for Reclamation/Restoration</li> <li>• Protection of vegetation from degradation</li> <li>• Effects from Wildlife Management Decisions:</li> <li>• Caribou and Moose habitat areas</li> <li>• Innoko Bottoms Priority Wildlife Habitat Area</li> <li>• Connectivity Corridors</li> <li>• Migratory Birds</li> <li>• Travel Management Decisions</li> <li>• UAS Uses</li> <li>• Providing Assistance with Cultural Tourism</li> <li>• Zones between Hunting Guide-Outfitter Operating Areas and Rural Communities</li> <li>• SSS Flora and Lichen Areas (Caribou Habitat)</li> <li>• Travel Management Decisions</li> <li>• BLM-permitted Surface Disturbance</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> <li>• Availability and access</li> <li>• Subsistence closures</li> </ul>
<p>OHV use could result in resource degradation and limit (restrict use) subsistence access.</p>	<ul style="list-style-type: none"> <li>• Effects from Travel and Transportation Management Decisions</li> <li>• Innoko Bottoms Priority Wildlife Habitat Area</li> <li>• All BSWI Lands Not Managed as TMUs, Conservation System Units, or Sensitive Resource Areas</li> <li>• Unalakleet Wild River Corridor</li> <li>• Travel Management Decisions</li> <li>• INHT NTMC TMA</li> <li>• Rohn Site Travel Decisions</li> <li>• Lands Managed for Wilderness Characteristics</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> <li>• Availability and access</li> <li>• Subsistence closures</li> </ul>
<p>Lack of regulation of motorized use within lands with wilderness characteristics use could result in resource degradation.</p>		<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> </ul>

Types of Effects	Management Actions	Indicators
Subsistence use of forest products would be allowed in certain places within the planning area.	<ul style="list-style-type: none"> <li>• Permitted Commercial Woodland Harvesting Areas</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> <li>• Availability and access</li> <li>• Subsistence closures</li> </ul>
Mineral entry could result in impacts to distribution and abundance of subsistence resources, and access to subsistence resources and use areas.	<ul style="list-style-type: none"> <li>• Locatable Mineral Withdrawals</li> <li>• Areas Closed to Salable Minerals</li> <li>• Areas Closed to Leasing</li> <li>• NSO Leasable Designation</li> <li>• Transportation Management Decisions</li> <li>• Minerals Decisions</li> <li>• Mineral Decisions in the INHT NTMC</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> <li>• Availability and access</li> </ul>
Increased use of trapping cabins could result in increased competition to local subsistence users.	<ul style="list-style-type: none"> <li>• INHT SRMA</li> <li>• BSWI ERMA – OHV</li> <li>• Unalakleet Wild River Corridor – Travel Decisions</li> <li>• User Conflicts</li> <li>• Recreation Management Area Designations</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> <li>• Availability and access</li> <li>• Subsistence closures</li> </ul>
Casual and subsistence OHV use could result in resource impacts within Conservation System Units. Summer cross-country OHV use could result in resource degradation and impact ORVs.	<ul style="list-style-type: none"> <li>• Effects from Recreation and Visitor Services Management Actions</li> <li>• INHT SRMA</li> <li>• BSWI ERMA – OHV</li> <li>• Unalakleet Wild River Corridor – Travel Decisions</li> <li>• User Conflicts</li> <li>• Recreation Management Area Designations</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> </ul>
Restrictions could inhibit subsistence access.	<ul style="list-style-type: none"> <li>• ROW Exclusion and Avoidance Areas</li> <li>• Permits and Leases</li> <li>• Land Acquisitions</li> <li>• Disposals</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution and abundance of subsistence resources within the planning area</li> <li>• Current and past use of resources within the planning area</li> <li>• Availability and access</li> <li>• Subsistence closures</li> </ul>

## Assumptions

The following assumptions were used to assess impacts associated with subsistence.

- The BLM will continue to have a major role in the management of public lands important to subsistence resources over the life of the RMP. The demand for subsistence resources could increase. Competition for resources could increase, especially those that receive high use from all resource users, because more lands would be private and recreational use of BLM-managed lands could increase.

- Subsistence harvest patterns and practices occur year-round following the seasonal cycles of the target resources. Subsistence practices will adapt and change based on the natural variations in population trends, migration patterns, and species shifts. Analysis is based on the current rates of harvest data, seasonal round and areas of use, and traditional use areas. As indicated (BSWI Draft RMP/EIS, Map 3.5.2-1), the primary subsistence harvest areas are along river corridors in the planning area.

### **Incomplete or Unavailable Information**

There are limited data available for places or areas significant to, and for subsistence use in, the planning area. Studies of patterns of use such as seasonal cycles, use areas, and resources harvested have been conducted by ADF&G Division of Subsistence and other agencies and organizations. Available data are primarily in technical reports by the ADF&G Division of Subsistence but are limited in the data sets and may be reflective only of use areas when the data were collected or may represent historical use areas. The lack of data for a community does not indicate that subsistence harvests lack importance in an area. Not all species are included in the ADF&G surveys, and only a few communities in the state are surveyed each year.

The discussion of harvest information in the following sections is supplemented by information that is available from recent ADF&G technical papers and from publicly available information. Because resource distribution and subsistence use areas change over time, information on subsistence use areas that was gathered during the scoping period, alternatives outreach, and ACEC nominations are important supplements.

### **Standard Operating Procedures and Best Management Practices**

The impact analysis takes into account the SOPs and BMPs that could be implemented by the BLM, which are included in Appendix K.

#### **3.11.3 Effects Analysis**

Management actions proposed for the following resources would not result in effects to subsistence:

- Air Quality and AQRVs
- Soils
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Hazardous Materials and Health and Human Safety

Management actions for resources that result in effects to subsistence are discussed in the following sections.

### **Subsistence: Effects from Water Resources and Fisheries Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topic were considered:

- Minerals Decisions in HVWs

***Effects under Alternative A***

Alternative A does not identify HVWs. Direct and indirect effects under this alternative would be highly variable and depend on the type of activities/authorizations permitted. Surface-disturbing activities have the potential to alter stream processes and degrade fish habitat, which could adversely affect water and fish resources. The duration of these impacts would be highly variable depending on the activity and the BMPs that are implemented. The BLM would continue to consider protection of floodplains and crucial salmon spawning habitat when implementing actions, reducing the potential for habitat loss or degradation due to surface-disturbing activities, human disturbance, and reduction in salmon. BMPs include the protection of streams and associated fish habitats, including avoidance of known spawning habitat and migration/spawning time periods.

Under Alternative A, mineral leasing is closed in essential riverine habitat to protect anadromous spawning areas. The closed areas equal 12,857 miles of streams (39 percent of total streams on BLM-managed land) and 20,430 acres of waterbodies (24 percent of total waterbodies on BLM-managed land). The geographic extent of management actions under Alternative A would be less than under the action alternatives because HVWs would not be defined or designated. Therefore, the amount of fisheries resources protected as HVWs would also be less than under Alternatives B or C.

There are no minerals decisions in HVWs under Alternative A.

***Effects Common to All Action Alternatives***

Under all of the action alternatives, subsistence users would benefit from efforts to protect water resources and fisheries. Maintenance of healthy watersheds, riparian areas, and associated fish habitats would support continued harvests of subsistence resources including fish, waterfowl, and furbearers. Implementation of BMPs and mitigation measures would also protect aquatic resources important to subsistence users.

Under all of the action alternatives, the BLM would complete a watershed-level cumulative impact analysis of all disturbances as part of permitting for most surface-disturbing activities. The analysis would allow the BLM to better manage habitats that are important subsistence use areas at the watershed scale because the BLM would coordinate and share information with USFWS and manage for connectivity of neighboring NWRs.

Under all of the action alternatives, the BLM would manage fish habitat to maintain self-sustaining populations of species used for subsistence. The BLM would also cooperate with tribal organizations and rural communities for efficient and effective program implementation for subsistence species conservation.

***Effects under Alternative B***

Alternative B would protect more river miles in HVWs than Alternatives C and D, which would result in fewer adverse impacts on water quality and fisheries than the other alternatives. Any proposals to develop land, water, or resources in the 100-year floodplain associated with high resource values 12,982 river miles (39 percent of stream miles on BLM-managed lands), medium-high resource values (1,906 stream miles [6 percent of stream miles on BLM-managed lands]) and medium resource values of 6,494 stream miles (20 percent of stream miles on BLM-managed lands) would be required to demonstrate that the development would not diminish the quality or diversity of habitats needed for fish and wildlife

populations, including those used for subsistence. There is the potential for direct effects to unknown spawning habitat in regions due to the lack of information regarding spawning areas in some regions. Any management action within HVWs apply to these values including appropriate buffers (BSWI Draft RMP/EIS, Map 2-2), extensively limiting surface-disturbing activities from minerals, travel management, and realty management actions, which would result in fewer impacts on water quality and ultimately fisheries compared to other alternatives

Compared to the other action alternatives, Alternative B would have the greatest amount of land receiving additional protection as HVWs and management actions providing the greatest amount of incidental benefit to fish species that are subsistence resources. Alternative B would also have more restrictions on mineral development in HVWs by maintaining the quality and diversity of areas of high fish and wildlife habitat value and river-based subsistence use from potential mineral development, which if not implemented could displace or impede access to subsistence uses, than Alternative C or D. Alternative B would result in long-term improvement to distribution and abundance of subsistence resources in HVWs in the planning area Alternative B would result in long-term improvement to distribution and abundance of subsistence resources in HVWs in the planning area and provides the most protection for streams/acres of waterbodies available for development associated with water resources actions among the other alternatives.

#### ***Effects under Alternative C***

Alternative C proposes HVWs for watersheds with a high resource value of 12,982 river miles (39 percent) and medium-high resource value of 1,906 river miles (6 percent). Under Alternative C, any proposals to develop land, water, or resources in the 100-year floodplain associated in HVWs would be required to demonstrate that the development would not diminish quality and diversity of habitats needed for fish and wildlife populations, including those used for subsistence.

Certain protections that would apply to the entire planning area under Alternative B would only apply to HVWs under Alternative C, including avoidance of permanent structures in the 100-year floodplain and restrictions on surface-disturbing activities or permanent structures in the 100-year floodplain of fish-bearing streams. Therefore, the incidental benefits to subsistence fish resources would be less than under Alternative B. Compared to Alternative B, this Alternative has a greater potential to impact fish and aquatic resources due to fewer exclusions to surface-disturbing activities in or around streams or waterbodies. Within HVWs (with the exception of locatable and salable mineral development and permitted activities by other agencies [ADF&G]) and subsistence users for permitted camps, there would be long-term improvement to distribution and abundance of subsistence resources by maintaining the quality and diversity of areas of high fish and wildlife habitat value and river-based subsistence use from potential mineral development although to a lesser magnitude and geographic extent than Alternative B.

#### ***Effects under Alternative D***

Alternative D proposes protection of a high resource value of 12,982 river miles (39 percent of stream miles on BLM-managed lands). As with the other action alternatives, any proposals to develop land, water, or resources within the 100-year floodplain of HVWs would be required to demonstrate that the development would not diminish quality and diversity of habitats needed for fish and wildlife populations, including those used for subsistence. Alternative D would have fewer restrictions on mineral development in HVWs than Alternatives B or C.



Alternative D would provide the least amount of protection for fish and aquatic resources and would rely on the operator to characterize the potential of streams for reclamation. Additionally, because watersheds with medium-high and medium resource values would not be protected as HVWs as proposed in Alternatives B and C, resources in these areas could degrade due to development activities. They would still be subject to the same SOPs and BMPs as Alternative B and C that could be implemented by the BLM as shown in Appendix K of the BSWI Draft RMP/EIS.

### **Subsistence: Effects from Grazing Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topic were considered:

- SSS Flora and Lichen Areas (Caribou Habitat)
- Travel Management Decisions
- BLM-permitted Surface Disturbance
- Seeding and Planting for Reclamation/Restoration

#### ***Effects under Alternative A***

Current management plans do not specify requirements for Grazing Management Plans. Alternative A would result in no change to the current extent, duration, or intensity of livestock grazing and the relationship to subsistence resources in the planning area compared to current practices. Crucial caribou habitat would continue to be protected. While authorized, the current level of grazing is extremely low. Of the areas open to grazing, approximately 19 percent is considered ecologically suitable, meaning it has at least 20 percent lichen cover by definition based on the classification classes from the REAs. Within the open areas, of the areas currently permitted for reindeer grazing, approximately 40 percent is considered ecologically suitable.

#### ***Effects Common to All Action Alternatives***

There would be no effects common to all action alternatives.

#### ***Effects under Alternative B***

All BLM-managed public lands within the planning area would be closed to grazing. Grazing would not be permitted under Alternative B, so there would be no impacts to subsistence resources from grazing management actions.

#### ***Effects under Alternative C***

In Alternative C, 1,565,761 acres would be open and considered suitable for grazing, or approximately 12 percent of the planning area. Permits would be authorized on a case-by-case basis. Under this alternative 617,422 acres are closed to grazing. Proposed grazing operations must submit a grazing permit application that includes a comprehensive Grazing Management Plan or a Range Conservation Plan. The areas closed to grazing (areas with important fisheries and watersheds values in the Nulato River watershed, Unalakleet Wild River Corridor, and INHT NTMC) would not sustain vegetation community changes due to grazing because no grazing permits would be considered or issued. HVWs would be

treated similarly in that they would be closed to grazing until grazing standards and guidelines for riparian vegetation health are developed; grazing in these areas would then be determined on a case-by-case basis.

To prevent adverse interactions between caribou and grazing permit-based reindeer herds, grazing permits would be issued on a case-by-case basis in known caribou habitat. For this alternative, ecological condition would take into account ecological suitability for grazing and reduce the potential for adverse changes in vegetation composition, structure, or function. New applications submitted under the 1937 Reindeer Industry Act and the Alaska Livestock Grazing Act of 1927 would be considered on a case-by-case basis if the applicant can: (1) provide a management plan which includes management objectives and how the applicant would ensure separation between domestic and wild animals and (2) conduct all land health monitoring activities as determined appropriate by the BLM AO.

### ***Effects under Alternative D***

There would be no requirement for a Grazing Management Plan or a Range Conservation Plan when applying for a grazing permit. New applications submitted under the 1937 Reindeer Industry Act and the Alaska Livestock Grazing Act of 1927 would be considered in the planning area on a case-by-case basis. Under Alternative D, the area open to grazing and considered ecologically feasible would be 2,635,231 acres or approximately 20 percent of the planning area. Effects under Alternative D would be the same as those described under Alternative C with two differences. The first difference is that grazing would be permitted in areas of the Nulato River watershed that are closed under Alternative C, Unalakleet Wild River Corridor, and INHT NTMC only if it is determined that the proposed permitted grazing is consistent with maintenance of the values for which these areas were deemed important or designated and with the historical and cultural setting of the INHT NTMC. The second difference is that no caribou avoidance would be required under Alternative D.

### **Subsistence: Effects from Vegetation Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topic were considered:

- Protection from Degradation
- Seeding and Planting for Reclamation/Restoration

### ***Effects under Alternative A***

Existing land use plans provide some protections for floodplains, wetlands, riparian areas, threatened and endangered plant habitat, and caribou habitat (lichen-rich areas) and provide guidance for sustainable yield of forest resources that would benefit vegetation communities. Alternative A does not have management direction specific to seeding and planting for reclamation and/or restoration activities. There would be no additional management specific to vegetation or special status plants in the planning area that would benefit subsistence resources. Under Alternative A, no acres of land would be protected by vegetation regulations, and there would be no formal program for controlling invasive weeds.

### ***Effects Common to All Action Alternatives***

Vegetation management decisions would benefit subsistence resources by ensuring that habitats support healthy, productive, and diverse populations of native plants and animals. Actions to minimize the footprint of BLM-permitted surface-disturbing activities, limit the magnitude or duration of impacts, and

preserve vegetation would benefit subsistence users and use areas in the development areas by potentially reducing associated habitat loss and fragmentation.

### ***Effects under Alternative B***

OHV use limitations, trail relocation, trail hardening, or trail closure implemented to reduce or eliminate degradation to SSS flora habitats (including dwarf shrub and lichen habitats [approximately 2,711,156 acres or 20 percent of BLM-managed land in the planning area] or sparse vegetation types [approximately 139 acres; less than 1 percent of BLM-managed land in the planning area]) would protect vegetation in these areas from further degradation. Under Alternative B, only native seeds and propagules would be used for reclamation and restoration and could include species that are used for subsistence, which would help maintain the distribution and abundance of subsistence resources in the planning area.

### ***Effects under Alternative C***

Protections for SSS flora habitats (including dwarf shrub and lichen habitats and sparse vegetation types) from OHV use would be the same as under Alternative B. Alternative C recommends the use of native species for revegetation of disturbed areas but would allow nonnative seed and propagules to be considered if applicable for the climatic condition and ecosystem function and if native plant species were not available or feasible. The use of nonnative plant species for restoration could lead to an adverse effect to subsistence users if reduction of the availability of plants traditionally used for subsistence purposes occurred and therefore affected harvest rates of traditionally used resources.

For example, subsistence users could respond to a decrease in the availability of an edible plant by harvesting more of another edible resource. However, this would be limited to a small portion of the planning area and would not necessarily coincide with vegetation subsistence harvest areas.

### ***Effects under Alternative D***

No protections for SSS flora habitats and lichen areas would be implemented if these areas become degraded by OHV use, and these areas could therefore be subject to further degradation. Under Alternative D, revegetation of disturbed areas would focus on using plant species that are appropriate for the climatic condition and ecological function, including nonnative plant species. There could be an adverse effect to subsistence users if native plants important for subsistence uses were not considered in revegetating areas, limiting the availability of these plants for subsistence harvest and use compared to Alternatives B and C. However, subsistence users could respond to a decrease in the availability of an edible plant by harvesting more of another edible resource. This would be limited to a small portion of the planning area and would not necessarily coincide with vegetation subsistence harvest areas.

## **Subsistence: Effects from Wildlife Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- Caribou and Moose habitat areas
- Innoko Bottoms Priority Wildlife Habitat Area
- Connectivity Corridors
- Migratory Birds

***Effects under Alternative A***

Under Alternative A, the BLM would continue to follow all laws, regulations, and policies, which pertain predominantly to wildlife that are used as subsistence resources. The BLM would consider impacts to wildlife used as subsistence resources when evaluating actions in the planning area that could affect subsistence resources and would implement mitigation as needed on a case-by-case basis.

Under Alternative A, the BLM would also consider caribou and moose in its management of resource uses in the planning area although no specific management actions are identified. Existing conditions would continue under Alternative A. The BLM would consider impacts to wildlife used as subsistence resources when evaluating actions in the planning area that could affect subsistence resources and would implement mitigation as needed on a case-by-case. Alternative A could have a long-term impact on migration and species movement if future development occurs in areas where it would fragment species ranges and reduce habitat connectivity. However, the proposed connectivity corridors under Alternatives B and C occur in areas that do not have medium or high LMP, so future development may have a low impact on migration for species important to subsistence under this alternative even without the corridors.

***Effects Common to All Action Alternatives***

Under all of the action alternatives, management of wildlife resources and mitigation of impacts to wildlife would benefit subsistence users through maintenance of ecosystem functions and the quantity and quality of habitat to support healthy populations of wildlife. All of the action alternatives would include management considerations that focus on wildlife species that are important subsistence resources. Wildlife that is subsistence resources would be managed to sustain wild resource population levels to provide for continued rural economic opportunity and support subsistence lifestyles.

Under all of the action alternatives, the BLM would coordinate with the ADF&G to use predator control as a tool for managing the long-term sustainability of predator and prey populations. Additionally, the BLM would use adaptive management that considers climate change and shifts in habitat or timing of essential portions of subsistence species' life cycles.

The BLM would implement numerous SOPs and BMPs designed to protect sensitive species and habitats, which would benefit subsistence resources and users. The SOPs and BMPs include buffer requirements, design features, seasonal restrictions, aircraft height restrictions, and location restrictions for activities with the potential to impact species and habitats of management concern from habitat loss, degradation, and fragmentation; noise and human disturbance; spread of diseases; and direct harm of individual species. Decisions that would benefit wildlife subsistence species include minimizing the potential for disease transmission; domestic sheep, goats, alpacas, llamas, and other similar species in Dall sheep habitat would be reviewed on a case-by-case basis.

The alternatives would vary in terms of the timing, extent, and magnitude of restrictions on mineral activities, construction, vegetation clearing, and surface-disturbing activities in caribou and moose habitat and riparian areas and the extent of land receiving additional protections through designation as the Innoko Bottoms Priority Wildlife Habitat Area, and in the number of connectivity corridors that the BLM would manage to maintain wildlife movement between two NWRs.

***Effects under Alternative B***

Management actions under Alternative B would provide the most protections to wildlife and thereby subsistence resources. Management actions would target important species and habitats in the planning

area. The geographic extent of these actions is summarized in Table 3.11.3-1, although in many cases these areas overlap. Note that Table 3.11.3-1 does not take into account management for other resources or resources uses that may also provide protections to wildlife. Alternative B offers more restrictions than Alternative C or D on construction and mineral development, which could interfere with or displace subsistence activities in migratory bird habitat, the Innoko Bottoms Priority Wildlife Habitat Area, and in moose and caribou calving and wintering habitat. Fall hunting in the area for moose and waterfowl is largely by Yukon and Innoko River village residents using river boats. A winter subsistence moose hunt occurs in February and March using snowmobiles. Moose are an important subsistence resource for village residents of the area. Moose populations in the Innoko Bottoms area are recognized as having some of the highest population densities in the State of Alaska by both Alaska resident and non-resident sport and subsistence hunters.

**Table 3.11.3-1: Extent of Wildlife Management Actions Influencing Subsistence under Alternative B**

Species/Habitat	Geographic Extent on BLM-Managed Lands in Planning Area	Associated Management Actions
Caribou and Moose calving and wintering habitats	10,251,780 acres (76 percent)	Mineral development, seasonal use restrictions
Innoko Bottoms Priority Wildlife Habitat Area	236,556 acres (2 percent)	Mineral development, Surface-disturbing activities, ROW exclusion, airboats/hovercraft
Connectivity Corridors	2 corridors totaling 845,670 acres (6 percent)	Mineral development, Surface-disturbing activities, ROW exclusion areas, airboats/hovercraft
Riparian habitat	2,290,454 acres (17 percent)	ROW avoidance, Mineral development
Other Migratory Bird Habitat	Not quantified	Surface-disturbing activity – Seasonal restrictions

The geographic extent of protective wildlife management actions under Alternative B would be greater than under Alternatives C and D. Wildlife and SSS in the Innoko Bottoms Priority Wildlife Habitat Area and two proposed connectivity corridors (North Connectivity Corridor and South Connectivity Corridor; see BSWI Draft RMP/EIS, Map 3.2.7-3) would receive protections from proposed locatable mineral withdrawal of these areas, would be designated as NSO for leasable development, closed to salable development, and designated as NSO for surface-disturbing BLM-permitted activities. The corridors would also be ROW exclusion areas, and there would be restrictions on casual use airboats and hovercraft.

These management actions would reduce disturbance to wildlife and provide protection to these key habitats by reducing the potential for habitat loss, degradation, and fragmentation. Connectivity corridors are designed to sustain and maximize abundance and landscape-scale biodiversity by maintaining general habitat connectivity, minimizing habitat fragmentation and loss, and avoiding or mitigating barriers to wildlife movement within the corridors (Magness et al. 2018). The corridors are expected to benefit a wide range of species that are important to subsistence. The South Connectivity Corridor includes a portion of the Innoko Bottoms Priority Wildlife Habitat Area and would therefore provide management protections to the variety of species in this area, including waterfowl, moose, and wood bison. The North Connectivity Corridor includes a portion of the winter range of the Western Arctic Caribou Herd; this

corridor would provide protected habitat and allow for movement of caribou in this herd near the southern end of their range. Creating two connectivity corridors between the Innoko and Yukon Delta NWRs would allow for landscape connectivity at multiple locations, provide more options for movement, and benefit a greater number of wildlife than a single connectivity corridor. Therefore, the management actions would benefit a wide range of species important to subsistence activities. The total area managed as connectivity corridors under Alternative B would be 845,670 acres (6 percent of the planning area). These management actions would maintain the existing distribution and abundance of bird and terrestrial wildlife subsistence resources in the planning area.

### ***Effects under Alternative C***

Alternative C would restrict development on BLM-managed land in one connectivity corridor totaling 576,038 acres (4 percent of the planning area). Management actions for the connectivity corridor under Alternative C would be less restrictive for locatable and salable mineral development (which would be allowed) than those under Alternative B. Alternative C would maintain the long-term benefits to wildlife movement in the Innoko Bottoms area that were discussed for the South Connectivity Corridor under Alternative B but would not provide the same management protections in the area identified as the North Connectivity Corridor, which intersects the range of the Western Arctic Caribou Herd. One connectivity corridor would still allow for landscape connectivity between the Innoko and Yukon Delta NWRs but would offer fewer options for movement across the landscape and would potentially benefit fewer wildlife subsistence resources than Alternative B. Because neither proposed connectivity corridor under Alternative B occurs in an area of medium or high LMP, the probability of future development in key movement areas may be low, and having only one corridor under Alternative C may not have a sizable difference on wildlife movement and habitat connectivity. Without information regarding the existing migration routes in the vicinity of the two corridors, it is difficult to assess the impacts of one location versus another. It is also difficult to evaluate the effectiveness of the proposed management actions without knowing how existing migration are currently affected by the types of activities that would be restricted. However, in general, having one corridor rather than two may increase the distance subsistence hunters would have to travel to reach the corridor. This in turn may reduce rates of subsistence harvest of wildlife species in this area as hunters would have to travel farther to be successful.

Alternative C offers more restrictions than Alternative D and fewer restrictions than Alternative B on construction and mineral development activities, which could interfere with or displace subsistence activities in migratory bird habitat, the Innoko Bottoms Priority Wildlife Habitat Area, and in moose and caribou calving and wintering habitat. Restrictions on casual use airboats and hovercraft would be the same as those under Alternative B, so there would be no difference in the potential reductions in auditory disturbance to wildlife and subsistence resources from these types of vehicles/boats. Alternative C would be slightly less protective than Alternative B and have a greater risk for disturbance to subsistence resources during the breeding season during certain activities, unless they were addressed through specific SOPs and BMPs. Under Alternative C, protections for wildlife that are important subsistence resources from management actions would be of slightly lower magnitude and smaller geographic extent than those under Alternative B (Table 3.11.3-2).

**Table 3.11.3-2: Extent of Wildlife Management Actions Influencing Subsistence under Alternative C**

Species/Habitat	Geographic Extent on BLM-Managed Lands in Planning Area	Associated Management Actions
Caribou and Moose calving habitat	540,896 acres (4 percent)	Mineral development, seasonal use restrictions
Innoko Bottoms Priority Wildlife Habitat Area	236,556 acres (2 percent)	ROW avoidance, airboats/hovercraft
Connectivity Corridors	1 corridor, 576,038 acres (4 percent)	Surface-disturbing activities, ROW avoidance, airboats/hovercraft, case-by-case salable mineral development
Riparian habitat	2,290,454 acres (17 percent)	ROW avoidance, mineral development
Other Migratory Bird Habitat	Not quantified	Surface-disturbing activity – seasonal restrictions

For caribou and moose, which are important subsistence resources, the management actions pertaining to leasable minerals and construction would apply only to calving habitat. Therefore, while caribou and moose would be protected during the breeding period, they could be disturbed in their crucial winter habitat areas, with disturbances potentially causing increased energy expenditures and stresses on wintering populations, which could result in decreased survivorship. This in turn can affect levels of subsistence hunting success and rates of harvest and sharing. This management would reduce potential impacts to wildlife over a much smaller geographic extent than under Alternative B, at only 4 percent of the planning area, which is 72 percent less. However, due to low potential for leasable development in the planning area, the potential for these impacts is low. In addition, although the Innoko Bottoms Priority Wildlife Management Area and South Connectivity Corridor would be open to locatable mineral development under Alternative C, there is no medium or high LMP in that area, so potential impacts would be low based on low likelihood for mineral development.

#### ***Effects under Alternative D***

Alternative D offers fewer restrictions than either Alternative B or C (Table 3.11.3-3) on construction and mineral development, which could interfere with or displace subsistence activities in migratory bird habitat, the Innoko Bottoms Priority Wildlife Habitat Area, and moose and caribou calving and wintering habitat. Similar to Alternative A, the BLM would not manage connectivity corridors under Alternative D, but the proposed connectivity corridors under Alternatives B and C occur in areas that do not have medium or high LMP, so future development may have a low impact on migration under this alternative even without the connectivity corridors. Fewer protections would exist for caribou and moose, particularly during the winter use period, during which there would be no additional protections beyond those described for all action alternatives and the BMPs/SOPs listed in Appendix K. For the Innoko Bottoms Priority Wildlife Habitat Area, management actions pertaining to mineral decisions and ROWs would be the same as those under Alternative C, and the reduced potential for impacts to fish, wildlife, and SSS from disturbance and habitat loss and fragmentation from mineral development and ROWs would also be the same. However, unlike Alternatives B and C, there would be no restrictions on casual use airboats and hovercraft and therefore no reduction in the potential for impacts to waterbirds and other species from associated disturbance. Because restrictions and mitigations for migratory birds would be determined on a case-by-case basis, it is difficult to assess the difference in impacts to migratory birds relative to other alternatives. Alternative D would be less protective than Alternatives B and C.

**Table 3.11.3-3: Extent of Wildlife Management Actions Influencing Subsistence under Alternative D**

Species/Habitat	Geographic Extent on BLM-Managed Lands in Planning Area	Associated Management Actions
Innoko Bottoms Priority Wildlife Habitat Area	236,556 acres (2 percent)	Mineral development, seasonal use restrictions, ROW avoidance
Riparian Habitat	2,290,454 acres (17 percent)	Case by case
Other Migratory Bird Habitat	No information	Surface-disturbing activity – case by case

**Subsistence: Effects from Nonnative Invasive Species Management Decisions**

There are no alternative-specific management actions for NNIS; therefore, impacts from Alternatives B, C, and D are discussed in combination.

***Effects under Alternative A***

Control of NNIS would continue to be required under applicable federal, State, county, and municipal regulations. Known invasive species control work has been performed at the Rohn cabin and the Nixon Fork Mine. There are no other known organized control or eradication efforts underway on known NNIS on BLM-managed land in the planning area. Under Alternative A, there would be no formal program for controlling invasive weeds throughout the planning area. Under Alternative A, NNIS would continue to alter the habitats of plants and animals harvested for subsistence.

***Effects Common to All Action Alternatives***

Invasive species can alter vegetative communities and fish and wildlife habitat, which can impact subsistence resource populations. Invasive species such as Elodea can take over waterways and impede subsistence-related travel via floatplane or boat. Under all of the action alternatives, NNIS management would reduce the potential for spread of NNIS throughout the planning area, which would help maintain the distribution and abundance of subsistence resources in the planning area. However, vegetation treatments to eliminate some species could adversely affect subsistence resources temporarily while plants become established.

**Subsistence: Effects from Lands with Wilderness Characteristics Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- Acres Managed to Protect Wilderness Characteristics as a Priority over Other Resource Values and Multiple Uses
- Acres Managed to Emphasize Other Resource Values and Multiple Uses while Applying Management Restrictions to Reduce Impacts on Wilderness Characteristics

***Effects under Alternative A***

Wilderness characteristics are not addressed under Alternative A. Therefore, there would be no effects to subsistence resources or users associated with management pertaining to lands with wilderness characteristics. Existing conditions would continue.



***Effects Common to All Action Alternatives***

There are no effects common to all of the action alternatives because areas that are managed for wilderness characteristics as a priority. The alternatives would vary in terms of area of lands managed for wilderness characteristics as a priority, area of lands managed to emphasize resource values and multiple uses, and the extent and magnitude of management restrictions in these areas that could reduce the potential for impacts to subsistence resources from various land uses.

***Effects under Alternative B***

Under Alternative B, 277,489 acres (2 percent) would be managed for wilderness characteristics as a priority. Management restrictions to reduce impacts on wilderness characteristics in these areas would also limit disturbance to fish, wildlife and SSS that are important to subsistence and degradation of habitats from land uses such as OHV use, facility construction, wood cutting and other forms of vegetation manipulation, and some types of mineral development. Additionally, actions to monitor and assess climate change impacts on current wildlife corridors and allocations for lands managed for wilderness characteristics based on predicted shifts in wildlife corridors would benefit subsistence resources by preserving corridors over the long term. Lands managed for wilderness characteristics as a priority under this alternative would overlap caribou wintering habitat (180,158 acres), and moose calving (18,757 acres) and wintering (26,100 acres) habitat. Therefore, it is expected that there would be a reduction in potential impacts to these wildlife habitats from various land uses as a result of wilderness management under this alternative.

Additionally, the BLM would manage 12,040,490 acres (89 percent of the planning area) to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. This management would also reduce the potential for impacts to wildlife subsistence resources and that are associated with lands with wilderness characteristics from various land uses, but to a lesser degree than lands managed for wilderness characteristics as a priority, because land uses with the potential to impact wildlife would be allowed in these areas. Lands managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics under this alternative would overlap a wider range of important wildlife habitat areas, although the magnitude of effects as far as reduced potential for impacts would be lower. This management category would affect caribou calving habitat (160,096 acres) and wintering habitat (8,956,098 acres), moose calving habitat (362,042 acres) and wintering habitat (868,707 acres), Audubon Important Bird Areas (314,297 acres), the Innoko Bottoms area (236,556 acres), muskox range (3,289,736), and wood bison range (3,362,942 acres).

***Effects under Alternative C***

Under Alternative C, no land would be identified as lands managed for wilderness characteristics as a priority, and 8,105,979 acres (60 percent of BLM-managed lands in the planning area) would be managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. This management would also reduce the potential for wildlife and subsistence in these areas from various land uses, but to a lesser degree than under Alternative B. Important wildlife habitats to subsistence that overlap this land management designation would be the same as those under Alternative B, with either the same or lower geographic extent of overlap. This

management category would affect caribou calving habitat (160,096 acres) and wintering habitat (5,881,286 acres), moose calving habitat (304,906 acres) and wintering habitat (717,457), Audubon Important Bird Areas (217,545 acres), the Innoko Bottoms area (236,555 acres), muskox range (2,053,738) and wood bison range (2,418,190 acres). Management under this alternative would have the potential to reduce impact to wildlife and subsistence resources in these important habitat areas from various land uses. However, reduced impacts associated with use restrictions and wildlife corridor planning would not occur under this alternative.

### ***Effects under Alternative D***

Under Alternative D, no acres would be identified as lands managed for wilderness characteristics as a priority or managed to emphasize other resource values and multiple uses while applying management restrictions to reduce impacts on wilderness characteristics. Similar to Alternative A, there would be no effects to fish, wildlife and SSS that are subsistence resources associated with management pertaining to lands with wilderness characteristics.

### **Subsistence: Effects from Wildfire Management Decisions**

There are no alternative-specific management actions for this resource; therefore, impacts from Alternatives B, C, and D are described in combination below.

### ***Effects under Alternative A***

Under Alternative A, prescribed and natural fires are recognized as a tool to maintain moose habitat which is an important subsistence resource. The use of wildland fire may become more frequent in moose habitat under Alternative A, resulting in fuels treatments being used as a tool to maintain natural vegetation composition that is in turn important to species that are important subsistence resources.

Under Alternative A, the BLM would continue to follow all laws, regulations, and guidance pertaining to wildland fire management and would follow the applicable BLM wildland fire management direction for the planning area. While there are no specific management actions stipulated under this alternative, managing wildland fire in the planning area according to the goals and objectives identified in the 2005 Land Use Plan Amendment Environmental Assessment for Wildland Fire and Fuels Management for Alaska (BLM 2005) would reduce the risk of human-caused fires in the planning area and associated short- and long-term impacts to fish, wildlife and SSS habitat through direct mortality and loss or alteration of habitat. ES&R plans would help rehabilitate fish, wildlife and SSS habitat following burns, which could reduce the intensity and duration of impacts from fire. Use of wildland fire to meet wildlife management objectives would also benefit fish, wildlife and SSS habitat. These actions would not change the amount of wildlife habitat in the planning area but could minimize short- and long-term reductions in late-successional habitat types in certain areas. However, fire suppression actions may result in a deviation from the natural fire regime which may affect fish, wildlife, and SSS habitat. This alternative does not specify the amount of BLM-managed land in the planning area is protected from fire or allowed to burn. The amount of wildlife habitat allowed to burn may increase or decrease, depending on where natural wildland fires occur and what fish, wildlife and SSS habitats are present in those areas.

### ***Effects Common to All Action Alternatives***

Wildfire management could impact wildlife or wildlife habitat that could in turn impact subsistence resources and use areas if there was a reduction in subsistence resource population and the distribution of subsistence species changes patterns of traditional harvest use area(s). If wildland fire changes the routes into an area, it may become easier for non-local users to access subsistence use areas and increase the potential for competition of the resource.

Wildland fire management under all action alternatives would be similar to that under Alternative A, although there would be BMPs/SOPs and additional management actions implemented that may benefit fish, wildlife and SSS. These actions include measures to prevent impacts to fish, wildlife and SSS from wildland fire suppression efforts, fuel breaks, and ES&R activities. Additionally, the BLM would monitor and measure the interactions between climate change, wildland fire, and resource objectives (including wildlife), and would adapt fire management strategies as necessary to protect resources. Strategies that pertain to lichen forage to changes in fire regime could allow the BLM to better manage caribou winter habitat in the long term.

### **Subsistence: Effects from Forestry and Woodland Products Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topic were considered:

- Permitted Commercial Woodland Harvesting Areas

Forests and woodlands comprise approximately 35 percent of the planning area. Removing both living and dead forest products from these areas can reduce the components of wildlife physical habitat for subsistence resources and remove food sources such as berries, seeds, and lichens. The magnitude and extent of the impact to subsistence would depend on the amount of habitat that was removed and the availability of these habitat components in nearby areas.

### ***Effects under Alternative A***

Commercial harvest of forest and woodland products in the planning area is limited but could increase with increasing demand. Under Alternative A, 1,644,588 (12 percent of the planning area) acres would continue to be open to commercial harvest, with permits granted on a case-by-case basis for 10,237,555 acres (76 percent of the planning area). A total of 1,583,751 acres (12 percent of the planning area) would be closed to commercial harvest. Alternative A does not provide management guidelines for woodland harvest in HVWs, the INHT NTMC, or ACECs. Under current management, impacts to subsistence would be limited in extent to areas where forest and woodland products removal occurs and where wildlife habitat that is important to subsistence use would be protected. Wildlife species and habitats most likely to be affected by permitted vegetation removal are those that occur in areas open to commercial harvest are described in Section 3.3. Subsistence harvest would continue to be common in areas around communities. Forests and woodlands over the entire planning area would continue to be open to personal use and subsistence woodland harvest, with permits for certain products issued on a case-by-case basis.

***Effects Common to All Action Alternatives***

Under all of the action alternatives, management actions and BMPs/SOPs would include considerations for wildlife when planning forest products harvest, surveys for sensitive resources prior to surface-disturbing activities, and labeling wildlife trees, among others. Actions to reduce impacts to other resources, such as lands managed for wilderness characteristics, would provide incidental benefits to fish, wildlife and SSS that are important subsistence resources that occur in these areas. These actions would provide a greater degree of protection to subsistence use areas than are currently afforded under Alternative A.

***Effects under Alternative B***

Under Alternative B, the total acres of fish, wildlife and SSS habitat that could be impacted by removal of forest and woodland products would be less than under Alternative A, because personal use and subsistence woodland harvest areas would be designated over 42,445 acres (3 percent of the planning area) in the vicinity of streams, communities, and burned areas, and permits would be required for harvest in these areas. Under Alternative B, 5,017,161 acres (37 percent of the planning area) would be permitted for commercial harvest. Timber sale operations and commercial woodland harvest would not be allowed within the 100-year floodplain of perennial rivers and streams. All types of commercial woodland harvest would be permitted by the BLM on all BLM-managed public lands unless they are within the Unalakleet Wild River Corridor, ACECs, lands managed for wilderness characteristics as a priority, 100-year floodplains in HVWs, or the INHT NTMC. House log harvesting would not be allowed within the riparian zone of perennial streams. While removal of forest and woodland products would be allowed outside of these areas on a case-by-case basis, it is expected that impacts to fish, wildlife and SSS would be concentrated in the personal use and subsistence woodland harvest areas.

This alternative would include additional restrictions that would reduce impacts to fish, wildlife and SSS habitat in 100-year floodplains in HVWs, the INHT NTMC, ACECs, and riparian areas, with 8,418,904 (63 percent of BLM-managed land in the planning area) closed to commercial woodland harvest, and permits required for commercial harvest on a case-by-case basis on 29,829 acres (less than 1 percent of BLM-managed land in the planning area; see Table 2-1b in Chapter 2 of the BSWI Draft RMP/EIS). This alternative would provide protections to fish, wildlife and SSS and habitat from the effects of vegetation removal by commercial harvest over a larger area than under Alternative A (about 6.8 million more acres of the planning area closed to commercial harvest). Wildlife species and habitats important to subsistence and those most likely to be affected by permitted vegetation removal are those that occur in areas that would be open to commercial harvest under this alternative are described in Section 3.3.

***Effects under Alternative C***

Management actions under Alternative C would have fewer restrictions on personal use and subsistence harvest that would reduce impacts to fish, wildlife and SSS, as the amount of harvest requiring a permit would increase. Subsistence use gathering of products would not require a permit in most of the planning area (13,423,449, nearly all BLM-managed land in the planning area), thus increasing ease of access for subsistence use. However, this alternative would otherwise be similar to Alternative B, with the same acres and locations of personal use and subsistence woodland harvest areas. Timber sale operations would not be allowed within the 100-year floodplain of perennial rivers and streams. All types of commercial woodland harvest would be permitted by the BLM on all BLM-managed public lands unless they are within the Unalakleet Wild River Corridor. House log harvesting would not be allowed within

the riparian zone of perennial streams. These additional restrictions would reduce the potential for impacts to fish, wildlife, and SSS habitat in and the Unalakleet and riparian areas but would not provide the same level of protection as under Alternative B. Commercial woodland harvest is permitted in the INHT NTMC on a case-by-case basis. These actions would result in less than 1 percent of BLM-managed land in the planning area closed to commercial woodland harvest, 9,811,727 acres (about 73 percent) open to commercial harvest, and permits for commercial harvest on a case-by-case basis on 3,607,214 acres (about 27 percent of the planning area). This alternative would provide substantially fewer protections to fish, wildlife and SSS and habitat from removal of vegetation by commercial harvest than under Alternative B (about 1.4 million acres less of the planning area closed to commercial harvest). It would open more acres to commercial woodland harvest than Alternative A, although Alternative A would have more areas available on a case-by-case basis. However; since permits issued on a case-by-case basis would include site-specific review, impacts to subsistence resources would likely be less under Alternative A than Alternative C. Wildlife species and habitats important to subsistence and most likely to be affected by permitted vegetation removal are those that occur in areas that would be open to commercial harvest under this alternative are described in this appendix.

### ***Effects under Alternative D***

Management actions under Alternative D would result in a similar level of potential impact to fish, wildlife and SSS habitat as Alternative C, as permits would not be required for subsistence use harvest or personal use gathering of firewood, and all of the planning area would potentially be available for personal use and subsistence woodland harvest. However; one notable difference is that Alternative C has more areas open on a case-by-case basis than Alternative B such that impacts would likely be less under Alternative C.

There would be fewer restrictions on commercial woodland harvest that would reduce the potential for impacts to wildlife than under Alternatives B, as almost the entire planning area (13,423,449 acres [99 percent] of the planning area) would potentially be open. Wildlife species and habitats most likely to be affected by permitted vegetation removal are those that occur in areas open to commercial harvest are described in Section 3.3.

### **Subsistence: Effects from Locatable and Salable Minerals Management Decisions**

In addition to management actions common to all action alternatives, potential impacts from the following management topics were considered:

- Locatable Mineral Withdrawals
- Areas Closed to Salable Minerals

Locatable and salable minerals management could affect fish, wildlife and SSS that are important to subsistence because development of mineral sites results in a loss of wildlife habitat, there is the potential for loss of subsistence access, and there is generally long-term surface disturbance, noise, and human activity at these sites for as long as they remain open and active. Associated access roads may result in loss and fragmentation of fish, wildlife and SSS habitat. Mining activities may cause localized degradation of important components of wildlife habitat, through contamination of air quality, water, and soil. Locatable mineral development is considered one of the management actions with the greatest likelihood to have high magnitude impacts to availability and abundance of subsistence resources due to the long-term impacts it would have on wildlife habitat and because there are areas of known medium and

high locatable mineral potential in the planning area where locatable mineral development is likely. Fish, including salmon and non-salmon (sheefish, whitefish, and trout) and large land mammals (including moose and caribou) are some of the most heavily harvested resources by rural communities within the planning area. If areas open to locatable mineral development in medium and high LMP areas are located upstream or alongside known fishing locations or within the calving areas or travel routes of the Mulchatna caribou herd, the abundance and availability of these species could be negatively impacted. Communities within the planning area rely heavily on fish (and salmon in particular), moose, and caribou to support their subsistence needs. With the heavy reliance on fish, moose, and caribou harvesting to supply the subsistence needs for the planning area communities, impacts from locatable mineral development could occur to the availability of subsistence resources as wildlife species would likely move out of the area during exploration, operation, and reclamation activities. Impacts could occur to the abundance of these resources as well from potential increased competition for fishing and hunting/trapping resources due to the influx of workers needed for mining activities. Subsistence users would likely make some adjustments to where they might traditionally harvest resources and then target resources that would be less affected by mineral development activities. It could be expected that adaptive approaches would likely sustain harvest levels for affected communities though the expenses and time needed to harvest subsistence resources could increase.

#### ***Effects under Alternative A***

Under Alternative A, 4,804,488 acres (36 percent) of the planning area would continue to be withdrawn from locatable minerals and closed to salable minerals, including withdrawals to protect wildlife habitat and other resource values that are important to subsistence. There would be no impacts to wildlife or SSS and no associated impacts to subsistence access from mineral development in these areas and therefore no impacts to subsistence. However, 294,325 acres of medium to high LMP areas would continue to be open (52 percent of that available in the planning area under BLM management). High magnitude impacts to important wildlife habitat (see Section 3.3) within these areas of medium to high LMP would result if locatable mineral development were to occur, which is likely in these areas. The communities most likely to experience impacts to availability of subsistence resources from locatable mineral development under Alternative A include: Chuathbaluk, Lower Kalskag, and Upper Kalskag.

#### ***Effects Common to All Action Alternatives***

Under each action alternative, locatable mineral exploration and development would be allowed in some portions of the planning area. The potential impacts to subsistence resources could occur if there is temporary displacement in localized areas; temporary and long-term loss of habitat; degradation of habitat; and direct mortality of small mammals or nestlings and brooding birds. Reduced or constrained access to use areas and to users and an increase in competition for the resources by non-residents may occur. Mechanisms to reduce these potential impacts would be through implementation of BMPs and SOPs (Appendix K of the BSWI Draft RMP/EIS) would minimize the potential impacts to subsistence users and specific mitigation measures to the impact causing actions.

Salable minerals and material disposal could have direct and indirect impacts to subsistence resources and harvest areas. Mineral activity could also impact access and lead to an increase in competition for use of resources that are important to subsistence. Impacts to subsistence from salable minerals may be low impacts under the action alternatives as there are sufficient material sources that have already been identified that can meet the needs of the communities and there are few mineral material disposal actions anticipated. BMPs and SOPs would minimize the potential impacts to subsistence users.

Under all action alternatives, WSR corridors would continue to be withdrawn from mineral entry. This management would provide protection from habitat loss and other impacts to fish, wildlife and SSS important to subsistence associated with mineral development. Additionally, BMPs and SOPs to protect wildlife and other natural resources would help reduce long-term impacts to fish, wildlife and SSS habitat in the planning area. Specifically, these actions would minimize mineral development and extraction in stream and river channels, deltas, wetlands, riparian zones, active floodplains, lakes, and habitat essential to local fish and wildlife populations, which would help prevent impacts to associated fish, wildlife and SSS that are subsistence resources. BMPs/SOPs would also include measures to minimize degradation of these habitats and expedite reclamation of disturbed areas. These measures would help reduce the level of impact to wildlife habitats in areas that remain open to locatable and salable mineral development.

The alternatives would vary in terms of land withdrawn from locatable minerals and closed to salable minerals.

### ***Effects under Alternative B***

Under Alternative B, 3,623,397 acres of the planning area would be open to locatable and salable mineral development which is less than half of that open under Alternative A. Of this area, 202,610 acres would be within areas of medium or high LMP (or 36 percent of that available on BLM-managed land in the planning area), where development and associated impacts to availability of subsistence resources is likely. Areas that would be open to locatable and salable mineral development, in areas of medium to high LMP, include the important wildlife habitat areas described in Section 3.3 that are also important to subsistence. Alternative B would have the most acres of medium or high locatable mineral withdrawn to locatable mineral development than any other alternative and therefore would have the least potential for impacts to subsistence resources from mining. Since Alternative B would open a smaller area to locatable mineral development, particularly in areas with medium or high LMP, than all other alternatives, it would reduce the potential for impacts to wildlife and SSS habitat over a larger geographic extent than current management.

New mines and associated infrastructure would only occur in areas open to locatable and salable mineral development. Because less of the planning area would be available for this resource use, there may be fewer new mines and infrastructure as compared to Alternative A, although demand for minerals would still likely be the biggest factor in determining the amount of new mineral development. BMPs/SOPs would also include measures to minimize degradation of these habitats and expedite reclamation of disturbed areas. These measures would help reduce the level of impact to wildlife habitats in areas that remain open to locatable and salable mineral development. The communities most likely to experience impacts to availability of subsistence resources from locatable mineral development under Alternative B include: Aniak, Crooked Creek, Chuathbaluk, Lower Kalskag, McGrath, Sleetmute, and Upper Kalskag.

### ***Effects under Alternative C***

Under Alternative C, 13,418,941 acres (over 99 percent) of BLM-managed land in the planning area would be open to locatable minerals and 6,645,750 acres (about 49 percent) would be open to salable mineral development with another 6,536,635 acres (about 49 percent) open on a case-by-case basis. However, all areas of medium or high LMP on BLM-managed land would be open to locatable mineral development. Alternative C would open more areas to locatable and salable mineral development than Alternative B, including in areas of medium or high LMP where likelihood for development and associated impacts is highest. While Alternative C would open fewer areas to salable mineral

development than Alternative A, when considering areas open on a case-by-case basis, it would have the potential to open more areas than Alternative A. Since potential for salable mineral development is low in the planning area, and Alternative C would open more areas of medium or high LMP to locatable mineral development than Alternative A, there would be high magnitude impacts to subsistence resources over a greater geographic extent than Alternative A.

Similar to Alternatives A and B, the potential for a number of new mines and associated infrastructure would likely increase, dependent on future demand for minerals, but would not occur in portions of the planning area closed to development. BMPs/SOPs listed in Appendix K of the BSWI Draft RMP/EIS would also include measures to minimize degradation of these habitats and expedite reclamation of disturbed areas. These measures would help reduce the level of impact to wildlife habitats in areas that remain open to locatable and salable mineral development. The communities most likely to experience impacts to availability of subsistence resources from locatable mineral development under Alternative C include: Aniak, Crooked Creek, Chuathbaluk, Lower Kalskag, McGrath, Sleetmute, and Upper Kalskag.

### ***Effects under Alternative D***

Alternative D would open the same acreage to locatable mineral development as Alternative C. Alternative D would close the same acreage to salable mineral development as Alternative C, and would open the remaining BLM-managed lands in the planning area to salable development rather than opening some areas on a case-by-case basis, as with Alternative C. Impacts to subsistence resources from locatable mineral development would be the same as Alternative C and nearly the same for impacts associated with salable mineral development due to low salable mineral potential and demand in the planning area. Areas that would be open to locatable and salable mineral development, in areas of medium to high mineral potential, include important wildlife habitat areas as described in Section 3.3.

Similar to Alternatives A and B, the potential for a number of new mines and associated infrastructure would likely increase, dependent on future demand for minerals, but would not occur in portions of the planning area closed to development. New mines and associated infrastructure would have the potential to occur over more of the planning area than under the other alternatives based on areas open to development. BMPs/SOPs would also include measures to minimize degradation of these habitats and expedite reclamation of disturbed areas. These measures would help reduce the level of impact to wildlife habitats in areas that remain open to locatable and salable mineral development. The communities most likely to experience impacts to availability of subsistence resources from locatable mineral development under Alternative D include: Aniak, Crooked Creek, Chuathbaluk, Lower Kalskag, McGrath, Sleetmute, and Upper Kalskag.

### **Subsistence: Effects from Leasable Minerals Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- Areas Closed to Leasing
- NSO Leasable Designation

Activities associated with leasable minerals have the potential to affect fish, wildlife, and SSS habitat that is important to subsistence resources and users through habitat loss and degradation and disturbance of resources. Seismic surveys may have long-term effects on habitat by removing vegetation and potentially creating new summer and winter OHV routes which can disturb wildlife and fragment habitat.



Exploration can harm small mammals and nesting birds and can harm small mammals and temporarily displace larger mammals such as caribou that are an important subsistence resource. Because there is a low development potential for leasable mineral resources in the planning area, impacts to subsistence resources and users is likely to be low, although demand could change.

### ***Effects under Alternative A***

Alternative A would continue to include closures and protective stipulations that would provide protections to fish, wildlife and SSS in the planning area. A total of 5,053,308 acres (38 percent) of the planning area would be closed to leasing, and 17,521 acres (less than 1 percent) of the planning area would be designated as NSO leasable. Additionally, there would be special stipulations for grizzly/brown bear denning areas and raptor nesting areas over a small portion of the INHT (unquantified), which would help reduce impacts to these species from leasable mineral actions. Overall, the area of wildlife habitat covered by management, reducing impacts to wildlife from impacts associated with leasable minerals, would be less than under the action alternatives, although the area of land completely closed to leasing would be greater than Alternative C and D.

### ***Effects Common to All Action Alternatives***

All action alternatives would include stipulations that provide protections to fish, wildlife and SSS that are important subsistence resources. While numerous stipulations would reduce impacts to wildlife and SSS, thereby protecting subsistence resources, there would also be stipulations specific to SSS, Dall sheep habitat, caribou calving/postcalving habitat, raptor nests, trumpeter swans, high value moose habitat, and active bald eagle nests. These stipulations would help minimize loss of caribou and moose calving and wintering areas, moose and caribou winter habitat, Dall sheep habitat, raptor nesting habitat, and migratory bird habitat in the event of mineral leasing in these areas and would therefore be beneficial to subsistence resources and users. Additional SOPs/BMPs designed to protect wetlands and streams/water quality and reduce the establishment and spread of NNIS would provide additional protections to subsistence resources from actions.

The alternatives would vary in terms of areas of land further protected by being closed to leasing, designated as NSO leasable, or open, subject to special stipulations leasing.

### ***Effects under Alternative B***

Alternative B would increase the proportion of the planning area designated as NSO leasable to 1,597,599 acres (12 percent of BLM-managed land in the planning area) and the land area closed to leasing to 9,350,881 acres (69 percent of BLM-managed land in the planning area). Therefore; fewer acres of fish, wildlife and SSS habitats (important as subsistence resources) over more of the planning area would be open to mineral leasing and more areas subject NSO lease stipulations necessary to protect resources important to subsistence.

Under Alternative B for the entire planning area (exception would be locatable mineral development and permitted activities by other agencies [e.g., ADF&G]), for fish-bearing streams the disturbance buffer would be the 100-year floodplain, no surface-disturbing activities or permanent structures would be allowed within these buffers. Buffers and therefore the total miles of streams would vary depending on stream order. Therefore, metrics for this alternative would be calculated on a case-by-case basis. If adverse effects resulted from these actions in displacement and disturbance to the resource then subsistence activities in these areas and harvest could be affected. The potential for and level of impact on

fish and aquatic resources is influenced by numerous factors, including management decisions allowing for surface-disturbing activities, combined with the success and adequacy of protective measures, such as maintaining riparian vegetation in proper functioning condition and the application of mineral withdrawals, BMPs, and reclamation procedures. Direct/indirect affects under this alternative would be highly variable and depend on the type of activities/authorizations permitted. All activities have the potential to alter stream processes and degrade fish habitat. The duration of these impacts would also be highly variable and dependent upon the activity and the BMPs that are implemented. Any BMP that protects the streams and associated habitats would be valuable and would include avoidance of known spawning habitat and migration/spawning time periods.

Alternative B would include the most restrictions associated with leasable mineral development compared with the other alternatives. Although potential for impacts would be low due to low potential in the planning area. BMPs/SOPs would include measures to minimize habitat degradation, expedite reclamation of disturbed areas, and minimizing conflicts with subsistence activities and access. These measures would help reduce the level of impact to wildlife habitats important to subsistence and on subsistence activities in areas that remain open to locatable, salable, and leasable mineral development.

### ***Effects under Alternative C***

Under Alternative C, the area designated as NSO leasable (6,824,035 acres; 51 percent) and closed to leasing (46,953 acres; less than 1 percent) would be substantially less than under Alternative B, and the remaining 6,594,906 acres of BLM-managed land in the planning area (49 percent) would be open to leasing with standard stipulations. Therefore, this alternative would be more likely to impact wildlife and subsistence resources from mineral leasing than Alternative B.

Under Alternative C within HVWs (exception would be locatable mineral development and permitted activities by other agencies [e.g., ADF&G]), for fish-bearing streams, the disturbance buffer would be the 100-year floodplain of fish-bearing streams; no surface-disturbing activities or permanent structures would be allowed within these buffers. Buffers and therefore the total miles of streams would vary depending on stream order. Therefore, metrics for this alternative would be calculated on a case-by-case basis. Areas open/closed to mining activities are provided in Table 3.1.3-7. If adverse effects resulted from these actions in displacement and disturbance to the resources then subsistence activities in these areas and harvest could be affected. The potential for and level of impact on fish and aquatic resources is influenced by numerous factors, including management decisions allowing for surface-disturbing activities, combined with the success and adequacy of protective measures, such as maintaining riparian vegetation in proper functioning condition and the application of mineral withdrawals. BMPs and reclamation procedures under this alternative would be similar to Alternative B.

### ***Effects under Alternative D***

Alternative D would result in the lowest proportion of the planning area closed to leasing (46,953 acres; less than 1 percent) or designated as NSO leasable (236,556 acres; 2 percent) and the greatest proportion designated as open to leasing subject to standard stipulations (13,182,385 acres; 98 percent), relative to the other action alternatives. Based on geographic extent of areas open to leasable minerals, this alternative would be more likely to impact fish, wildlife and SSS from leasable mineral development than Alternatives A, B, and C.

Under Alternative D surface-disturbing activities or permanent structures would be allowed within the 100-year floodplain of perennial and fish-bearing streams. This would occur if permittees can

demonstrate these activities would not substantively impact floodplain function and would be decided on a case-by-case basis. If adverse effects resulted from these actions in displacement and disturbance to the resource then subsistence activities in these areas and harvest could be affected. The potential for and level of impact on fish and aquatic resources is influenced by numerous factors, including management decisions allowing for surface-disturbing activities, combined with the success and adequacy of protective measures, such as maintaining riparian vegetation in proper functioning condition and the application of mineral withdrawals, BMPs, and reclamation procedures. BMPs under this alternative would be similar to Alternatives B and C. Therefore, Alternative D could impact fish, wildlife, and SSS important for subsistence over a greater geographic extent and higher magnitude than Alternative B and C. It could have subsistence impacts over a greater geographic extent than Alternative A although the magnitude of impacts would be less due to BMPs, SOPs, and reclamation procedures that would be implemented under Alternative D.

### **Subsistence: Effects from Lands and Realty Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- ROW Exclusion and Avoidance Areas
- Permits and Leases
- Disposals

Potential impacts on subsistence resources from lands and realty management would include habitat loss, fragmentation, and degradation; disturbance of or direct mortality to resources; loss of species diversity from ROW development and other permitted facilities; and changes in ownership that might result in different standards for managing subsistence resources. Permits and leases are often associated with human uses that increase human presence, which may increase stress on wildlife resources during breeding, migration, and wintering periods, and potentially interfere with subsistence harvest activities. Land acquisitions could benefit fish, wildlife, and SSS that are subsistence resources by increasing the acres of wildlife habitat in the planning area, including sensitive or key habitats, and by creating more contiguous blocks of habitat for management purposes. Conversely, land disposals would reduce the amount of habitat for subsistence resources under BLM management. Land withdrawals would have the potential to benefit fish, wildlife and SSS used for subsistence if the BLM closed BLM-managed lands to activities with the potential to impact species and their habitat.

Areas open for ROW development are considered one of the management actions with the greatest likelihood to have high magnitude impacts to availability of subsistence resources due to the long-term impact ROWs could have on availability of subsistence resources by changing species movement patterns. Areas open to ROW location could cause habitat degradation and fragmentation and increase competition for resources if those ROWs were used to build structures, utilities, or transportation corridors. This may impact moose, caribou, and fish resources (particularly salmon, but also non-salmon fish including sheefish, whitefish, and trout) as these resources are typically the most heavily harvested resources in the planning area communities. New ROW would likely be associated with locatable mineral development for roads and pipelines needed for transportation of personnel, equipment, and resources. Access to subsistence resources and traditional harvest areas could be of low to high magnitude depending on the portions of the nearby communities' harvest areas that are affected and could be adverse or beneficial.

***Effects under Alternative A***

Under Alternative A, all existing ANCSA 17(d)(1) withdrawals would remain in place, affecting 12,559,533 acres (93 percent) of the planning area. Alternative A does not provide additional management guidance for lands and realty that would affect fish, wildlife and SSS used as subsistence resources or their indicators. Existing conditions would continue. Under Alternative A, new ROW would be permitted on the entire planning area on a case-by-case basis, which would affect availability of subsistence resources. The communities most likely to experience impacts to access and availability of subsistence resources from new ROW development under Alternative A include: Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, Unalakleet, and Upper Kalskag.

***Effects Common to All Action Alternatives***

Under all of the action alternatives, the BLM would implement actions to consolidate land management that could affect the amount of fish, wildlife, and SSS habitat that is important for subsistence use and resources in the planning area. The BLM would consider objectives to protect subsistence resource habitat and reduce habitat fragmentation when making decisions about land disposal, exchange, and acquisition. Additionally, the BLM would attempt to co-locate linear projects within existing ROWs and would require ROWs to provide for unimpeded caribou passage in all caribou connectivity corridors or where essential winter habitat exists.

Additional SOPs/BMPs listed in Appendix K of the BSWI Draft RMP/EIS designed to protect wetlands and streams/water quality and reduce the establishment and spread of NNIS would provide additional protections to subsistence resources from actions associated with lands and realty.

***Effects under Alternative B***

Identification of ROW exclusion and avoidance areas under Alternative B would help minimize habitat fragmentation and degradation in these areas, which could affect availability of subsistence resources. It would also minimize unintentionally opening new access routes to uses competing with subsistence activities. ROW exclusion areas would occur on 1,464,069 acres (11 percent) of the planning area and include high value wildlife habitat, such as the Innoko Bottoms Priority Wildlife Habitat Area, the managed North Connectivity Corridor and South Connectivity Corridor, and the Unalakleet Wild River Corridor. ROW avoidance areas would occur on an additional 8,824,848 acres (66 percent) of the planning area, and would provide some protections to additional areas, including fish and wildlife habitats. Restrictions on where trapping/subsistence cabins could occur would reduce impacts in fish, wildlife and subsistence locations and would provide a minimal benefit to those resources but could also restrict the traditional subsistence use of cabins. Areas with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs that could reduce availability of subsistence resources would be in the 3,176,977 acres (about 24 percent of BLM-managed land in the planning area) areas outside of ROW exclusion and avoidance areas. The communities most likely to experience impacts to access and availability of subsistence resources from new ROW development under Alternative B include: Aniak, Crooked Creek, Holy Cross, Kaltag, McGrath, Marshall, Nikolai, Sleetmute, Unalakleet, Upper Kalskag, and Lime Village

Under Alternative B, the BLM would pursue opportunities to acquire lands within the INHT NTMC, which could result in an increase in wildlife habitat in the planning area and associated benefits to subsistence.

Under Alternative B, there would be approximately 9,795,543 acres of new FLPMA withdrawals proposed, approximately 8,530,066 acres of existing ANCSA 17(d)(1) withdrawals that would be retained, and approximately 4,931,465 acres of existing ANCSA 17(d)(1) withdrawals that would be revoked. Other existing withdrawals in the planning area would remain. Under this alternative, 342,360 acres (3 percent) of the planning area are available for exchange, which could reduce the total amount of wildlife habitat in the planning area under BLM management depending on the areas that were added to BLM-management under the exchange. Available exchanges and acquisitions under Alternative B that would affect important wildlife habitat and subsistence in the planning area include reductions in riparian area, moose calving and wintering areas, caribou crucial winter habitat, and the Innoko Bottoms Priority Wildlife Habitat Area. These reductions could be offset to some degree by available acquisitions, which would include a smaller geographic extent of riparian areas and moose calving and wintering areas and no caribou crucial winter habitat, but a greater extent of the Innoko Bottoms Priority Wildlife Habitat Area. Adverse effects to subsistence resources could result if there were reductions in harvest success and limits in access to resources in areas where BLM is no longer managing the land.

#### ***Effects under Alternative C***

Alternative C would have a greater risk for habitat fragmentation and degradation affecting availability of subsistence resources than Alternative B, because there would be no designated ROW exclusion areas. Additionally, a smaller portion of the planning area (7,645,532 acres; 57 percent of the planning area) would be identified as ROW avoidance area (including areas of ROW avoidance for linear realty actions only). Areas outside of ROW avoidance areas, with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs would include habitats important to subsistence harvest of resources. The communities most likely to experience impacts to access and availability of subsistence resources from new ROW development under Alternative C include: Aniak, Crooked Creek, Grayling, Holy Cross, Kaltag, Lower Kalskag, McGrath, Marshall, Nikolai, Russian Mission, Shageluk, Sleetmute, Stony River, Unalakleet, Upper Kalskag, Lime Village.

The potential increase in wildlife habitat managed by BLM that could affect subsistence in the planning area would be the same as Alternative B. Based on the land available for exchange (356,942 acres; 3 percent of the planning area), the amount of fish and wildlife habitat under BLM management could be slightly reduced compared to Alternative B, with greater reductions in riparian areas and moose calving and wintering areas but the same amount of caribou crucial winter habitat and Innoko Bottoms Priority Wildlife Habitat Area. Available acquisitions that could somewhat offset disposals would be the same as under Alternative B.

#### ***Effects under Alternative D***

Alternative D would have a greater risk for wildlife and subsistence habitat fragmentation and degradation affecting availability of subsistence resources than Alternatives B and C, because there would be no designated ROW exclusion areas, and the acreage of ROW avoidance areas would be the lowest of all the action alternatives (5,130,927 acres; 37 percent of the planning areas). Areas outside of ROW exclusion and avoidance areas, with the greatest potential for habitat loss, degradation, and fragmentation

from development of ROWs would include habitats that are important for subsistence resources. The communities most likely to experience impacts to access and availability of subsistence resources from new ROW development under Alternative D include: Aniak, Anvik, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lower Kalskag, McGrath, Marshall, Nikolai, Russian Mission, Shageluk, Sleetmute, Stony River, Unalakleet, Upper Kalskag, and Lime Village.

Because the BLM would not pursue opportunities to acquire public land under Alternative D, there would be no potential increase in wildlife habitat in the planning area. Based on the amount of land available for disposal (451,173 acres; 3 percent of the planning area), this alternative would result in the greatest reduction in the amount of wildlife habitat under BLM management, compared to Alternatives B and C, and there would be no acquisitions of these habitats to help offset the losses. The amount of caribou crucial winter habitat available for exchange or disposal would be the same as Alternatives B and C, but with no acquisition of this habitat to help offset the loss. If all available exchanges/disposals and acquisitions are carried out, the amount of high-value wildlife in the planning area would be less than under Alternatives A, B, and C. The amount of caribou crucial winter habitat would be the same as Alternatives B and C, but less than under Alternative A. Overall, Alternative D would have a greater adverse impact on fish and wildlife habitat and related subsistence resources than Alternatives A, B, and C in terms of the geographic extent of key wildlife habitats important for subsistence available for exchange or disposal.

### **Subsistence: Effects from Recreation and Visitor Services Management Actions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- INHT SRMA
- BSWI ERMA – OHV
- Unalakleet Wild River Corridor – Travel Decisions
- User Conflicts
- Recreation Management Area Designations

Recreation can affect subsistence resources and local users in the planning area by introducing humans into remote areas and potentially interfere with subsistence activities and compete for subsistence resources. The presence of motorized vehicles, vessels and humans can disturb fish and wildlife resources, potentially resulting in increased energy expenditure due to movement away from the activity and avoidance of the activity for the short and long term. The movement of wildlife in turn can impact subsistence harvest activities and result in hunters having to travel farther and expend more resources (fuel/time) to hunt and harvest resources. Recreation activities during breeding periods can reduce reproductive success of subsistence resources. Wildlife can also habituate to human presence, which can increase the risk of injury or mortality from human-wildlife interactions. Recreation can also result in degradation or loss of habitat although there are no existing or proposed recreation facilities in the planning area where concentrated recreation use is likely to occur with the exception of the INHT. Use of OHVs can degrade wildlife habitats and subsistence use areas through surface disturbance, particularly when soils are not frozen; can crush nests and small terrestrial species; and can lead to the creation of new trails, which can increase the amount of disturbed area and provide access to competing harvest of fish and wildlife. Most recreation in the planning area occurs along the INHT corridor, and fish, wildlife and SSS that are important to subsistence users in this area are the most likely to be affected by increased use

of recreationists and visitors. Recreational hunting and fishing have a direct impact on wildlife and subsistence resources through mortality and reduction in prey species, although because game populations are managed by ADF&G, these impacts are not the focus of this analysis. If it were to occur on a large scale recreational berry picking can affect grizzly bears, migratory birds, and other species by resulting in a localized reduction in availability of this food source to subsistence users.

Impacts on subsistence from recreation are generally the result of conflicts between recreational uses (e.g., motorized versus non-motorized use), sport hunting and fishing, the designation of SRMAs and ERMAs, and limits or stipulations placed on SRPs. The frequency and intensity of user conflicts are seasonal, localized, and only occur when users perceive the uses to be incompatible. Conflicts increase over time as an increasing number of visitors seek recreation opportunities on BLM-managed land. The potential for impacts is greatest where visitors' expectations are for a remote experience with little interaction with other users.

Managing SRMAs and ERMAs would improve diverse recreation experiences in accordance with management objectives. Based on specific SRMA and ERMA management, potential increases in recreation would occur. Developing new recreation facilities in SRMAs would expand recreation opportunities but would also attract more visitors to the decision area. Increased visitation could result in more conflicts between recreation users and subsistence users, particularly in high-use areas, such as along the INHT.

#### ***Effects under Alternative A***

Under Alternative A, under a continuation of current management, there would be a potential for user conflicts, especially in popular recreation areas, such as along the INHT and Unalakleet Wild River Corridor. Due to an increase in vehicle technology, there would be more frequent and intense impacts between motorized and non-motorized users.

The BLM would not designate Recreation Management Areas, and in general, would support dispersed and unstructured recreation opportunities throughout the entire decision area.

Continuing to issue SRPs on a case-by-case basis would allow outfitters to accommodate demand for guided hunting and fishing (which can conflict with subsistence activities and compete for resources), special events on the INHT, and other specially permitted activities. Over time, an expanding number and size of SRP activities would increase the potential for conflicts with subsistence users and damage natural resources that contribute to the recreation setting for all users. These impacts to subsistence would be greatest in areas of high recreation use, such as along the INHT.

#### ***Effects Common to All Action Alternatives***

Under all of the action alternatives, in the BSWI ERMA, hunting and dispersed camping would be the primary recreation activities for which the BLM would manage. The management actions would reduce the potential for conflicts in secondary activities, such as snowmobiling and commercial fishing guides. The issuance of SRPs with stipulations to protect resources that contribute to positive recreation experiences and the recreation setting would provide for the long-term protection of those resources from permitted activities in the ERMA.

Recreation and travel management would have the potential to affect subsistence by influencing the amount of associated human presence and habitat disturbance. Proposed management would allow the BLM to reduce the impacts on important subsistence resource areas and limit the potential for conflicts

between user groups. The BLM would seek to reduce conflicts between recreation and subsistence users by taking community interests and impact into account in hunting guide permitting decisions and by encouraging hunting guide-outfitters to coordinate with local communities. The BLM would also implement SOPs/BMPs that would help protect streams, water quality, wetlands, and floodplains, as well as associated wildlife and SSS that are important to subsistence resources.

### ***Effects under Alternative B***

Under Alternative B, the planning area would be managed as 355,799 acres as SRMA and 13,110,096 acres as ERMA and have an OHV designation of “Limited.” Compared with Alternative A, there would be a reduction in the potential for user conflicts.

The 355,799-acre INHT SRMA would provide specific outcome-focused management objectives and setting characteristics intended to reduce conflicts while supporting trail-based recreation activities and positive user experiences. Alternative B applies a CFZ within a 10-mile buffer surrounding BSWI communities. SRPs for hunting guide-outfitter businesses would not be authorized within a 10-mile radius of any established community in the planning area (10-mile radius of all communities includes 818,395 acres of BLM-managed public lands), although shuttle service operations would be allowed with a required SRP throughout the entire ERMA (including CFZs). This would reduce conflicts with subsistence users in comparison to Alternatives A, C and D.

### **Unalakleet Wild River Corridor**

Under Alternative B, OHV designation in the Unalakleet Wild River Corridor would be limited. Casual summer access would be prohibited; however, subsistence summer access would be permitted, limited to existing trails, primitive roads, and roads. This would remove potential for use conflicts between recreationists and subsistence users. Winter casual use would be permitted by snowmobile only, providing for recreation opportunities that do not cause resource damage. Because winter recreation use is low, it is not expected to conflict with subsistence or other casual uses of the area.

### ***Effects under Alternative C***

Under Alternative C, 13,125,320 acres would be managed as and ERMA and 340,574 acres as SRMA. Impacts under Alternative C would be similar to Alternative B with the exceptions that a slightly smaller SRMA. Under Alternative C, casual and subsistence OHV use would be permitted on existing routes at the Rohn Site. Winter casual and subsistence access would be allowed for snowmobiles only, similar to Alternative B, and impacts from winter travel would be the same as Alternative B. Management actions would provide for increased recreation opportunity during summer months, and could also result in increased conflicts between recreational, casual and subsistence users. Increased use could result in damage to the trail resource, thereby altering recreation setting, opportunity, and experience over time. Summer OHV casual use would be limited to existing routes. Subsistence cross-country summer OHV access on all lands in the planning area managed as undesignated would be allowed by ATV and UTV. This action could also result in potential conflict between recreationists and casual or subsistence users. Alternative C applies a CFZ within a 5-mile buffer surrounding BSWI communities. SRPs for hunting guide-outfitter businesses would not be authorized within a 5-mile radius of any established community in the planning area (5-mile radius of all communities includes 95,307 acres of BLM-managed public lands). As with Alternative B, SRPs would not be authorized in CFZs for hunting guide/outfitters. These restrictions would not apply to shuttle service operations, which would be allowed without an SRP



throughout the ERMA unless increases in use conflict with the BSWI ERMA objectives, at which point the BLM would engage in additional planning to maintain the objectives. This would reduce conflicts with subsistence users compared to Alternatives A and D, though to a lesser extent than under Alternative B.

### **Unalakleet Wild River Corridor**

OHV use in the Unalakleet Wild River Corridor for casual summer access would be limited to existing trails, primitive roads, and roads and would include ATVs only. Subsistence cross-country summer OHV access on lands in the Unalakleet Wild River Corridor would be allowed by ATV. Recreation access in the summer would provide for increased opportunity for conflict. However, due to the wet and boggy condition of the area, summer travel is expected to be minimal such that while damage to the lands (rutting, braiding) could occur and there could be an increased potential for use conflicts between recreationists and subsistence users, it would be low in terms of magnitude.

### ***Effects under Alternative D***

Under Alternative D, the planning area would be managed as 13,125,320 acres as ERMA and 340,574 as SRMA, same as Alternative C. Under Alternative D, the BLM would designate the INHT SRMA; however, there would be limited additional management beyond that specified in Alternative A to limit SRPs or mitigate user conflicts. Under Alternative D, the BLM's recreation program would accommodate demand for future permitted recreation activities, and these activities could conflict with each other and with other subsistence and individual users. There would be no CFZs applied under this alternative. Alternative D does not propose SRPs for hunting guide-outfitter/outfitter business authorizations operating within a radius of any established community in the planning area and allows shuttle service operations throughout the ERMA without an SRP. However, if the ERMA objectives are not being met, BLM would increase monitoring, outreach, education, and/or enforcement, case-by-case. Therefore, Alternative D would be less protective than Alternatives A, B and C.

### **Unalakleet Wild River Corridor**

OHV designation in the Unalakleet Wild River Corridor would be limited. Casual and subsistence summer access would be the same as Alternative C; however, travel could be by ATV or UTV. Winter access would be the same as under Alternative B. The expanded mode of summer travel would provide increased recreation opportunities. However, due to the wet and boggy condition of the area, summer travel is expected to be minimal such that while damage to the lands (rutting, braiding) could occur and there may be an increase potential for use conflicts between recreationists and subsistence users it would be low in terms of magnitude, similar to Alternative C. Impacts from winter travel would be identical to Alternative C.

### **Subsistence: Effects from Travel and Transportation Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- Innoko Bottoms Priority Wildlife Habitat Area
- All BSWI Lands Not Managed as TMUs, Conservation System Units, or Sensitive Resource Areas

- Unalakleet Wild River Corridor Travel Management Decisions
- INHT NTMC TMA
- Rohn Site Travel Decisions
- Lands Managed for Wilderness Characteristics TMA

Summer subsistence OHV travel restrictions are considered one of the management actions with the greatest likelihood to have high magnitude impacts to access to subsistence resources since they could obstruct existing routes to subsistence resources used by rural communities, particularly areas for moose, caribou, and fish harvesting. Additionally, casual OHV use in the planning area can lead to degradation of habitats and resources, and may increase competition for resources, which may affect the availability and abundance of subsistence resources.

### ***Effects under Alternative A***

All lands in the planning area are managed as undesignated for travel and transportation management, which allows full access to the planning area for subsistence uses. Traditional means of access such as outboard motorboats, airplanes, dogsleds, and snowmobiles are allowed for all river users. Other means of access, such as inboard jet boats, airboats, hovercraft, and all-terrain vehicles are not allowed in the Unalakleet Wild River Corridor. However, because there is a lack of travel and transportation management for all uses in the planning area, impacts to subsistence could occur from OHV vehicle use that could result in loss or degradation of subsistence resource habitat from physical disturbance and also to loss of habitat in use areas through avoidance of the area by resources, and could fragment habitat in use areas if new trails were created. It could also create additional access for activities that compete for subsistence resources, such as sport hunting and fishing. The existing conditions would continue under Alternative A. Due to the lack of management direction on OHV use, the route network would continue to expand which would affect subsistence resources. Additionally, restricting OHV summer subsistence OHV use in the Unalakleet Wild River Corridor could obstruct access to fishing subsistence use areas. The communities most likely to experience impacts to access to subsistence resources from summer OHV restrictions under Alternative A include: Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, Unalakleet, and Upper Kalskag.

### ***Effects Common to All Action Alternatives***

Under all of the action alternatives, the BLM would work with local communities to mark winter travel routes between communities and take actions to limit motorized use that degrades habitats and leads to displacement of wildlife due to noise and activity. Designating all of BLM-managed lands in the planning area as “Limited” would reduce the potential for loss, degradation, and fragmentation of wildlife habitats that are important to subsistence, as OHV use would be limited to certain areas or specific trails. Additionally, implementing travel management planning would allow the BLM to develop a travel network that meets the needs of subsistence and other users while considering potential impacts to wildlife and subsistence in the planning area. Additional resource competition from recreational users would be mitigated through more lenient restrictions on motorized watercraft, snowmobiles, and OHVs used for subsistence purposes. The BLM would support overland travel needed for accessing subsistence resources and traveling between communities to share subsistence resources by working with communities to maintain existing trail systems and by managing winter and summer travel routes. The BLM would also support the development of communications infrastructure, such as cell phone towers

and emergency shelter cabins. The communications infrastructure would improve safety for subsistence harvesters. Summer subsistence OHV restrictions could impact access to fishing and harvesting subsistence use areas, depending on where the restrictions would occur.

### ***Effects under Alternative B***

To minimize impacts to subsistence resources and reduce subsistence conflict, casual use airboats and hovercraft would not be allowed on non-navigable waterways on BLM-managed land within the designated connectivity corridors (845,670 acres) or the Innoko Bottoms Priority Wildlife Habitat Area. These actions would help reduce impacts to habitat used by caribou and other wildlife important to subsistence. In the Innoko Bottoms Wildlife Habitat Area, restrictions on airboats and hovercraft would reduce disturbance impacts to subsistence resources.

Alternative B would be more restrictive on summer and winter overland travel for casual use (565,955 acres, 4 percent of the planning area) than for subsistence uses (see Table 3.11.3-4 **Error! Not a valid bookmark self-reference.**). Alternative B is also generally more restrictive on overland travel for casual and subsistence uses than Alternatives C and D (see Table 3.11.3-5 and Table 3.11.3-6). OHV restrictions could minimize impacts to subsistence resources and reduce competition between casual and subsistence users by providing more access to more of the planning area for subsistence uses. However; the 288,466 acres (about 2 percent of BLM-managed land in the planning area) that would be closed to summer subsistence OHV use would impact access to hunting, fishing, and harvesting subsistence use areas.

Impacts from OHV restrictions for winter or summer use could occur for the following communities: Anvik, Grayling, Holy Cross, Kaltag, McGrath, Nikolai, Shageluk, Sleetmute, Stony River, Unalakleet, and Lime Village.

Designation of the two connectivity corridors and Innoko Bottoms Priority Wildlife Habitat Area and associated management actions under Alternative B would provide protections for wildlife and subsistence resources, minimize impacts to subsistence resources, and reduce subsistence conflict with recreation use in those areas.

**Table 3.11.3-4: Overland Travel Restrictions for Subsistence and Casual Use Proposed under Alternative B**

<b>Travel Restriction</b>	<b>Affected Area for Subsistence Use (acres)</b>	<b>Affected Area for Casual Use (acres)</b>
Summer OHV Access Prohibited	241,512	565,955
Summer OHV Access Limited to Existing Trails	324,443	12,899,939
Winter Use – Snowmobiles Only	4,243,914	13,465,894

### ***Effects under Alternative C***

To minimize impacts to subsistence resources and reduce subsistence conflict, casual use airboats and hovercraft would not be allowed on non-navigable waterways on BLM-managed land in the designated wildlife connectivity corridor (576,038 acres, 4 percent of the planning area) or the Innoko Bottoms Priority Wildlife Habitat Area. Management actions in caribou habitat and the Innoko Bottoms Wildlife Habitat Area and associated effects on wildlife that affect subsistence resources would be identical to those under Alternative B. Alternative C would have the same restrictive on summer overland travel for casual use and subsistence use (see Table 4.6.2-6). Alternative C would also be slightly less restrictive on

overland subsistence travel than Alternative B and more restrictive than Alternative D. The 225,925 acres (about 2 percent of BLM-managed land in the planning area) that would be closed to summer subsistence OHV use would impact access to hunting, fishing, and harvesting subsistence use areas.

The following communities would have impacts related to OHV use: Anvik, Grayling, Holy Cross, Kaltag, Nikolai, Shageluk, Sleetmute, Stony River, Unalakleet, and Lime Village.

Designation of the one connectivity corridor and Innoko Bottoms Priority Wildlife Habitat Area and associated management actions under Alternative C would provide protections for wildlife and subsistence resources, minimize impacts to subsistence resources, and reduce subsistence conflict with recreation use in those areas.

**Table 3.11.3-5: Overland Travel Restrictions for Subsistence and Casual Use Proposed under Alternative C**

Travel Restriction	Affected Area for Subsistence Use (acres)	Affected Area for Casual Use (acres)
Summer OHV Access Prohibited	225,925	225,925
Summer OHV Access Limited to Existing Trails	0	13,239,969
Winter Use – snowmobiles only	3,097,798	3,097,798

#### ***Effects under Alternative D***

Alternative D would be somewhat more restrictive on summer overland travel for casual use than for subsistence use (see Table 3.11.3-6). Alternative D would also be less restrictive on overland subsistence travel than Alternative B and C. Since Alternative D would not prohibit summer OHV subsistence access, it would not impact access to subsistence resources for any communities.

Alternative D would not prohibit casual use airboats or hovercraft on non-navigable waterways on BLM-managed land. There would be no additional travel management for caribou habitat and the Innoko Bottoms Priority Wildlife Habitat Area, so disturbance impacts to wildlife and subsistence in these areas would not be reduced as they would be under Alternatives B and C.

**Table 3.11.3-6: Overland Travel Restrictions for Subsistence and Casual Use Proposed under Alternative D**

Travel Restriction	Affected Area for Subsistence (acres)	Affected Area for Casual Use (acres)
Summer OHV Access Prohibited	0	225,925
Summer OHV Access Limited to Existing Trails	225,925	46,953
Winter Use – snowmobiles only	225,925	225,925

#### **Subsistence: Effects from Areas of Critical Environmental Concern Management Decisions**

Potential impacts from the following management topics were considered:

- Transportation Management Decisions
- Minerals Decisions

***Effects under Alternative A***

Under Alternative A, 1,884,376 existing acres would continue to be managed as ACECs where special attention is required to protect and prevent irreparable damage to important resources.

***Effects Common to All Action Alternatives***

There would be no effects common to all action alternatives.

***Effects under Alternative B***

Under Alternative B, 3,913,372 acres would be designated and managed as ACECs, where special attention is required to protect and prevent irreparable damage to important resources. Management decisions on ACECs would include more restrictions on overland travel for casual use than for subsistence and additional restrictions on mineral development. These restrictions would help reduce competition between recreational and subsistence uses and reduce displacement of subsistence resources and activities by mineral development.

***Effects under Alternative C***

Under Alternative C, no land would be managed as ACECs, and there would be potential for less protection for subsistence resources and harvest practices in areas that are in existing ACECs under Alternative A and proposed under Alternative B. However, some management actions would apply to this area under VRM and HWV classifications.

***Effects under Alternative D***

Under Alternative D, no land would be managed as ACECs. Under Alternative D, the Sheefish ACEC and the Swift River Whitefish Spawning ACEC would not be designated, which could impact subsistence resources because these spawning areas support the sheefish and whitefish populations of the Kuskokwim River. The area would be open to commercial woodland harvest, ROW, and floodplain development under conditions specified in the RMP. This would be least protective of fisheries resources, though some management actions would apply to these areas to provide protections. Fishing resources, including salmon and non-salmon species (e.g., sheefish and whitefish) are one of the most heavily harvested resources for subsistence communities. The importance of non-salmon fish species has increased as a subsistence resource due to declines in the salmon returns which had made sheefish and whitefish even more important over time.

**Subsistence: Effects from National Trails Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topic were considered:

- Mineral Decisions in the INHT NTMC
- Management Decisions regulating casual access and OHV

The INHT supports habitats used by fish, wildlife, and SSS. This trail is a focal area for recreation and is associated with increased human presence and motorized uses that have the potential to impact wildlife and SSS. While national trails management generally does not pertain to wildlife, it may help reduce the potential for impacts wildlife and SSS or their habitats from various land uses.

***Effects under Alternative A***

Existing management of the INHT is focused on the historic sites associated with the trail. Under Alternative A, the INHT would not be designated as an NTMC and would not be subject to associated management. However, the BLM would continue to implement management actions for the INHT that are designed to reduce surface disturbance from other resource uses, including minerals, forestry and woodland products, and livestock grazing. These actions could reduce the potential for impacts to fish, wildlife and SSS in the INHT area from these resource uses and in turn provide protections for subsistence. Existing conditions would continue under Alternative A.

***Effects Common to All Action Alternatives***

Under all action alternatives, effects to wildlife and SSS from disturbance and habitat degradation associated with use of the INHT would be similar to those under Alternative A. However, the BLM would establish the INHT NTMC in the planning area. This designation would include additional management with prescriptions such as exclusion from coal leasing, noise restrictions, and a “Limited” travel management designation. Additionally, the BLM would implement BMPs/SOPs to limit the spread of NNIS, which could result in minor, typically localized benefits to fish, wildlife and SSS and subsistence. The alternatives would vary in terms of acreage designated as the INHT NTMC, where additional protections to wildlife and SSS could occur.

Under all of the action alternatives, coal leasing would not occur in the INHT NTMC, which would reduce the potential for displacement of subsistence resources and activities. The BLM would prohibit winter OHV use in areas where it has degraded resources or interferes with National Trails System Act of 1968 trails management, which could impede subsistence-related travel but would also limit wildlife disturbance and degradation of wildlife habitat.

***Effects under Alternative B***

Under Alternative B, designation of the INHT NTMC on 288,466 acres (2 percent of the planning area) could provide incidental, localized protections that would reduce impacts to fish, wildlife and SSS and their habitats that are important for subsistence over Alternative A. Alternative B would be more restrictive on mineral development in the 288,466-acre INHT NTMC than Alternatives C and D. This would offer the most protection of all of the alternatives for the abundance of subsistence resources and activities within the INHT NTMC.

***Effects under Alternative C***

Under Alternative C, the INHT NTMC would consist of 273,242 acres (2 percent of the planning area). Therefore, incidental, localized protections that would reduce impacts to fish, wildlife and SSS and their habitats that are important for subsistence would occur over a slightly smaller area than under Alternative B. Alternative C would be more restrictive on mineral development in the INHT NTMC than Alternative D and less restrictive than Alternative B. At 273,242 acres, the INHT NTMC would also be smaller under Alternative C than under Alternative B and therefore offer fewer protections to the abundance of subsistence resources.

***Effects under Alternative D***

The INHT NTMC would be the same size under Alternative D as it would under Alternative C, but Alternative D would impose the fewer restrictions on mineral development and exploration than Alternatives B and C, which could result in lesser protections to subsistence resources and activities.

Alternative D would be somewhat more restrictive on summer overland travel for casual use than for subsistence use in comparison to Alternative A which has no restrictions. As compared to Alternative B and C, Alternative D would be less restrictive on overland subsistence travel. Alternative D would not prohibit casual use airboats or hovercraft on non-navigable waterways on BLM-managed land. Alternatives B and C include additional travel management for caribou habitat and the Innoko Bottoms Priority Wildlife Habitat Area, reducing disturbance impacts to wildlife and subsistence. Alternative D does not include this travel management, so disturbance impacts could lead to increase potential for use conflicts between recreationists and subsistence users. Alternative D would prohibit casual OHV use on about 2 percent of the planning area and restrict less than one percent to existing trails. Subsistence OHV use would be prohibited nowhere within the planning area would be restricted to existing trails for about 2 percent of the planning area. Therefore, Alternative D would have the least impact on existing access for both casual and subsistence use and would only limit OHV use to existing routes in one area (INHT NTMC TMA) thus providing opportunities for network expansion.

**Subsistence: Effects from Wild and Scenic Rivers Management Decisions**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:

- Travel Management Decisions
- UAS Uses

WSR corridors provide habitat for subsistence resources and users that use stream and riparian habitats. Management to preserve the outstanding natural, cultural, and recreational values in a free-flowing condition promotes wildlife habitat health in these areas. However, human disturbance associated with recreational use of these areas may disturb fish, wildlife and SSS and therefore disturb subsistence resources and users.

***Effects under Alternative A***

Alternative A includes the designated Unalakleet Wild River Corridor (46,953 acres, less than 1 percent of the planning area) and 18 river segments (332,176 acres) identified as eligible. Management direction to preserve the environment of the river and river corridor in a natural, primitive condition would limit impacts to subsistence resources within the Unalakleet Wild River Corridor. Alternative A does not include management direction regarding use of UASs or travel management decisions that would pertain to fish, wildlife and SSS or their habitat in WSRs. In accordance with BLM Manual 6400, projects on BLM-managed lands within the eligible river corridor or on lands that are adjacent to or border eligible rivers must consider guidelines to protect ORVs from activities such as locatable, salable, and leasable mineral development; transportation and motorized travel; ROW authorization; recreation; wildlife and fish projects; and livestock grazing which could reduce impacts to wildlife and their habitats (and in turn affect subsistence) within those eligible river corridors from these resource uses, if implemented.

***Effects Common to All Action Alternatives***

All action alternatives would include additional management actions in WSR corridors that may reduce impacts to wildlife and SSS from various resource uses, such as acquiring additional lands within designated WSR corridors, which would potentially increase the amount of protected wildlife and SSS habitat, prohibiting or restricting development and some types of uses in these areas with the potential to degrade or fragment habitats, and minimizing noise intrusions that could disturb nesting birds and other fish, wildlife and SSS that are important to subsistence.

The alternatives would vary in terms of area of land within WSR corridors and in the magnitude of management restrictions pertaining to OHVs and UASs in these areas.

***Effects under Alternative B***

Under Alternative B, the Unalakleet Wild River Corridor would remain in place. In addition, 332,176 acres (3 percent of the planning area) would be recommended as suitable for WSR designation. Under Alternative B, the Unalakleet Wild River Corridor and all corridors recommended as suitable would be subject to management actions that could reduce impacts to fish and wildlife from various land uses, as described in the section Effects Common to All Action Alternatives. Because Alternative B provides additional protections for the 332,176 acres of rivers recommended as suitable, compared with the guidelines that would be considered for those same 332,176 acres determined eligible, Alternative B would have a greater potential to reduce impacts to wildlife from resource uses in these areas compared with Alternative A. Additionally, this alternative includes travel management decisions that would limit OHV use in designated and eligible WSR corridors, which would reduce associated disturbance and habitat degradation. Restrictions on some uses of UASs could also reduce disturbance to fish, wildlife and SSS (predominantly birds) that are used as subsistence resources.

***Effects under Alternative C***

Under Alternative C, 46,953 acres (less than 1 percent of the planning area) would be within WSR corridors (Unalakleet Wild River Corridor), which is identical to Alternative A and less than Alternative B. Travel management decisions and restrictions and management pertaining to UASs, which would be similar to those under Alternative B, would provide a similar reduction of potential impacts to wildlife and SSS and subsistence from resource uses in these areas, but the geographic extent of these effects would be less than under Alternative B.

***Effects under Alternative D***

Under Alternative D, the land area within WSR corridors (Unalakleet Wild River Corridor) would be identical to the area under Alternatives A and C. Compared to Alternatives B and C, management pertaining to travel management and UASs would be less restrictive (e.g., takeoff and landing of casual use UASs would be allowed in the WSR corridor) and would have slightly less ability to reduce impacts to wildlife and SSS and subsistence from resource uses in these areas.

**Subsistence: Effects from Support for BSWI Communities**

In addition to the management actions common to all of the action alternatives, potential impacts from the following management topics were considered:



- Providing Assistance with Cultural Tourism
- Zones between Hunting Guide-Outfitter Operating Areas and Rural Communities

### ***Effects under Alternative A***

There are no existing management actions specific to support for BSWI communities. The existing conditions would continue under Alternative A.

### ***Effects Common to All Action Alternatives***

Under all of the action alternatives, subsistence resources would be managed to sustain wild resource population levels to provide for continued rural economic opportunity and support subsistence lifestyles. The BLM would support efforts to train local residents as commercial recreation guides, encourage BLM-permitted operators to use local hire and accommodate subsistence schedules, and hire and train local workers for BLM operations, which would increase the cash income to local communities that is needed to sustain and supplement a subsistence lifestyle.

The BLM would seek to reduce conflicts between recreation and subsistence users by taking community interests and potential impacts into account in hunting guide permitting decisions and by encouraging hunting guide-outfitters to coordinate with local communities and donate meat to communities. Additional resource competition from recreational users would be mitigated through more lenient restrictions on motorized watercraft, snowmobiles, and OHVs used for subsistence purposes.

The BLM would support overland travel needed for accessing subsistence resources and traveling between communities to share subsistence resources by working with communities to maintain existing trail systems and by managing winter and summer travel routes. The BLM would also support the development of communications infrastructure, such as cell phone towers and emergency shelter cabins. The communications infrastructure would improve safety for subsistence harvesters.

### ***Effects under Alternative B***

Under Alternative B, the BLM would cooperate with the AIANTA to carry out activities to enhance cultural tourism in the planning area, which could expand economic opportunities in BSWI communities and lead to an increase in the cash incomes that are needed to sustain and supplement a subsistence lifestyle. Alternative B also applies a CFZ within a 10-mile buffer surrounding BSWI communities where SRPs for hunting guide-outfitters, guide, or outfitter businesses would not be authorized. This would reduce conflicts with subsistence users in comparison to Alternatives A, C and D.

### ***Effects under Alternative C***

Alternative C would be the same as Alternative B except it would include a 5-mile buffer between rural communities and hunting guide-outfitter operating areas on BLM lands. The buffer would help reduce competition and conflicts between recreation and subsistence users; however, the area would be 723,088 acres smaller than Alternative B.

### ***Effects under Alternative D***

Alternative D would be the same as Alternative C except the BLM would seek funding to provide grants, loans, and technical assistance to BSWI communities to increase cultural tourism capacity, spur associated infrastructure development, and elevate living standards in BSWI communities. These

opportunities for grants, loans, and assistance would increase the likelihood over Alternatives B and C that cash incomes would increase in local communities as a result of cultural tourism. Also, Alternative D would not propose any buffers between rural communities and hunting guide-outfitter operating areas on BLM lands.

### **Subsistence: Climate Change Impacts**

Management actions that relate to subsistence would not counteract climate change impacts to subsistence resources. Changes in snowfall patterns and frequency, forest type, and overall shifting “climates” would likely drive changes in subsistence resource distribution related to plants, fish, wildlife, and timber. Such changes would increase economic insecurity of communities in the planning area reliant upon subsistence incomes due to increased time and fuel costs to locate resources or to cultivate new methods to secure subsistence livelihoods closer to their villages. When the effects of Alternative B are considered in context with the cumulative effects of climate change, measures to reduce direct and indirect stressors on ecological systems that support important subsistence species may lead to a higher level of ecological resilience in responding to changing climate. Alternative B may increase ecological resilience to climate change, which could result in decreased risk to households and communities reliant upon subsistence resources. On the other hand, Alternative D could be viewed as allowing BLM management to be more adaptable to changing conditions on a site-specific basis.

### **Subsistence: Cumulative Effects**

Past and present land uses in the planning area, such as resource exploration and extraction, management of the INHT, community infrastructure, military activities, research and monitoring, recreation, and subsistence activities can all affect subsistence. Land use for all lands, including lands not managed by BLM, within the planning area can influence the current condition of subsistence resources in the planning area. Impacts from such actions include ROW establishment, lease sales, and surface occupancy. Past recreation, sport hunting and fishing activities, and traditional subsistence practices are expected to continue. Past uses of the INHT are also expected to continue. Recent funding has supported trail improvements such as shelter cabins. Land use for recreation, subsistence, and tourism may increase as local, state, and national populations grow. Climate change will benefit some subsistence resources and adversely affect others. Frequency and severity of natural wildland fire in western Alaska are predicted to increase and result in shifts to deciduous and shrub-dominated landscapes, which may benefit moose and some furbearers but not caribou. Predicted increases in water temperatures would alter chemical and biotic conditions to the detriment of subsistence fish diversity and abundance. Increases in soil temperatures would result in drying of lakes and ponds.

The potential development of transportation corridors and trails, solid mineral exploration and development on State and Native lands, and the potential for increased recreational activities occurring in or adjacent to the planning area, would have cumulative impacts on subsistence resources. Depending on the location, extent, intensity, and duration of development these impacts could include: habitat integrity (relative to fragmentation, degradation, conversion could be compromised); increased access into wildlife habitats; unauthorized or uncontrolled OHV use; increased disturbance impacts; increased potential for mortality (road kills); and possible alteration of behavior or movement patterns and seasonal habitat use of wildlife.

The continued use of small roads that connect communities within the planning area may aid subsistence users in accessing their traditional harvest areas. However, these small roads may also concentrate

hunting efforts along the road/trail corridors, depleting resources from the area, and potentially altering harvest from current traditional harvest areas. Increased competition for subsistence resources would likely result if smaller communities were linked to new transportation corridors, as non-resident and non-local hunters would be able to access the area with little effort. This may also result in an increase in tourist traffic and recreational use of the area, resulting in additional impacts to wildlife. However, the construction of major road projects within the life of the plan would be dependent upon social and economic conditions and it is not clear which, if any, of these projects would be completed during the life of the plan. Because road construction in the planning area is so uncertain and the level of development projected through this plan so minimal, no cumulative impacts to subsistence species are anticipated.

When considering the cumulative case, impacts to subsistence may result in any reasonably foreseeable or significant restriction of subsistence use for rural communities within the planning area if significant activities occur with transportation corridor development, mineral exploration and development, increased recreational activities occurring in or adjacent to the planning area, or unforeseen events in climate change that impact resource abundance, change harvest patterns, limit access to resources or increase competition. Under all alternatives Donlin Gold's proposed mine may result in a restriction to subsistence uses for communities along the Kuskokwim River and communities along the gas pipeline right-of way. The development of ancillary facilities, temporary access roads, and airstrips association with the pipeline may result in unintended development along this corridor, which affects subsistence gathering regions. Designations that provide measures of protections for aquatic and terrestrial habitats, such as HVW, ACEC, WSR, and areas managed to preserve wilderness characteristics, will reduce risk to sensitive areas important for the reproduction of subsistence values.

In comparison to the other alternatives, Alternative B would provide the greatest measure of protection for the maintenance and perpetuation of subsistence resources indirectly affected by the development of the Donlin Gold Mine and the associated natural gas pipeline.

The results of the cumulative effects analysis for subsistence are presented in Table 3.11.3-7.

**Table 3.11.3-7: Cumulative Effects Analysis for Subsistence**

Trends and Forecasts of Subsistence in Consideration of Past and Present Actions	Trends and Forecasts of Subsistence in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative A)	Trends and Forecasts of Subsistence in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative B)	Trends and Forecasts of Subsistence in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative C)	Trends and Forecasts of Subsistence in Consideration of Past, Present, and Reasonably Foreseeable Future Actions (Alternative D)
<p>Local residents harvest a wide variety of wild fish, wildlife, and vegetation for myriad purposes including for food, fuel, arts and crafts, tools, and clothing. Past and present activities have disturbed and displaced subsistence resources and activities, but harvest levels and practices would likely continue.</p> <p><b>Trend: No change overall for wildlife habitat important for subsistence resources but degrading for some species and improving for others.</b></p>	<p>With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources could continue to degrade, and some subsistence users could face increased competition for resources.</p> <p><b>Trend: Existing trends would continue, with no trend overall, but degrading for some species important to subsistence and improving for others. With increased development in the planning area, species with affected habitat may experience a trend of increased degradation or lessened improvement at a similar rate.</b></p>	<p>With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources could continue to degrade, could become less available, and some subsistence users could face increased competition for resources.</p> <p><b>Trend: Improving. It is expected that implementing Alternative B would result in an improved trend for most fish and wildlife that are subsistence resources. For species with habitat or populations that are degrading, this alternative would lessen the rate of degradation or stabilize or counter the existing trend. For species with habitat or populations that are improving, improvement would continue at a similar or greater rate.</b></p>	<p>With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources could continue to degrade, could become less available, and some subsistence users could face increased competition for resources.</p> <p><b>Trend: Varies between species important to subsistence. It is expected that implementing Alternative C would result in a degrading trend for most fish and wildlife that are subsistence resources, though this trend would be less than Alternative A. With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources would continue to be degraded and subsistence users would face increased competition for available resources by non-local users. For species with habitat or populations that are degrading, the degradation may continue but at a lesser rate and could be stabilized.</b></p>	<p>With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources could continue to degrade, could become less available, and some subsistence users could face increased competition for resources.</p> <p><b>Trend: Varies between species, stable or declining. For forest and woodland species and species in areas of medium to high mineral development that are important as subsistence resources, potential trends could degrade as a result of the cumulative effects of future development, climate change, and fragmentation of habitats. These species would experience a trend of increased degradation or lessened improvement.</b></p>

## ***Section 4. References***

- ADF&G (Alaska Department of Fish and Game). 2014. Subsistence in Alaska: A Year 2014 Update. Division of Subsistence, Anchorage, Alaska. Available at: [http://www.adfg.alaska.gov/static/home/subsistence/pdfs/subsistence\\_update\\_2014.pdf](http://www.adfg.alaska.gov/static/home/subsistence/pdfs/subsistence_update_2014.pdf) (accessed December 6, 2017).
- ADF&G. 2018. "Our Agency Mission." Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=about.mission> (accessed October 31, 2018).
- ADNR. 1988. Kuskokwim Area Plan for State Lands. Division of Mining, Land and Water Management. Available at: <http://dnr.alaska.gov/mlw/planning/areaplans/kuskokwim/> (accessed October 2016).
- ADNR. 1991. Tanana Basin Area Plan. Division of Mining, Land and Water. Available at: <http://dnr.alaska.gov/mlw/planning/areaplans/tanana/> (accessed November 2016).
- ADNR. 2002. Wood- Tickchik State Park Management Plan. Division of Parks and Outdoor Recreation. Anchorage. Available at: <http://dnr.alaska.gov/parks/plans/woodt/woodtpln.htm> (accessed November 2016).
- Association of Village Council Presidents. 2014. Comprehensive Economic Development Strategy. Available at: <https://www.commerce.alaska.gov/web/Portals/6/pub/FY%2013%20AVCP%20CEDS.pdf> (accessed August 2018).
- Association of Village Council Presidents. 2018a. Yukon-Kuskokwim Freight and Energy Corridor Fact Sheet. Available at: <https://www.slideshare.net/secret/kEyUCuI0CI9e0u> (accessed December 17, 2018).
- Association of Village Council Presidents. 2018b. Yukon-Kuskokwim Freight and Energy Corridor Frequency Asked Questions. Available at: <http://www.avcp.org/wp-content/uploads/2018/09/62393-AVCP-FAQ-Rev07.pdf> (accessed December 17, 2018).
- BLM. 1981a. Management Framework Plan, Southwest Planning Area. Anchorage: US DOI BLM ADO. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 1981b. Iditarod National Historic Trail Comprehensive Management Plan: A Multi-Agency Management Plan. Iditarod National Historic Trail Project Office. BLM Anchorage District Office. Available at: [https://ia801002.us.archive.org/7/items/IditarodNationalHistoricTrailCompMgmtPlanMultiAgencyMgmtPlan/IditarodNationalHistoricTrailCompMgmtPlanMultiAgencyMgmtPlan\\_047.pdf](https://ia801002.us.archive.org/7/items/IditarodNationalHistoricTrailCompMgmtPlanMultiAgencyMgmtPlan/IditarodNationalHistoricTrailCompMgmtPlanMultiAgencyMgmtPlan_047.pdf) (accessed August 2018).

- BLM. 1983. Unalakleet National Wild River Management Plan. U.S. Department of the Interior, Bureau of Land Management. Anchorage District, Alaska. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 1986a. Central Yukon Planning Area Resource Management Plan and Record of Decision, September 1986. Fairbanks District Office, Northwest Resource Area. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 1986b. The Iditarod National Historic Trail, Seward to Nome Route: A Comprehensive Management Plan. Washington, DC. U.S. Department of Interior, Bureau of Land Management. Washington, D.C. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 2005. Decision Record for the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska Environmental Assessment. AK-313-04-EA-001. Prepared by the Bureau of Land Management Alaska Fire Service, Fairbanks, AK. July 20, 2005. Available at: [https://fire.ak.blm.gov/content/planning/DecisionRecord\\_Signed072005.pdf](https://fire.ak.blm.gov/content/planning/DecisionRecord_Signed072005.pdf) (accessed November 2016).
- BLM. 2008. BLM Handbook H-1791-1. National Environmental Policy Act. Available at: [https://www.ntc.blm.gov/krc/uploads/366/NEPAHandbook\\_H-1790\\_508.pdf](https://www.ntc.blm.gov/krc/uploads/366/NEPAHandbook_H-1790_508.pdf)
- BLM. 2012. BLM Manual 6400: Wild and Scenic Rivers: Policy and Program Direction for Identification, Evaluation, Planning, and Management. Available at: [https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter\\_blmpolicymanual6400.pdf](https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual6400.pdf) (accessed July 21, 2018).
- BLM. 2015a. Mineral Occurrence and Development Potential Report for Leasable Minerals within the Bering Sea – Western Interior Planning Area. Prepared by Zachary Lyons, Geologist, Energy and Minerals Branch, Division of Resources, BLM Alaska State Office. January 2015. Available at: [https://eplanning.blm.gov/epl-front-office/projects/lup/36665/43890/58028/2015-01-07\\_LeasableMineralsReport.pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36665/43890/58028/2015-01-07_LeasableMineralsReport.pdf) (accessed October 16, 2018).
- BLM. 2015b. Guidance on Reclamation Bonding for Plans and Notices on BLM Managed Lands in Alaska. AK IM-2015-001. Available at <https://www.blm.gov/policy/ak-im-2015-001> (accessed August 2018).
- BLM. 2018a. Areas of Critical Environmental Concern Report on the Application of the Relevance and Importance Criteria. Bering Sea Western Interior Resource Management Plan. Original publication April 2015. Revised version October 2016. Bureau of Land Management, Anchorage Field Office, Anchorage, Alaska.

- BLM. 2018b. Wild and Scenic Study Report for the Bering Sea–Western Interior Resource Management Plan. September.
- BLM GIS (Geographic Information System). 2018. Unpublished data. BLM, Anchorage Field Office, Anchorage, AK.
- CEQ (Council on Environmental Quality). 1997. Considering cumulative effects under the National Environmental Policy Act
- CEQ. 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. June 24. Available at: [https://www.energy.gov/sites/prod/files/nepapub/nepa\\_documents/RedDont/G-CEQ-PastActsCumulEffects.pdf](https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-PastActsCumulEffects.pdf) (accessed August 2018).
- DOI (U.S. Department of the Interior). 2018. Strategic Plan for Fiscal Years 2018-2022.
- Flagstad, L., and H. Cortes-Burns. 2010. Tracking Weeds along the Iditarod National Historic Trail. Alaska Natural Heritage Program, University of Alaska, Anchorage. Available at: [http://accs.uaa.alaska.edu/files/invasive-species/Publications/2010/Tracking\\_Weeds\\_Along\\_Iditarod\\_National\\_Historic\\_Trail.pdf](http://accs.uaa.alaska.edu/files/invasive-species/Publications/2010/Tracking_Weeds_Along_Iditarod_National_Historic_Trail.pdf) (accessed August 2018).
- Fried, Neal. 2018. The Cost of Living in Alaska. Alaska Economic Trends, July 2018. Available at: <http://live.laborstats.alaska.gov/col/col.pdf> (accessed August 2018).
- Greenstein, C. 2013. Monitoring and Controlling Invasive Plants at Rohn Cabin: 2013 Update. Alaska Natural Heritage Program, University of Alaska, Anchorage. Available at: [http://accs.uaa.alaska.edu/files/invasive-species/Publications/2013/Controlling\\_Invasive\\_Plants\\_Rohn\\_Cabin\\_2013.pdf](http://accs.uaa.alaska.edu/files/invasive-species/Publications/2013/Controlling_Invasive_Plants_Rohn_Cabin_2013.pdf) (accessed August 2018).
- Harris, J.A., R.J. Hobbs, E. Higgs, and J. Aronson. 2006. Ecological Restoration and Global Climate Change. *Restoration Ecology*, 14(2):170-176. Available at: <https://training.fws.gov/courses/csp/csp3132/resources/Climate%20Change/Ecological%20restoration%20and%20CC.pdf> (accessed August 2018).
- Johnson, J., and V. Litchfield. 2016a. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Interior Region, Effective March 1, 2016. Alaska Department of Fish and Game, Special Publication No. 16-02, Anchorage.
- Johnson, J., and V. Litchfield. 2016b. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Southwestern Region, Effective June 1, 2016. Alaska Department of Fish and Game, Special Publication No. 16-05, Anchorage.
- Johnson, J., and V. Litchfield. 2016c. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Western Region, Effective June 1, 2016. Alaska Department of Fish and Game, Special Publication No. 16-06, Anchorage.

- Kling, L 2018. Personal communication -Louise Kling, AECOM to Jena Barringer, Bonnie Million and Bruce Seppi, BLM. Status Update and Next Steps.
- Kurtak, J., J. Hoppe and R. Ellefson. 2017. Mineral Occurrence and Development Potential Report, Locatable and Salable Minerals. BLM Alaska Technical Report 63, July 2017. Available at: [https://eplanning.blm.gov/epl-front-office/projects/lup/36665/145032/178739/2017\\_Minerals\\_Occurrence\\_and\\_Development\\_Potential\\_Report\\_Rev1.pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36665/145032/178739/2017_Minerals_Occurrence_and_Development_Potential_Report_Rev1.pdf) (accessed September 2018).
- Magness, D.R., A.L. Sesser, and T. Hammond. 2018. Using Geodiversity to Connect Conservation Lands in the Central Yukon, Alaska. *Landscape Ecology*. 33(4) pp 547–556. Available at: <https://doi.org/10.1007/s10980-018-0617-0>.
- McDowell Group. 2014. The Economic Impacts of Guided Hunting in Alaska. Alaska Professional Hunters Association: Juneau, AK. 23 p.
- Newell, E. 2018. Personal communication Emily Newell, AECOM and Bruce Seppi, BLM on November 26, 2018 regarding ANILCA 810 Status Update.NovaGold. 2018. Donlin Gold Permitting. Available at: [http://www.novagold.com/properties/donlin\\_gold/permitting/](http://www.novagold.com/properties/donlin_gold/permitting/) (accessed October 2018).
- NovaGold. 2018. Donlin Gold Permitting. Available at: [http://www.novagold.com/properties/donlin\\_gold/permitting/](http://www.novagold.com/properties/donlin_gold/permitting/) (accessed October 2018).
- NPS (National Park Service). 2009. Lake Clark National Park and Preserve Foundation Statement. Alaska Regional Office. Available at: <https://parkplanning.nps.gov/showFile.cfm?projectID=24966&filename=LACL%20Foundation%20Statement%20Final%20101009.pdf&sfid=74704> (accessed August 2018).
- NPS. 2013. Draft Land Protection Plan. Lake Clark National Park and Preserve, Alaska. Available at: <https://parkplanning.nps.gov/document.cfm?parkID=17&projectID=47089&documentID=53457> (accessed August 2018).
- NPS. 2014. Lake Clark General Management Plan Amendment/Environmental Assessment. Lake Clark National Park and Preserve, Alaska. Available at: <https://parkplanning.nps.gov/document.cfm?parkID=17&projectID=36331&documentID=57141> (accessed August 2018).
- Pajunen, A., R. Virtanen, and H. Roininen. 2008. “The effects of reindeer grazing on the composition and species richness of vegetation in forest-tundra ecotone.” *Polar Biology*, 31:1233.1244.
- Swanson, J.D., and M.H.W. Barker. 1992. Assessment of Alaska reindeer populations and range conditions. *Rangifer*, 12:33-43. Available at: <https://septentrio.uit.no/index.php/rangifer/article/view/1023/977> (accessed August 2018).



- U.S. Census Bureau. 2010a. 2010 Census Fact Finder. Available at:  
<https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml> (accessed October 2018).
- U.S. Census Bureau. 2010b. 2010 Census Interactive Population Search Bethel City.
- USFWS (U.S. Fish and Wildlife Service). 1988. Yukon Delta National Wildlife Refuge comprehensive conservation plan, environmental impact statement, wilderness review, and wild river plan: Final. Anchorage, AK: U.S. Department of the Interior, Fish and Wildlife Service, Alaska Region
- USFWS. 2008. Revised Comprehensive Conservation Plan for the Innoko National Wildlife Refuge. Alaska Region U.S. Fish and Wildlife Service. Available at:  
[https://www.fws.gov/alaska/nwr/planning/pdf/innoko/Inn\\_CoverandFrontPages.pdf](https://www.fws.gov/alaska/nwr/planning/pdf/innoko/Inn_CoverandFrontPages.pdf) (accessed August 2018).

**Appendix O: Alaska National Interest Lands Conservation  
Act (ANILCA) Preliminary Section 810 Evaluation**



## Table of Contents

<b>Acronyms .....</b>	<b>iv</b>
<b>Section 1 Introduction .....</b>	<b>1</b>
<b>Section 2 Subsistence Evaluation Factors under ANILCA Section 810(a) .....</b>	<b>3</b>
2.1 Determinations .....	3
2.2 Findings.....	4
<b>Section 3 Evaluations and Findings for All Alternatives and the Cumulative Case .....</b>	<b>7</b>
3.1 Evaluation and Findings for Alternative A (No Action Alternative).....	7
3.1.1 Evaluation of the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	9
3.1.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed under Alternative A.....	10
3.1.3 Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	10
3.1.4 Findings .....	10
3.2 Evaluation and Findings for Alternative B .....	11
3.2.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	13
3.2.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed Under Alternative B.....	13
3.2.3 Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	14
3.2.4 Findings .....	14
3.3 Evaluation and Findings for Alternative C .....	15
3.3.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	18
3.3.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed Under Alternative C.....	18
3.3.3 Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	19
3.3.4 Findings .....	19
3.4 Evaluation and Findings for Alternative D .....	21
3.4.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	24
3.4.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed Under Alternative D.....	24

3.4.3	Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	25
3.4.4	Findings .....	25
3.5	Evaluation and Findings for the Cumulative Case.....	26
3.5.1	Past, Present and Reasonably Foreseeable Land Use and Activities .....	27
3.6	Evaluation and Findings for the Cumulative Case – Alternative A .....	39
3.6.1	Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	39
3.6.2	Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area .....	40
3.6.3	Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	40
3.6.4	Findings .....	40
3.7	Evaluation and Findings for the Cumulative Case – Alternative B .....	41
3.7.1	Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	41
3.7.2	Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area .....	41
3.7.3	Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	41
3.7.4	Findings .....	42
3.8	Evaluation and Findings for the Cumulative Case – Alternative C .....	42
3.8.1	Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	42
3.8.2	Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area .....	43
3.8.3	Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	43
3.8.4	Findings .....	43
3.9	Evaluation and Findings for the Cumulative Case – Alternative D.....	44
3.9.1	Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs.....	44
3.9.2	Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area .....	44
3.9.3	Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes.....	44
3.9.4	Findings .....	45
	<b>Section 4 Notice and Hearings .....</b>	<b>46</b>

**Section 5 Subsistence Determinations Under ANILCA Sections 810(a)(3)(A), (B), and (C)..... 47**

- 5.1 Significant Restriction of Subsistence Use is Necessary, Consistent with Sound Management Principles for the Utilization of Public Lands..... 47
- 5.2 The Proposed Activity Will Involve the Minimal Amount of Public Lands Necessary to Accomplish the Purposes of such Use, Occupancy or Other Disposition ..... 47
- 5.3 Reasonable Steps will be Taken to Minimize Adverse Impacts upon Subsistence Uses and Resources Resulting from such Actions. .... 47

**Section 6 References..... 48**

**Tables**

Table 1: High Locatable Mineral Potential in the Planning Area ..... 35

**Appendices**

Appendix O-1: Impact Methodology and Results

## *Acronyms*

ACEC	Area of Critical Environmental Concern
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
APDES	Alaska Pollutant Discharge Elimination System
ATV	all-terrain vehicle
BLM	Bureau of Land Management
BMP	best management practice
BSWI	Bering Sea–Western Interior
CFR	Code of Federal Regulations
CFZ	Community Focus Zone
CYRMP	Central Yukon Resource Management Plan
EIS	Environmental Impact Statement
EO	Executive Order
ERMA	Extensive Recreation Management Area
FLPMA	Federal Land Policy and Management Act of 1976
GMU	Game Management Unit
HVW	high-value watershed
IM	Instruction Manual
INHT	Iditarod National Historic Trail
LMP	locatable mineral potential
LUP	land use plan
NEPA	National Environmental Protection Act
NPS	National Park Service
NSO	no surface occupancy
NTMC	National Trail Management Corridor
NWR	National Wildlife Refuge
OHV	off-highway vehicle
RMP	Resource Management Plan
ROW	right-of-way
SOP	standard operating procedures
SRMA	Special Recreation Management Area
SRP	special recreation permit
SSS	special status species
SWMFP	Southwest Management Framework Plan

TKC	The Kuskokwim Corporation
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
UTV	utility terrain vehicle



This page intentionally left blank

## ***Section 1 Introduction***

In 2013, the U.S. Department of the Interior, Bureau of Land Management (BLM), issued a Notice of Intent to prepare a Resource Management Plan (RMP) and associated Environmental Impact Statement (EIS) for public lands in the Bering Sea–Western Interior (BSWI) Planning Area (planning area). In accordance with Alaska National Interest Lands Conservation Act (ANILCA) § 810, the BLM is required to conduct an analysis of the effects of this proposed action on subsistence resources associated with the planning area.

In 2018, the BLM Anchorage Field Office prepared the Bering Sea–Western Interior Resource Management Plan: Affected Environment Report (Appendix M) and Supplemental Impact Analysis Information (Appendix N) to support the Draft RMP/EIS. These appendices provide:

- Consolidated direction to address land and resource use and development on BLM-managed lands in the planning area, and
- Analysis of the environmental effects that could result from the implementation of the alternatives proposed in the Draft BSWI RMP/EIS.

When final, the BSWI RMP, will replace the current 1981 Southwest Alaska Management Framework Plan (SWMFP [BLM 1981]) and a small portion of the 1986 Resource Management Plan and Record of Decision for the Central Yukon Planning Area (Central Yukon RMP [CYRMP]) (BLM 1986), including amendments.

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.), resource management planning regulations (43 Code of Federal Regulations [CFR] 1610 et seq.), and BLM’s *Land Use Planning Handbook*, H-1601-1 (BLM 2005), the Draft BSWI RMP/EIS provides planning-level guidance for the management of resources and designation of uses on all BLM-managed public lands in the planning area and any BLM-managed subsurface estate, including the subsurface beneath private surface estate if the subsurface estate was reserved to the BLM. The Draft BSWI RMP/EIS was developed in coordination with federal, State, and local governments; tribal governments; Alaska Native corporations; and interested members of the public. New management direction in the RMP addresses land use issues and conflicts that have emerged since the 1981 SWMFP was adopted.

The FLPMA requires the BLM to “develop, maintain, and, when appropriate, revise land use plans” (43 U.S.C. 1712 (a)).<sup>1</sup> Because the existing SWMFP does not follow the current land use process for the development of RMPs, the BLM has decided to replace the 1981 plan with the BSWI RMP/EIS (the first RMP for the planning area) rather than revise the 1981 plan. The BLM is also revising the 1986 CYRMP for the portions of that planning area that changed under a district boundary realignment and are now in the current planning area (Appendix E of the Draft BSWI RMP/EIS).

The purpose of the Draft BSWI RMP/EIS is to document decisions that will guide future land management actions and subsequent site-specific implementation decisions. The decisions will establish goals and objectives for resource management (desired outcomes) and the identified uses (allocations) that are allowable, restricted, or prohibited in order to achieve the goals and objectives. Management

---

<sup>1</sup> For purposes of BLM planning, “land use plan” is synonymous with RMP.

actions are also identified where they can help achieve desired outcomes and include measures or criteria that may guide day-to-day as well as long-term management. Such management actions could include protection and restoration opportunities; administrative designations such as Areas of Critical Environmental Concern (ACECs); proposed withdrawals, disposals, exchanges, acquisitions; and suitability for congressional designations. All decisions are pursuant to the multiple-use and sustained yield mandate of FLPMA.

## ***Section 2 Subsistence Evaluation Factors under ANILCA Section 810(a)***

ANILCA § 810(a) requires an evaluation of the effects on subsistence uses of any federal determination to “withdraw, reserve, lease, or otherwise permit the use, occupancy or disposition of public lands.” As such, an evaluation of the potential impacts to subsistence under ANILCA § 810(a), must be evaluated for the BSWI RMP. ANILCA § 810(a) (16 U.S.C. 3120) requires that the evaluation include findings on the following three issues:

- Effect of use, occupancy, or disposition on subsistence uses and needs.
- Availability of other lands for the purpose sought to be achieved.
- Other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

The evaluation and findings required by ANILCA § 810(a) are set out for each of the four alternatives considered in the Draft BSWI RMP/EIS. The four alternatives are as follows:

- Alternative A (No Action): This alternative represents existing management mandated by current land use plans for the planning area and provides the baseline against which to compare the other alternatives.
- Alternative B: This alternative emphasizes reducing the potential for competition between recreational or developmental uses and subsistence resources by compartmentalizing key areas for additional protections of long-term resource values within the planning area.
- Alternative C: This alternative emphasizes adaptive management at the planning level to protect the long-term sustainability of resources while providing for multiple resource uses.
- Alternative D: This alternative provides additional flexibility at the project-specific implementation level and fewer overarching management restrictions at the planning level.

### **2.1 Determinations**

Pursuant to ANILCA § 810, a finding that the proposed action may significantly restrict subsistence uses imposes additional requirements, including provisions for notices to the State of Alaska and appropriate regional and local subsistence committees, a hearing in the vicinity of the area involved, and the making of the following determinations, as required by ANILCA § 810(a)(3) prior to approving the proposed land use:

*Such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands;*

*The proposed activity will involve the minimal amount of public lands necessary to accomplish the purpose of the use, occupancy, or other disposition; and,*

*Reasonable steps will be taken to minimize adverse effects upon subsistence uses and resources resulting from such actions.*

If there is no positive finding (i.e., no significant restrictions to subsistence uses are expected to occur), then the ANILCA § 810(a)(3) determinations are not required.

To determine if a significant restriction of subsistence uses and needs may result from any one of the alternatives discussed in the Draft BSWI RMP/EIS, including their cumulative effects, the following factors in particular are considered in accordance with BLM Instruction Manual (IM) 2011-008 (BLM 2010):

*Abundance: The reduction in the availability of subsistence resources caused by a decline in the population or abundance of harvestable resources. This may include fish, wildlife, edible plants, house logs, firewood or drinking water, for example. Forces that might cause a reduction in abundance include adverse impacts on habitat, direct impacts on the resource, increased harvest, and increased competition from non-subsistence users.*

*Availability: Reductions in the availability of resources used for subsistence purposes caused by alteration of their distribution, migration patterns, or location, and*

*Access: Limitations on access to subsistence resources, including from increased competition for the resources, including physical and legal barriers.*

## 2.2 Findings

The IM 2011-008 policy states that the ANILCA § 810 evaluation shall conclude with a distinct finding that the proposed action and alternatives either may or will not significantly restrict subsistence uses for identified subsistence communities or groups (BLM 2010).

A finding of “may significantly restrict” requires either (1) that the process be stopped for the action and the action prohibited; or (2) that the agency proceed to the notice and hearings step described below. A finding of “no significant restriction” concludes the ANILCA § 810 process.

A proposed action and/or alternatives would be considered to significantly restrict subsistence uses if, after consideration of any stipulations or protection measures included as a part of each alternative, that action or alternative can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources. Substantial reductions in the opportunity to continue subsistence uses generally are caused by large reductions in the abundance, or a major redistribution of resources; extensive interference with access; or, major increases in the use of those resources by non-local users (BLM 2010). A proposed action and/or alternatives may be found to “not create a significant restriction,” but it may be appropriate for the analyst to identify and attempt to mitigate localized, individual restrictions created by an action.

According to IM 2011-008, the Findings shall be stated as either:

- This evaluation concludes that the action will not result in a significant reduction in subsistence uses; or
- This evaluation concludes that the action may result in a significant restriction to subsistence uses for the communities of \_\_\_\_\_ due to (specify causes).

The first Finding, above, is frequently referred to as a “Negative Finding,” in that no significant restrictions are expected to occur. Likewise, the second Finding is commonly referred to as a “Positive Finding,” in that significant restriction may be expected to occur.

In some cases, individual alternatives will fall below the “may significantly restrict” threshold, and only the cumulative case exceeds the threshold. Note that the cumulative effects analysis is not, in and of itself,

a proposed action. Instead, the purpose of the cumulative effects analysis is to determine the effects of the proposed action and alternatives together with other past, present, and reasonably foreseeable future actions. In this way, a finding of “may significantly restrict” subsistence uses in the cumulative case is, in effect, a Positive Finding, even though the finding is only noted under the cumulative case. A Positive Finding in the cumulative case triggers the Notice, Hearing, and Determination requirements of ANILCA § 810(a).

Chapter 3, Affected Environment and Environmental Consequences, of the Draft BSWI RMP/EIS, and Appendix M provide information on areas and resources important for subsistence use and the degree of dependence of affected villages or communities on different subsistence populations. Chapter 3 and Appendix N provide much of the data on potential impacts and levels of reduction and limitations under each alternative, which were used to determine whether the action would cause a significant restriction to subsistence uses. Appendix N also lists the methodology and assumptions used in the analysis. The information in the Draft BSWI RMP/EIS and Appendices N and O are the primary data used in the analysis that is presented in this report.

A subsistence evaluation and findings under ANILCA § 810 must also include a cumulative impacts analysis. The following section begins with evaluations and findings for each of the four alternatives discussed in the BSWI RMP/EIS. The cumulative case, as discussed in Chapter 3, Affected Environment and Environmental Consequences, of the Draft BSWI RMP/EIS, is evaluated. This approach will help the reader separate the subsistence restrictions that could result from activities proposed under the four alternatives from those that could be caused by past, present, and future activities that could occur, or have already occurred, in the surrounding area.

### **Environmental Justice**

In addition to ANILCA, Executive Order (EO) 12898, Environmental Justice for Low Income & Minority Populations, calls for an analysis of the effects of federal actions on minority populations with regard to subsistence. Environmental Justice is defined as:

*The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (U.S. Environmental Protection Agency).*

Fair treatment is defined as:

*The principle that no group of people, including racial, ethnic, or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and Tribal programs and policies (U.S. Environmental Protection Agency).*

Section 4-4 of EO 12898, Subsistence Consumption of Fish and Wildlife, requires federal agencies to collect, maintain, and analyze information on the consumption patterns of populations that principally rely on fish and/or wildlife for subsistence. The EO also requires federal agencies to communicate to the public any risks associated with the consumption patterns from activities they are proposing. The following were reviewed and found to comply with EO 12898:

- Description of subsistence use in Chapter 3, Affected Environment and Environmental Consequences, of the Draft BSWI RMP/EIS and Appendix M.

- Subsistence analyses of the alternatives in Chapter 3, Affected Environment and Environmental Consequences, of the Draft BSWI RMP/EIS and Appendix N.

## ***Section 3 Evaluations and Findings for All Alternatives and the Cumulative Case***

The ANILCA § 810 evaluations in this section are based on information related to the environmental and subsistence consequences of Alternatives A through D and the cumulative impacts analysis as presented in Chapter 3, Affected Environment and Environmental Consequences, of the Draft BSWI RMP/EIS. The standard operating procedures (SOPs) and best management practices (BMPs) are discussed in Appendix K of the Draft BSWI RMP/EIS and were also considered for the alternatives to which they apply. The evaluations and findings focus on potential impacts to the subsistence resources themselves as well as access to resources and economic and cultural issues that relate to subsistence.

The action alternatives (Alternatives B, C, and D), and the leasing stipulations and SOPs that accompany them, take into consideration comments and concerns generated during the scoping and alternative scoping process for the Draft BSWI RMP/EIS, including consultation with federally recognized tribal governments.

### **3.1 Evaluation and Findings for Alternative A (No Action Alternative)**

This section provides an overview of impacts for the planning area. A detailed community by community analysis is provided in Appendix A.

Alternative A represents the existing management mandated by current land use plans for the planning area. Alternative A meets the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) requirement in 40 CFR 1502.14 that the BLM consider a No Action alternative and provides the baseline against which to compare the other alternatives. This alternative would continue the present management direction and practices based on existing land use plans (LUPs) and LUP amendments, SOPs, and BMPs. Direction in existing laws, regulations, policies, and standards would also continue to be implemented, sometimes superseding provisions of the 1981 SWMFP (BLM 1981) and the 1986 CYRMP (BLM 1986) and subsequent amendments. The current levels, methods, and mix of multiple use management of BLM-managed lands in the planning area would continue, and resource values would continue to receive attention at present levels.

Alternative A would not designate any high-value watersheds (HVWs); therefore, the amount of fisheries resources protected as HVWs would be less than under Alternative B or C.

Under Alternative A, no acres of land would be protected by vegetation regulations, and there would be no formal program for controlling invasive weeds. Existing conditions would continue under Alternative A in terms of the availability, abundance and access to these resources for subsistence users.

BLM would consider impacts to wildlife used as subsistence resources when evaluating actions in the planning area that could affect the abundance and availability of subsistence resources and would implement mitigation as needed on a case-by-case basis. Under Alternative A, the BLM would consider caribou and moose in its management of resource uses although no specific management actions are identified. Alternative A could have a long-term impact on migration and species movement if future development occurs in areas where it would fragment species ranges and reduce habitat connectivity. Existing conditions would continue under Alternative A in terms of the availability, abundance and access to these resources for subsistence users.



Alternative A would continue to include closures and protective stipulations that would provide protections to fish, wildlife, and special status species (SSS) in the planning area. A total of 5,202,221 acres (39 percent) of the planning area would be closed to leasing, and 17,521 acres (less than 1 percent) of the planning area would be designated as no surface occupancy (NSO) leasable. Overall, the area of wildlife habitat covered by management, reducing impacts to wildlife from impacts associated with leasable minerals, would be less than under the action alternatives, although the area of land completely closed to leasing would be greater than under the action alternatives. Existing conditions would continue under Alternative A in terms of the availability, abundance, and access to these resources for subsistence users.

Under Alternative A, 4,804,488 acres (36 percent) of the planning area would continue to be withdrawn from locatable minerals and closed to salable minerals, including withdrawals to protect wildlife habitat and other resource values that are important to subsistence. Under Alternative A, 8,661,406 acres (64 percent of BLM-managed land in the planning area) would continue to be open to locatable and salable mineral development with 294,325 acres open in areas of medium or high locatable mineral potential (LMP). Of these mineral decisions, areas open to locatable mineral development are most likely to affect subsistence resources because there are areas of medium and high LMP in the planning area. Locatable mineral development could affect abundance and availability of subsistence resources by impacting habitat and causing wildlife populations to migrate out of the area, most notably to fishing resources within the planning area. Fish (including salmon, trout, and whitefish) are some of the most heavily harvested resources for the communities within the planning area. If areas open to locatable mineral development that have a medium and high LMP are located upstream or alongside known fishing locations, the abundance and availability of these fish species could be negatively impacted. These impacts may be caused by habitat degradation from mining exploration and operational activities (e.g., the release of chemicals from mining activities and increased particulates in the water due to soil disturbance) but also from the potential for increased competition for fishing resources due to the influx of workers for the mining activities. Communities within the planning area rely heavily on fish (and salmon in particular) to support their subsistence needs. Salmon populations have been declining sharply within the Kuskokwim and Yukon River watersheds (Ikuta 2014), increasing the importance of non-salmon species for subsistence. With the heavy reliance on fish harvesting to supply the subsistence needs for the planning area communities, areas open to locatable mineral development and that have medium or high LMP may threaten the abundance or availability of fish in the planning area. Important wildlife habitat areas that could be affected are further described in Appendix N of the Draft BSWI RMP/EIS.

Under Alternative A, all BLM-managed land within the planning area would be open to right-of-way (ROW) decisions on a case-by-case basis. Alternative A could result in wildlife and subsistence habitat fragmentation and degradation because there would be no designated ROW exclusion or avoidance areas. Areas open to ROWs on a case-by-case basis with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs would include habitats that are important for the availability of subsistence resources, including moose, caribou, and fish species important to communities within the planning area.

All existing Alaska Native Claims Settlement Act (ANCSA) 17(d)(1) (43 U.S.C. 1616(d)(1)) withdrawals would remain in place, affecting 13,461,531 acres (> 99 percent) of the planning area. Alternative A does not provide additional management guidance for lands and realty that would affect fish, wildlife, or SSS used as subsistence resources or their indicators. Existing conditions would continue. Under the continuation of current management, there would be a potential for user conflicts, especially in popular

recreational areas, such as along the Iditarod National Historic Trail (INHT) and Unalakleet Wild River Corridor. Due to an increase in vehicle technology, there would be more frequent and intense impacts between subsistence and non-local users. The impacts would be greatest during the summer when subsistence activities may be concentrated. The BLM would not designate Recreation Management Areas or manage for specific desired outcomes or setting characteristics. In general, management would support dispersed and unstructured recreational opportunities throughout the entire planning area. Continuing to issue special recreation permits (SRPs) on a case-by-case basis would allow outfitters (commercial operators that provide hands-on hunting assistance and guide services) to accommodate demand for guided hunting and fishing (which can conflict with subsistence activities and compete for resources), special events on the INHT, and other specially permitted activities. No current management decisions pertain to the operation of shuttle services in the planning area under Alternative A. Over time, an expanding number and size of SRP activities could increase the potential for conflicts with subsistence users and damage natural resources that contribute to the recreational setting for all users. These impacts to subsistence that could impact the abundance and availability of harvestable resources would be greatest in areas of high recreational use, such as along the INHT.

All lands in the planning area are managed as undesignated for travel and transportation management, which allows full access to the planning area for subsistence uses. Traditional means of access such as outboard motorboats, airplanes, dogsleds, and snowmobiles are allowed for all river users. Other means of access, such as inboard jet boats, airboats, hovercraft, and all-terrain vehicles (ATVs) are not allowed in the Unalakleet Wild River Corridor. Off-highway vehicle (OHV) use could result in loss or degradation of subsistence resource habitat from physical disturbance and could fragment habitat if new trails were created. OHV use could also create additional access for activities that compete for subsistence resources, such as sport hunting and fishing. Due to the lack of management direction on OHV use, the route network would continue to expand which would adversely affect subsistence resources if there is a reduction in the abundance and availability of harvestable resources because of increased access and/or competition from non-local hunters. The harvesting of large land mammals (including, most notably, moose and caribou) is one of the most important subsistence activities for most of the communities in the planning area (based on weight of harvested resources per year). The moose populations throughout the planning area have experienced some decreases within the past couple decades, especially in Game Management Units (GMUs) 18, 19, and 21 (Ikuta 2014). The BLM has used various management actions to try to boost the moose populations in the GMUs within the planning area. Similarly, threats to caribou populations have also resulted in the Mulchatna caribou herd (the predominant herd in the planning area) being heavily managed in an attempt to increase its population. Undesignated OHV use within the planning area may bring increased competition for moose and caribou harvest and may also degrade the habitat to a degree that the abundance and availability of these resources will be impacted.

### **3.1.1 Evaluation of the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Under Alternative A, there would be no reduction in the availability of harvestable resource area that is used for subsistence, and existing conditions as described in the Draft BSWI RMP/EIS would continue. Alternative A would continue to include closures and protective stipulations in certain areas that would provide protections to fish, wildlife, and SSS in the planning area. A total of 5,202,221 acres (39 percent) of the planning area would be closed to leasing, and 17,521 acres (less than 1 percent) of the planning area would be designated as NSO leasable. There would be no limitations on the access of subsistence

users to resources. However, harvest, conflict, and competition from non-local users could all increase which could reduce the abundance and availability of the resources for subsistence users. Continuing to issue SRPs on a case-by-case basis would allow outfitters to accommodate demand for guided hunting and fishing, special events on the INHT, and other specially permitted activities. Over time, an expanding number and size of SRP activities, particularly during the summer, would increase the potential for these activities to conflict with subsistence users and damage natural resources that contribute to the recreational setting for all users.

### **3.1.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed under Alternative A**

Under Alternative A, the management of the BLM-managed lands in the planning area would continue under the 1981 SWMFP (BLM 1981) and a small portion of the 1986 CYRMP (BLM 1986), including amendments. Subsurface estate within U. S. Fish and Wildlife Service (USFWS) lands is managed by the BLM under the Mineral Leasing Act of 1920. ANILCA § 304(c) is addressed in the *Mineral Occurrence and Development Potential Report for Leasable Minerals within the Bering Sea – Western Interior Planning Area* (BLM 2015) and would be addressed on a case-by-case basis and would not be subject to the Draft BSWI RMP/EIS. Similarly, any prior existing mining claims administered by the BLM existing within USFWS or National Park Service (NPS) lands would be addressed on a case-by-case basis and would not be covered by the Draft BSWI RMP/EIS. Other BLM-managed lands in the state already have land use planning documents in place or are being addressed by separate planning processes. State, Native corporation lands, Native allotments, and private lands cannot be considered in a BLM plan, and under BLM policy, other BLM lands outside Alaska are not considered under ANILCA.

### **3.1.3 Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. Alternatives that would reduce or eliminate the use of public lands needed for subsistence include Alternatives B, C, and D, which are analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.1.4 Findings**

Management actions that are seen as having the most potential to significantly restrict abundance, availability, or access of subsistence resources are:

- Areas open to locatable mineral development (in areas of high and medium LMP) in known subsistence use areas;
- OHV closures to subsistence use areas; and
- ROW exclusion or avoidance areas in subsistence use areas.

Appendix A provides detail on the methods and analysis used to determine the communities that may have a significant restriction to subsistence uses. Alternative A may result in a significant restriction to subsistence uses for the communities of Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet.

Locatable mineral decisions would impact the abundance and availability of fishing resources for the communities of Lower Kalskag and Upper Kalskag. OHV use would impact the abundance and availability of moose and caribou in all of the communities in the planning area. ROW decisions would impact the availability of subsistence resources (moose and caribou) for all of the communities in the planning area. Appendix A provides a detailed analysis by community that supports these findings.

Under Alternative A, the BLM would continue to follow all laws, regulations, and policies that pertain predominantly to subsistence resources. The BLM would consider impacts to subsistence resources when evaluating actions in the planning area that could affect subsistence resources and would implement BMPs and mitigation as needed on a case-by-case basis. Under Alternative A, the BLM would also work with the Alaska Department of Fish and Game (ADF&G) to monitor caribou and moose populations in the planning area and make management recommendations to the Federal Subsistence Board. The Federal Subsistence Board would determine whether to take management action based on results of caribou and moose populations.

### **3.2 Evaluation and Findings for Alternative B**

This section provides an overview of impacts for the planning area. A detailed community by community analysis is provided in Appendix A.

Alternative B emphasizes reducing the potential for competition between recreational and subsistence users by compartmentalizing key areas for additional protections of long-term resource values in the planning area. These areas include ACECs, lands managed for wilderness characteristics, the INHT segments on BLM-managed public lands and associated sites (e.g., Rohn Site, Kaltag Portage, Farewell Burn), and identified HVWs. This alternative seeks to support subsistence uses through sustainable management of the resources on which subsistence depends and by attempting to reduce competition for these resources in key areas surrounding rural communities by applying Community Focus Zones (CFZs) to a 10-mile buffer around BSWI communities (818,935 acres). SRPs would not be authorized in CFZs for hunting guide/outfitters, although shuttle service operations would be allowed with a required SRP throughout the entire Extensive Recreation Management Area (ERMA) (including CFZs). This alternative also provides clear guidance on the requirements for subsequent site-specific management and projects, which ensures consistency but limits flexibility at the site-specific implementation level.

Alternative B would decrease the proportion of the planning area currently open to locatable, salable, and locatable mineral development. Of these mineral decisions, areas open to locatable mineral development are most likely to affect subsistence resources because there are areas of medium and high LMP in the planning area. Alternative B would decrease the amount of land open to locatable mineral development compared to Alternative A, with 3,623,397 acres open to locatable mineral development and 202,610 acres open in areas of medium or high LMP. Locatable mineral development could affect abundance of subsistence resources by impacting habitat, removing resources (such as trees, plants, and berries), and causing wildlife populations to migrate out of the area. The total area of land open to mineral development would decrease compared to Alternative A. Fish, including salmon and non-salmon

(sheefish, whitefish, and trout) and large land mammals (including moose and caribou) are some of the most heavily harvested resources for the communities within the planning area. If areas open to locatable mineral development that have a medium and high LMP are located upstream or alongside known fishing locations or within the calving areas or travel routes of the Mulchatna caribou herd, the abundance and availability of these species could be negatively impacted. These impacts may be caused by habitat degradation or fragmentation from mining exploration and operational activities (e.g., the release of chemicals from mining activities and increased particulates in the water due to soil disturbance), but also from the increased competition for fishing and hunting/trapping resources due to the influx of workers for the mining activities. Communities within the planning area rely heavily on fish (and salmon in particular), moose, and caribou to support their subsistence needs. With the heavy reliance on fish, moose, and caribou harvesting to supply the subsistence needs for the planning area communities, areas open to locatable mineral development in areas of medium or high LMP may threaten the abundance or availability of fish, moose, and caribou in the planning area.

Identification of ROW exclusion and avoidance areas under Alternative B would help minimize habitat fragmentation and degradation in these areas but could affect access for subsistence users to resources. While restrictions on where trapping/subsistence cabins could occur would reduce impacts on fish, wildlife, and subsistence locations, they would provide a minimal benefit to those resources but could also restrict access to traditional subsistence use of cabins. However, areas open to ROW location could cause habitat degradation and fragmentation and increase competition for resources if those ROWs were used to build structures, utilities, or transportation corridors. This may impact moose, caribou, and fish (particularly salmon, but also non-salmon fish including sheefish, whitefish, and trout) resources as these resources are typically the most heavily harvested resources in the planning area communities.

Under Alternative B 8,530,066 acres of existing ANCSA 17(d)(1) withdrawals would be retained and 342,360 acres (3 percent) of the planning area would be available for exchange, which could reduce the total amount of wildlife habitat under BLM management. Lands available for exchange and acquisitions under Alternative B would affect important wildlife habitat and subsistence in the planning area such as changes in riparian area, moose calving and wintering areas, caribou crucial winter habitat, and the Innoko Bottoms Priority Wildlife Habitat Area. These potential reductions could be offset by lands available for acquisitions, which would include a smaller geographic extent of riparian areas and moose calving and wintering areas and no caribou crucial winter habitat, but a greater extent of the Innoko Bottoms Priority Wildlife Habitat Area. If all exchanges and acquisitions are carried out on lands identified as available for those actions, the amount of high-value wildlife habitat associated with important wildlife habitat in the planning area would be less than under Alternative A, with associated effects on the reduction in the abundance of subsistence resources and access to the resources. BLM management actions to protect wildlife habitat would no longer be implemented on those lands. These actions would not affect fish, wildlife, and SSS habitat important to subsistence in lands with wilderness characteristics being managed as a priority, ACECs, or connectivity corridors.

Under Alternative B, a total of 5,017,161 acres (37 percent of the planning area) would be permitted for commercial woodland harvest. Under this alternative, in personal use and subsistence woodland harvest areas, house log harvesting would not be allowed within the riparian zone of perennial streams. Gathering of forest firewood in excess of that required for personal or household use would require a permit. A pilot project would be instituted to hire a local in a targeted area to issue permits and collect use information and/or include maps or questions in local subsistence surveys. This would apply to all BLM-managed public lands within 15 miles of a river area that are open for subsistence and personal use woodland

harvest; all areas within 25 miles of a community that are open for subsistence and personal use woodland harvest; and all burned areas outside of the areas above that are open for subsistence and personal use woodland harvest. This alternative would also include additional restrictions that would reduce impacts to fish, wildlife, and SSS habitat in HVWs, the INHT National Trail Management Corridor (NTMC), ACECs, and riparian areas, with a total of 8,418,904 (63 percent of the planning area) closed to commercial woodland harvest, and permits required for commercial harvest on a case-by-case basis on 29,829 acres (less than 1 percent of the planning area; see Chapter 2 of the Draft BWSI RMP/EIS). Permits would be granted outside these areas on a case-by-case basis dependent on resource concerns. These permits would include required stipulations to minimize harvesting impacts. Under Alternative B, cutting or otherwise disturbing trees used for trapping would be prohibited.

Subsistence cross-country summer OHV access would be prohibited on 241,512 acres (2 percent of BLM-managed land in the planning area) and limited to existing roads and trails on 324,443 acres (2 percent of BLM-managed land in the planning area). The remaining acres within the planning area would be open for OHV cross-country access for subsistence. While OHV prohibitions and restrictions on casual use would help to preserve the subsistence resources in the planning area by minimizing habitat fragmentation and degradation, some access restrictions for subsistence uses would impact the planning area communities. OHV restriction and prohibitions extending to subsistence OHV use would limit access to moose, caribou, and fishing subsistence areas for several of the communities. While these access restrictions are fairly limited in scope, they do impact some of the most heavily harvested resources for the planning area communities.

### **3.2.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Alternative B would reduce the potential impacts on subsistence use as a result of management actions or designations within the planning area. Several of the proposed actions under this alternative would positively impact subsistence because management decisions and actions would provide for fish and wildlife habitat and in turn provide subsistence resource protections. Management decisions and actions such as ACECs, lands managed for wilderness characteristics, the INHT segments located on BLM-managed public lands and associated sites (e.g., Rohn Site, Kaltag Portage, Farewell Burn), and identified HVWs would not limit or impose any restriction on subsistence. Alternative B would decrease the proportion of the planning area open to locatable mineral development in areas of medium or high LMP to 202,610 acres (2 percent of BLM-managed land in the planning area and 36 percent of medium and high LMP areas). Lands available for exchange and acquisitions under Alternative B could adversely affect important wildlife habitat and subsistence in the planning area, with reductions in riparian area, moose calving and wintering areas, caribou crucial winter habitat, and the Innoko Bottoms Priority Wildlife Habitat Area because BLM management actions to protect wildlife habitat would no longer be implemented on these lands.

### **3.2.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed Under Alternative B**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and therefore would not be considered under this analysis. Under Alternative B, BLM-managed lands in the planning area would be managed to reduce the impacts

to species important to subsistence, reduce the potential for competition between recreational and subsistence resources, lessen impacts that impeded access to resources by identifying key areas for additional protections of long-term resource values within the planning area. Other BLM lands in the state already have land use planning documents in place that specify the amounts and types of activities that can or cannot occur or are currently being evaluated by separate planning processes. State and Native corporation lands cannot be considered in a BLM plan, and under BLM policy, other BLM lands outside Alaska are not considered under ANILCA, but activity and land use on adjacent State or Native lands would potentially impact BLM subsistence activity and resources in terms of resource abundance, distribution, movements, and subsistence user access to said resources. BLM lands may provide support infrastructure for access, mineral materials, water resource transportation systems, or other things needed for development on adjacent non-BLM lands, which may have impacts to fish and wildlife resources, habitats, and subsistence uses. Further evaluation of such developments may be necessary if and when they are proposed. Such development would also potentially increase competition for subsistence resources from other user groups by providing increased accessibility, which may increase harvest on BLM lands and adjacent lands that share subsistence resource populations.

### **3.2.3 Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

Alternatives that would reduce or eliminate the use of public lands needed for subsistence include Alternatives C and D, which are presented and analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.2.4 Findings**

Management actions that are seen as having the most potential to significantly restrict abundance, availability, or access of subsistence resources are:

- Areas open to locatable mineral development (in areas of high and medium LMP) in known subsistence use areas;
- OHV closures to subsistence use areas; and
- ROW exclusion or avoidance areas in subsistence use areas.

Appendix A provides detail on the methods and analysis used to determine the communities that may have as significant restriction to subsistence uses. Alternative B may result in a significant restriction to subsistence uses for the communities of Aniak, Anvik, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Shageluk, Sleetmute, Stony River, and Unalakleet. Gathering practices of and access to available forestry and woodland resources could also be inhibited and substantially reduced if users became deterred from this harvest due to the requirements to obtain a permit.

Locatable mineral decisions would impact the abundance and availability of fishing resources, and moose and caribou harvesting, for the communities of Aniak, Crooked Creek, Chuathbaluk, Lower Kalskag, McGrath, Sleetmute, and Upper Kalskag. OHV restrictions and prohibitions for subsistence users would

impact the access to moose, caribou, and fishing locations in the communities of Anvik, Grayling, Kaltag, Lime Village, McGrath, Nikolai, Shageluk, Sleetmute, Stony River, and Unalakleet. ROW decisions would impact the availability of subsistence resources (moose, caribou, and fish species) for the communities of Aniak, Crooked Creek, Holy Cross, Kaltag, Lime Village, Marshall, McGrath, Nikolai, Sleetmute, Unalakleet, and Upper Kalskag. Appendix A provides a detailed analysis by community that supports these findings.

If all available exchanges and acquisitions are carried out, the amount of high-value wildlife habitat associated with important wildlife habitat in the planning area would be less than under Alternative A and could adversely affect the abundance of subsistence resources if there were reductions in harvest success and limitations in access to resources in areas where BLM is no longer managing the land. Available land exchanges under Alternative B would affect important wildlife habitat and subsistence in the planning area, with reductions in riparian area, moose calving and wintering areas, caribou crucial winter habitat, and the Innoko Bottoms Priority Wildlife Habitat Area. These reductions could be offset to some degree by lands available for acquisitions, which would include a smaller geographic extent of riparian areas and moose calving and wintering areas and no caribou crucial winter habitat but a greater extent of the Innoko Bottoms Priority Wildlife Habitat Area.

Management decisions and actions such as ACECs, lands managed for wilderness characteristics, the INHT segments on BLM-managed public lands and associated sites (e.g., Rohn Site, Kaltag Portage, Farewell Burn), and identified HVWs that impact subsistence resources would be beneficial, and any impacts from the limited development allowed under this alternative would be minimized by BMPs, SOPs, and stipulations.

### **3.3 Evaluation and Findings for Alternative C**

This section provides an overview of impacts for the planning area. A detailed community by community analysis is provided in Appendix A.

Alternative C emphasizes adaptive management at the planning level to protect the long-term sustainability of resources while providing for multiple resource uses. It provides for planning-level protections of key areas, such as the portions of the INHT on BLM-managed lands while allowing for flexibility in resource use in those areas depending on the monitoring of resource impacts. It emphasizes collaboration with and education of permit applicants to address potential competition for use of existing resources. This alternative is meant to provide flexibility at the planning level while still providing enough direction to make processing of site-specific projects easier and more consistent.

Alternative C recommends the use of native species for revegetation of disturbed areas but would allow nonnative seed and propagules to be considered if applicable for the climatic condition and ecosystem function and if native plant species were not available or feasible. The use of nonnative plant species for restoration could lead to an adverse effect to subsistence users if reduction of the availability of and access to plants traditionally used for subsistence purposes occurred and therefore affected harvest rates of traditionally used resources.

Alternative C would restrict development on BLM-managed land in one connectivity corridor totaling 576,038 acres (4 percent) of the planning area. Alternative C would only manage one connectivity corridor, the South Connectivity Corridor, rather than the two proposed under Alternative B and would open the connectivity corridor to locatable and salable minerals. Having one corridor rather than two may increase the distance subsistence hunters would have to travel to reach the corridor, making access to



available resources more challenging. This in turn may reduce rates of subsistence harvest of wildlife species in this area as hunters will have to travel further to be successful.

Under Alternative C, 13,418,941 acres (99 percent) of the planning area would be open to locatable minerals and 6,645,750 acres (49 percent) would be open to salable mineral development, with another 6,536,635 acres (about 49 percent) open on a case-by-case basis. All areas of medium or high LMP on BLM-managed land would be open to locatable mineral development. Areas that would be open to locatable and salable mineral development, in areas of medium to high LMP, include important wildlife habitat areas that are important in terms of abundance of subsistence resources (Section 3.2.7 of the Draft BSWI RMP/EIS).

Alternative C would open more areas to locatable and salable mineral development than Alternative B, including areas of medium or high LMP where likelihood for development and associated impacts is highest. While Alternative C would open fewer areas to salable mineral development than Alternative A, when considering areas open on a case-by-case basis, it would have the potential to open more areas than Alternative A. Since potential for salable mineral development is low in the planning area, and Alternative C would open more areas of medium or high LMP to locatable mineral development than Alternative A, there would be high magnitude impacts to subsistence resources over a greater geographic extent than Alternative A.

Similar to Alternatives A and B, the potential for a number of new mines and associated infrastructure would likely increase, dependent on future demand for minerals, but would not occur in portions of the planning area closed to development. This could affect access to resources in some areas for subsistence users. Fish, including salmon and non-salmon (sheefish, whitefish, and trout) and large land mammals (moose and caribou) are some of the most heavily harvested resources for the communities within the planning area. If areas open to locatable mineral development that have a medium and high LMP are located upstream or alongside known fishing locations or within the calving areas or travel routes of the Mulchatna caribou herd, the abundance and availability of these species could be negatively impacted. These impacts may be caused by habitat degradation or fragmentation from mining exploration and operational activities (e.g., the release of chemicals from mining activities and increased particulates in the water due to soil disturbance) but also from the potential for increased competition for fishing and hunting/trapping resources due to the influx of workers for the mining activities. Communities within the planning area rely heavily on fish (and salmon in particular), moose, and caribou to support their subsistence needs. With the heavy reliance on fish, moose, and caribou harvesting to supply the subsistence needs for the planning area communities, areas open to locatable mineral development and that have medium or high LMP may threaten the abundance or availability of fish, moose, and caribou in the planning area.

Under Alternative C, the area designated as NSO leasable (6,824,035 acres; 51 percent of the lands managed by BLM) and closed to leasing (46,953 acres; <1 percent of the lands managed by BLM) would be less than under Alternative B, and 6,594,906 acres (49 percent of the lands managed by BLM) would be open to leasing with standard stipulations. Therefore, this alternative would be more likely to impact wildlife and subsistence resources from mineral leasing than Alternative B. This could affect access to resources in some areas for subsistence users. Under Alternative C, within HVWs, BMPs and other protective measures would be similar to Alternative B but less restrictive. For example, HVWs would be NSO leasable under Alternative C but would be closed to mineral leasing under Alternative B.

Alternative C would have a greater risk for habitat fragmentation and degradation than Alternative B because there would be no designated ROW exclusion areas. Additionally, a smaller portion of the planning area (7,069,494 acres or 52 percent of the lands managed by BLM) would be identified as ROW avoidance area and 576,038 acres (about 4 percent of lands managed by BLM) would be ROW avoidance for linear realty actions. Areas outside ROW exclusion and avoidance areas with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs include habitats that are important to subsistence. The potential increase in wildlife habitat that could affect subsistence in the planning area would be identical to that under Alternative B. Based on the amount of land available for exchange (356,942 acres or 3 percent of the lands managed by BLM), the amount of fish and wildlife habitat under BLM management in the planning area would be slightly reduced compared to Alternative B, with greater reductions in riparian areas and moose calving and wintering areas but the same amount of caribou crucial winter habitat and Innoko Bottoms Priority Wildlife Habitat Area. Lands available for acquisitions that could somewhat offset lands available for disposals would be the same as under Alternative B. Therefore, if all available land exchanges and acquisitions are carried out, the amount of high-value wildlife habitat in the planning area would be less than under Alternative A or B. Overall, Alternative C would have a larger adverse impact on fish, wildlife habitat, and potentially SSS habitat that is important to the abundance and availability of subsistence resources than Alternative B.

Under this alternative, in personal use and subsistence woodland harvest areas, house log harvesting would not be allowed within the riparian zone of perennial streams. Gathering of forest firewood and forestry products for subsistence would not require a permit. Gathering of more than 10 cords of forest firewood per household per year for personal use (defined as allowed use of renewable resources, which cannot be sold, bartered, traded or used for profit, by individuals other than federally qualified rural residents) and gathering of forestry products for personal use would require a permit for all areas within 15 miles of a river that are open for subsistence and personal use woodland harvest; all areas within 25 miles of a community that are open for subsistence and personal use woodland harvest; and all burned areas outside of the areas above that are open for subsistence and personal use woodland harvest. Permits would be granted outside these areas on a case-by-case basis dependent on resource concerns. Under Alternative C cutting or otherwise disturbing trees used for trapping would be prohibited. This may limit the success of subsistence individual trapping activities that require these materials.

Under Alternative C, 13,125,320 acres (97 percent) of the planning area would be managed as an ERMA and 340,574 acres (2 percent) of the planning area would be managed as a Special Recreation Management Area (SRMA). Impacts under Alternative C would be similar to Alternative B with the exception of a slightly smaller SRMA and smaller CFZs. Under Alternative C, CFZs would be applied to a 5-mile buffer around BSWI communities (95,307 acres). As with Alternative B, SRPs would not be authorized in CFZs for hunting guide/outfitters. These restrictions would not apply to shuttle service operations, which would be allowed without an SRP throughout the ERMA unless increase in use conflicts with the BSWI ERMA objectives, at which point the BLM would engage in additional planning to maintain the objectives. Under Alternative C, casual and subsistence use would be permitted on existing routes at the Rohn Site. Winter casual and subsistence access would be allowed for snowmobiles only, similar to Alternative B, and impacts from winter travel would be the same as Alternative B. Management actions would provide for increased recreation opportunity during summer months, and could also result in increased conflicts between recreational, casual and subsistence users. Increased use could result in damage to the trail resource, thereby altering recreation setting, opportunity, and experience over time. Summer OHV casual use would be limited to existing routes. Subsistence cross-

country summer OHV access would be prohibited on 225,925 acres (2 percent of BLM-managed land in the planning area) and limited to existing roads and trails on 363 acres. The remaining acres within the planning area would be open for OHV cross-country access for subsistence.

Under Alternative C, OHV designation in the Unalakleet Wild River Corridor as casual summer access would be limited to existing trails, primitive roads, and roads and would include ATVs only. Subsistence cross-country summer OHV access on lands in the Unalakleet Wild River Corridor would be allowed by ATV. Recreation access in the summer would provide for increased opportunity for conflict and could reduce the availability of resources for harvest by subsistence users. However, due to the wet and boggy condition of the area, summer travel is expected to be minimal such that while damage to the lands (rutting, braiding) could occur and there could be an increased potential for use conflicts between recreationists and subsistence users it would be low in terms of magnitude. Alternative C would be more protective of subsistence resource habitat than Alternative A, which does not have any OHV restrictions except for within the Unalakleet Wild River Corridor. However, some access restrictions for subsistence uses would impact the planning area communities. OHV restriction and prohibitions extending to subsistence OHV use would limit access to moose, caribou, and fishing subsistence areas for several of the communities. While these access restrictions are fairly limited in scope, they do impact some of the most heavily harvested resources for the planning area communities.

### **3.3.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Alternative C would reduce the potential impacts on subsistence use as a result of management actions or designations within the planning area. Several of the proposed actions under this alternative would positively impact subsistence because management decisions and actions would provide for fish and wildlife habitat and in turn provide subsistence resource protections. Management decisions and actions such as the INHT segments located on BLM-managed public lands and associated sites (e.g., Rohn Site, Kaltag Portage, Farewell Burn) and identified HVWs would not limit or impose any restriction on subsistence.

Alternative C would have a greater proportion of the planning open to locatable mineral development than Alternative A and B including areas with medium or high LMP. Lands available for exchange and acquisitions under Alternative C would adversely affect important wildlife habitat and abundance and access to subsistence resources in the planning area, with reductions in riparian area, moose calving and wintering areas, caribou crucial winter habitat, and the Innoko Bottoms Priority Wildlife Habitat Area because BLM management actions to protect wildlife habitat would no longer be implemented on these lands.

### **3.3.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed Under Alternative C**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. Under Alternative C, BLM-managed lands in the planning area would be managed to reduce the impacts to species important to subsistence, reduce the potential for competition between recreational and subsistence resources, and lessen impacts that impede subsistence access to resources by identifying key areas for additional protections of long-term resource

values within the planning area. Other BLM lands in the state already have land use planning documents in place that specify the amounts and types of activities that can or cannot occur or are currently being evaluated by separate planning processes. State and Native corporation lands cannot be considered in a BLM plan, and under BLM policy, other BLM lands outside Alaska are not considered under ANILCA. However, activity and land use on adjacent State or Native lands would potentially impact BLM subsistence activity and resources in terms of resource abundance, distribution, movements, and subsistence user access to said resources. BLM lands may provide support infrastructure for access, mineral materials, water resources transportation systems, or other things needed for development on adjacent non-BLM lands, which may have impacts to fish and wildlife resources, habitat, and subsistence uses. Further evaluation of such developments may be necessary if and when proposed. Such development would also potentially increase competition for subsistence resources from other user groups by providing increased accessibility, which may increase harvest on BLM lands and adjacent lands that share subsistence resource populations.

### **3.3.3 Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

Alternatives that would reduce or eliminate the use of public lands needed for subsistence include actions in Alternatives B and D that are presented and analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.3.4 Findings**

Management actions that are seen as having the most potential to significantly restrict abundance, availability, or access of subsistence resources are:

- Areas open to locatable mineral development (in areas of high and medium LMP) in known subsistence use areas;
- OHV closures to subsistence use areas; and
- ROW exclusion or avoidance areas in subsistence use areas.

Appendix A provides detail on the methods and analysis used to determine the communities that may have as significant restriction to subsistence uses.

This evaluation concludes that Alternative C may result in a significant restriction to subsistence uses for the communities of Aniak, Anvik, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet.

Locatable mineral decisions would impact the abundance and availability of fishing resources, and moose and caribou harvesting, for the communities of Aniak, Crooked Creek, Chuathbaluk, Lower Kalskag, McGrath, Sleetmute, and Upper Kalskag. OHV restrictions and prohibitions for subsistence users would impact the access to moose, caribou, and fishing locations in the communities of Anvik, Grayling, Kaltag, Lime Village, Nikolai, Shageluk, Sleetmute, Stony River, and Unalakleet. ROW decisions would impact the availability of subsistence resources (moose, caribou, and fish species) for the communities of Aniak,

Crooked Creek, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Marshall, McGrath, Nikolai, Russian Mission, Shageluk, Sleetmute, Stony River, Unalakleet, and Upper Kalskag. Appendix A provides a detailed analysis by community that supports these findings.

In addition to the bullets listed above, the following proposed management under Alternative C would also adversely affect subsistence:

- The use of nonnative plant species for restoration could lead to an adverse effect to subsistence users if reduction of the availability of plants traditionally used for subsistence purposes occurred and substantially affected harvest rates of traditionally used resources.
- For caribou and moose, which are important subsistence resources, the management actions pertaining to leasable minerals and construction would apply only to calving habitat. Therefore, while caribou and moose would be protected during the breeding period, they could be disturbed in their crucial winter habitat areas, with disturbances potentially causing increased energy expenditures and stresses on wintering populations, which could result in decreased survivorship. Decreased survivorship could substantially affect levels of subsistence hunting success in terms of abundance of available resources and reduce rates of harvest and sharing.
- If all available disposals and acquisitions are carried out, the amount of high-value wildlife habitat in the planning area would be less than under Alternative A or B. As with Alternative B, these actions would not affect fish, wildlife, or SSS habitat important to subsistence in lands with wilderness characteristics being managed as a priority or connectivity corridor. Overall, this alternative would have a larger adverse negative impact on fish, wildlife habitat, and potentially SSS habitat that is important maintaining abundant subsistence resources and provides access to resources than Alternative B.
- Under Alternative C, in addition to subsistence use, casual use would be permitted on existing routes at the Rohn Site. Winter casual and subsistence access would be allowed for snowmobiles only, similar to Alternative B. This action could result in potential conflict between recreational users and casual users and subsistence users and increased competition for resources and interference with access to resources that reduces subsistence harvest success.
- Subsistence cross-country summer OHV access would be allowed by ATV and utility terrain vehicle (UTV) (Chapter 2 of the Draft BSWI RMP/EIS). Summer OHV casual use would be limited to existing routes (as shown in the BLM's current route inventory once implementation planning occurs). Recreational access in the summer could result in impacts to setting through damage to the resource (e.g., rutting, braiding) and could increase the potential for use conflicts between recreationists and subsistence users including increased competition for resources and interference with access to resources that reduces subsistence harvest success.
- While gathering of forest firewood and forestry products for subsistence would not require a permit, gathering of forest firewood of more than 10 cords of firewood per household per year for personal use (defined as allowed use of renewable resources, which cannot be sold, bartered, traded or used for profit, by individuals other than federally qualified rural residents) and gathering of forestry products for personal use would require a permit for all areas within 15 miles of a river that are open for subsistence and personal use woodland harvest; all areas within 25 miles of a community that are open for subsistence and personal use woodland harvest; and all burned areas outside of the areas above that are open for subsistence and personal use woodland

harvest. Permits would be granted outside these areas on a case-by-case basis dependent on resource concerns. This action could result in increased competition to the resources by non-local users (including other federally qualified users) and in a substantial reduction in the opportunity to continue subsistence uses of renewable resources.

Management decisions and actions such as the INHT segments on BLM-managed public lands and associated sites (e.g., Rohn Site, Kaltag Portage, Farewell Burn), and identified HVWs that impact subsistence resources would be beneficial, and any impacts from the limited development allowed under this alternative would be minimized by BMPs, SOPs, and stipulations.

### **3.4 Evaluation and Findings for Alternative D**

This section provides an overview of impacts for the planning area. A detailed community by community analysis is provided in Appendix A.

Alternative D provides additional flexibility at the project-specific implementation level and fewer overarching management restrictions at the planning level. It also emphasizes lands available for exchange or disposal as necessary to consolidate and simplify management. It depends on existing federal laws and implementation-level NEPA to a greater degree than the other action alternatives to determine how to best manage multiple-use of sensitive resources while preserving long-term sustainability. This alternative provides more flexibility at the site-specific implementation level but requires additional work to ensure consistency and compliance with management requirements. Impacts from the development allowed under this alternative would be minimized to some degree by BMPs, SOPs, and stipulations.

Alternative D proposes protection of a high resource value of 12,982 river miles (39 percent of river miles on BLM-managed lands). As with the other action alternatives, any proposals to develop land, water, or resources within the 100-year floodplain of HVWs would be required to demonstrate that the development would not diminish quality and diversity of habitats needed for fish and wildlife populations, including those used for subsistence. Alternative D would have fewer restrictions on mineral development in HVWs than Alternatives B or C because they would be open to mineral leasing subject to standard stipulations. Alternative D would provide the least amount of protection for fish and aquatic resources and would rely on the operator to characterize the potential of streams for reclamation. Additionally, because watershed medium-high and medium resource values would not be protected as HVWs as proposed in Alternatives B and C, resources and their availability to subsistence users in these areas could degrade due to development activities. They would still be subject the same SOPs and BMPs as Alternative B and C that could be implemented by the BLM.

No protections for SSS flora habitats and lichen areas would be implemented if these areas become degraded by OHV use and therefore these areas could be subject to further degradation. Under Alternative D, revegetation of disturbed areas would focus on using plant species that are appropriate for the climatic condition and ecological function, including nonnative plant species. There could be an adverse effect to subsistence users if native plants important for subsistence uses were not considered in revegetating areas, limiting the availability and access to these plants for subsistence harvest and use compared to Alternatives B and C. However, subsistence users could respond to a decrease in the availability of an edible plant by harvesting more of another edible resource but would be limited to a small portion of the planning area and would not necessarily coincide with vegetation subsistence harvest areas.

Alternative D offers fewer restrictions than Alternative A, B or C on construction and mineral development, which could interfere with or displace subsistence activities in migratory bird habitat, the Innoko Bottoms Priority Wildlife Habitat Area, and in moose and caribou calving and wintering habitat. Unlike Alternatives B and C, there would be no restrictions on casual use airboats and hovercraft and therefore no reduction in the potential for impacts to waterbirds and other species from associated disturbance. Because restrictions and mitigations for migratory birds would be determined on a case-by-case basis, it is difficult to assess the difference as far as impacts to migratory birds relative to other alternatives. Alternative D would have a greater effect on the availability of resources to subsistence than Alternative A and Alternative D would be less protective than Alternatives B and C.

Under Alternative D, all acres of medium or high LMP within the planning area would be open to locatable minerals development, which is to the same as Alternative C, and substantially less protective than Alternative B. Alternative D would close 283,509 acres (2 percent) to salable minerals mineral development; however, potential for impacts from salable mineral development is low to due to low potential and demand. Alternative D would also result in the lowest proportion of the planning area designated as NSO and the greatest proportion designated as open to leasing subject to standard stipulations. Based on geographic extent of areas open to locatable salable minerals and leasable minerals, this alternative would have a lower potential to reduce impacts to fish, wildlife, and SSS associated with mineral development than Alternatives B and C, but a higher potential than Alternative A. Areas that would be open to locatable and salable mineral development in areas of medium to high LMP include important wildlife habitat areas are described in Draft BSWI RMP/EIS, Section 3.3.3, and Appendix N. Fish, including salmon and non-salmon (sheefish, whitefish, and trout) and large land mammals (moose and caribou) are some of the most heavily harvested resources for the communities within the planning area. If areas open to locatable mineral development that have a medium and high LMP are located upstream or alongside known fishing locations or within the calving areas or travel routes of the Mulchatna caribou herd, the abundance and availability of these species could be negatively impacted. These impacts may be caused by habitat degradation or fragmentation from mining exploration and operational activities (e.g., the release of chemicals from mining activities and increased particulates in the water due to soil disturbance), but also from the potential for increased competition for fishing and hunting/trapping resources due to the influx of workers for the mining activities. Communities within the planning area rely heavily on fish (and salmon in particular), moose, and caribou to support their subsistence needs. With the heavy reliance on fish, moose, and caribou harvesting to supply the subsistence needs for the planning area communities, areas open to locatable mineral development and that have medium or high LMP may threaten the abundance or availability of fish, moose, and caribou in the planning area.

Similar to Alternatives A and B, the potential for a number of new mines and associated infrastructure would likely increase, dependent on future demand for minerals, but would not occur in portions of the planning area closed to development. Under Alternative D surface-disturbing activities or permanent structures would be allowed on a case-by-case basis within the 100-year floodplain of perennial and fish-bearing streams, if permittees can demonstrate these activities would not substantively impact floodplain function. If adverse effects resulted from these actions in displacement and disturbance to the resource, then access to resources for subsistence activities in these areas and availability of the harvests could be affected. BMPs and reclamation procedures under this alternative would be the same as Alternatives B and C.

Alternative D would have a greater risk for wildlife and subsistence habitat fragmentation and degradation than Alternatives B and C because there would be no designated ROW exclusion areas, and the acreage of ROW avoidance areas would be the lowest of all the action alternatives (5,130,927 acres; 37 percent of the lands managed by BLM). Areas outside of ROW exclusion and avoidance areas with the greatest potential for habitat loss, degradation, and fragmentation from development of ROWs would include habitats that are important for available subsistence resources. Because the BLM would not pursue opportunities to acquire public land under Alternative D, there would be no potential increase in wildlife habitat in the planning area. Based on the amount of available land proposed for disposal (451,173 acres; 3 percent of the lands managed by BLM), this alternative would result in the greatest reduction in the amount of wildlife habitat under BLM management, compared to Alternatives B and C, and there would be no acquisitions of these habitats to help offset the losses. The amount of caribou crucial winter habitat proposed for exchange or disposal would be the same as Alternatives B and C, but with no acquisition of this habitat to help offset the loss. If all available exchanges/disposals and acquisitions are carried out, the amount of high-value wildlife in the planning area would be less than under Alternatives A, B, and C. The amount of caribou crucial winter habitat would be the same as Alternatives B and C, but less than under Alternative A. Overall, Alternative D would have a greater adverse impact on fish and wildlife habitat and related availability of subsistence resources than Alternatives A, B, and C in terms of the geographic extent of key wildlife habitats important for subsistence available for disposal.

Under this alternative, subsistence use gathering of forest firewood and forestry products and personal use gathering of forest firewood would not require a permit. Personal use gathering of forestry products would require a permit. Unless otherwise restricted by other resource management actions in this RMP, all of the planning area would be available for personal use and subsistence woodland harvest. Under Alternative D, cutting or otherwise disturbing trees used for trapping would be prohibited. This may limit the success of subsistence individual trapping activities that require these materials to be available in order to be used during subsistence trapping activities.

Under Alternative D, the 13,125,320 acres of the planning area would be managed as ERMA and 340,574 acres as SRMA, same as Alternative C. Under Alternative D, the BLM would designate the INHT SRMA; however, there would be limited additional management beyond that specified in Alternative A to limit SRPs or mitigate user conflicts. OHV designation in the Unalakleet Wild River Corridor would be limited. Casual and subsistence summer access would be the same as Alternative C; however, travel could be by ATV or UTV. Winter access would be the same as under Alternative B. The expanded mode of summer travel would provide increased recreation opportunities. However, due to the wet and boggy condition of the area, summer travel is expected to be minimal such that while damage to the lands (rutting, braiding) could occur and there may be an increase potential for use conflicts between recreationists and subsistence users it would be low in terms of magnitude, similar to Alternative C. Impacts from winter travel would be identical to Alternative C. There would be no CFZ applied under this alternative. Alternative D does not propose SRP limitations for hunting guide-outfitters and guide/outfitter business authorizations operating within a radius of any applied CFZ in the planning area and allows shuttle service operations throughout the planning area without an SRP. However, if the ERMA objectives are not being met, BLM would increase monitoring, outreach, education, and/or enforcement, case-by-case. Therefore, this alternative would be less protective in terms of preventing increased competition for available resources between subsistence users and non-local users than existing conditions under Alternatives A, and the buffer zones provided under Alternatives B and C.



Alternative D would not prohibit casual use airboats or hovercraft on non-navigable waterways on BLM-managed land. Alternatives B and C include additional travel management for caribou habitat and the Innoko Bottoms Priority Wildlife Habitat Area, reducing disturbance impacts to wildlife and subsistence. Alternative D does not include this travel management, so disturbance impacts could lead to increase potential for use conflicts between recreationists and subsistence users. Alternative D would prohibit casual OHV use on about 2 percent of the lands managed by BLM and restrict less than 1 percent to existing trails. Subsistence OHV use would be prohibited nowhere within the planning area and limited to existing roads and trails in 225,925 acres (2 percent of BLM-managed land in the planning area). Therefore, Alternative D would have the least impact on existing access for both casual and subsistence use and would only limit OHV use to existing routes in one area (INHT NTMC Travel Management Area) thus providing opportunities for network expansion. The harvesting of large land mammals (including, most notably, moose and caribou) is one of the most important subsistence activities for most of the communities in the planning area (based on weight of harvested resources per year). Unrestricted OHV use throughout most of the planning area under Alternative D may bring increased competition for moose and caribou harvest and may also degrade the habitat to a degree that the abundance and availability of these resources will be impacted.

### **3.4.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Under Alternative D, the impacts to subsistence would be associated with management decisions that could result in reduction in the availability of harvest of subsistence resources or limitations to access and cause increased competition for subsistence resources between local and nonlocal user groups by acting on lands available for disposal. Alternative D would have more land open to locatable mineral development in areas of medium or high LMP than Alternative A. There would be no designation of ACECs or HVW and fewer restrictions on construction and mineral development, which could interfere with or displace subsistence activities in migratory bird habitat, the Innoko Bottoms Priority Wildlife Habitat Area, and in moose and caribou calving and wintering habitat. Alternative D does not include the management of connectivity corridors. The BLM would not manage connectivity corridors under this alternative, which would result in fewer protections for caribou and moose, particularly during the winter use period. There would be no restrictions on casual use airboats and hovercraft, which could disturb waterbirds and the other subsistence species that are harvested.

### **3.4.2 Evaluation of the Availability of Other Lands for Land Use Decisions Allowed Under Alternative D**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. Under Alternative D, BLM-managed lands in the planning area would be managed to reduce the impacts to species important to subsistence, reduce the potential for competition between recreationists and subsistence resources, and lessen impacts that impede access to resources by identifying key areas for additional protections of long-term resource values within the planning area. Alternative D would manage BLM lands in the planning area in order to provide additional flexibility at the project-specific implementation level and fewer overarching management restrictions at the planning level. Lands managed by other federal agencies in the planning area are managed under NPS or USFWS planning documents, and wide-scale development of these lands

is limited or disallowed by the mission and goals of these federal lands as conservation system units. Additional BLM lands in the state are managed by current planning documents that allow a mixture of development and conservation following the BLM multiple-use mission or are currently being evaluated through the planning process. State and Native corporation lands cannot be considered in a BLM plan, and under BLM policy, other BLM lands outside Alaska are not considered under ANILCA. However, activities on adjacent State and Native land may impact subsistence fish and wildlife resources and the access to and use of subsistence resources on BLM-managed lands. BLM has little control over such activities except by active participation in input and the management of proposed actions that would occur on BLM lands in support of development on non-BLM lands.

### **3.4.3 Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

Alternatives that would reduce or eliminate the use of public lands needed for subsistence include Alternatives B and C, which analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.4.4 Findings**

Management actions that are seen as having the most potential to significantly restrict abundance, availability, or access of subsistence resources are:

- Areas open to locatable mineral development (in areas of high and medium LMP) in known subsistence use areas;
- OHV closures to subsistence use areas; and
- ROW exclusion or avoidance areas in subsistence use areas.

Appendix A provides detail on the methods and analysis used to determine the communities that may have as significant restriction to subsistence uses.

This evaluation concludes that Alternative D may result in a significant restriction to subsistence uses for the communities of Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, and Upper Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet.

Locatable mineral decisions would impact the abundance and availability of fishing resources, and moose and caribou harvesting, for the communities of Aniak, Crooked Creek, Chuathbaluk, Lower Kalskag, McGrath, Sleetmute, and Upper Kalskag. OHV use would impact the availability and abundance of moose, caribou, and fish species in all of the communities in the planning area. ROW decisions would impact the availability of subsistence resources (moose, caribou, and fish species) for all of the communities in the planning area, except Nulato. Appendix A provides a detailed analysis by community that supports these findings.

In addition to the bullets listed above, the following proposed management under Alternative D would also adversely affect subsistence:

- This alternative would provide the least amount of protection for fish and aquatic resources and would rely on the operator to characterize the potential of streams for reclamation. Additionally, because watershed medium-high and medium resource values would not be protected as HVWs as proposed in Alternatives B and C, resources in these areas could degrade due to allowable development activities. This action could result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources.
- No protections for SSS flora habitats and lichen areas would be implemented if these areas became degraded by OHV use, and these areas could therefore be subject to further degradation. There could be an adverse effect to subsistence users if native plants important for subsistence uses were not considered in revegetating areas, reducing the abundance and availability of these plants for subsistence harvest and use compared to Alternatives B and C.
- There would be no restrictions on casual use airboats and hovercraft and therefore no reduction in the potential for impacts to waterbirds and other species from associated disturbance. Because restrictions and mitigations for migratory birds would be determined on a case-by-case basis, it is difficult to assess the difference in impacts to migratory birds relative to other alternatives. This action could result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources.
- There would be no restriction on areas that would be available for exchange or disposal, and there would be no consideration of lands available for acquisitions to help offset potential losses. If all lands available for disposal and acquisitions are carried out, the amount of high-value wildlife important to preserve the abundance of subsistence resources in the planning area would be less than under Alternative A, B, or C.
- Alternative D does not apply CFZ buffers around the communities in the planning area. The lack of this buffer could increase the potential for use conflicts and increase competition for available resources between subsistence users and non-local resource users. This action could result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources and interference with access.
- Alternative D would not prohibit casual use airboats or hovercraft on non-navigable waterways on BLM-managed land. There would be no additional travel management for caribou habitat and the Innoko Bottoms Priority Wildlife Habitat Area, so disturbance impacts to wildlife could increase and reduce the abundance and availability of wildlife resources for subsistence in these areas. This action could result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources and interference with access.

### **3.5 Evaluation and Findings for the Cumulative Case**

The goal of the cumulative analysis is to evaluate the incremental impact of the current action in conjunction with all past, present, and reasonably foreseeable future actions in or near the planning area. The cumulative analysis considers in greatest detail the activities that are more certain to happen and activities that were identified as being of great concern during scoping. Actions considered in the cumulative analysis include, but are not limited to, the actions that are presented in the following subsections. Past and present land use activities are described below.

### 3.5.1 Past, Present and Reasonably Foreseeable Land Use and Activities

Relevant past and present actions are those that have influenced the current condition of the resources in the planning area. These actions, described below, were identified based on a review of the planning issues; agency records, including existing decisions and formal proposals; and non-federal actions on lands not managed by the BLM.

#### Land Use

The planning area and much of the surrounding lands are characterized by large tracts of undisturbed ecosystems that support a variety of native wildlife and fish species. Past and present land use and activities in the planning area are summarized below and provide the basis for analysis of cumulative effects. More detail regarding land uses in the planning area can be found in Chapter 1 of the Draft BSWI RMP/EIS and in Appendix M.

Although the Draft BSWI RMP/EIS does not address lands that are not managed by the BLM, including State of Alaska lands, ANCSA Native corporation lands, NPS lands, USFWS lands, private lands, and Native allotments, past and present (as well as reasonable foreseeable future actions) land use for all lands within the planning area has influenced or has the potential to influence the current condition of the resources in the planning area and is therefore considered in the cumulative effects analysis. Impacts from such actions include ROW establishment, lease sales, and surface occupancy. As noted in Chapter 1 of the BSWI Draft RMP/EIS, subsurface estate within USFWS lands is managed by the BLM under the Mineral Leasing Act of 1920. ANILCA § 304(c) is addressed in the *Mineral Occurrence and Development Potential Report for Leasable Minerals within the Bering Sea – Western Interior Planning Area Planning Area* (BLM 2015). Conservation system units and other land tracts established by ANILCA will be addressed on a case-by-case basis and are not subject to this plan. Similarly, any prior existing mining claims administered by the BLM within USFWS or NPS lands will be addressed on a case-by-case basis.

#### ***BLM Land***

Past and current land use on BLM-managed land in the planning area (see Draft BSWI RMP/EIS, Map 1-2), including the INHT, are considered for the cumulative effects analysis. This information is described in detail in Chapter 3 of the Draft BSWI RMP/EIS. These are lands that will most likely be retained in long-term federal ownership. These lands, which constitute 10,727,251 acres, or approximately 17 percent of the lands managed by BLM, are not selected by the State of Alaska or by Native corporations. An additional 2,594,941 (approximately 4 percent of the lands managed by BLM) and 144,284 acres (less than 1 percent of the lands managed by BLM) are selected by the State of Alaska and Native corporations, respectively. Selected lands are in BLM management until interim conveyed or tentatively approved; however, selected lands do not qualify as Federal Public Lands under ANILCA § 810.

#### ***National Wildlife Refuges***

The Yukon Delta National Wildlife Refuge (NWR) and the Innoko Unit of the Innoko NWR are in the planning area. These refuges were established in 1980 by ANILCA with the following management goals: (1) to conserve fish and wildlife populations and their habitats in their natural diversity, (2) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their

habitats, (3) to provide the opportunity for continued subsistence uses by local residents, and (4) to ensure adequate water quantity and quality necessary to meet refuge purposes. Activities taking place on the refuges include hunting, fishing, recreational use, and subsistence harvest, as well as research and management activities. Residents of adjacent villages on the lower Innoko and Yukon Rivers harvest the land's fish and wildlife resources. Fish and fall hunting camps are still in use up and down rivers of the Innoko region. Indigenous people known as the Yup'ik and Cup'ik Eskimos and Athabaskans inhabit the Yukon Delta NWR and rely heavily on local natural resources.

Historically, 77 lode and placer mining claims were located in the Yukon NWR, mostly in the Kilbuck Mountains in the southeastern quarter of the refuge. Currently, no active mining claims or valid oil and gas leases are located on refuge lands. Eight pending oil and gas lease applications (totaling 20,392 acres) are on file with the BLM for the Yukon NWR. All were filed in 1968, but leases were never issued. The lease applications were "grandfathered in" under the authority of the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (101 Stat. 1330-256, 259).

### ***National Park Service Lands***

One NPS unit, Lake Clark National Park and Preserve, reaches into the southeastern portion of the planning area, constituting approximately 1.0 percent of the lands managed by BLM. The 4-million-acre Lake Clark National Park and Preserve was established in 1980 by ANILCA. Approximately 2,572,000 acres of the park is designated wilderness. The stated purpose of Lake Clark National Park and Preserve is to "protect a region of dynamic geologic and ecological processes that create scenic mountain landscapes, unaltered watersheds supporting Bristol Bay red salmon, and habitats for wilderness dependent populations of fish and wildlife, vital to 10,000 years of human history" (NPS 2009). Subsistence activities by local rural residents and those who live on private land in the park and preserve boundaries include hunting, trapping, fishing, and timber harvest. Recreational and sport uses of the Lake Clark area are those commonly associated with Alaskan wilderness activities such as hunting, fishing, trapping, river running, hiking, photography, and wilderness camping. Sport fishing is allowed throughout the park and preserve, but sport hunting and trapping are confined to the national preserve. Visitor access is by commercial and privately operated airplanes and boats. The use of off-road vehicles for other than subsistence activities is prohibited on federal lands within the park and preserve.

Management of the park and preserve is guided by a portfolio of management plans, including a foundation statement (NPS 2009), a general management plan amendment (NPS 2014), and draft land protection plan (NPS 2013). The guiding principle of land protection plans is to ensure the protection of each unit of the national park system consistent with the stated purposes for which the unit was created and administered.

Nine patented mining claims total 51.2 acres within the Lake Clark Park and Preserve boundary. Park and preserve lands are no longer available for new mineral entry and location (NPS 2013).

### ***State Lands***

The planning area includes roughly 18.1 million acres of State lands and 2.6 million acres of BLM lands that have been selected by the State (approximately 21 and 4 percent of the lands managed by BLM, respectively). The BLM continues to manage lands selected by the State of Alaska that have not yet been conveyed. Lands that have already been conveyed to the State constitute approximately 29 percent of lands managed by BLM. State lands in the planning area are managed under guidelines outlined in Alaska

Department of Natural Resources (ADNR) area plans, such as the *Kuskokwim Area Plan* (ADNR 1988) and *Tanana Basin Area Plan* (ADNR 1991). The State lands are managed for multiple uses, with priorities varying according to the resource values for particular subunits. Primary land uses include forestry, agriculture, minerals management, recreation, fish and wildlife habitat, heritage resources, recreation and tourism, settlement, public access, transportation, and low-value resource management.

Wood-Tikchik State Park reaches into the southern boundary of the planning area. The park is a 1.6-million-acre area that was established to protect fish and wildlife populations and to support traditional subsistence and recreational activities. Traditional activities in the park include subsistence fishing, hunting, and trapping, as well as recreational fishing and hunting. The number of recreational wilderness-travel activities in the park has grown and includes kayaking, river floating, hiking, and some mountain climbing. The park management plan (ADNR 2002) designates the upper Tikchik Lakes and Kulik/Grant lakes as “Wilderness,” most of the remainder of the park “Natural Area,” and the Agulowak River and Lake Aleknagik State Recreation Site as “Recreational Development.”

### ***Native Lands***

The planning area includes lands conveyed to village and regional Native corporations (approximately 16 percent of the lands managed by BLM) and lands acquired by Alaska Natives under the Alaska Native Allotment Act of 1906 (34 Stat. 197) and the Native Townsite Act of 1926 (43 U.S.C. 733–736) (approximately 440,000 acres, or about 1 percent of the lands managed by BLM).

Federally recognized tribes, ANCSA village corporations, and ANCSA regional corporations with a nexus to the planning area are listed in Chapter 1 of the Draft BSWI RMP/EIS. More than 50 village corporations and five regional corporations (Doyon, Limited, Calista Corporation, Cook Inlet Region Incorporated, Bering Straits Native Corporation, and NANA Regional Corporation) have a nexus to the planning area. Management objectives for regional corporation lands in the planning area are focused on the protection of traditional shareholder uses and responsible economic development of resources. Throughout much of the twentieth century, mining provided an economic basis for shareholders. Placer gold mining supported several settlements, including Iditarod, Marshall, and Nyac. Currently, placer gold production continues on a small scale and is an important source of revenue for shareholders. Illustrative of regional corporation objectives to support responsible development is NANA’s historical involvement with the Red Dog mine north of the planning area.

Exploration and baseline studies for the Donlin Gold Project in the Calista Region near Crooked Creek have been ongoing since 1995. This mineral resource site is located on surface land owned by The Kuskokwim Corporation (TKC), and Calista Corporation owns the subsurface land.

### ***Military Lands***

Military lands constitute less than 0.1 percent of the lands managed by BLM. If military lands are released and returned to BLM management during the life of the BSWI RMP, the direction in the Draft BSWI RMP/EIS would apply. Generally, military use of lands in the planning area was during the Cold War era following World War II and was tied to the communication, navigation, and radar needs of the time. Most military installations have been decommissioned, and little present use exists.

## **Past and Present Activities**

### ***Oil, Gas, Coal, and Geothermal Leasing and Exploration***

Fluid mineral occurrence and development potential in the planning area is associated primarily with coal and coal bed natural gas, oil and gas, peat, and geothermal resources (BLM 2015). The findings in this report on past and present activities are summarized in the following subsections.

#### **Oil and Gas**

Oil and gas basins in the planning area include Bethel, Galena, Holitna, Innoko, Minchumina, and Yukon Delta Basins. Historically, several geophysical surveys (e.g., airborne magnetic surveys, gravity surveys, reflection seismic surveys) have been conducted in the region, and one exploratory well was drilled in the Bethel Basin (Napatuk Creek No. 1) in the early 1960s but was abandoned as a dry hole. No additional exploratory wells have been drilled in the area, and no recent federal oil and gas leasing has taken place.

#### **Pending Oil and Gas Leases**

Fifty-nine pending oil and gas lease offers within the planning area were filed in the late 1960s, all within the boundary of the Yukon Delta NWR. These pending lease offers were subsequently suspended by Public Land Orders and remain unavailable for oil and gas leasing.

#### **Coal**

The areas in the planning area that contain coal have been divided into one field and five districts: Farewell (Little Tonzona) Coal Field and the Windy Fork, Middle Fork, Cheeneetnuk, Big River, and Nelson Island Districts (Draft BSWI RMP/EIS, Map 3.3.4-1). Most of the coal in the planning area is tertiary-aged and subbituminous. Known coal mineral resources are limited to a few thin coal beds on Nelson and Nunivak Islands, but these are considered noncommercial. Modest amounts of coal from Windy Fork have been used by trappers, prospectors, and big game hunters for local home heating applications. Coal was also noted to have been mined at Flat and used for home heating until the 1930s. Some limited coal exploration of the Little Tonzona River coal deposits occurred in the 1980s for Doyon, Ltd. However, this field has no substantial past production.

#### **Geothermal**

Two geothermal springs are documented in the planning area: Ophir Hot Springs and Chuilnuk Hot Springs. The only spring that is currently being used as a source of energy is the hot spring occurrence near Ophir Creek.

### ***Mineral Exploration and Mining***

The current report analyzing locatable and salable mineral resource potential in the planning area for the BSWI RMP is the *Mineral Occurrence and Development Potential Report – Locatable and Salable Minerals Bering Sea-Western Interior Resource Management Plan* (Kurtak et al. 2017). The findings from this report on past and present activities specific to this resource are summarized in the following subsections. Distribution of mineral occurrences in the planning area is illustrated in the Draft BSWI RMP/EIS, Map 3.3.3-1, and is generally concentrated in upland portions of the planning area and lowlands in the immediate vicinity of these uplands where placer deposits occur.

The planning area has a long and colorful mining history, dating back to the late 1830s when Russian traders discovered mercury-bearing minerals along the Kuskokwim River near Aniak. Gold was discovered in the Flat area in 1908, driving one of the last great gold rushes in Alaska. Documented mineral production in the planning area totals 3.2 million ounces of gold, 151,750 ounces of silver, 2.1 million pounds of copper, and 41,767 flasks of mercury. The Iditarod Mining District, which includes the Flat area, ranks third in placer gold production in Alaska (Kurtak et al. 2017).

The planning area contains 453 documented mineral occurrences (Draft BSWI RMP/EIS, Map 3.3.3-3) and 2,480 mining claims, with 207 of those under federal management. Mineral occurrences include placer gold, gold-bearing quartz veins, copper-gold skarns, and silica-carbonate mercury deposits. In 2015, there were 19 active placer mines and one active lode mine. Currently, less than 1 percent of the total acreage taken up by mining claims and prospecting sites in the planning area are under federal management. The majority of the mining and mineral exploration is taking place on State of Alaska, Native corporation, or private lands (Kurtak et al. 2017).

Twelve separate companies or individuals (11 open pit placers and one hard rock mine) were estimated to be producing metals (predominantly gold) in the planning area in 2014. Additionally, the Donlin Gold Project near Crooked Creek is an advanced stage exploration project (Kurtak et al. 2017). On August 13, 2018, the U.S. Army Corps of Engineers and BLM issued a joint Federal Record of Decision, along with the Clean Water Act Section 404/Rivers and Harbors Act Section 10 permit and the Offer to Lease for the pipeline ROW at Donlin Gold. The project is currently seeking State permit approval for initial mine startup (NovaGold 2018).

The primary mineral material commodities used in the planning area are crushed rock and sand and gravel. Thirteen material sites were reported to be active in 2008 in Southwest Alaska, which includes the planning area. Sand and gravel are used in construction and road maintenance. Currently, the BLM does not have any requests to develop sand and gravel on BLM-managed land in the planning area because local demands are being met by sand and gravel producers located on private or State-owned lands. This status is unlikely to change in the near future due to lack of appropriate BLM-managed land in the vicinity of population centers that require sand and gravel (Kurtak et al. 2017).

### ***Forest Resources Use***

Forest resources in the planning area have historically provided materials for sheltering and heating. House logs and local sawmills have been used to construct housing, lodges, and commercial buildings throughout the area. Firewood is a staple of the subsistence lifestyle for heating and, in some instances, cooking. BLM forests, although generally farther from communities than non-BLM lands, may still play a role in the long-term supply of wood—especially BLM lands near rivers that can assist in wood transport. Most villages have portable sawmills to produce building materials or repair materials locally, and one full sawmill in Chuathbaluk has produced building materials for use in the Kuskokwim Basin. There has been recent interest from villages in the use of biomass for heating buildings or communities; these projects could eventually expand to include power generation.

### ***Development of Infrastructure for Communities***

There are 65 rural communities in the planning area. Based on 2010 data from the U.S. Census Bureau for these communities, the population in the planning area is approximately 25,000 (U.S. Census Bureau 2010a). The largest population center is Bethel in the southwest portion of the planning area, with a



population of 6,080 (U.S. Census Bureau 2010b). Very few roads pass through the planning area; the longest is a 43-mile gravel road that connects Sterling Landing on the Kuskokwim River with the historical mining community of Ophir on the Innoko River. A handful of short roads serving local communities, or remaining from past human activities, also exist. Almost all of these existing roads in the planning area are on lands managed by entities other than the BLM.

### **Military Activities**

Little additional military use and activities are anticipated in the planning area.

### **Research, Monitoring, and Land Management**

Research, monitoring, and land management are frequent activities on non-BLM lands in the planning area. Specifically, fixed-wing aircraft and helicopters are used to transport personnel and equipment and to conduct surveys. Remote areas are also accessed by boats during the summer and snow machines during the winter to conduct research, monitoring, and other land-management activities.

### **Recreation and Subsistence**

Sport hunting and subsistence uses are the most prevalent land uses in the planning area. The undeveloped nature of the planning area, the existence of unique historical features such as the INHT, and the presence of surrounding NWRs provide opportunities for unique outdoor recreational opportunities, including guided hunting, fishing, eco-tourism, and organized events such as the Iditarod Sled Dog Race and the Iron Dog Snowmobile Race. Subsistence fishing and hunting are important for the economies and cultures of many families and communities in Alaska, especially for rural families who depend on subsistence hunting and fishing as sources of nutrition and cultural practices. Subsistence use occurs under both federal subsistence regulations and State general fishing, hunting, and subsistence regulations. ADF&G reports statewide harvest for 2014 as follows: 0.9 percent—subsistence food harvested by Alaska residents (about 33.8 million pounds); 0.2 percent—personal use fishing and hunting under general regulations by Alaskans; 0.4 percent—sport fishing and hunting; 98.5 percent—commercial fisheries (ADF&G 2014).

### **Reasonably Foreseeable Future Land Use and Actions**

For this analysis, reasonably foreseeable future actions are actions that are external to the proposed action and likely (or reasonably certain) to occur, although they may be subject to a degree of uncertainty, within the next 15 to 25 years. Typically, they are based on documents such as existing plans, permit applications, and fiscal appropriations.

#### ***Future Land Use***

### **BLM Lands**

Alternative land use scenarios for BLM-managed land in the planning area are described in Chapter 2 of the BSWI Draft RMP/EIS. Conveyance of lands to the State of Alaska and Native corporations is ongoing. On a statewide basis, about 98 percent of the Native conveyances and 95 percent of the State conveyances have been completed.

Donlin Gold LLC, a limited liability company jointly owned by Barrick Gold U.S. Inc. and NovaGold Resources Alaska, Inc., received key permits on August 13, 2018, for development of the Donlin Gold Project, an open pit hardrock mine near the village of Crooked Creek., including ROW permit approval from BLM. The ROW Grant has a term of 30 years. Construction has not yet begun, and Donlin Gold LLC has 8 years from August 13, 2018, to complete construction.

The Donlin Gold Mine Project includes development and operation of an open pit mine, mine facilities, and a port site, as well as ancillary facilities such as airstrips, access roads, material sites, and a connecting 14-inch-diameter, 316-mile-long natural gas pipeline. The pipeline would cross 97 miles of largely remote and undisturbed BLM-managed land. The total footprint for the temporary 150-foot construction ROW and ancillary facilities on BLM land is 2,329 acres. The total footprint for the 51-foot operations and maintenance ROW on BLM land is 601 acres. The proposed mine and related facilities would have a total footprint of approximately 16,300 acres located throughout 80,600 acres of leased land (USACE 2018). The proposed project would require 3 to 4 years to construct, followed by an active mine life of approximately 27 years. After the end of the Operations Phase, the mine site facilities would be closed and reclaimed as required by permit conditions. The ROW Grant includes stipulations to reduce impacts to the environment. However, Donlin Gold's proposed mine may result in a significant restriction to subsistence uses for communities along the Kuskokwim River and communities along the gas pipeline right-of way (Appendix N in USACE 2018). The development of ancillary facilities, temporary access roads, and airstrips developed in association with the pipeline may result in unintended development along this corridor, which affects subsistence gathering regions. Designations that provide measures of protections for aquatic and terrestrial habitats, such as HVW, ACEC, wild and scenic rivers, and areas managed to preserve wilderness characteristics, will reduce risk to sensitive areas important for the protection of subsistence values.

### **National Wildlife Refuges**

Conservation plans are in place for the refuges that guide management principles. The Yukon Delta plan was prepared in 2004 (USFWS 2004) and the revised Innoko plan was prepared in 2008 (USFWS 2008). This analysis assumes that management of the Yukon Delta and Innoko NWRs would continue as it has during recent decades and as outlined in the current conservation plans. Approximately 1.3 million acres (35 percent of the refuge) southeast of the Innoko River is designated wilderness. Two wilderness areas (Andreafsky Wilderness and Nunivak Wilderness) are designated inside the Yukon Delta NWR, totaling approximately 1.9 million acres. Limited activities are allowed in designated wilderness areas. Wilderness characteristics would be preserved on the majority of the refuge lands that are not designated as wilderness. Development and exploration activities could occur on Native and privately owned lands within the refuge boundaries. While oil and gas development is not reasonably foreseeable on the refuge lands due to low potential, some exploration from Native corporation lands and private land owners within the refuge boundaries could occur. Decisions to allow exploration on refuge lands would be made on a case-by-case basis. These activities would require a Special Use Permit with site-specific stipulations to ensure compatibility with refuge purposes and consistency with comprehensive conservation plan management objectives.

### **National Park Service Lands**

This analysis assumes that the current management direction for the Lake Clark National Park and Preserve would continue. As outlined in the *General Management Plan Amendment* (NPS 2014) and

Lake Clark National Park and Preserve Draft Land Protection Plan (NPS 2013), the NPS intends to manage the park to maintain its natural and cultural resource values and maintain and enhance public understanding and enjoyment of these values.

Park and preserve lands are no longer available for new mineral entry and location. Mining could occur on private lands, including Native corporation lands, within the park and preserve boundaries. Additionally, State mineral claims may currently be filed anywhere on State lands inside the unit (the submerged lands beneath the navigable lakes and rivers). As outlined in the Lake Clark National Park and Preserve Draft Land Protection Plan (NPS 2013), the NPS recommends that the State close the beds of navigable waters to new mineral entry, extraction of oil and gas, and sand and gravel resources and will apply to the State for these closures. The NPS will also pursue cooperative agreements with the State for the management of lands under navigable waterbodies (shorelands).

Mineral development and operation of the existing mining claims within the park boundary could continue. Development of these claims would need to be in compliance with the Mining in the Parks Act (16 U.S.C. 1901 et seq.). NPS (2013) identifies the Johnson River as the area of the park most likely to see future mining.

### **State Lands**

State lands would continue under multiple use management, with uses prioritized to conserve valuable resources in some areas while allowing resource use in other areas. As much as possible, State lands are managed so that uses are compatible with land use on adjoining federal lands. Land use for recreation, subsistence, and tourism may increase as local, state, and national populations grow.

State of Alaska permitting in the planning area is for the proposed Donlin Gold Project's ancillary facilities that would be constructed on State lands, such as material sites and portions of the natural gas pipeline ROW. Project details are listed above in the section "BLM Lands." Significant progress has been made to advance State permitting for the Donlin Gold Mine Project, including issuance of the State air quality and Alaska Pollutant Discharge Elimination System (APDES) wastewater discharge permits (NovaGold 2018).

### **Native Lands**

Economic development of resources is a reasonably foreseeable use of Native-owned lands within the planning area. The Donlin Gold Project, described above in the section "BLM Lands," also includes land leased from Calista Native Corporation, which holds the subsurface (mineral) estate for ANCSA lands in the project area. A surface use agreement with TKC, the village corporation that owns the surface land, grants surface use rights to lands that TKC holds at the mine site. The proposed mine would provide income from employment during both construction and operations of the mine. This would allow employed subsistence users to better afford fuel and equipment necessary for subsistence activities. Project employment and incomes would benefit 25 to 29 percent of area households during the estimated 3- to 4-year construction period and 5 to 9 percent of households during the estimated 27-year operation period (USACE 2018, Section 3.21). Higher mean income levels are associated with lower subsistence productivity at the community level (Wolfe and Walker 1987), suggesting households with jobs and incomes participate less in subsistence activities, and subsistence productivity may increase with lower median income at the community level. Outmigration and adverse effects of rotation work shifts may also

affect up to half of households with project employment, with greater impacts in the smaller communities with more concentrated project employment (USACE 2018).

### ***Future Activities***

#### **Oil and Gas, Coal, and Geothermal Leasing and Exploration**

The development potential for leasable mineral resources such as coal, coal bed natural gas, oil and gas, geothermal, peat, and coalbed natural gas in the planning area is low (BLM 2015). The expense of developing some of these resources and the lack of roads or railroads connecting the planning area to the rest of the state would also likely preclude small- and large-scale development in the foreseeable future. Prospective oil and gas basins in the region of the planning area include the Holitna, Bethel, and Minchumina Basins, along with the Yukon Delta. There are 59 pending oil and gas Pre-Reform Act lease offers in the planning area, all within the boundary of the Yukon Delta NWR and therefore have been suspended. No additional oil and gas lease offers may be filed until the land selection process that the State and various Alaska Native entities are undertaking is complete. The BLM will continue its adjudicative role on prior existing rights under the mining laws and process dispositions under the mineral leasing laws or material sales. Some areas of known coal (leasable) mineral potential exist, but there has been little interest in developing it to date.

#### **Mineral Exploration and Mining**

A total of 101 areas in the planning area are considered to have high LMP, including a number of areas that are in BLM-managed land and covered by federal mining claims. These include the Nixon Fork Mine area, Flat-Chicken Mountain area, Ophir Creek drainage (Kilbuck Mountains), and the Nyac (Shamrock Creek) area. Additional areas of interest include the high LMP areas on State-selected lands near the Little Creek (west of Donlin), Oskawalik, Julian Creek, and the Granite-Willow Creek areas. Future mineral exploration and mining activities have the potential to occur in these areas and could have impacts on BLM-managed land extending outside the mining claim boundaries (Kurtak et al. 2017). See the discussion of the Donlin Gold Project above in the section “BLM Lands.” Table 1 details the high LMP areas in the planning area as identified in Kurtak et al. (2017).

**Table 1: High Locatable Mineral Potential in the Planning Area**

District	Name	Production Status	Deposit Type	Land Status
Akiak	Canyon Creek	Past producer	Placer Au-PGE	State
	Cripple Creek	Producer	Placer Au-PGE	State
	Eureka Creek	Past producer	Past producer	Past producer
	Gemuk Mtn	No production	Au-polymetallic	State
	Kisa	No production	Felsic-dike-hosted qtz veinlets	State
	Marvel Creek	Producer	Placer Au-PGE	State
	Nyac Placer	Producer	Placer Au-PGE	Calista Corp./BLM
	Nyac Lode	No production	Plutonic-hosted cu-au polymetallic	Calista Corp.
	Ophir Creek	No production	Placer Au-PGE	BLM
	Russian Mtns	No production	Polymetallic veins	Calista Corp.

District	Name	Production Status	Deposit Type	Land Status
Georgetown	Donlin Creek (Ruby Gulch)	Producer	Placer Au-PGE	Calista Corp.
	Donlin Creek (Lewis Gulch)	Producer	Placer Au-PGE	Calista Corp.
	Donlin Creek Lode	No production	Felsic-dike-hosted qtz veinlets	Calista Corp.
	Fortyseven Creek	Past producer	Placer Au-PGE	State
	Granite-Willow Creeks	Producer	Placer Au-PGE	State
	Julian Creek	Producer	Placer Au-PGE	State
	Mountain Top	Past producer	Silica-carbonate Hg	State
	Oskawalik River	No production	Polymetallic replacement deposits and veins	State
	Red Devil	Past producer	Silica-carbonate Hg	BLM
	Murry Gulch	Past producer	Placer Au-PGE	State
	Taylor Creek	Past producer	Placer Au-PGE	State
Iditarod	Chicken Mtn-Flat	No production	Plutonic-hosted Cu-Au polymetallic	Doyon Ltd
	Decourcy Mtn	Past producer	Silica-carbonate Hg	Calista Corp.
	Flat Creek	Past producer	Placer Au-PGE	BLM
	Golden Horn Mine	Past producer	Plutonic-hosted Cu-Au polymetallic	State
	Little Creek	No production	Placer Au-PGE	State
	Otter Creek	Past producer	Placer Au-PGE	BLM
	Prince Creek	Past producer	Placer Au-PGE	BLM
	Willow Creek	Past producer	Placer-Au-PGE	BLM
	Little Creek	Producer	Placer Au-PGE	Patented
Innoko	Beaver Mtns (Cirque)	No production	Polymetallic vein	State
	Boob Creek-Mt Hurst	Past producer	Placer Au-PGE	State
	Colorado Creek	Past producer	Placer Au-PGE	State
	Cripple Creek	Past producer	Placer Au-PGE	State
	Ester Creek	Past producer	Placer Au-PGE	State
	Esperanto Creek	Past producer	Placer Au-PGE	State
	Ganes Creek (Lower)	Past producer	Placer Au-PGE	Patented
	Ganes Creek (Upper)	Producer	Placer Au-PGE	Patented/State
	Innoko River (Lower)	Past producer	Placer Au-PGE	State
	Montana Creek	Producer	Placer Au-PGE	State
	Moore Creek	Producer	Placer Au-PGE	State
	Yankee Creek (Lower)	Past producer	Placer Au-PGE	Doyon Ltd.
	Yankee Creek (Upper)	Producer	Placer Au-PGE	Patented/ Doyon Ltd./ State
Win	No production	Sn-polymetallic veins	State	

District	Name	Production Status	Deposit Type	Land Status
Marshall	Buster Creek	Past producer	Placer Au-PGE	Patented
	Stuyahok – Flat Creek	No production	Felsic-dike-hosted qtz veinlets	Calista Corp.
	Willow Creek	Past producer	Placer Au-PGE	Calista
McGrath	Bowser	No production	Zn-Pb skarn deposits	State
	Broken Shovel	No production	Plutonic-hosted Cu-Au polymetallic	State
	Candle Creek	Producer	Placer Au-PGE	State/ Doyon Ltd.
	Eagle Creek	Past producer	Placer Au-PGE	State
	Nixon Fork Mine	Producer	Cu skarn deposits	BLM/ Doyon Ltd.
	Roberts Pgm	No production	Noril'sk Cu-Ni-PGE	State
	Sheep Creek	No production	Polymetallic replacement deposits and veins	Doyon Ltd.
	Terra	Producer	Low-sulfide Au-quartz veins	State
	Tin Creek	No production	Zn-Pb skarn deposits	Doyon Ltd.
	Vinasale	No production	Plutonic-hosted Cu-Au polymetallic	Doyon Ltd.
Tonzona	Reef Ridge	No production	Southeast Missouri Pb-Zn	Doyon Ltd.

Source: Kurtak et al. (2017)

AU = gold

BLM = Bureau of Land Management

Cu = copper

Hg = mercury

Ni = nickel

Pb = lead

PGE = platinum group element

qtz = quartz

Sn = tin

Zn = zinc

### **Sand and Gravel**

Future demand for additional sand and gravel will be driven by development in the planning area, such as the proposed Donlin Gold Project pipeline that would cross 97 miles of BLM lands.

### **Peat**

It is possible that villages and individuals in the planning area could develop peat as a resource for small-scale energy and heat generation. This type of development is unlikely on BLM-managed land because most villages in the planning area have enough land to harvest peat on their own or from adjacent State lands with fewer restrictions. Additional discussion of peat resources can be found in Section 3.3.8, Renewable Energy, of the Draft BSWI RMP/EIS.

### **Infrastructure and Communities**

Potential transportation corridors are under review by the State of Alaska and include two road and ROW corridors—the Western Alaska Access Planning Study (“Road to Nome” Fairbanks–Nome route [DOWL 2010]) and the Yukon-Kuskokwim Energy Corridor Plan (WHPacific Inc. and Information Insights 2015)—both of which would cross BLM-managed land in the planning area. The Western Alaska Access Planning Study has evaluated three routes, including the preferred Yukon River Corridor, to connect the Nome-Council Road to the existing road system in the Fairbanks area. The proposed final stage of the Yukon River Corridor is between the villages of Koyuk and Nulato and would cross BLM-managed land in the Nulato Hills region of the planning area. The Yukon-Kuskokwim Energy Corridor Plan evaluated overland transport routes in the Portage Mountains area to connect the Yukon and Kuskokwim Rivers for

fuel and freight transport purposes. The assessed routes would cross BLM-managed land from Paimute Slough on the Yukon River to the northeast of the Upper and Lower Kalskag and Kuskokwim River communities.

Projects that have been studied but not considered as a reasonably foreseeable future action for the time frame of the impact analysis include the following:

- Yukon-Kuskokwim Transportation Corridor – This project was proposed by the Association of Village Council Presidents (funded through a State of Alaska general fund appropriation) and is currently in the planning phase. A report on this potential project was presented at the Association of Village Counsel President’s Annual Convention in 2013 and prepared for Alaska Department of Transportation and Public Facilities. However, the project has no appropriation for construction and is not currently on the Alaska Department of Transportation and Public Facilities’ Statewide Transportation Improvement Program for construction funding or identified in an Alaska Statewide Long Range Transportation Plan (ADOT 2002).
- Road to Nome – A proposed highway from the Interior to Western Alaska was studied by the Alaska Department of Transportation but has not advanced beyond conceptual design. One route that was studied would connect the Elliott Highway near Manley Hot Springs to the end of the Nome-Council Highway. No definite sources of funding for the project have been identified, and it is not currently identified in an Alaska Statewide Long Range Transportation Plan.

### **State Lands**

Activities on State lands and for State-managed resources will continue and increase in proportion to population growth, resource development to generate economic activity and revenue for corporation shareholders, and tourism. The mission of the ADF&G is to protect, maintain, and improve the fish, game, and aquatic resources of the state and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle (ADF&G 2017). Education, nongame management and research, and wildlife viewing opportunities are expected to increase. Future actions will address human-wildlife conflicts, subsistence management, and predator management.

### **Research, Monitoring, and Land Management**

Research, monitoring, and land management will continue on federal, State, and Native lands. Remote areas will continue to be accessed by fixed-wing aircraft, helicopters, boats, and snowmobiles, depending on the season.

### **Subsistence and Recreation**

Past recreation, sport hunting, and fishing activities and traditional subsistence practices are expected to continue. Past uses of the INHT are also expected to continue. Recent funding has supported trail improvements such as shelter cabins. Land use for recreation, subsistence, and tourism may increase as local, state, and national populations grow.

## **Climate Change**

Climate change will benefit some subsistence resources and adversely affect others. Frequency and severity of natural wildland fire in western Alaska are predicted to increase and result in shifts to deciduous and shrub-dominated landscapes, which may benefit moose and some furbearers but not caribou. Predicted increases in water temperatures would alter chemical and biotic conditions to the detriment of subsistence fish diversity and abundance. Increases in soil temperatures would result in drying of lakes and ponds.

The following climate warming scenarios are likely in the planning area, based on the Rapid Ecoregional Assessment and the National Climate Assessment and are considered in the cumulative effects analysis:

- Increased temperatures
- Permafrost thaw; the only areas in the planning area that are expected to retain permafrost to a depth of 1 meter, the most influential on vegetation and surface conditions, in the future, aside from isolated pockets, are in the Nulato Hills region.
- Decreased snow cover (albedo effect), subnivean species impacts
- Increased wildland fire intensity, size, and frequency
- Increase in nonnative invasive species presence/spread
- Later freeze-up dates (river ice)
- Sea level rise (salt intrusion, transportation changes)
- Shrub encroachment
- Spruce trees replaced with aspen/birch hardwood trees

## **3.6 Evaluation and Findings for the Cumulative Case – Alternative A**

### **3.6.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Based on the analyses in Chapter 3 of the Draft BSWI RMP/EIS, and Appendix N, potential development of transportation corridors, mineral exploration and development on State and Native lands, and the potential for increased recreational activities occurring in or adjacent to the planning area would have cumulative impacts on subsistence resources. Depending on the location, extent, intensity, and duration of development, these impacts may include alteration of the traditional lifestyles of rural residents, subsistence resource degradation and limits to subsistence access, distribution to and limited abundance of subsistence resources, and increased competition to local subsistence users.

The potential list of cumulative activities would, depending on timing, magnitude, duration, intensity, and type of activity, impact the full spectrum of local and regional subsistence species fish and wildlife relative to abundance, distribution, seasonal habitat use, movement patterns, habitat integrity (relative to fragmentation, degradation, conversion).

The continued use of small roads that connect communities in the planning area may aid subsistence users in accessing their traditional harvest areas. However, these small roads may also concentrate hunting efforts along the road/trail corridors, depleting resources from the area, and potentially altering harvest



from current traditional harvest areas. Increased competition for subsistence resources would likely result if smaller communities were linked by construction of new transportation corridors because non-resident and non-local hunters would be able to access the area with little effort. This may also result in an increase in recreational use of the area, resulting in additional impacts to wildlife.

### **3.6.2 Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area**

As described, the cumulative case contains information on reasonably foreseeable activities that could have an effect on the management decisions being analyzed as part of the Draft BSWI RMP/EIS. The purpose of the cumulative case is to present known ongoing activity by all entities on all lands near or within the planning area, as well as activities that have been proposed for the future and are likely to occur. The cumulative case is not an implementable alternative that specifies land uses and management but is instead a discussion of impacts that could affect the management decisions in Alternatives A through D.

### **3.6.3 Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. Alternatives that would reduce or eliminate other uses of public lands otherwise needed for subsistence include the alternatives that are presented and analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.6.4 Findings**

The cumulative case, as presented in this analysis, may result in a significant restriction of subsistence uses for the communities of Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet due to a decrease in resource availability, alteration in the distribution of resources, obstruction to access of resources, and an increase in competition from access by non-qualified subsistence. Increased recreational activities occurring in or adjacent to the planning area, and climate influences (climate change) would impact resources important to subsistence users. With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources would continue to be degraded and subsistence users would face increased competition for resources by non-local users. Donlin Gold's proposed mine may result in a restriction to subsistence uses for communities along the Kuskokwim River and communities along the gas pipeline right-of way. The development of ancillary facilities, temporary access roads, and airstrips developed in association with the pipeline may result in unintended development along this corridor, which affects subsistence gathering regions. Designations that provide measures of protections for aquatic and terrestrial habitats, such as HWV, ACEC, wild and scenic rivers,

and areas managed to preserve wilderness characteristics, would reduce risk to sensitive areas important for the protection of subsistence values.

### **3.7 Evaluation and Findings for the Cumulative Case – Alternative B**

#### **3.7.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Based on the analyses in Chapter 3 of the Draft BSWI RMP/EIS, and Appendix N, potential development of transportation corridors, mineral exploration and development on State and Native lands, and the potential for increased recreational activities occurring in or adjacent to the planning area would have cumulative impacts on subsistence resources. Depending on the location, extent, intensity, and duration of development, these impacts may include alteration of the traditional lifestyles of rural residents, subsistence resource degradation and limits to subsistence access, distribution to and limited abundance of subsistence resources, and increased competition to local subsistence users.

The potential list of cumulative activities would, depending on timing, magnitude, duration, intensity, and type of activity, impact the full spectrum of local and regional subsistence species fish and wildlife relative to abundance, distribution, seasonal habitat use, movement patterns, habitat integrity (relative to fragmentation, degradation, conversion).

The continued use of small roads that connect communities in the planning area may aid subsistence users in accessing their traditional harvest areas. However, these small roads may also concentrate hunting efforts along the road/trail corridors, depleting resources from the area, and potentially altering harvest from current traditional harvest areas. Increased competition for subsistence resources would likely result if smaller communities were linked by construction of new transportation corridors because non-resident and non-local hunters would be able to access the area with little effort. This may also result in an increase in recreational use of the area, resulting in additional impacts to wildlife.

#### **3.7.2 Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. As described, the cumulative case contains information on reasonably foreseeable activities that could have an effect on the management decisions being analyzed as part of the Draft BSWI RMP/EIS. The purpose of the cumulative case is to present known ongoing activity by all entities on all lands near or within the planning area, as well as activities that have been proposed for the future and are likely to occur. The cumulative case is not an implementable alternative that specifies land uses and management but is instead a discussion of impacts that could affect the management decisions in Alternatives A through D.

#### **3.7.3 Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

Alternatives that would reduce or eliminate other uses of public lands otherwise needed for subsistence include the alternatives that are presented and analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS.

These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.7.4 Findings**

The cumulative case, as presented in this analysis, may result in a significant restriction of subsistence uses for the communities of Aniak, Anvik, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Shageluk, Sleetmute, Stony River, and Unalakleet due to a decrease in resource availability, alteration in the distribution of resources, obstructions to access of resources, and an increase in competition from access by non-qualified subsistence. Increased mineral exploration and development due to the lifting of withdrawals, increased recreational activities occurring in or adjacent to the planning area, and climate influences (climate change) would impact resources important to subsistence users. With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources would continue to be degraded and subsistence users would face increased competition for available resources by non-local users. For species with habitat or populations that are degrading, this alternative would lessen the rate of degradation or stabilize or counter the existing trend. For species with habitat or populations that are improving, this alternative would allow the improvement to continue at a similar or greater rate. Alternative B would provide a greater measure of protection than the other alternatives for the maintenance and perpetuation of subsistence resources indirectly affected by the development of the Donlin Gold Mine and the associated natural gas pipeline.

## **3.8 Evaluation and Findings for the Cumulative Case – Alternative C**

### **3.8.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Based on the analyses in Chapter 3 of the Draft BSWI RMP/EIS, and Appendix N, potential development of transportation corridors, mineral exploration and development on State and Native lands, and the potential for increased recreational activities occurring in or adjacent to the planning area would have cumulative impacts on subsistence resources. Depending on the location, extent, intensity, and duration of development, these impacts could include alteration of the traditional lifestyles of rural residents, subsistence resource degradation and limits to subsistence access, distribution to and limited abundance of subsistence resources, and increased competition to local subsistence users.

The potential list of cumulative activities would, depending on timing, magnitude, duration, intensity, and type of activity, impact the full spectrum of local and regional subsistence species fish and wildlife relative to abundance, distribution, seasonal habitat use, movement patterns, habitat integrity (relative to fragmentation, degradation, conversion).

The continued use of small roads that connect communities in the planning area may aid subsistence users in accessing their traditional harvest areas. However, these small roads may also concentrate hunting efforts along the road/trail corridors, depleting resources from the area, and potentially altering harvest from current traditional harvest areas. Increased competition for subsistence resources would likely result if smaller communities were linked by construction of new transportation corridors because non-resident

and non-local hunters would be able to access the area with little effort. This may also result in an increase in recreational use of the area, resulting in additional impacts to wildlife.

### **3.8.2 Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. As described, the cumulative case contains information on reasonably foreseeable activities that could have an effect on the management decisions being analyzed as part of the Draft BSWI RMP/EIS. The purpose of the cumulative case is to present known ongoing activity by all entities on all lands near or within the planning area, as well as activities that have been proposed for the future and are likely to occur. The cumulative case is not an implementable alternative that specifies land uses and management but is instead a discussion of impacts that could affect the management decisions in Alternatives A through D.

### **3.8.3 Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

Alternatives that would reduce or eliminate other uses of public lands otherwise needed for subsistence include the alternatives that are presented and analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.8.4 Findings**

The cumulative case, as presented in this analysis, may result in a significant restriction of subsistence use for the communities of Aniak, Anvik, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, , Upper Kalskag, Marshall, McGrath, Nikolai, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet due to a decrease in resource availability, alteration in the distribution of resources, obstruction to access of resources, and an increase in competition from access by non-qualified subsistence. Increased mineral exploration and development due to the lifting of withdrawals, increased recreational activities occurring in or adjacent to the planning area, and climate influences (climate change) would impact resources important to subsistence users. With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources would continue to be degraded and subsistence users would face increased competition for available resources by non-local users. For species with habitat or populations that are degrading, the degradation may continue but at a lesser rate and could be stabilized. Alternative C would provide a greater measure of protection than Alternatives A and D but to a lesser extent than Alternative B for the maintenance and perpetuation of subsistence resources indirectly affected by the development of the Donlin Gold Mine and the associated natural gas pipeline.

## **3.9 Evaluation and Findings for the Cumulative Case – Alternative D**

### **3.9.1 Evaluation of the Effects of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

Based on the analyses in Chapter 3 of the Draft BSWI RMP/EIS, and Appendix N, potential development of transportation corridors, mineral exploration and development on State and Native lands, and the potential for increased recreational activities occurring in or adjacent to the planning area would have cumulative impacts on subsistence resources. Depending on the location, extent, intensity, and duration of development, these impacts may include alteration of the traditional lifestyles of rural residents, subsistence resource degradation and limits to subsistence access, distribution to and limited abundance of subsistence resources, and increased competition to local subsistence users.

The potential list of cumulative activities would, depending on timing, magnitude, duration, intensity, and type of activity, impact the full spectrum of local and regional subsistence species fish and wildlife relative to abundance, distribution, seasonal habitat use, movement patterns, habitat integrity (relative to fragmentation, degradation, conversion).

The continued use of small roads that connect communities in the planning area may aid subsistence users in accessing their traditional harvest areas. However, these small roads may also concentrate hunting efforts along the road/trail corridors, depleting resources from the area, and potentially altering harvest from current traditional harvest areas. Increased competition for subsistence resources would likely result if smaller communities were linked by construction of new transportation corridors because non-resident and non-local hunters would be able to access the area with little effort. This may also result in an increase in recreational use of the area, resulting in additional impacts to wildlife.

### **3.9.2 Evaluation of the Availability of Other Lands for Land Use Plan Decisions Allowed in the Planning area**

The proposed action and/or alternatives are to occur on lands needed for subsistence purposes. For the BSWI RMP, the planning area is by definition the focus, not other areas. Areas outside of the planning area are not subject to the planning process and are outside the scope of the planning process and therefore would not be considered under this analysis. As described, the cumulative case contains information on reasonably foreseeable activities that could have an effect on the management decisions being analyzed as part of the Draft BSWI RMP/EIS. The purpose of the cumulative case is to present known ongoing activity by all entities on all lands near or within the planning area, as well as activities that have been proposed for the future and are likely to occur. The cumulative case is not an implementable alternative that specifies land uses and management but is instead a discussion of impacts that could affect the management decisions in Alternatives A through D.

### **3.9.3 Evaluation of Other Alternatives that would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes**

Alternatives that would reduce or eliminate other uses of public lands otherwise needed for subsistence include the alternatives that are presented and analyzed in Chapters 2 and 3 of the Draft BSWI RMP/EIS. These alternatives were created to represent a wide range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values

following current national guidelines. Additional alternatives that were considered but not analyzed in detail are also discussed in Chapter 2 of the Draft BSWI RMP/EIS.

### **3.9.4 Findings**

The cumulative case, as presented in this analysis, may result in a significant restriction of subsistence uses for the communities of Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet due to a decrease in resource availability, alteration in the distribution of resources, obstruction to access of resources, and an increase in competition from access by non-qualified subsistence. Increased mineral exploration and development due to the lifting of withdrawals, increased recreational activities occurring in or adjacent to the planning area, and climate influences (climate change) would impact resources important to subsistence users. With the trends of continued natural resource development and increased casual and recreational use in the planning area, subsistence resources would continue to be degraded and subsistence users would face increased competition for available resources by non-local users. For forest and woodland species and species in areas of medium to high mineral development that are important as subsistence resources, potential trends could degrade as a result of the cumulative effects of future development, climate change, and fragmentation of habitats. These species would experience a trend of increased degradation or lessened improvement. Donlin Gold's proposed mine may result in a restriction to subsistence uses for communities along the Kuskokwim River and communities along the gas pipeline ROW.

## ***Section 4 Notice and Hearings***

ANILCA § 810(a) provides that no “withdrawal, reservation, lease, permit, or other use, occupancy or disposition of the public lands which would significantly restrict subsistence uses shall be effected” until the federal agency gives the required notice and holds a hearing in accordance with ANILCA § 810(a)(1) and (2). The BLM will provide notice in the *Federal Register* that it has made positive findings pursuant to ANILCA § 810 that the alternatives and the cumulative case presented in the Draft BSWI RMP/EIS meet the “may significantly restrict” threshold. As a result, public hearings will be held in the vicinity of the potentially affected communities in the planning area which are Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet. Notice of these hearings will also be provided by way of the local media, including the newspaper and the local radio station, with coverage to communities in the planning area.

## ***Section 5 Subsistence Determinations Under ANILCA Sections 810(a)(3)(A), (B), and (C)***

ANILCA § 810(a) provides that no “withdrawal, reservation, lease, permit, or other use, occupancy or disposition of the public lands which would significantly restrict subsistence uses shall be effected” until the federal agency gives the required notice and holds a hearing in accordance with ANILCA § 810(a)(1) and (2) and makes the three determinations required by ANILCA § 810(a)(3)(A), (B), and (C). The three determinations are (1) that such a significant restriction of subsistence use is necessary, consistent with sound management principles for the utilization of the public lands, (2) that the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other such disposition, and (3) that reasonable steps will be taken to minimize adverse impacts to subsistence uses and resources resulting from such actions (16 U.S.C. 3120(a)(3)(A), (B), and (C)).

The BLM has found in this subsistence evaluation that each of the alternatives considered in the Draft BSWI RMP/EIS may significantly restrict subsistence uses. Therefore, the BLM will undertake the notice and hearing procedures required by ANILCA § 810(a)(1) and (2) in conjunction with release of the Draft BSWI RMP/EIS to solicit public comment from the potentially affected communities and subsistence users in Aniak, Anvik, Bethel, Crooked Creek, Chuathbaluk, Grayling, Holy Cross, Kaltag, Lime Village, Lower Kalskag, Upper Kalskag, Marshall, McGrath, Nikolai, Nulato, Russian Mission, Shageluk, Sleetmute, Stony River, and Unalakleet.

The determination that the requirements of ANILCA § 810(a)(3)(A), (B), and (C) have been met will be analyzed in the Final ANILCA § 810 Evaluation, using input from the communities in which subsistence hearings will be held.

**Note: the following sections are placeholders for the Final Section 810 analysis.**

- 5.1 Significant Restriction of Subsistence Use is Necessary, Consistent with Sound Management Principles for the Utilization of Public Lands**
  
- 5.2 The Proposed Activity Will Involve the Minimal Amount of Public Lands Necessary to Accomplish the Purposes of such Use, Occupancy or Other Disposition**
  
- 5.3 Reasonable Steps will be Taken to Minimize Adverse Impacts upon Subsistence Uses and Resources Resulting from such Actions**



## Section 6 References

- ADF&G (Alaska Department of Fish and Game). 2014. Subsistence in Alaska: A Year 2014 Update. Division of Subsistence, Anchorage, Alaska. Accessed December 6, 2017. Available at: [http://www.adfg.alaska.gov/static/home/subsistence/pdfs/subsistence\\_update\\_2014.pdf](http://www.adfg.alaska.gov/static/home/subsistence/pdfs/subsistence_update_2014.pdf)
- ADF&G. 2017. Alaska Department of Fish and Game “Agency Mission,” accessed December 6, 2017. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=about.mission>
- ADNR (Alaska Department of Natural Resources). 1988. Kuskokwim Area Plan. Available at: <http://dnr.alaska.gov/mlw/planning/areaplans/kuskokwim/> (accessed October 2018)
- ADNR. 1991. Tanana Basin Area Plan. Available at: <http://dnr.alaska.gov/mlw/planning/areaplans/tanana/> (accessed October 2018).
- ADNR. 2002. Wood-Tikchik State Park Management Plan. Available at: <http://dnr.alaska.gov/parks/plans/woodt/woodtpln.htm> (accessed October 2018).
- ADOT (Alaska Department of Transportation and Public Facilities). 2002. Yukon Kuskokwim Delta Transportation Plan. Executive Summary.
- BLM (U.S. Bureau of Land Management). 1981. Management Framework Plan, Southwest Planning Area. Anchorage: BLM Anchorage District Office. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 1986. Central Yukon Planning Area Resource Management Plan and Record of Decision, September 1986. Fairbanks District Office, Northwest Resource Area. Available at: <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=48431> (accessed October 2016).
- BLM. 2005. Land Use Planning Handbook (H-1601-1). March 11, 2005. Washington, DC. Available at: [https://www.ntc.blm.gov/krc/uploads/360/4\\_BLM%20Planning%20Handbook%20H-1601-1.pdf](https://www.ntc.blm.gov/krc/uploads/360/4_BLM%20Planning%20Handbook%20H-1601-1.pdf) (accessed July 31, 2018).
- BLM. 2010. Instruction Manual, Bureau of Land Management (BLM) Instructions and Policy for Compliance with Section 810 the Alaska National Interest Lands Conservation Act (ANILCA). Available at: <https://www.blm.gov/policy/im-ak-2011-008>.
- BLM. 2015. Mineral Occurrence and Development Potential Report for Leasable Minerals within the Bering Sea – Western Interior Planning Area. Prepared by Zachary Lyons, Geologist, Energy and Minerals Branch, Division of Resources, BLM Alaska State Office. January 2015. Available at: [https://eplanning.blm.gov/epl-front-office/projects/lup/36665/43890/58028/2015-01-07\\_LeasableMineralsReport.pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36665/43890/58028/2015-01-07_LeasableMineralsReport.pdf).
- DOWL. 2010. Western Alaska Access Planning Study Corridor Planning Report. Executive Summary. Prepared for State of Alaska, Department of Transportation and Public Facilities. Northern Region Planning. 14 p.
- Ikuta, H., C.L. Brown, and D.S. Koster. 2014. Subsistence Harvests in 8 Communities in the Kuskokwim River Drainage and Lower Yukon River, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 396. Fairbanks, AK.

- Kurtak, J., J. Hoppe, and R. Ellefson. 2017. Mineral Occurrence and Development Potential Report, Locatable and Salable Minerals. BLM Alaska Technical Report 63, July 2017. Available at: [https://eplanning.blm.gov/epl-front-office/projects/lup/36665/145032/178739/2017\\_Minerals\\_Occurrence\\_and\\_Development\\_Potential\\_Report\\_Rev1.pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36665/145032/178739/2017_Minerals_Occurrence_and_Development_Potential_Report_Rev1.pdf).
- NovaGold. 2018. NovaGold. 2018. Donlin Gold Permitting. Available at: [http://www.novagold.com/properties/donlin\\_gold/permitting/](http://www.novagold.com/properties/donlin_gold/permitting/) (accessed September 7, 2018).
- NPS (National Park Service). 2009. Lake Clark National Park and Preserve Foundation Statement, October 2009. National Park Service, Alaska Regional Office.
- NPS. 2013. Lake Clark National Park and Preserve Draft Land Protection Plan.
- NPS. 2014. General Management Plan Amendment/Environmental Assessment.
- U.S. Census Bureau. 2010a. 2010 Census Fact Finder. Available at: <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml> (accessed October 2016).
- U. S. Census Bureau. 2010b. 2010 Community Facts Search Bethel City. Available at: [https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml) (accessed October 2018).
- USACE (U.S. Army Corps of Engineers). 2018. Donlin Gold Project Final Environmental Impact Statement. Alaska District.
- USFWS (U.S. Fish and Wildlife Service). 2004. Land Conservation Plan for Yukon Delta National Wildlife Refuge, Bethel, Alaska. Available at: [https://www.fws.gov/alaska/nwr/planning/pdf/YD\\_LCP.pdf](https://www.fws.gov/alaska/nwr/planning/pdf/YD_LCP.pdf) (accessed October 2018)
- U. S. Fish and Wildlife Service (USFWS). 2008. *Revised Comprehensive Conservation Plan: Innoko National Wildlife Refuge*.
- WHPacific Inc., and Information Insights. 2015. *Yukon-Kuskokwim Energy Corridor Plan*. Executive Summary. Prepared for Nuvista Light and Electric Cooperative, Inc. Draft June 2015. 89 p.
- Wolfe, R. J., and R. J. Walker. 1987. Subsistence economies in Alaska: productivity, geography, and development impacts. *Arctic Anthropology*. 24(2): 56-81.

This page intentionally left blank

## **Appendix O-1: Impact Methodology and Results**



## Impact Methodology

The Alaska National Interest Lands Conservation Act (ANILCA) Preliminary Section 810 Evaluation performed for the Draft Bering–Sea Western Interior (BSWI) Resource Management Plan (RMP)/Environmental Impact Statement (EIS) included a quantitative and qualitative analysis to identify which communities may have a significant restriction to subsistence uses.

The impact analysis focused on the following three management actions as they were identified to have the most potential to significantly restrict abundance of, availability to, or access to subsistence resources:

- **Areas open to locatable mineral development (in areas of high and medium locatable mineral potential) in known subsistence use areas.** Impacts from locatable mineral development could occur to the availability of subsistence resources as wildlife species would likely move out of the area while exploration, operation, and reclamation activities occur. Subsistence users would likely make some adjustments to where they might traditionally harvest resources and then target resources that would be less affected by mineral development activities
- **Off-highway vehicle (OHV) closures to subsistence use areas.** Summer subsistence OHV travel restrictions could obstruct existing routes to subsistence resources used by rural communities.
- **Right-of-way (ROW) exclusion or avoidance areas.** Areas open for ROW development could impact availability of subsistence resources due to the long-term impact ROWs could have on availability of subsistence resources by changing species movement patterns. New ROWs would likely be associated with locatable mineral development for roads and pipelines needed for transportation of personnel, equipment, and resources. Access to subsistence resources and traditional harvest areas could be of low to high magnitude depending on the portions of the nearby communities' harvest areas that are affected and could be adverse or beneficial.

### Quantitative Analysis

In determining the impacts threshold for quantitative analysis, for management actions (listed above) found to cover 10 percent or greater of the total subsistence use area for the community (regardless of ownership of land), a rebuttable presumption of significance was made. Areas with less than a 10 percent overlap could have specific impacts to individuals that use those areas; however, these impacts were presumed to be less than significant. If there is no overlap, there is an assumption of no significant adverse effect (i.e., no positive finding).

### Qualitative Analysis

Potentially significant impacts identified per the quantitative analysis were next reviewed using a qualitative approach. For the qualitative analysis a potentially significant impact was determined if the analyzed management action intersects a known travel route; closure would occur during the season in which the resource is harvested; and/or closure would impact a resource that is heavily relied upon by a community.

### Assumptions

Due to similarities between some communities we may be able to make assumptions to “reasonably predict” subsistence use areas:

- Shageluk and Holy Cross are located within the Lower Middle Yukon River in an area that is referred to as the “GASH.” It was assumed that subsistence use information for these two communities is the same as other GASH communities for which we do have data (Grayling and Anvik).
- For Marshall, subsistence uses would be similar to other communities that are upstream (such as Holy Cross).
- Kaltag has similar subsistence uses as Unalakleet due to the proximity of the two communities.
- Lime Village and Nulato are very small communities; however, they are dependent on specific caribou herds.

## Impact Analysis Results

A “(+)” symbol indicates a positive finding for one or more subsistence use areas within the community for the respective management action (LM = locatable minerals; OHV = subsistence OHV access; ROW = Right-of-Way) and a “(-)” symbol indicates a negative finding. Communities with a positive finding for a minimum of one subsistence use area for a minimum of one management action are considered to have a positive finding for the purposes of this analysis.

<b>Community</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Aniak	LM (-) OHV (+) ROW (+)	LM (+) OHV (-) ROW (+)	LM (+) OHV (-) ROW (+)	LM (+) OHV (+) ROW (+)
Anvik	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (-)	LM (-) OHV (+) ROW (-)	LM (-) OHV (+) ROW (+)
Bethel	LM (-) OHV (+) ROW (+)	LM (-) OHV (-) ROW (-)	LM (-) OHV (-) ROW (-)	LM (-) OHV (+) ROW (-)
Crooked Creek	LM (-) OHV (+) ROW (+)	LM (+) OHV (-) ROW (+)	LM (+) OHV (-) ROW (+)	LM (+) OHV (+) ROW (+)
Chuathbaluk	LM (+) OHV (+) ROW (+)	LM (+) OHV (-) ROW (-)	LM (+) OHV (-) ROW (-)	LM (+) OHV (+) ROW (+)
Grayling	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)
Holy Cross	LM (-) OHV (+) ROW (+)	LM (-) OHV (-) ROW (+)	LM (-) OHV (-) ROW (+)	LM (-) OHV (+) ROW (+)
Kaltag	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)
Lime Village	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)
Lower Kalskag	LM (+) OHV (+) ROW (+)	LM (+) OHV (-) ROW (-)	LM (+) OHV (-) ROW (+)	LM (+) OHV (+) ROW (+)
Marshall	LM (-) OHV (+) ROW (+)	LM (-) OHV (-) ROW (+)	LM (-) OHV (-) ROW (+)	LM (-) OHV (+) ROW (+)
McGrath	LM (-) OHV (+) ROW (+)	LM (+) OHV (+) ROW (+)	LM (+) OHV ROW (+)	LM (+) OHV (+) ROW (+)
Nikolai	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)
Nulato	LM (-) OHV (+) ROW (+)	LM (-) OHV (-) ROW (-)	LM (-) OHV (-) ROW (-)	LM (-) OHV (+) ROW (-)
Russian Mission	LM (-) OHV (+) ROW (+)	LM (-) OHV (-) ROW (-)	LM (-) OHV (-) ROW (+)	LM (-) OHV (+) ROW (+)
Shageluk	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (-)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)
Sleetmute	LM (-) OHV (+) ROW (+)	LM (+) OHV (+) ROW (+)	LM (+) OHV (+) ROW (+)	LM (+) OHV (+) ROW (+)
Stony River	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (-)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)



<b>Community</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Unalakleet	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)	LM (-) OHV (+) ROW (+)
Upper Kalskag	LM (+) OHV (+) ROW (+)	LM (+) OHV (-) ROW (+)	LM (+) OHV (-) ROW (+)	LM (+) OHV (+) ROW (+)

**Impact Analysis Results—Aniak**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	41.2	<p>LM: 3% of use area. Closest open area is located ~25 miles from the town. It covers a portion of the Kolmakof River, but a majority of the river corridor is withdrawn. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 2% of use area. Closest open area is located ~15 miles from the village, but most areas located 20 miles or more from town. Open areas are located towards the northern and eastern boundaries of the use polygon, and generally leave areas around waterways clear. There is a potential chokepoint that could occur along the Kuskokwim River near the confluence of Kolmakof River, though travel could still take place on the Kuskokwim River itself. Additionally, there is a route along a valley area that is withdrawn from locatable and may serve as a travel route. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 40% of the use area limits summer casual use to existing trails. This same 40% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 12% of use area would be open to ROW location, 27% would be ROW avoidance areas, and .6% would be ROW exclusion areas. LLM are the second most heavily harvested resource (by weight) for Aniak. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but may still have a significant impact. <b>Positive (+).</b></p>	<p>LM: 7% of use area. Closest open area is located ~15 miles from the village, but most areas located 20 miles or more from town. Open areas are located towards the northern and eastern boundaries of the use polygon, and generally leave areas around waterways clear. There is a potential chokepoint that could occur along the Kuskokwim River near the confluence of Kolmakof River, though travel could still take place on the Kuskokwim River itself even if this section were fully developed. Larger amount of land impacted than Alternative A. LLM are the second most heavily harvested resource (by weight) for Aniak. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 40% of the use area limits summer casual use to existing trails. There is no limit on casual winter use. Therefore, there is no access restriction for subsistence uses and some protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 20% of the use area is open to ROW location, 20% would be ROW avoidance areas, and 0% would be ROW exclusion areas. LLM are the second most heavily harvested resource (by weight) for Aniak. This could have a potentially significant impact on subsistence uses and resources, but is less than Alternative A, which has no restrictions. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 31% of the use area would be open to ROW location, and 9% of the use area would be a ROW avoidance area. LLM are the second most heavily harvested resource (by weight) for Aniak. This could have a potentially significant impact on subsistence uses and resources, but is less than Alternative A, which has no restrictions. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	SLM	3.2	<p>LM: 3% of use area. Closest open area is located ~25 miles from the town. The open areas are concentrated in the Kolmakof River watershed and cross portions of Kolmakof River, Quinn Creek, and Getmuna Creek. Majority of SLM area is closer to the village and does not overlap with high and medium potential mineral decision areas. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 2% of use area. Closest open area that overlaps with use polygon is over 20 miles from the village. The open areas are concentrated in the Kolmakof River watershed, but do not cross the Kolmakof River or Getmuna Creek. A small portion of Quinn Creek is open. Majority of SLM area is closer to the village and does not overlap with high and medium potential mineral decision areas. Less impacts as compared to Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 32% of the use area limits summer casual use to existing trails. This same 32% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 9% of use area would be open to ROW location, 23% would be ROW avoidance areas, and .4% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: 8% of use area. Closest open area that overlaps with use polygon is over 20 miles from the village. The open areas are concentrated in the Kolmakof River watershed and cross portions of Kolmakof River, Quinn Creek, and Getmuna Creek. Larger amount of land impacted than Alternative A. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 32% of the use area limits summer casual use to existing trails. This same 32% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 15% of use area would be open to ROW location, 17% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas as compared to Alternative A but may still have significant impacts. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 25% of use area would be open to ROW location, 7% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas as compared to Alternative A but may still have significant impacts. <b>Positive (+).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting (Birds)	Ducks Geese	0.0	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: .06% of use area. Open areas are along edges of use area along the Kuskokwim River and do not appear to block travel routes (i.e., there is area along the river shore and the river itself to travel further into the use area). <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 19% of the use area limits summer casual use to existing trails. This same 19% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 13% of use area would be open to ROW location, 4% would be ROW avoidance areas, and 3% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is for a resource that is not heavily harvested (0 lbs. in 2009). <b>Negative (-)</b>.</p>	<p>LM: .06% of use area. Open areas are along edges of use area along the Kuskokwim River and do not appear to block travel routes (i.e., though a portion of the use area land upstream of the confluence of Seuter Creek is open, the river itself can be used to travel further into the use area). <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 19% of the use area limits summer casual use to existing trails. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 16% of use area would be open to ROW location, 0% would be ROW avoidance areas, and 3% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is for a resource that is not heavily harvested (0 lbs. in 2009). <b>Negative (-)</b>.</p>	<p>LM: Same as Alternative C. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 17% of use area would be open to ROW location, 2% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas as compared to Alternative A but is for a resource that is not heavily harvested (0 lbs. in 2009). <b>Negative (-)</b>.</p>
Fishing	Salmon Trout Whitefish	Salmon: 190.04  Non-Salmon Fish: 49.58	<p>LM: Closest areas to high/med mineral potential areas are withdrawn from locatable mining. The closest open area to fishing locations is over 5 miles away. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: Areas open to locatable minerals with high/med potential are near (right along the shoreline) to fishing locations along the Kuskokwim River (near the confluence of Kolmakof River). Fishing resources are the majority of the subsistence resources harvested by this community (in lbs.) and make up over 78% of the harvest in 2009. <b>Positive (+)</b>.</p> <p>OHV: No limits to access for subsistence users. Casual summer use is limited to existing trails in several areas close to fishing locations, and winter casual use is limited to snowmobiles only in these same areas. <b>Negative (-)</b>.</p> <p>ROW: Fish are the most heavily harvested resource (by weight) for Aniak. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but may still have a significant impact due to the prevalence of open and avoidance areas near fishing locations. <b>Positive (+)</b>.</p>	<p>LM: Areas open to locatable minerals with high/med potential are near (right along the shoreline) to fishing locations along the Kuskokwim River (near the confluence of Kolmakof River). Fishing resources are the majority of the subsistence resources harvested by this community (in lbs.) and make up over 78% of the harvest in 2009. <b>Positive (+)</b>.</p> <p>OHV: No limits to access for subsistence users. Casual summer use is limited to existing trails in several areas close to fishing locations, but there are no limitations on winter casual use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: Fish are the most heavily harvested resource (by weight) for Aniak. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but may still have a significant impact due to the prevalence of open and avoidance areas near fishing locations. <b>Positive (+)</b>.</p>	<p>LM: Areas open to locatable minerals with high/med potential are near (right along the shoreline) to fishing locations along the Kuskokwim River (near the confluence of Kolmakof River). Fishing resources are the majority of the subsistence resources harvested by this community (in lbs.) and make up over 78% of the harvest in 2009. <b>Positive (+)</b>.</p> <p>OHV: Summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. Fish is the most harvested resources (by weight) in this community. <b>Positive (+)</b>.</p> <p>ROW: Numerous areas open to ROW near fishing locations that could impede access and decrease availability of resources. <b>Positive (+)</b>.</p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Gathering	Berries Plants	5.8	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: .06% of use area. Some open areas along the Kuskokwim River on both sides of the bank. However, does not appear to block travel routes as the river is still accessible, as are portions of the bank on either side. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 19% of the use area limits summer casual use to existing trails. This same 19% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 8% of use area would be open to ROW location, 12% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: .09% of use area. Some open areas along the Kuskokwim River on both sides of the bank. However, does not appear to block travel routes as the river is still accessible, as are portions of the bank on either side. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 19% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. Gathering does not make up a substantial part of the harvesting in this community (in lbs.). <b>Negative (-)</b>.</p> <p>ROW: 10% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is to a threshold that could be significant even though gathering does not make up a substantial part of the harvesting for this community (in lbs.). <b>Positive (+)</b>.</p>	<p>LM: Same as Alternative C. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 16% of use area would be open to ROW location, 3% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is to a threshold that could be significant even though gathering does not make up a substantial part of the harvesting for this community (in lbs.). <b>Positive (+)</b>.</p>

**Notes:**

LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Anvik**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Moose	90.0	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 8% is restricted for winter subsistence use. 36% of the use area limits summer casual use to existing trails. This same 36% is also limited to snowmobiles only for casual winter use. There would be some access restriction for subsistence uses in the 8% of the use area that limits winter subsistence use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. While the access restrictions do not meet the 10% threshold for impacts, this is one of the top harvested resources in the community (in lbs.). <b>Positive (+)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 15% would be ROW avoidance areas, and 18% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 8% is restricted for winter subsistence use. 36% of the use area limits summer casual use to existing trails. 8% is also limited to snowmobiles only for casual winter use. There would be some access restriction for subsistence uses in the 8% of the use area that limits winter subsistence use to snowmobiles only. This alternative provides the better protection against habitat degradation and competing uses, as compared to Alternative A. While the access restrictions do not meet the 10% threshold for impacts, this is one of the top harvested resources in the community (in lbs.). <b>Positive (+)</b>.</p> <p>ROW: 4% of use area would be open to ROW location, 23% would be ROW avoidance areas, and 10% would be ROW avoidance areas for linear realty actions. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 6% of use area would be open to ROW location, 30% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>
Hunting and Trapping (SLM)	Beaver SLM	19.3	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 5% is restricted for winter subsistence use. 26% of the use area limits summer casual use to existing trails. This same 26% is also limited to snowmobiles only for casual winter use. There would be some access restriction for subsistence uses in the 5% of the use area that limits winter subsistence use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. The access restrictions do not hit 10% of the use area, and this is not one of the top harvested resources. <b>Negative (-)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 4% would be ROW avoidance areas, and 19% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 5% is restricted for winter subsistence use. 26% of the use area limits summer casual use to existing trails. There would be some access restriction for subsistence and casual uses in the 5% of the use area that limits winter OHV use to snowmobiles only. This alternative provides higher protection against habitat degradation and competing uses, as compared to Alternative A, though it provides some access restrictions to portions of the use area. <b>Negative (-)</b>.</p> <p>ROW: 6% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 19% would be ROW avoidance areas for linear realty actions. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 25% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but would rise to a level of significance because of the amount of land impacted. <b>Positive (+)</b>.</p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting (Birds)	Ducks Geese Ptarmigan Grouse	12.8	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 2% is restricted for winter subsistence use. 21% of the use area limits summer casual use to existing trails. This same 21% is also limited to snowmobiles only for casual winter use. There would be some access restriction for subsistence uses in the 2% of the use area that limits winter subsistence use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. While the access restrictions do not hit 10% of the use area, and this is not one of the top harvested resources. <b>Negative (-)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 4% would be ROW avoidance areas, and 14% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 2% is restricted for winter subsistence use. 21% of the use area limits summer casual use to existing trails. There would be some access restriction for subsistence and casual uses in the 2% of the use area that limits winter OHV use to snowmobiles only. This alternative provides higher protection against habitat degradation and competing uses, as compared to Alternative A, though it provides some access restrictions to portions of the use area. <b>Negative (-)</b>.</p> <p>ROW: 4% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 8% would be ROW avoidance areas for linear realty actions. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 25% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but would rise to a level of significance because of the amount of land impacted. <b>Positive (+)</b>.</p>
Fishing	Burbot Chinook Chum Northern Pike Pike Salmon Sheefish Whitefish	Salmon: 231.8  Non-salmon Fish: 34.8	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: Some areas limit winter subsistence use to snowmobiles only, but if these areas are accessed for any winter fishing, the access would not be impeded by these areas closed to larger winter OHVs as the river areas up to the fishing locations are open to all subsistence OHV use. <b>Negative (-)</b>.</p> <p>ROW: None of the fishing locations would be covered by an area that is open to ROWs, though some spots are located close to areas that are ROW avoidance areas. Access would not be impeded by ROWs as the Yukon River is able to be used to access these fishing spots unimpeded. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: Some areas limit winter subsistence use to snowmobiles only, but if these areas are accessed for any winter fishing, the access would not be impeded by these areas closed to larger winter OHVs as the river areas up to the fishing locations are open to all subsistence OHV use. <b>Negative (-)</b>.</p> <p>ROW: None of the fishing locations would be covered by an area that is open to ROWs, though some spots are located close to areas that are ROW avoidance areas. Access would not be impeded by ROWs as the Yukon River is able to be used to access these fishing spots unimpeded. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: Access to fishing areas will not be impacted by OHV use as the locations are mostly within a 10-mile radius from the community and directly accessible through the Yukon River and a tributary creek that is near the Anvik community. <b>Negative (-)</b>.</p> <p>ROW: None of the fishing locations would be covered by an area that is open to ROWs, though some spots are located close to areas that are ROW avoidance areas. Access would not be impeded by ROWs as the Yukon River is able to be used to access these fishing spots unimpeded. <b>Negative (-)</b>.</p>
Gathering	Berries Greens	2.2	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 31% of the use area limits summer casual use to existing trails. This same 31% is also limited to snowmobiles only for casual winter use. There would be no access restriction for subsistence uses. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 16% would be ROW avoidance areas, and 13% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: OHV: 0% of use area is restricted for summer subsistence use and 5% is restricted for winter subsistence use. 26% of the use area limits summer casual use to existing trails. There would be some access restriction for subsistence and casual uses in the 5% of the use area that limits winter OHV use to snowmobiles only. This alternative provides higher protection against habitat degradation and competing uses, as compared to Alternative A, though it provides some access restrictions to portions of the use area. <b>Negative (-)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 23% would be ROW avoidance areas, and 6% would be ROW avoidance areas for linear realty actions. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 8% of use area would be open to ROW location, 23% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

- 1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.
- 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Bethel**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Brown Bear Caribou	43.3	<p>LM: Close to 0% of use area overlaps with LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive.</b></p>	<p>LM: Close to 0% of use area overlaps with LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 4% of the use area limits summer casual use to existing trails. This same 4% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 3% would be ROW avoidance areas, and close to 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: 1% of use area overlaps with LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 4% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. LLM does make up a substantial part of the harvesting in this community (in lbs.). <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 2% would be ROW avoidance areas, and close to 0% would be ROW avoidance areas for linear realty actions. This alternative would reduce habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alt C. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 3% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Hunting (marine mammals)	Beluga Seal Walrus	3.2	No overlap	No overlap	No overlap	No overlap
Fishing	Salmon Sheefish Whitefish	Salmon: 68.8 Non-salmon Fish: 33.3	<p>LM: There is no overlap between this use area and the areas with med/high LM potential. Additionally, only one fishing location is near land that is open to LM with med/high potential. Majority of locations are over 100 river miles downstream. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between this use area and the areas with med/high LM potential. Additionally, only one fishing location is near land that is open to LM with med/high potential. Majority of locations are over 100 river miles downstream. <b>Negative (-).</b></p> <p>OHV: Majority of the fishing locations are not near BLM land. There is no restriction on access for subsistence users, and the limitations on casual summer and winter OHV use provide the highest degree of protection, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Two fishing locations on the Kuskokwim River are near areas open to ROW development. The majority of the fishing locations, however, lie near the village and would be unimpacted by ROW development. <b>Negative (-).</b></p>	<p>LM: There is no overlap between this use area and the areas with med/high LM potential. Additionally, only one fishing location is near land that is open to LM with med/high potential. Majority of locations are over 100 river miles downstream. <b>Negative (-).</b></p> <p>OHV: Majority of the fishing locations are not near BLM land. There is no restriction on access for subsistence users, and the limitations on casual summer and winter OHV use provide a higher degree of protection, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Two fishing locations on the Kuskokwim River are near areas open to ROW development. The majority of the fishing locations, however, lie near the village and would be unimpacted by ROW development. <b>Negative (-)</b></p>	<p>LM: Same as Alt C. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Two fishing locations on the Kuskokwim River are near areas open to ROW development. The majority of the fishing locations, however, lie near the village and would be unimpacted by ROW development. <b>Negative (-)</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

Available data for the Community of Bethel did not include hunting and trapping (small land mammals), hunting (birds), and gathering subsistence use areas.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>



**Impact Analysis Results—Crooked Creek**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Moose	25.5	<p>LM: 4% of use area. Closest open area is located ~25 miles from the village. Open areas are located towards the northern and eastern boundaries of the use polygon and leave most areas around waterways clear. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential, and 6% would be withdrawn. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 57% of the use area limits summer casual use to existing trails. This same 57% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 3% of use area would be open to ROW location, 54% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: 6% of the use area would be open to locatable, with high/med potential. LLM are one of the most highly harvested resources for this community, and the impacts would be greater than Alternative A. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 57% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. <b>Negative (-).</b></p> <p>ROW: 20% of use area would be open to ROW location, 37% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in avoidance areas, as compared to Alternative A, but is over the threshold for impacts for the areas open to ROWs. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 31% of use area would be open to ROW location, 26% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold for impacts for the areas open to ROWs. This could result in impacts to the availability of resources. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	SLM	6.8	<p>LM: No land within the use area would be open. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 37% of the use area limits summer casual use to existing trails. This same 37% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Close to 0% of use area would be open to ROW location, 37% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 37% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. SLM does not make up a substantial part of the harvesting in this community (in lbs.). <b>Negative (-).</b></p> <p>ROW: 3% of use area would be open to ROW location, 35% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 7% of use area would be open to ROW location, 31% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Hunting (Birds)	Ducks Geese	0.0	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential. 0lbs of birds were harvested in 2009. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential. 0lbs of birds were harvested in 2009. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 3% of the use area limits summer casual use to existing trails. This same 3% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. 0lbs of birds were hunted according to 2009 data. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 3% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. SLM does not make up a substantial part of the harvesting in this community (in lbs.). <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 3% of use area would be open to ROW location, 0% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Salmon Trout Whitefish	Salmon: 171.1 Non-salmon Fish: 29.2	<p>LM: No fishing locations would be near areas with med/high potential for locatable mineral development and the majority of the uses would be easily accessible from the village. The closest area is approximately 11 river miles from the furthest upstream fishing site. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive.</b></p>	<p>LM: There are a few portions of locatable mineral sites with high and medium potential directly upstream of fishing sports along Crooked Creek. 82% of the harvested resources in 2009 (by lbs.) was fish. While most of the areas on the shorelines are withdrawn from mineral actions, areas within the water basin are open and are situated approximately 3.5 river miles from the closest fishing location. This is a greater impact than Alternative A. <b>Positive (+).</b></p> <p>OHV: There are no restrictions to OHV use for subsistence users. Some restrictions for casual winter and summer use would provide protections to the habitat and resource, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Numerous areas around known fishing locations for the community are open to ROW development. This could cause habitat degradation and introduce new competing users to the area. Fishing is the most heavily harvested resource (by weight) for the community. <b>Positive (+).</b></p>	<p>LM: There are a few portions of locatable mineral sites with high and medium potential directly upstream of fishing sports along Crooked Creek. 82% of the harvested resources in 2009 (by lbs.) was fish. This is also greater impacts than Alternative A. <b>Positive (+).</b></p> <p>OHV: There are no restrictions to OHV use for subsistence users. Some restrictions for casual winter and summer use would provide protections to the habitat and resource, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Numerous areas around known fishing locations for the community are open to ROW development. This could cause habitat degradation and introduce new competing users to the area. Fishing is the most heavily harvested resource (by weight) for the community. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Numerous areas around known fishing locations for the community are open to ROW development. This could cause habitat degradation and introduce new competing users to the area. Fishing is the most heavily harvested resource (by weight) for the community. <b>Positive (+).</b></p>
Gathering	Berries Plants	10.9	<p>LM: 0% of the use area would be open to locatable with high/med potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 20% of the use area limits summer casual use to existing trails. This same 20% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 7% of use area would be open to ROW location, 13% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. Gathering is not one of the top harvesting activities by volume for the community. <b>Negative (-).</b></p>	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 20% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. <b>Negative (-).</b></p> <p>ROW: 9% of use area would be open to ROW location, 12% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. Gathering is not one of the top harvesting activities by volume for the community. <b>Negative (-).</b></p>	<p>LM: Same as Alternative C. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 18% of use area would be open to ROW location, 3% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. This is above the impacts threshold. <b>Positive (+).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.

2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Chuathbaluk**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	40.9	<p>LM: 0% of the use area would be open to locatable with high/med potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 1% of the use area would be open to locatable with high/med potential. This is below the significance threshold but is for a resource that is the second-most harvested resource (in lbs.) for the community (17% of harvested lbs. in 2009). This is also a larger impact than Alternative A. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 16% of the use area limits summer casual use to existing trails. This same 16% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 14% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: 4% of the use area would be open to locatable with high/med potential. This is below the significance threshold but is for a resource that is the second-most harvested resource (in lbs.) for the community (17% of harvested lbs. in 2009). This is also a larger impact than Alternative A. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 16% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. LLM does make up a substantial part of the harvesting in this community (in lbs.) and is the second most harvest resource. <b>Negative (-).</b></p> <p>ROW: 6% of use area would be open to ROW location, 10% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 10% of use area would be open to ROW location, 6% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. This is over the threshold for impacts and could result in impacts to access and availability of resources. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	SLM	8.0	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between SLM and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between SLM and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between SLM and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between SLM and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: There is no overlap between SLM and ROW decisions. <b>Negative (-).</b></p>
Hunting (Birds)	Ducks Geese	2.5	<p>LM: Less than 1% of the use area overlaps with LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Less than 1% of the use area overlaps with LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is almost no (close to 0%) overlap between bird hunting areas and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is almost no (close to 0%) overlap between bird hunting areas and ROW decisions. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: There is almost no (close to 0%) overlap between bird hunting areas and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is almost no (close to 0%) overlap between bird hunting areas and ROW decisions. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: There is almost no (close to 0%) overlap between bird hunting areas and ROW decisions. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Salmon Trout Whitefish	Salmon: 159.0 Non-salmon Fish: 20.0	<p>LM: Some med/high potential LM areas are located in a basin ~15 miles from numerous fishing locations. This has the potential to degrade habitat. Fishing is the most harvested resource (by weight). <b>Positive (+).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Some med/high potential LM areas are located in a basin ~15 miles from numerous fishing locations. This has the potential to degrade habitat. Fishing is the most harvested resource (by weight). <b>Positive (+).</b></p> <p>OHV: There are no restrictions to OHV use for subsistence users. Some restrictions for casual winter and summer use would provide protections to the habitat and resource, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Areas close to known fishing locations are mostly ROW avoidance areas. There are some areas open to ROW development, though these do not appear to block access to the fishing locations. <b>Negative (-).</b></p>	<p>LM: Some med/high potential LM areas are located in a basin ~15 miles from numerous fishing locations. This has the potential to degrade habitat. Fishing is the most harvested resource (by weight). <b>Positive (+).</b></p> <p>OHV: There are no restrictions to OHV use for subsistence users. Some restrictions for casual winter and summer use would provide protections to the habitat and resource, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Areas close to known fishing locations are mostly ROW avoidance areas. There are some areas open to ROW development, though these do not appear to block access to the fishing locations. <b>Negative (-).</b></p>	<p>LM: Some med/high potential LM areas are located in a basin ~15 miles from numerous fishing locations. This has the potential to degrade habitat. Fishing is the most harvested resource (by weight). <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Numerous areas around known fishing locations for the community are open to ROW development. This could cause habitat degradation and introduce new competing users to the area. Fishing is the most heavily harvested resource (by weight) for the community. <b>Positive (+).</b></p>
Gathering	Berries Plants	13.7	<p>LM: 2% of the use area would be open to locatable with high/med potential. This resource is not one of the most highly harvested resources (in lbs.) and the open area does not seem to block access routes. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Less than 1% of the use area would be open to locatable with high/med potential. This resource is not one of the most highly harvested resources (in lbs.) and the open area does not seem to block access routes. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 17% of the use area limits summer casual use to existing trails. This same 17% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 16% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 17% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. <b>Negative (-).</b></p> <p>ROW: 9% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 10% of use area would be open to ROW location, 7% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. This is over the threshold for impacts and could result in impacts to access and availability of resources. <b>Positive (+).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Grayling**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Moose	58.7	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 10% of the use area limits summer casual use to existing trails. This same 10% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 1% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 9% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 10% of the use area limits summer casual use to existing trails. There is no limit for OHV use for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 1% of use area would be open to ROW location, 4% would be ROW avoidance areas, and 6% would be ROW exclusion areas for linear realty. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. The realty avoidance area would cross a portion of the LLM use area that could impede access to the remaining portions of the use area, and also cause impacts to availability. LLM is one of the most highly harvested resources in the community. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 7% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. The remainder of the BLM land would allow ROWs on a case-by-case basis, which could potentially cross a portion of the LLM use area that could impede access to the remaining portions of the use area, and also cause impacts to availability. LLM is one of the most highly harvested resources in the community. <b>Positive (+)</b>.</p>
Hunting and Trapping (SLM)	SLM Beaver	15.4	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 1% of the use area limits summer casual use to existing trails. This same 1% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: Close to 0% of use area would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: Same as Alternative B. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: Close to 0% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>
Hunting (Birds)	Ducks Geese Ptarmigan Grouse	7.9	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, nearly 0% of summer casual use is restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only except for 26 acres, so nearly the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: Close to 0% of use area would be open to ROW location, close to 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, nearly 0% of summer casual use is restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only except for 26 acres, so nearly the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: Close to 0% of use area would be open to ROW location, close to 0% would be ROW avoidance for linear realty areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 26 acres would be open to ROWs at the edge of the use area. Bird harvesting is not a significant portion of the resources harvested for this community. <b>Negative (-)</b>.</p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Burbot Chinook Chum Norther Pike Salmon Sheefish Whitefish	Salmon: 121.9  Non-salmon Fish: 37.4	LM: LM areas with med/high potential are not near any fishing spots for Grayling. <b>Negative (-)</b> .  OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> .  ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: LM areas with med/high potential are not near any fishing spots for Grayling. <b>Negative (-)</b> .  OHV: Several portions of the areas near fishing spots have summer OHV restrictions for casual use that would limit OHV use to existing trails and winter casual use to snowmobiles only. This would be more protective to habitats and subsistence resources than Alternative A. Additionally, there is no access restrictions for subsistence uses. There are areas where subsistence winter use is limited to snowmobiles only to the west and north of the community, but none of these portions would impede access to the fishing locations. <b>Negative (-)</b> .  ROW: Areas close to fishing spots are ROW exclusion areas and will not impact access or availability. <b>Negative (-)</b> .	LM: LM areas with med/high potential are not near any fishing spots for Grayling. <b>Negative (-)</b> .  OHV: Several portions of the areas near fishing spots have summer OHV restrictions for casual use that would limit OHV use to existing trails. This would be more protective to habitats and subsistence resources than Alternative A. Additionally, there is no access restrictions for subsistence uses. There are areas where both casual and subsistence winter use is limited to snowmobiles only to the west and north of the community, but none of these portions would impede access to the fishing locations. <b>Negative (-)</b> .  ROW: Fishing spots north of the village would be located close to ROW avoidance areas for linear realty. While this area is small, it is close to several fishing locations for the community, and fish are the most heavily harvested subsistence resource for this community (65% of lbs. harvested in 2011). <b>Positive (+)</b> .	LM: LM areas with med/high potential are not near any fishing spots for Grayling. <b>Negative (-)</b> .  OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> .  ROW: Fishing spots north of the village would be located close to ROW open areas. While this area is small, it is close to several fishing locations for the community, and fish are the most heavily harvested subsistence resource for this community. <b>Positive (+)</b> .
Gathering	Berries Greens	4.6	LM: 0% of the use area would be open to locatable with high/med potential. <b>Negative (-)</b> .  OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> .  ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Less than 1% of the use area would be open to locatable with high/med potential. <b>Negative (-)</b> .  OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 20% of the use area limits summer casual use to existing trails. This same 20% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b> .  ROW: 4% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 12% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b> .	LM: Less than 1% of the use area would be open to locatable with high/med potential. <b>Negative (-)</b> .  OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 20% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. <b>Negative (-)</b> .  ROW: 4% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 12% would be ROW avoidance areas for linear realty. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b> .	LM: Same as Alternative C. <b>Negative (-)</b> .  OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> .  ROW: 11% of use area would be open to ROW location, 7% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold for impacts. <b>Positive (+)</b> .

**Notes:**  
LM: Locatable minerals with med/high potential  
OHV: travel decisions relating to OHV use  
ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.

2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Holy Cross**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Moose	0.0	<p>LM: Close to 0% of the use area is designated as high/med potential for LM decisions. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Close to 0% of the use area is designated as high/med potential for LM decisions. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 1% is restricted for winter subsistence use. 44% of the use area limits summer casual use to existing trails. This same 44% is also limited to snowmobiles only for casual winter use. There would be some access restriction for subsistence uses in the 1% of the use area that limits winter subsistence use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. Data for harvests is limited, but 1990 totals list 0lbs of LLM harvested. <b>Negative (-).</b></p> <p>ROW: 14% of use area would be open to ROW location, 15% would be ROW avoidance areas, and 15% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: Close to 0% of the use area is designated as high/med potential for LM decisions. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 1% is restricted for winter subsistence use. 44% of the use area limits summer casual use to existing trails. 1% is limited to snowmobiles only for casual and subsistence winter use. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. Data for harvests is limited, but 1990 totals list 0lbs of LLM harvested. <b>Negative (-).</b></p> <p>ROW: 19% of use area would be open to ROW location, 12% would be ROW avoidance areas, and 12% would be ROW exclusion areas for linear realty actions. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: Close to 0% of the use area is designated as high/med potential for LM decisions. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 30% of use area would be open to ROW location, 14% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold for impacts. <b>Positive (+).</b></p>
Hunting and Trapping (SLM) (ANVIK DATA)		68.6	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Positive (+).</b></p> <p>ROW: Same as Anvik. <b>Positive (+).</b></p>
Hunting (Birds) (ANVIK DATA)		28.5	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Positive.</b></p> <p>ROW: Same as Anvik. <b>Positive.</b></p>
Fishing (ANVIK DATA)	Salmon Burbot Whitefish Lamprey Dolly Varden Arctic Grayling Arctic Char	Salmon: 121.2 Non-salmon Fish: 80.9	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>	<p>LM: Same as Anvik. <b>Negative (-).</b></p> <p>OHV: Same as Anvik. <b>Negative (-).</b></p> <p>ROW: Same as Anvik. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Gathering (ANVIK DATA)		12.7	LM: Same as Anvik. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Same as Anvik. <b>Negative (-)</b> . OHV: Same as Anvik. <b>Negative (-)</b> . ROW: Same as Anvik. <b>Negative (-)</b> .	LM: Same as Anvik. <b>Negative (-)</b> . OHV: Same as Anvik. <b>Negative (-)</b> . ROW: Same as Anvik. <b>Negative (-)</b> .	LM: Same as Anvik. <b>Negative (-)</b> . OHV: Same as Anvik. <b>Positive (+)</b> . ROW: Same as Anvik. <b>Negative (-)</b> .

**Notes:**

LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

- 1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.
- 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>



**Impact Analysis Results—Kaltag**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM) (UNALAKLEET DATA)		No data.	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Negative (-)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Negative (-)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Positive (+)</b> .
Hunting and Trapping (SLM) (UNALAKLEET DATA)		No data.	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Negative (-)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Positive (+)</b> .
Hunting (Birds) (UNALAKLEET DATA)		No data.	LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Positive (+)</b> . ROW: Same as Unalakleet. <b>Positive (+)</b> .
Fishing (UNALAKLEET DATA)		Salmon: 665.4	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Negative (-)</b> . ROW: Same as Unalakleet. <b>Negative (-)</b> .	LM: Same as Unalakleet. <b>Negative (-)</b> . OHV: Same as Unalakleet. <b>Negative (-)</b> . ROW: Same as Unalakleet. <b>Negative (-)</b> .	LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-)</b> . OHV: OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> . ROW: No overlap in the use area and areas with ROW decisions. <b>Negative (-)</b> .

**Notes:**  
LM: Locatable minerals with med/high potential  
OHV: travel decisions relating to OHV use  
ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

Available data for the Community of Kaltag did not include gathering subsistence use areas.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.

2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Lime Village**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	260.0	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 3% is restricted for winter use. 38% of the use area limits summer casual use to existing trails. This same 38% is also limited to snowmobiles only for casual winter use. There is some access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. LLM are one of the most heavily harvested resources for the community. <b>Positive (+).</b></p> <p>ROW: 14% of use area would be open to ROW location, 23% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. LLM are one of the top resources harvested in the community. Access may be impacted by the open ROW areas as they are located throughout the LLM use area. Habitat may be degraded, and the ROWs may allow for competing uses for the subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 3% is restricted for winter use. 38% of the use area limits summer casual use to existing trails. 3% of both casual and subsistence use is limited to snowmobiles only for winter use. There is some access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. LLM are one of the most heavily harvested resources for the community. <b>Positive (+).</b></p> <p>ROW: 29% of use area would be open to ROW location, 9% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. LLM are one of the top resources harvested in the community. Access may be impacted by the open ROW areas as they are located throughout the LLM use area. Habitat may be degraded, and the ROWs may allow for competing uses for the subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 33% of use area would be open to ROW location, 4% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in the avoidance areas, as compared to Alternative A. LLM are one of the top resources harvested in the community. Access may be impacted by the open ROW areas as they are located throughout the LLM use area. Habitat may be degraded, and the ROWs may allow for competing uses for the subsistence resources. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	SLM	17.2	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 3% is restricted for winter use. 15% of the use area limits summer casual use to existing trails. This same 15% is also limited to snowmobiles only for casual winter use. There is some access restriction for subsistence uses along the upper northern boundary of the use area along the Swift River, and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. SLM is not one of the top harvested resources for the community, and access restrictions would not be significant. <b>Negative (-).</b></p> <p>ROW: 9% of use area would be open to ROW location, 6% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 3% is restricted for winter use. 15% of the use area limits summer casual use to existing trails. 3% is also limited to snowmobiles only for casual winter use. There is some access restriction for subsistence uses along the upper northern boundary of the use area along the Swift River, and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. SLM is not one of the top harvested resources for the community, and access restrictions would not be significant. <b>Negative (-).</b></p> <p>ROW: 12% of use area would be open to ROW location, 3% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative C. <b>Positive (+).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting (Birds)	Waterfowl	0.0	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 29% of the use area limits summer casual use to existing trails. This same 29% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 24% of use area would be open to ROW location, 5% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 29% of the use area limits summer casual use to existing trails. There is no limit for OHV use for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 27% of use area would be open to ROW location, 2% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 28% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>
Fishing	Salmon Whitefish Lease cisco Humpback whitefish Grayling Northern Pike	Salmon: 555.8  Non-salmon Fish: 49.9	<p>LM: There is no overlap between use area and LM areas with med/high potential. No LM areas with med/high potential are nearby or within the basin for the fishing locations. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. No LM areas with med/high potential are nearby or within the basin for the fishing locations. <b>Negative (-).</b></p> <p>OHV: There is no overlap between areas that limit winter subsistence uses and the fishing locations for the community. Surrounding BLM land has limits on casual summer and winter use, which provides protection against habitat degradation and competing uses. <b>Negative (-).</b></p> <p>ROW: Access does not appear to be impeded by areas open to ROWs. However, a large portion of the upstream basins for the fishing locations are open to ROW development. These open areas could degrade habitat and bring new users to the area that would compete for resources. Fish are the top harvested resource for the community. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. No LM areas with med/high potential are nearby or within the basin for the fishing locations. <b>Negative (-).</b></p> <p>OHV: There is no overlap between areas that limit winter subsistence uses and the fishing locations for the community. Surrounding BLM land has limits on casual summer use, which provides protection against habitat degradation and competing uses. <b>Negative (-).</b></p> <p>ROW: Access does not appear to be impeded by areas open to ROWs. However, a large portion of the upstream basins for the fishing locations are open to ROW development. These open areas could degrade habitat and bring new users to the area that would compete for resources. Fish are the top harvested resource for the community. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. No LM areas with med/high potential are nearby or within the basin for the fishing locations. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Access does not appear to be impeded by areas open to ROWs. However, a large portion of the upstream basins for the fishing locations are open to ROW development. These open areas could degrade habitat and bring new users to the area that would compete for resources. Fish are the top harvested resource for the community. <b>Positive (+).</b></p>
Gathering	Plants Wood Berries	48.2	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 4% of the use area limits summer casual use to existing trails. This same 4% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 3% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 4% of the use area limits summer casual use to existing trails. There is no limit for OHV use for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 4% of use area would be open to ROW location. This is less than the threshold for impacts and does not appear to interfere with travel routes. <b>Negative (-).</b></p>	<p>LM: There is no overlap between use area and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative C. <b>Negative (-).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

- 1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.
- 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Lower Kalskag**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	35.4	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Close to 0% of the use area has OHV decisions. <b>Negative (-).</b></p> <p>ROW: Close to 0% of the use area has ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Close to 0% of the use area has OHV decisions. <b>Negative (-).</b></p> <p>ROW: Close to 0% of the use area has ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Close to 0% of the use area has ROW decisions. <b>Negative (-).</b></p>
Hunting and Trapping (SLM)	SLM	3.3	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between SLM and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between SLM and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between SLM and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between SLM and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: There is no overlap between SLM and ROW decisions. <b>Negative (-).</b></p>
Hunting (Birds)	Ducks Geese	0.0	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Close to 0% of the use area has OHV decisions. <b>Negative (-).</b></p> <p>ROW: Close to 0% of the use area has ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Close to 0% of the use area has OHV decisions. <b>Negative (-).</b></p> <p>ROW: Close to 0% of the use area has ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Close to 0% of the use area has ROW decisions. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Salmon Whitefish	Salmon: 98.6  Non-salmon Fish: 0	<p>LM: Med/high areas open to LM mining are located approximately 6 river miles upstream on Ophir Creek of numerous fishing locations in Whitefish Lake. Fish make up approximately half of the harvested subsistence resources for the community (in lbs.) based on 2009 data. Access is not likely to be impacted, but mining could result in degradation of resources and increased competition. <b>Positive (+).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Med/high areas open to LM mining are located approximately 6 river miles upstream on Ophir Creek of numerous fishing locations in Whitefish Lake. Additionally, more open areas are located approximately 17 river miles upstream on the Kuskokwim River. Fish make up approximately half of the harvested subsistence resources for the community (in lbs.) based on 2009 data. Access is not likely to be impacted, but mining could result in degradation of resources and increased competition. The impacts would be greater than Alternative A as more areas are open. <b>Positive (+).</b></p> <p>OHV: None of the surrounding area would have limitations to winter or summer subsistence OHV use, so no impacts to access. This alternative also has the greatest limitations to casual summer and winter OHV use (limited to existing trails for summer use, and limited to only snowmobiles in winter), so it is more protective of resources than Alternative A. <b>Negative (-).</b></p> <p>ROW: Some areas open to ROW placement around the Crooked Creek area, which has a few fishing locations for the community. However, the majority of fishing locations are not near areas open to ROW placement and do not appear to block access. <b>Negative (-).</b></p>	<p>LM: Med/high areas open to LM mining are located approximately 6 river miles upstream on Ophir Creek of numerous fishing locations in Whitefish Lake. Additionally, more open areas are located approximately 17 river miles upstream on the Kuskokwim River. Fish make up approximately half of the harvested subsistence resources for the community (in lbs.) based on 2009 data. Access is not likely to be impacted, but mining could result in degradation of resources and increased competition. The impacts would be greater than Alternative A as more areas are open. <b>Positive (+).</b></p> <p>OHV: None of the surrounding area would have limitations to winter or summer subsistence OHV use, so no impacts to access. This alternative also has limitations to casual summer OHV use (limited to existing trails for summer use) but no limitations on casual winter OHV use. It is more protective of resources than Alternative A. <b>Negative (-).</b></p> <p>ROW: Some areas open to ROW placement around the Crooked Creek area, which has a few fishing locations for the community. There are more open areas upstream of Ophir Creek, which flows into Whitefish Lake, which is a heavily used area for fishing. These areas could lead to resource and habitat degradation, as well as increased competition for resources. Fish is the most heavily harvested subsistence resource for the community. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative C. <b>Positive (+).</b></p>
Gathering	Berries Plants	12.6	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between Gathering and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between Gathering and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Marshall**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	LLM	72.0	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 25% of the use area limits summer casual use to existing trails. This same 25% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 8% of use area would be open to ROW location, 15% would be ROW avoidance areas, and 2% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. LLM are one of the top resources harvested in the community. Access does not appear to be impacted by the open ROW areas, though habitat may be degraded ROWs in open and avoidance areas. <b>Positive (+)</b>.</p>	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 25% of the use area limits summer casual use to existing trails. There is no limit for OHV use for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 14% of use area would be open to ROW location, 10% would be ROW avoidance areas, and 1% would be ROW exclusion areas for linear realty. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, though the areas impacted are above the threshold. LLM is one of the most highly harvested resources in the community. <b>Positive (+)</b>.</p>	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 21% of use area would be open to ROW location, 4% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. LLM is one of the most highly harvested resources in the community. <b>Positive (+)</b>.</p>
Hunting and Trapping (SLM)	SLM	5.8	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 48% of the use area limits summer casual use to existing trails. This same 48% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 8% of use area would be open to ROW location, 15% would be ROW avoidance areas, and 2% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 48% of the use area limits summer casual use to existing trails. There is no limit for OHV use for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 9% of use area would be open to ROW location, 15% would be ROW avoidance areas, and 39% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 28% of use area would be open to ROW location, 15% would be ROW avoidance areas, and 20% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold. <b>Positive (+)</b>.</p>
Hunting (Birds)	Birds	13.7	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 1% of the use area limits summer casual use to existing trails. This same 1% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 0% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 1% of the use area limits summer casual use to existing trails. There is no limit for OHV use for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: Close to 0% of use area would be open to ROW location, close to 1% would be ROW avoidance. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 1% would be open to ROWs at the edge of the use area. Bird harvesting is not a significant portion of the resources harvested for this community. <b>Negative (-)</b>.</p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Salmon	Salmon: 393.2 Non-salmon Fish: 194.3	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: Only a small portion of BLM land lies near the fishing locations for the community. These areas limit casual summer use to existing trails and casual winter use to snowmobiles only. There would be no access restrictions for subsistence uses. <b>Negative (-)</b> . ROW: Close to 0% of the use area would be open and close to 0% would be avoidance areas. These portions of land are towards the edges of the fishing locations and would not impede access. <b>Negative (-)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: Only a small portion of BLM land lies near the fishing locations for the community. These areas limit casual summer use to existing trails. There would be no access restrictions for subsistence uses. <b>Negative (-)</b> . ROW: Close to 0% of the use area would be open to ROWs. These portions of land are towards the edges of the fishing locations and would not impede access. <b>Negative (-)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> . ROW: Same as Alternative C. <b>Negative (-)</b> .
Gathering	Vegetation	8.2	LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b> . OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 24% of the use area limits summer casual use to existing trails. This same 24% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b> . ROW: 5% of use area would be open to ROW location, 17% would be ROW avoidance areas, and 2% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b> .	LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b> . OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. 24% of the use area limits summer casual use to existing trails. 0% of the use area has limitations placed on winter casual use and therefore all winter OHVs are allowed. <b>Negative (-)</b> . ROW: 10% of use area would be open to ROW location, 13% would be ROW avoidance areas, and 1% would be ROW avoidance areas for linear realty. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold. <b>Positive (+)</b> .	LM: Close to 0% of the use area would overlap with LM decisions with med/high potential. <b>Negative (-)</b> . OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> . ROW: 18% of use area would be open to ROW location, 6% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Positive (+)</b> .

**Notes:**  
LM: Locatable minerals with med/high potential  
OHV: travel decisions relating to OHV use  
ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>



**Impact Analysis Results—McGrath**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Brown Bear Caribou Moose	115.0	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 1% of the use area has med/high potential for LM. LLM is the most harvested resource (by weight). This area of open LM is located on a tributary of the Kuskokwim. It covers a portion of the use area that leads to further upstream areas for LLM harvest, but it appears that access could still be achieved in portions of the surrounding land. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 7% of the use area limits summer casual use to existing trails. This same 7% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 5% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 7% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 5% of use area would be open to ROW location, 2% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 6% of use area would be open to ROW location, 2% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Hunting and Trapping (SLM)	SLM Beaver Wolf	11.3	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. <b>Negative (-).</b></p> <p>OHV: 1% of use area is prohibited for summer subsistence use (in the INHT) and 15% is restricted for winter subsistence use to snowmobiles only. 23% of the use area limits summer casual use to existing trails and 1% is prohibited to casual OHV use. 24% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 15% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant. <b>Positive (+).</b></p> <p>ROW: 8% of use area would be open to ROW location, 12% would be ROW avoidance areas, and 4% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. <b>Negative (-).</b></p> <p>OHV: 1% of use area is prohibited for summer subsistence use (in the INHT) and 4% is restricted for winter subsistence use to snowmobiles only. 23% of the use area limits summer casual use to existing trails and 1% is prohibited to casual OHV use. 4% of casual winter OHV use is limited to snowmobiles only. The access impacts to subsistence users does not meet the threshold, and this alternative provides greater protection to resources than Alternative A. <b>Negative (-).</b></p> <p>ROW: 14% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 15% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting (Birds)	Ducks Geese Ptarmigan Grouse	9.1	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 1% of the use area is open to LM with med/high potential. This does not meet the threshold and birds are not one of the top harvested resources. It covers a portion of the use area that leads to further upstream areas for bird harvest, but it appears that access could still be achieved in portions of the surrounding land. <b>Negative (-)</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter casual use to existing trails. 8% is limited to snowmobiles only for casual winter use. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 6% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter casual use to existing trails. There are no restrictions for casual winter use. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 6% of use area would be open to ROW location, 2% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter casual use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 7% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Fishing	Burbot Chinook Chum Pike Salmon Sheefish Whitefish	Salmon: 66.0  Non-salmon Fish: 25.6	<p>LM: Fishing locations for the community are upstream of LM decisions with med/high potential. Fish is one of the largest portions of harvested resources for the community, but access will not be impeded by LM areas, nor will habitat or resources be degraded based on the location of the LM areas. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Some open areas are positioned upstream of numerous fish harvesting areas. This has the potential to degrade habitat and increase competition for the resource. Fish are one of the most harvested resources in the community (by weight). <b>Positive (+).</b></p> <p>OHV: Access to fishing locations is not impacted by the areas closed to subsistence OHV summer use or limitations to winter OHV use for subsistence users. <b>Negative (-).</b></p> <p>ROW: Some areas that are open to ROW placement are upstream of or close to known fishing locations for the community. Because fish is one of the most harvested resources (by weight), this could cause habitat degradation and increase competition for resources. <b>Positive (+).</b></p>	<p>LM: Some open areas are positioned upstream of numerous fish harvesting areas. This has the potential to degrade habitat and increase competition for the resource. Fish are one of the most harvested resources in the community (by weight). <b>Positive (+).</b></p> <p>OHV: Access to fishing locations is not impacted by the areas closed to subsistence OHV summer use or limitations to winter OHV use for subsistence users. <b>Negative (-).</b></p> <p>ROW: Some areas that are open to ROW placement are upstream of or close to known fishing locations for the community. Because fish is one of the most harvested resources (by weight), this could cause habitat degradation and increase competition for resources. <b>Positive (+).</b></p>	<p>LM: Some open areas are positioned upstream of numerous fish harvesting areas. This has the potential to degrade habitat and increase competition for the resource. Fish are one of the most harvested resources in the community (by weight). <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter casual use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Some areas that are open to ROW placement are upstream of or close to known fishing locations for the community. Because fish is one of the most harvested resources (by weight), this could cause habitat degradation and increase competition for resources. <b>Positive (+).</b></p>
Gathering	Berries Greens	14.2	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between Gathering and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between Gathering and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter casual use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

- 1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.
- 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Nikolai**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Brown Bear Caribou Moose	247.2	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is prohibited for summer subsistence use (in the INHT) and 17% is restricted for winter subsistence use to snowmobiles only. 18% of the use area limits summer casual use to existing trails and less than 1% is prohibited to casual OHV use. 18% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 17% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant. LLM is the most highly harvest resource in the community. <b>Positive (+).</b></p> <p>ROW: Close to 0% of use area would be open to ROW location, 17% would be ROW avoidance areas, and 1% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is prohibited for summer subsistence use (in the INHT) and 6% is restricted for winter subsistence use to snowmobiles only. 6% of the use area limits summer casual use to existing trails and less than 1% is prohibited to casual OHV use. There are no restrictions to casual winter use outside of the INHT area. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 6% that limits winter subsistence OHV use to snowmobiles only. This alternative provides more protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant for LLM, which is the most highly harvest resource in the community. <b>Positive (+).</b></p> <p>ROW: 8% of use area would be open to ROW location, 10% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is restricted for summer subsistence use and less than 1% is restricted for winter subsistence use. However, summer casual use is restricted to existing trails for that same portion of land, which could lead to degradation of habitat and conflict from competing uses. Winter casual and subsistence use is restricted to snowmobiles only for this 1%, and the rest of the BLM land in the use area is open to all winter OHV uses. This is similar impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 8% of use area would be open to ROW location, 10% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Hunting and Trapping (SLM)	SLM	14.6	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 1% of use area is prohibited for summer subsistence use (in the INHT) and 7% is restricted for winter subsistence use to snowmobiles only. 10% of the use area limits summer casual use to existing trails and less than 1% is prohibited to casual OHV use. 10% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 7% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. The area where casual and subsistence OHV use is prohibited would cut off a portion of the use area, which could be a significant impact. <b>Positive (+).</b></p> <p>ROW: Close to 0% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 1% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is prohibited for summer subsistence use (in the INHT) and 9% is restricted for winter subsistence use to snowmobiles only. 30% of the use area limits summer casual use to existing trails and less than 1% is prohibited to casual OHV use. There are no restrictions to casual winter use outside of the INHT area. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 9% that limits winter subsistence OHV use to snowmobiles only. This alternative provides more protection against habitat degradation and competing uses, as compared to Alternative A. The area where casual and subsistence OHV use is prohibited would cut off a portion of the use area, which could be a significant impact. <b>Positive (+).</b></p> <p>ROW: 3% of use area would be open to ROW location, 7% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. Some SLM routes are crossed by open areas, but this resource was not one of the top harvested resources based on 2011 data. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 1% of use area is restricted for summer subsistence use and 1% is restricted for winter subsistence use. However, summer casual use is restricted to existing trails for that same portion of land, which could lead to degradation of habitat and conflict from competing uses. Winter casual and subsistence use is restricted to snowmobiles only for this 1%, and the rest of the BLM land in the use area is open to all winter OHV uses. This is similar impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative C. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting (Birds)	Ducks Geese Ptarmigan Grouse	24.4	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is prohibited for summer subsistence use (in the INHT) and 27% is restricted for winter subsistence use to snowmobiles only. 30% of the use area limits summer casual use to existing trails and less than 1% is prohibited to casual OHV use. 10% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 27% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. The area where casual and subsistence OHV use is prohibited would cut off a portion of the use area, which could be a significant impact. <b>Positive (+).</b></p> <p>ROW: 1% of use area would be open to ROW location, 28% would be ROW avoidance areas, and 2% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is prohibited for summer subsistence use (in the INHT) and 9% is restricted for winter subsistence use to snowmobiles only. 30% of the use area limits summer casual use to existing trails and less than 1% is prohibited to casual OHV use. 9% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 1% of the use area that prohibits OHV use in the summer, and the 30% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A. The area where casual and subsistence OHV use is prohibited would cut off a portion of the use area, which could be a significant impact. <b>Positive (+).</b></p> <p>ROW: 12% of use area would be open to ROW location, 18% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but the open areas are over the threshold. <b>Positive (+).</b></p>	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: Less than 1% of use area is restricted for summer subsistence use and less than 1% is restricted for winter subsistence use. However, summer casual use is restricted to existing trails for that same portion of land, which could lead to degradation of habitat and conflict from competing uses. Winter casual and subsistence use is restricted to snowmobiles only for this 1%, and the rest of the BLM land in the use area is open to all winter OHV uses. This is similar impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 13% of use area would be open to ROW location, 17% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but the open areas are over the threshold. <b>Positive (+).</b></p>
Fishing	Pike Salmon Sheefish Whitefish	Salmon: 131.0  Non-salmon Fish: 75.9	<p>LM: There is no overlap between fish and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between fish and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: A portion of the INHT that prohibits subsistence OHV use in the summer and limits OHV use in the winter would cover known fishing locations for the community. This would be an impact to access. <b>Positive (+).</b></p> <p>ROW: Areas open to ROWs exist close to fishing locations and make up a large portion of the upstream basins of the Salmon River and other tributaries to the Kuskokwim, which could contribute to degradation of habitat and increased competition for resources. Fish are one of the top harvested resource for the community. <b>Positive (+).</b></p>	<p>LM: There is no overlap between fish and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: A portion of the INHT that prohibits subsistence OHV use in the summer and limits OHV use in the winter would cover known fishing locations for the community. This would be an impact to access. <b>Positive (+).</b></p> <p>ROW: Areas open to ROWs exist close to fishing locations and make up a large portion of the upstream basins of the Salmon River and other tributaries to the Kuskokwim, which could contribute to degradation of habitat and increased competition for resources. Fish are one of the top harvested resource for the community. <b>Positive (+).</b></p>	<p>LM: There is no overlap between fish and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: A portion of the INHT that prohibits subsistence OHV use in the summer and limits OHV use in the winter would cover known fishing locations for the community. This would be an impact to access. Positive. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Areas open to ROWs exist close to fishing locations and make up a large portion of the upstream basins of the Salmon River and other tributaries to the Kuskokwim, which could contribute to degradation of habitat and increased competition for resources. Fish are one of the top harvested resource for the community. <b>Positive (+).</b></p>
Gathering	Berries Greens	9.8	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is prohibited for summer subsistence use and 56% is restricted for winter subsistence use to snowmobiles only. 58% of the use area limits summer casual use to existing trails and 58% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 56% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant for any winter gathering. <b>Positive (+).</b></p> <p>ROW: Close to 0% of use area would be open to ROW location, 55% would be ROW avoidance areas, and 3% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is prohibited for summer subsistence use and 17% is restricted for winter subsistence use to snowmobiles only. 58% of the use area limits summer casual use to existing trails and 17% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 17% that limits winter subsistence OHV use to snowmobiles only. This alternative provides greater protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant for any winter gathering. <b>Positive (+).</b></p> <p>ROW: 26% of use area would be open to ROW location, 32% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but the open areas are over the threshold of the assumptions of the analysis. <b>Positive (+).</b></p>	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 27% of use area would be open to ROW location, 31% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but the open areas are over the threshold of the assumptions of the analysis. <b>Positive (+).</b></p>

**Notes:**

LM: Locatable minerals with med/high potential

OHV: travel decisions relating to OHV use

ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.

2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Nulato**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)		85.5	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for subsistence winter use to snowmobiles. 3% of the use area limits summer casual use to existing trails. This same 3% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 1% would be ROW avoidance areas, and close to 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 3% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 3% of use area would be open to ROW location, close to 0% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 3% of use area would be open to ROW location, close to 0% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Hunting and Trapping (SLM)		9.3	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 1% of the use area limits summer casual use to existing trails. This same 1% is also limited to snowmobiles only for casual winter use. Therefore, there is limited access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for winter use. 1% of the use area limits summer casual use to existing trails. Close to 0% of the use area restricts casual winter OHV use to snowmobiles only. Therefore, there is limited access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Same as Alternative B. <b>Negative (-).</b></p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative B. <b>Negative (-).</b></p>
Hunting (Birds)		2.4	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between bird hunting and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between bird hunting and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: There is no overlap between bird hunting and OHV decisions. <b>Negative (-).</b></p> <p>ROW: There is no overlap between bird hunting and ROW decisions. <b>Negative (-).</b></p>	<p>LM: There is no overlap between bird hunting and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: There is no overlap between bird hunting and ROW decisions. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing		Salmon: 108.4  Non-salmon Fish: 25.7	LM: There is no overlap between fishing and LM areas with med/high potential. No LM areas in upstream portions of the basin. <b>Negative (-)</b> .  OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> .  ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: There is no overlap between fishing and LM areas with med/high potential. No LM areas in upstream portions of the basin. <b>Negative (-)</b> .  OHV: There is no overlap between fishing and OHV decisions. <b>Negative (-)</b> .  ROW: There is no overlap between fishing and ROW decisions. <b>Negative (-)</b> .	LM: There is no overlap between fishing and LM areas with med/high potential. No LM areas in upstream portions of the basin. <b>Negative (-)</b> .  OHV: There is no overlap between fishing and OHV decisions. <b>Negative (-)</b> .  ROW: There is no overlap between fishing and ROW decisions. <b>Negative (-)</b> .	LM: There is no overlap between fishing and LM areas with med/high potential. No LM areas in upstream portions of the basin. <b>Negative (-)</b> .  OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> .  ROW: <b>Negative (-)</b> .
Gathering		7.3	LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-)</b> .  OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> .  ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-)</b> .  OHV: There is no overlap between Gathering and OHV decisions. <b>Negative (-)</b> .  ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-)</b> .	LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-)</b> .  OHV: There is no overlap between Gathering and OHV decisions. <b>Negative (-)</b> .  ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-)</b> .	LM: There is no overlap between Gathering and LM areas with med/high potential. <b>Negative (-)</b> .  OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> .  ROW: There is no overlap between Gathering and ROW decisions. <b>Negative (-)</b> .

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

- 1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.
- 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>



**Impact Analysis Results—Russian Mission**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	107.5	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 10% of the use area limits summer casual use to existing trails. This same 10% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: Close to 0% of use area would be open to ROW location, 7% would be ROW avoidance areas, and 3% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 10% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, 4% would be ROW avoidance areas, and 2% would be ROW exclusion areas for linear realty. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: There is no overlap between LLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 7% of use area would be open to ROW location, 2% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A and does not surpass the threshold. Open areas do not appear to block travel routes. <b>Negative (-)</b>.</p>
Hunting and Trapping (SLM)	SLM	4.4	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. Close to 0% of the use area limits summer casual use to existing trails. This nearly 0% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. SLM was not one of the top harvested resources according to data from 2011 (by weight). <b>Negative (-)</b>.</p> <p>ROW: 59 acres (close to 0%) would be ROW avoidance areas. <b>Negative (-)</b>.</p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. Close to 0% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and more protection against habitat degradation and competing uses for the 3% within the use area, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 59 acres (close to 0%) would be ROW avoidance areas. <b>Negative (-)</b>.</p>	<p>LM: There is no overlap between SLM and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 59 acres (close to 0%) would be ROW avoidance areas. <b>Negative (-)</b>.</p>
Hunting (Birds)	Ducks Geese Ptarmigan Grouse	9.5	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b>.</p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b>.</p>	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 3% of the use area limits summer casual use to existing trails. This 3% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. Birds were not one of the top harvested resources according to data from 2011 (by weight). <b>Negative (-)</b>.</p> <p>ROW: 3% of use area would be a ROW avoidance area. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 3% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and more protection against habitat degradation and competing uses for the 59 acres within the use area, as compared to Alternative A. <b>Negative (-)</b>.</p> <p>ROW: 2% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>	<p>LM: There is no overlap between birds and LM areas with med/high potential. <b>Negative (-)</b>.</p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b>.</p> <p>ROW: 3% of use area would be open to ROW location, close to 0% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b>.</p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Burbot Pike Salmon Sheefish Whitefish	Salmon: 110.4  Non-salmon Fish: 89.4	<p>LM: There are no open areas with med/high potential in the vicinity of the fishing locations for the community. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: One small area of open land with med/high potential in the vicinity of the fishing locations but does not appear to be upstream of the locations or in spot that would impede access. <b>Negative (-).</b></p> <p>OHV: No limit to subsistence access for areas surrounding fishing locations. Summer casual OHV use is limited to existing trails, and winter casual use is limited to snowmobiles only. <b>Negative (-).</b></p> <p>ROW: There are a few spots of land open to ROW placement that are close to the village, but they do not appear to be in a basin that is upstream of the fishing locations. These areas also do not appear to block access to these locations. <b>Negative (-).</b></p>	<p>LM: Two small area of open land with med/high potential in the vicinity of the fishing locations but does not appear to be upstream of the locations or in spot that would impede access. <b>Negative (-).</b></p> <p>OHV: No limit to subsistence access for areas surrounding fishing locations. Summer casual OHV use is limited to existing trails. <b>Negative (-).</b></p> <p>ROW: More land that is open to ROWs is closer to fishing locations for the community. These areas could bring in competing uses for fish resources and also degrade the surrounding habitat. Fish is the most highly harvest resource (by weight) for the community, based on 2011 data. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative C. <b>Positive (+).</b></p>
Gathering	Berries Greens	4.7	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 24% of the use area limits summer casual use to existing trails. This 24% is also limited to snowmobiles only for casual winter use. Therefore, there is no access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. Gathering was not one of the top harvested resources according to data from 2011 (by weight). <b>Negative (-).</b></p> <p>ROW: 0% of use area would be open to ROW location, 22% would be ROW avoidance areas, and 10% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 24% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 11% of use area would be open to ROW location, 12% would be ROW avoidance areas, and 1% would be ROW avoidance areas for linear realty. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: There is no overlap between gathering and LM areas with med/high potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 22% of use area would be open to ROW location, 2% would be ROW avoidance areas. This alternative would limit habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. <b>Positive (+).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.

2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Shageluk**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Moose	126.1	<p>LM: No overlap in use areas. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use areas. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 31% of the use area limits summer casual use to existing trails. This same 31% is also limited to snowmobiles only for casual winter use. Therefore, there is limited access restriction for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 4% of use area would be open to ROW location, 7% would be ROW avoidance areas, and 20% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use areas. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use. 31% of the use area limits summer casual use to existing trails. Close to 0% is also limited to snowmobiles only for casual winter use. Therefore, there is limited access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 4% of use area would be open to ROW location, 7% would be ROW avoidance areas, and 20% would be ROW exclusion areas for linear realty. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but may have significant impacts due to the amount of LLM that is harvested in the community. The avoidance and open areas could affect access and availability. LLM is the second highest subsistence resource harvested (by weight). <b>Positive (+).</b></p>	<p>LM: No overlap in use areas. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 12% of use area would be open to ROW location, 18% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but may have significant impacts due to the amount of LLM that is harvested in the community. The avoidance and open areas could affect access and availability. LLM is the second highest subsistence resource harvested (by weight). <b>Positive (+).</b></p>
Hunting and Trapping (SLM) (GRAYLING DATA)		8.2	<p>LM: Same as Grayling. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-).</b></p> <p>OHV: Same as Grayling. <b>Negative (-).</b></p> <p>ROW: Same as Grayling. <b>Negative (-).</b></p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-).</b></p> <p>OHV: Same as Grayling. <b>Positive (+).</b></p> <p>ROW: Same as Grayling. <b>Negative (-).</b></p>	<p>LM: Same as Grayling. <b>Negative (-).</b></p> <p>OHV: Same as Grayling. <b>Positive (+).</b></p> <p>ROW: Same as Grayling. <b>Negative (-).</b></p>
Hunting (Birds) (GRAYLING DATA)		9.1	<p>LM: Same as Grayling. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-).</b></p> <p>OHV: Same as Grayling. <b>Positive (+).</b></p> <p>ROW: Same as Grayling. <b>Negative (-).</b></p>	<p>LM: No overlap in open areas and use areas. <b>Negative (-).</b></p> <p>OHV: Same as Grayling. <b>Positive (+).</b></p> <p>ROW: Same as Grayling. <b>Negative (-).</b></p>	<p>LM: Same as Grayling. <b>Negative (-).</b></p> <p>OHV: Same as Grayling. <b>Positive (+).</b></p> <p>ROW: Same as Grayling. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Fish	Salmon: 157.9 Non-salmon Fish: 141.4	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: There are no areas close to fishing use areas that limit subsistence access in the summer or winter. Also, several portions of the surrounding land have summer and winter limitations for casual use. <b>Negative (-)</b> . ROW: 3% of use area would be open to ROW location, 8% would be ROW avoidance areas, and 10% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: There are no areas close to fishing use areas that limit subsistence access in the summer or winter. Also, several portions of the surrounding land have summer (but no winter) limitations for casual use. <b>Negative (-)</b> . ROW: 8% of use area would be open to ROW location, 7% would be ROW avoidance areas, and 7% would be ROW exclusion areas for linear realty. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but may have significant impacts due to the amount of fish that is harvested in the community. The avoidance and open areas could affect access and availability. Fish is the number one subsistence resource harvested (by weight). <b>Positive (+)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> . ROW: 12% of use area would be open to ROW location, 9% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but may have significant impacts due to the amount of fish that is harvested in the community. The avoidance and open areas could affect access and availability. Fish is the number one subsistence resource harvested (by weight). <b>Positive (+)</b> .
Gathering (GRAYLING DATA)		2.6	LM: Same as Grayling. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: Same as Grayling. <b>Negative (-)</b> . ROW: Same as Grayling. <b>Negative (-)</b> .	LM: No overlap in open areas and use areas. <b>Negative (-)</b> . OHV: Same as Grayling. <b>Negative (-)</b> . ROW: Same as Grayling. <b>Negative (-)</b> .	LM: Same as Grayling. <b>Negative (-)</b> . OHV: Same as Grayling. <b>Positive (+)</b> . ROW: Same as Grayling. <b>Negative (-)</b> .

**Notes:**  
LM: Locatable minerals with med/high potential  
OHV: travel decisions relating to OHV use  
ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Sleetmute**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	43.9	<p>LM: Close to 0% of the use area is withdrawn from LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Nearly 0% of the use area is open to LM and have med/high potential. There is a potential chokepoint that could occur along the Kuskokwim River near the confluence of Kolmakof River, though travel could still take place on the Kuskokwim River itself. Additionally, there is a route along a valley area that may serve as a travel route. <b>Negative (-).</b></p> <p>OHV: 0% of use area is prohibited for summer subsistence use and 6% is restricted for winter subsistence use to snowmobiles only. 8% of the use area limits summer casual use to existing trails. 8% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 6% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant. LLM is the most highly harvested resource in the community. <b>Positive (+).</b></p> <p>ROW: 0% of use area would be open to ROW location, 8% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is prohibited for summer subsistence use and 6% is restricted for winter subsistence use to snowmobiles only. 8% of the use area limits summer casual use to existing trails. 6% is limited to snowmobiles only for casual winter use. There would be access restriction for subsistence uses in the 6% that limits winter subsistence OHV use to snowmobiles only. This alternative provides the greatest protection against habitat degradation and competing uses, as compared to Alternative A, but the access impacts would be significant. LLM is the most highly harvested resource in the community. <b>Positive (+).</b></p> <p>ROW: 1% of use area would be open to ROW location, 7% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 5% of use area would be open to ROW location, 4% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Hunting and Trapping (SLM)	SLM	15.1	<p>LM: 1% of the use area is withdrawn from LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 1% of the use area is open to LM and have med/high potential. There is a potential chokepoint that could occur along the Kuskokwim River near the confluence of Kolmakof River, though travel could still take place on the Kuskokwim River itself. Additionally, there is a route along a valley area that may serve as a travel route. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for subsistence winter use to snowmobiles. 2% of the use area limits summer casual use to existing trails. This same 2% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for winter subsistence use. 2% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 2% of use area would be open to ROW location, 0% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting (Birds)	Ducks Geese	5.4	<p>LM: 2% of the use area is withdrawn from LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 2% of the use area is open to LM and have med/high potential. There is a potential chokepoint that could occur along the Kuskokwim River near the confluence of Kolmakof River, though travel could still take place on the Kuskokwim River itself. Additionally, there is a route along a valley area that may serve as a travel route. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for subsistence winter use to snowmobiles. 3% of the use area limits summer casual use to existing trails. This same 3% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use. 3% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 2% of use area would be open to ROW location, 0% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>
Fishing	Salmon Trout Whitefish	Salmon: 277.1 Non-salmon Fish: 53.9	<p>LM: Some BLM land near known fishing locations for the community is withdrawn from LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Some BLM land close to known fishing locations for the community are open for LM and have high/med potential. This could cause access impacts and degradation of habitat, in addition to potentially bringing in new users to the area that could increase competition for resources. Fish make up the largest portion of harvested resources for the community. <b>Positive (+).</b></p> <p>OHV: Some fishing locations on the Stony River are near areas where subsistence OHV use is limited to snowmobiles in the winter, but the access to these spots would not be impacted. Additionally, limitations places on casual summer and winter OHV use provide some protection to the habitat and decrease conflict between competing users. This impact is less than Alternative A. <b>Negative (-).</b></p> <p>ROW: Land that is open to ROWs is close to fishing locations for the community. These areas could bring in competing uses for fish resources and also degrade the surrounding habitat. Fish is the most highly harvest resource (by weight) for the community, based on 2009 data. <b>Positive (+).</b></p>	<p>LM: Same as Alternative B. <b>Positive (+).</b></p> <p>OHV: Some fishing locations on the Stony River are near areas where subsistence OHV use is limited to snowmobiles in the winter, but the access to these spots would not be impacted. Additionally, limitations places on casual summer and winter OHV use provide some protection to the habitat and decrease conflict between competing users. This impact is less than Alternative A. <b>Negative (-).</b></p> <p>ROW: Land that is open to ROWs is close to fishing locations for the community. These areas could bring in competing uses for fish resources and also degrade the surrounding habitat. Fish is the most highly harvest resource (by weight) for the community, based on 2009 data. <b>Positive (+).</b></p>	<p>LM: Same as Alternative B. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Land that is open to ROWs is close to fishing locations for the community. These areas could bring in competing uses for fish resources and also degrade the surrounding habitat. Fish is the most highly harvest resource (by weight) for the community, based on 2009 data. <b>Positive (+).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Gathering	Berries Plants	10.5	<p>LM: 2% of the use area is withdrawn from LM with med/high potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: 2% of the use area is open to LM and have med/high potential. There is a potential chokepoint that could occur along the Kuskokwim River near the confluence of Kolmakof River, though travel could still take place on the Kuskokwim River itself. Additionally, there is a route along a valley area that may serve as a travel route. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for subsistence winter use to snowmobiles. 4% of the use area limits summer casual use to existing trails. This same 4% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 3% of use area would be open to ROW location, 1% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use. 4% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Same as Alternative B. <b>Negative (-).</b></p>	<p>LM: Same as Alternative B. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 4% of use area would be open to ROW location. This alternative would have the same impacts as compared to Alternative A. <b>Positive (+).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Stony River**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	20.3	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 7% is restricted for subsistence winter use to snowmobiles. 37% of the use area limits summer casual use to existing trails. This same 37% is also limited to snowmobiles only for casual winter use. This alternative offers the greatest protection against habitat degradation and competing uses, as compared to Alternative A, but may result in access impacts for subsistence users. LLM is one of the most heavily harvested resources for this community. <b>Positive (+).</b></p> <p>ROW: 5% of use area would be open to ROW location, 32% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 7% is restricted for subsistence winter use to snowmobiles. 37% of the use area limits summer casual use to existing trails. 7% is also limited to snowmobiles only for casual winter use. This alternative offers greater protection against habitat degradation and competing uses, as compared to Alternative A, but may result in access impacts for subsistence users. LLM is one of the most heavily harvested resources for this community. <b>Positive (+).</b></p> <p>ROW: 12% of use area would be open to ROW location, 25% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. The area of land open to new ROWs is above the threshold for impacts. Additionally, LLM is one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 27% of use area would be open to ROW location, 11% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. The area of land open to new ROWs is above the threshold for impacts. Additionally, LLM is one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	SLM	38.7	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 74% of the use area limits summer casual use to existing trails. This same 74% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Close to 0% of use area would be open to ROW location, 74% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use. 74% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 48% of use area would be open to ROW location, 26% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. The area of land open to new ROWs is above the threshold for impacts. Additionally, SLM is one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 60% of use area would be open to ROW location, 15% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. The area of land open to new ROWs is above the threshold for impacts. Additionally, SLM is one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>
Hunting (Birds)	Ducks Geese	0.0	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 12% of the use area limits summer casual use to existing trails. This same 12% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 2% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use. 12% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 10% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 4% of use area would be open to ROW location, 8% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>



Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Salmon Trout Whitefish	Salmon: 366.0 Non-salmon Fish: 92.4	<p>LM: The majority of the fishing locations are within a few river miles of the village and located on the Kuskokwim River. The closest area that is upstream and open to LM with med/high potential is approximately 40 river miles upstream on the Cheeneetuk River. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: The majority of the fishing locations are within a few river miles of the village and located on the Kuskokwim River. The closest area is open to LM with med/high potential is downstream of the fishing locations (around the Red Devil mine). The closest area that is upstream and open to LM with med/high potential is approximately 50 river miles upstream of the Cheeneetuk River, and within the Cheeneetuk basin (not on the river itself). <b>Negative (-).</b></p> <p>OHV: None of the land surrounding the fishing locations is restricted for subsistence summer or winter use, though there are limits placed on casual summer and winter uses. There is a portion of land located upstream in the basins of the Cheeneetuk, Gagaryah, and Swift Rivers that limits subsistence winter use to snowmobiles only, but there are no mapped fishing locations for this community in that portion of the planning area. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: There are some portions of land near the village fishing locations that would be open to ROWs, though they do not appear to block access as the surrounding land is either undesignated or is a ROW avoidance area. Additionally, the majority of the fishing locations are located near the village and would not have access impeded by new ROWs. Habitat degradation and competition for resources would be minimal as most of the BLM land that is nearest to the fishing locations would be ROW avoidance areas. <b>Negative (-).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: None of the land surrounding the fishing locations is restricted for subsistence summer or winter use, though there are limits placed on casual summer use. There is a portion of land located upstream in the basins of the Cheeneetuk, Gagaryah, and Swift Rivers that limits subsistence winter use to snowmobiles only, but there are no mapped fishing locations for this community in that portion of the planning area. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Large portions of the areas upstream of the fishing locations for the community would be open to new ROWs. Though this would not impede access to these locations, the new ROWs could degrade the habitat and increase competition to the resource. Fish was the most harvested resource for the community. <b>Positive (+).</b></p>	<p>LM: Same as Alternative A. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Large portions of the areas upstream of the fishing locations for the community would be open to new ROWs. Though this would not impede access to these locations, the new ROWs could degrade the habitat and increase competition to the resource. Fish was the most harvested resource for the community. <b>Positive (+).</b></p>
Gathering	Berries Plants	9.8	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 9% of the use area limits summer casual use to existing trails. This same 9% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 1% of use area would be open to ROW location, 8% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use. 12% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 8% of use area would be open to ROW location, 1% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 9% of use area would be open to ROW location. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Unalakleet**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Moose Caribou	110.66	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 1% of use area is restricted to existing trails for summer subsistence use and 23% is restricted for subsistence winter use to snowmobiles. Additionally, summer subsistence OHV use is prohibited in 4% of the use area. For casual use, 31% is limited to existing trails in summer and 35% is limited to snowmobiles only for winter use. Summer casual OHV access is prohibited in 5% of the use area. Therefore, there are access restrictions for subsistence uses, though this use area also has the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Positive (+).</b></p> <p>ROW: 4% of use area would be open to ROW location, 25% would be ROW avoidance areas, and 7% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted to existing trails for summer subsistence use and 21% is restricted for subsistence winter use to snowmobiles. Additionally, summer subsistence OHV use is prohibited in 5% of the use area. For casual use, 31% is limited to existing trails in summer and 21% is limited to snowmobiles only for winter use. Therefore, there are access restrictions for subsistence uses, though this use area also has the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Positive (+).</b></p> <p>ROW: 9% of use area would be open to ROW location, 26% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 4% of use area is restricted for summer subsistence use and 4% is restricted for winter subsistence use. 4% of summer casual use is restricted to existing trails and 4% of winter casual use is restricted to snowmobiles only. This is the same impact as Alternative A. Therefore, there are access restrictions for subsistence uses, though this use area also has the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Positive (+).</b></p> <p>ROW: 14% of use area would be open to ROW location, 20% would be ROW avoidance areas, and 2% would allow ROWs on a case-by-case basis. This alternative has areas open to ROWs that exceed the threshold for impacts. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	No data	1.11	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted to existing trails for summer subsistence use and 44% is restricted for subsistence winter use to snowmobiles. Additionally, summer subsistence OHV use is prohibited in 1% of the use area. For casual use, 62% is limited to existing trails in summer and 62% is limited to snowmobiles only for winter use. Summer casual OHV access is prohibited in 1% of the use area. Therefore, there are access restrictions for subsistence uses, though this use area also has the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Positive (+).</b></p> <p>ROW: 2% of use area would be open to ROW location, 44% would be ROW avoidance areas, and 16% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted to existing trails for summer subsistence use and 44% is restricted for subsistence winter use to snowmobiles. Additionally, summer subsistence OHV use is prohibited in 1% of the use area. For casual use, 62% is limited to existing trails in summer and 44% is limited to snowmobiles only for winter use. Therefore, there are access restrictions for subsistence uses, though this use area also has the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Positive (+).</b></p> <p>ROW: 12% of use area would be open to ROW location, 50% would be ROW avoidance areas. This alternative would decrease habitat fragmentation and degradation in these areas, as compared to Alternative A, but is over the threshold for impacts. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 1% of use area is restricted for summer subsistence use and 1% is restricted for winter subsistence use. 1% of summer casual use is restricted to existing trails and 1% of winter casual use is restricted to snowmobiles only. This is the same impact as Alternative A. Therefore, there are access restrictions for subsistence uses, though this use area also has the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Positive (+).</b></p> <p>ROW: 22% of use area would be open to ROW location, 40% would be ROW avoidance areas, and 1% would allow ROWs on a case-by-case basis. This alternative has areas open to ROWs that exceed the threshold for impacts. <b>Positive (+).</b></p>
Fishing	No data	Salmon: 264.07 Non-salmon Fish: 108.48	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: Subsistence OHV restrictions and prohibitions would limit access for subsistence uses in the community. <b>Positive (+).</b></p> <p>ROW: Areas open to ROW development lie close to known fishing locations near Norton Sound and the Unalakleet and North Rivers. This could cause habitat degradation and introduce competing users into the area. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: Subsistence OHV restrictions and prohibitions would limit access for subsistence uses in the community. <b>Positive (+).</b></p> <p>ROW: Areas open to ROW development lie close to known fishing locations near Norton Sound and the Unalakleet and North Rivers. This could cause habitat degradation and introduce competing users into the area. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Areas open to ROW development lie close to known fishing locations near Norton Sound and the Unalakleet and North Rivers. This could cause habitat degradation and introduce competing users into the area. <b>Positive (+).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Gathering	No data	6.38	LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-)</b> . OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+)</b> . ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+)</b> .	LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-)</b> . OHV: No overlap in the use area and areas with OHV decisions. <b>Negative (-)</b> . ROW: No overlap in the use area and areas with ROW decisions. <b>Negative (-)</b> .	LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-)</b> . OHV: No overlap in the use area and areas with OHV decisions. <b>Negative (-)</b> . ROW: No overlap in the use area and areas with ROW decisions. <b>Negative (-)</b> .	LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-)</b> . OHV: OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+)</b> . ROW: No overlap in the use area and areas with ROW decisions. <b>Negative (-)</b> .

**Notes:**

LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

Available data for the Community of Unalakleet did not include hunting (birds) subsistence use areas.

- 1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.
- 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>

**Impact Analysis Results—Upper Kalskag**

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Hunting and Trapping (LLM)	Black Bear Caribou Moose	46.4	<p>LM: Close to 0% of the use area overlaps with areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Close to 0% of the use area overlaps with areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 11% of the use area limits summer casual use to existing trails. This same 11% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 2% of use area would be open to ROW location, 9% would be ROW avoidance areas, and 1% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Close to 0% of the use area overlaps with areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 11% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 7% of use area would be open to ROW location, 4% would be ROW avoidance areas, and close to 0% would be ROW avoidance areas for linear realty. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A. <b>Negative (-).</b></p>	<p>LM: Close to 0% of the use area overlaps with areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 11% of use area would be open to ROW location, close to 0% would be ROW avoidance areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. Additionally, LLM is one of the most heavily harvested resources in the community. <b>Positive (+).</b></p>
Hunting and Trapping (SLM)	SLM	7.9	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No overlap in use area and OHV decisions. <b>Negative (-).</b></p> <p>ROW: No overlap in use area and areas with ROW decisions. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No overlap in use area and OHV decisions. <b>Negative (-).</b></p> <p>ROW: No overlap in use area and areas with ROW decisions. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: No overlap in use area and areas with ROW decisions. <b>Negative (-).</b></p>
Hunting (Birds)	Ducks Geese	0.0	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. Close to 0% of the use area limits summer casual use to existing trails. This same close to 0% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Close to 0% of the use area overlaps with ROW decisions. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. Close to 0% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: Close to 0% of the use area overlaps with ROW decisions. <b>Negative (-).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Close to 0% of the use area overlaps with ROW decisions. <b>Negative (-).</b></p>

Aggregated Subsistence Use Category	Species Included in Aggregated Category <sup>1</sup>	Annual Pounds of Resource Harvested <sup>2</sup>	Alternative A Significant Impact? [POSITIVE FINDING?]	Alternative B Significant Impact? [POSITIVE FINDING?]	Alternative C Significant Impact? [POSITIVE FINDING?]	Alternative D Significant Impact? [POSITIVE FINDING?]
Fishing	Salmon Trout Whitefish	Salmon: 198.8 Non-salmon Fish: 48.3	<p>LM: Med/high areas open to LM mining are located approximately 6 river miles upstream on Ophir Creek of numerous fishing locations in Whitefish Lake. Fish make up approximately 71% of the harvested subsistence resources for the community (in lbs.) based on 2009 data. Access is not likely to be impacted, but mining could result in degradation of resources and increased competition. <b>Positive (+).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: Med/high areas open to LM mining are located approximately 6 river miles upstream on Ophir Creek of numerous fishing locations in Whitefish Lake. Additionally, more open areas are located upstream on the Kuskokwim River. Fish make up approximately 71% of the harvested subsistence resources for the community (in lbs.) based on 2009 data. Access is not likely to be impacted, but mining could result in degradation of resources and increased competition. The impacts would be greater than Alternative A as more areas are open. <b>Positive (+).</b></p> <p>OHV: None of the surrounding area would have limitations to winter or summer subsistence OHV use, so no impacts to access. This alternative also has the greatest limitations to casual summer and winter OHV use (limited to existing trails for summer use, and limited to only snowmobiles in winter), so it is more protective of resources than Alternative A. <b>Negative (-).</b></p> <p>ROW: Some areas open to ROW placement around the Crooked Creek area, which has a few fishing locations for the community. However, the majority of fishing locations are not near areas open to ROW placement and do not appear to block access. <b>Negative (-).</b></p>	<p>LM: Med/high areas open to LM mining are located approximately 6 river miles upstream on Ophir Creek of numerous fishing locations in Whitefish Lake. Additionally, more open areas are located upstream on the Kuskokwim River. Fish make up approximately 71% of the harvested subsistence resources for the community (in lbs.) based on 2009 data. Access is not likely to be impacted, but mining could result in degradation of resources and increased competition. The impacts would be greater than Alternative A as more areas are open. <b>Positive (+).</b></p> <p>OHV: None of the surrounding area would have limitations to winter or summer subsistence OHV use, so no impacts to access. This alternative also has limitations to casual summer OHV use (limited to existing trails for summer use) but no limitations on casual winter OHV use. It is more protective of resources than Alternative A. <b>Negative (-).</b></p> <p>ROW: Some areas open to ROW placement around the Crooked Creek area, which has a few fishing locations for the community. There are more open areas upstream of Ophir Creek, which flows into Whitefish Lake, which is a heavily used area for fishing. Open areas near Kuskokwim River are near fishing locations upstream of the community. These areas could lead to resource and habitat degradation, as well as increased competition for resources. Fish is the most heavily harvested subsistence resource for the community. <b>Positive (+).</b></p>	<p>LM: Same as Alternative C. <b>Positive (+).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: Same as Alternative C. <b>Positive (+).</b></p>
Gathering	Berries Plants	36.2	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: No access impacts to resources. Potential impact to resources from competing uses and degradation of habitat because OHV use is unrestricted. <b>Positive (+).</b></p> <p>ROW: No ROW exclusion areas, and all ROWs allowed on a case-by-case basis. This has the potential to fragment habitats and degrade subsistence resources. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and close to 0% is restricted for subsistence winter use to snowmobiles. 22% of the use area limits summer casual use to existing trails. This same 22% is also limited to snowmobiles only for casual winter use. Therefore, there are no access restrictions for subsistence uses and the greatest protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 20% of use area would be open to ROW location, 2% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. Gathering resources is also one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter use. 22% of the use area limits summer casual use to existing trails. There is no OHV limitation for casual winter use. Therefore, there is no access restriction for subsistence uses and the greater protection against habitat degradation and competing uses, as compared to Alternative A. <b>Negative (-).</b></p> <p>ROW: 20% of use area would be open to ROW location, 2% would be ROW avoidance areas, and 0% would be ROW exclusion areas. This alternative would minimize habitat fragmentation and degradation in these areas, as compared to Alternative A, but is above the threshold for impacts. Gathering resources is also one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>	<p>LM: No overlap in use area and areas with med/high LM potential. <b>Negative (-).</b></p> <p>OHV: 0% of use area is restricted for summer subsistence use and 0% is restricted for winter subsistence use. However, summer casual use is not restricted to existing trails, which could lead to degradation of habitat and conflict from competing uses. Winter casual use is not restricted to snowmobiles only, so the entire use area is open to all winter OHV uses. This is the same impact as Alternative A. <b>Positive (+).</b></p> <p>ROW: 22% of use area would be open to ROW location. This alternative could impact gathering resources by degrading habitat and allowing for new users to compete for resources. It is above the threshold for impacts. Gathering resources is also one of the most heavily harvested resources for the community. <b>Positive (+).</b></p>

**Notes:**  
 LM: Locatable minerals with med/high potential  
 OHV: travel decisions relating to OHV use  
 ROW: Right-of-way decisions

Impact analysis to determine whether there is a positive or negative finding is based on an assessment of magnitude, duration, extent, likelihood, and intensity.

1) This column shows which species the BSWI EIS Team has GIS data for at the time of the DEIS release. Communities may have differing sets of data available or may be missing data completely for an aggregated category. In most instances where data sets for "Hunting and Trapping (SLM)" were available, the subsistence use area did not specify which species are included in the use area.  
 2) Data is from the ADF&G Community Subsistence Information System (CSIS), available at <http://www.adfg.alaska.gov/sb/CSIS/>