

Josephine County Multi-Jurisdictional Natural Hazard Mitigation Plan

Josephine County,
Cave Junction, and
Grants Pass



Photo Credit: Gary Halvorson, Oregon State Archives

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Josephine County
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University of Oregon
Institute for Policy Research and Engagement
Oregon Partnership for Disaster Resilience

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Special thanks to Emily Ring, Josephine County Emergency Manager for her vision, passion, and positive outlook throughout the plan update process.

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About the Institute for Policy Research and Engagement

The Institute for Policy Research and Engagement (IPRE), a research center affiliated with the School of Planning, Public Policy and Management at the University of Oregon, is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of the IPRE is to link the skills, expertise and innovation of higher education with the transportation, economic development and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

About the Oregon Partnership for Disaster Resilience

The Oregon Partnership for Disaster Resilience (OPDR) is a coalition of public, private and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by the Institute for Policy Research and Engagement at the University of Oregon, the OPDR employs a service-learning model to increase community capacity and enhance disaster safety and resilience statewide.

NHMP Template Disclaimer

This NHMP is based in part on a plan template developed by the Oregon Partnership for Disaster Resilience. The template is structured to address the requirements contained in 44 CFR 201.6; where language is applicable to communities throughout Oregon, OPDR encourages the use of standardized language. As part of this regional planning initiative, OPDR provided copies of the plan templates to communities for use in developing or updating their hazards mitigation plans. OPDR hereby authorizes the use of all content and language provided to Josephine County in the plan template.

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PLAN SUMMARY

Josephine County updated this Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP) to prepare for the long-term effects resulting from hazards. It is impossible to predict exactly when these hazards will occur, or the extent to which they will affect the community. However, with careful planning and collaboration among public agencies, private sector organizations and citizens within the community, it is possible to create a resilient community that will benefit from long-term recovery planning efforts.

FEMA defines mitigation as “. . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk.” Said another way, hazard mitigation is a method of permanently reducing or alleviating the losses of life, property and injuries resulting from hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances, projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as non-English speaking residents or the elderly. Hazard mitigation is the responsibility of the “Whole Community.” FEMA defines Whole Community as, “private and nonprofit sectors, including businesses, faith-based and disability organizations and the public, in conjunction with the participation of local, tribal, state, territorial and Federal governmental partners.”

44 CFR 201.6 – The local mitigation plan is the representation of the jurisdiction’s commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. . . .

Why Develop this Mitigation Plan?

The Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP in order to receive FEMA Hazard Mitigation Assistance (HMA) funds for mitigation projects. To that end, Josephine County is involved in a broad range of hazard and emergency management planning activities. Local and federal approval of this NHMP ensures that the County and listed jurisdictions will (1) remain eligible for pre- and post-disaster mitigation project grants and (2) promote local mechanisms to accomplish risk reduction strategies.

44 CFR 201.6(a)(1) – A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants . . .

What is Mitigation?

“Any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.”

- U.S. Federal Emergency Management Agency

Who Participated in Developing the Plan?

The Josephine County NHMP is the result of a collaborative effort between the County, cities, special districts, citizens, public agencies, non-profit organizations, the private sector and regional organizations. County, city, and special district Steering Committees guided the NHMP development process.

For a list of specific County steering committee participants, refer to the acknowledgements section above. The update process included representatives from the following jurisdictions and agencies: Josephine County, Cave Junction, Grants Pass, Cow Creek Band of the Umpqua Tribe of Indians, Oregon Water Resources Department, Illinois Valley Fire District, Pacific Power, and Grants Pass Fire Rescue.

The Josephine County Emergency Manager convened the planning process and will take the lead in implementing, maintaining, and updating the plan. Each of the participating cities and special districts have also named a local convener who is responsible for implementing,

maintaining and updating their Jurisdictional Addendum (see addenda for specific names and positions). Josephine County is dedicated to directly involving the public in the continual review and update of the NHMP. The County achieves this through systematic engagement of a wide variety of active groups, organizations or committees, public and private infrastructure partners, watershed and neighborhood groups and numerous others. Although

44 CFR 201.6(c)(1) – Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process and how the public was involved.

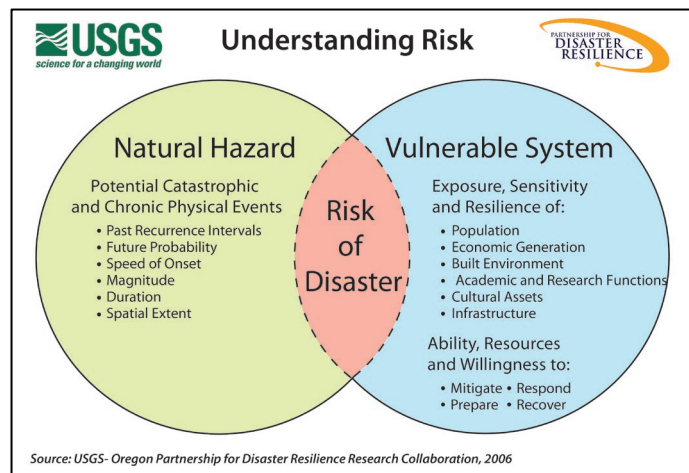
members of the steering committee represent the public to some extent, the public will continue to provide feedback about the NHMP throughout the implementation and maintenance period.

How Does this NHMP Reduce Risk?

The NHMP is a tool for Josephine County to use to mitigate the impacts of natural hazards by identifying resources, information, and strategies for risk reduction. It is also intended to guide and coordinate mitigation activities throughout the County. A risk assessment consists of three phases: hazard identification, vulnerability assessment and risk analysis, as illustrated in Figure PS-1.

By identifying and understanding the relationship between hazards, vulnerable systems and existing capacity, Josephine County is better equipped to identify and implement actions aimed at reducing the overall risk to hazards.

Figure PS-1 Understanding Risk



What is Josephine County’s Overall Risk to Hazards?

Josephine County reviewed and updated the risk assessment to evaluate the probability of each hazard as well as the vulnerability of the community to that hazard. Table PS-1 summarizes hazard probability and vulnerability as determined by the County steering committee (for more information see Volume I, Section 2).

44 CFR 201.6(c)(2) – A Risk Assessment that provides the factual basis for activities proposed in the strategy ...

Table PS-1 Hazard Analysis Matrix – Josephine County

Hazard	Maximum				Total Threat Score	Hazard Rank	Hazard Tiers
	History	Vulnerability	Threat	Probability			
Wildfire	14	40	100	70	224	#1	Top Tier
Winter Storm	16	40	100	63	219	#2	
Drought	16	30	90	70	206	#3	
Earthquake - Cascadia	2	50	100	49	201	#4	
Flood - Riverine	18	20	70	70	178	#5	Middle Tier
Windstorm	14	25	70	63	172	#6	
Extreme Heat Event	8	30	60	63	161	#7	
Earthquake - Crustal	8	25	100	21	154	#8	
Landslide	8	10	40	56	112	#9	Bottom Tier
Volcanic Event	2	5	30	7	44	#10	

Source: Josephine County NHMP Steering Committee (2022)

What is the NHMP’s Mission?

The NHMP mission states the purpose and defines the primary functions of the NHMP. It is intended to be adaptable to any future changes made to the NHMP and need not change unless the community’s environment or priorities change.

To promote public policy and mitigation activities which will enhance the safety to life and property from natural hazards.

What are the NHMP Goals?

Mitigation plan goals are more specific statements of direction that Josephine County residents, and public and private partners can use to plan their work to reduce the risk from natural hazards and to identify if it is successful. These statements of direction form a bridge between the broad mission statement and particular action items. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

44 CFR 201.6(c)(3)(i) – A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Public participation was a key aspect in developing the plan goals. Meetings with the project steering committee, stakeholder interviews and public workshops all served as methods to obtain input and priorities in developing goals for reducing risk and preventing loss for natural hazards in Josephine County.

All the plan goals are important and are listed below in no order of priority. Establishing community priorities within action items neither negates nor eliminates any goals, but it establishes which action items to consider implementing first, should funding become available. Below is a list of the plan goals:

Goal 1: Protect life and reduce injuries resulting from natural hazards.

Goal 2: Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.

Goal 3: Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Josephine County.

Goal 4: Minimize the impact of natural hazards while protecting, restoring, and sustaining environmental processes.

Goal 5: Enhance and maintain local capability to implement a comprehensive hazard loss reduction strategy.

Goal 6: Document and evaluate progress in achieving hazard mitigation strategies and action items.

Goal 7: Motivate the public, private sector, and government agencies to mitigate the effects of natural hazards through information and education.

Goal 8: Apply development standards that mitigate or eliminate the potential impacts of natural hazards.

Goal 9: Mitigate damage to historic and cultural resources from natural hazards.

Goal 10: Increase communication, collaboration, and coordination among agencies at all levels of government and the private sector to mitigate natural hazards.

Goal 11: Integrate local NHMPs with comprehensive plans and implementing measures.

How are the Action Items Organized?

The action items are organized within an action matrix included within Section 3, Mitigation Strategy.

Data collection, research and the public participation process resulted in the development of the action items. The Action Item Matrix portrays the plan framework and identifies linkages between the plan goals and actions. The matrix documents the title of each action along with, the coordinating organization, timeline and the NHMP goals addressed. City specific action items are included in Volume II, Jurisdictional Addenda.

44 CFR 201.6(c)(3)(ii) – A section that identifies and analyzes a comprehensive range of specific mitigation actions . . .

Comprehensive Action Plan

Action items are detailed recommendations for activities that local departments, citizens, and others could engage in to reduce risk. The Steering Committee will prioritize the following actions to focus their attention, and resource availability, upon an achievable set of high leverage activities over the next five-years.

44 CFR 201.6(c)(3)(iii) – An action plan describing how the actions . . . will be prioritized, implemented and administered . . .

44 CFR 201.6(c)(4) – A plan maintenance process . . .

- **Multi-Hazard 1.1:** Continue to improve and sustain public information and education programs about potential hazards in the county, the need for personal preparedness, and mitigation actions possible.
- **Multi-Hazard 1.6:** Starting with the critical facilities identified in the “Josephine County Solar + Storage Microgrid Feasibility” project, complete solar + storage microgrid feasibility studies and implement projects with assistance from Energy Trust.
- **Earthquake 3.4:** Assess vulnerable county and city buildings to identify safety zones and earthquake mitigations for employee offices and high-traffic visitor areas. This includes historic buildings such as the County Courthouse and the unreinforced historic masonry buildings of core downtown business, government, and public use.
- **Earthquake 3.6:** Repair the McMullen Dam (Lake Selmac) that is at risk of failure.
- **Severe Weather 6.1:** Collaborate with local community organizations to develop community sites for use as a warming shelter in the winter, a cooling shelter in the summer, and a clean air refuge site when needed.
- **Wildfire 7.1:** Continue to support the Firewise Program for communities throughout the county. Utilize Firewise guidance to promote the Firewise Communities/USA” recognition program to promote wildfire resilience.
- **Wildfire 7.3:** Implement wildfire mitigation action items listed in the Rogue Valley (Jackson and Josephine counties) Integrated Community Wildfire Protection Plan (RVICWPP) and continue to participate with ongoing maintenance and updates.

The implementation and maintenance section (Section 4) details the formal process that will ensure that the Josephine County NHMP remains an active and relevant document. The Josephine County Emergency Manager is the designated NHMP convener and is responsible for overseeing the review and implementation processes (see jurisdictional addenda for city conveners). The NHMP maintenance process includes a schedule for monitoring and evaluating the NHMP quarterly and revising the NHMP every five years. This section also describes how the communities will integrate public participation throughout the implementation and maintenance process.

The accomplishment of the NHMP goals and actions depends upon regular steering committee participation and adequate support from County, city, and special district leadership. Comprehensive familiarity with this NHMP will result in the efficient and effective implementation of appropriate mitigation activities and a reduction in the risk and the potential for loss from future natural hazard events.

NHMP Adoption

Once the NHMP is locally reviewed and deemed complete the NHMP Convener (or their designee) submits it to the State Hazard Mitigation Officer at the Oregon Office of Emergency Management (OEM). OEM reviews the NHMP and submits it to FEMA Region X for pre-approval. This review will address the federal criteria outlined in [44 CFR Part 201.6](#).

Once pre-approved by FEMA, the County, cities, and special districts may formally adopt it via resolution.

The Josephine County NHMP Convener will be responsible for ensuring local adoption of the NHMP and providing the support necessary to ensure NHMP implementation. Once the resolution is executed at the local level and documentation is provided to FEMA, the NHMP will be formally approved by FEMA and the County and participating cities will regain eligibility for Hazard Mitigation Assistance (HMA) grants.

The steering committees for Josephine County and participating cities each met to review the NHMP update process, and their governing bodies adopted the NHMP as shown below and in Volume II. Copies of adopting documents are provided at the beginning of this NHMP.

County Date of Adoption and Approval

Josephine County adopted the NHMP on [Month Day], 2022. FEMA Region X approved the Josephine County NHMP on [Month Day], 2022. With approval of this NHMP, the County is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through [Month Day], 2027.

For the date of adoption for each participating city or special district see Volume II.

44 CFR 201.6(c)(5) – Documentation that the plan has been formally adopted by the governing body of the jurisdiction . . .

44 CFR 201.6(d) – Plan review [process] . . .

**Volume I:
Basic Plan**

REVIEW DRAFT

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REVIEW DRAFT

SECTION I: INTRODUCTION

This section provides a general introduction to natural hazard mitigation planning in Josephine County. In addition, it addresses the planning process requirements contained in 44 CFR 201.6(b) thereby meeting the planning process documentation requirement contained in 44 CFR 201.6(c)(1). The section concludes with a general description of how the NHMP is organized.

What is Natural Hazard Mitigation?

The Federal Emergency Management Agency (FEMA) defines mitigation as “. . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk.”¹ Said another way, natural hazard mitigation is a method of permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances, projects, seismic retrofits to critical facilities and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the “Whole Community”; individuals, private businesses and industries, state and local governments and the federal government.

Engaging in mitigation activities provides jurisdictions (counties, cities, special districts, etc.) with many benefits, including reduced loss of life, property, essential services, critical facilities, and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why Develop a Mitigation Plan?

Josephine County updated this Multi-Jurisdictional Natural Hazard Mitigation Plan (NHMP) to reduce future loss of life and damage to property resulting from natural hazards. It is impossible to predict exactly when natural hazard events will occur, or the extent to which they will affect community assets. However, with careful planning and collaboration among public agencies, private sector organizations and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201, require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local adoption and federal approval of this NHMP ensures that the County and listed cities will remain eligible for pre- and post-disaster mitigation project grants.

¹ FEMA, *What is Mitigation?* <http://www.fema.gov/what-mitigation>

What Federal Requirements Does This NHMP Address?

DMA2K is the latest federal legislation addressing mitigation planning. It reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels. State and local jurisdictions must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Mitigation plans must demonstrate that State and local jurisdictions' proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and State and local jurisdictions' capabilities.

Chapter 44 Code of Federal Regulations (CFR), section 201.6, also requires a local government to have an approved NHMP in order to receive HMGP project grants.² Pursuant of Chapter 44 CFR, the NHMP planning processes shall include opportunity for the public to comment on the NHMP during review and the updated NHMP shall include documentation of the public planning process used to develop the NHMP.³ The NHMP update must also contain a risk assessment, mitigation strategy and a NHMP maintenance process that has been formally adopted by the governing body of the jurisdiction.⁴ Lastly, the NHMP must be submitted to the Oregon Office of Emergency Management (OEM) for initial review and then sent to FEMA for federal approval.⁵ Additionally, a recent change in the way OEM administers the Emergency Management Performance Grant (EMPG), which helps fund local emergency management programs, also requires a FEMA-approved NHMP.

What is the Policy Framework for Natural Hazards Planning in Oregon?

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this NHMP aligns with the goals of the jurisdiction's Comprehensive Plan and helps each jurisdiction meet the requirements of statewide land use planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, additional resources exist at the state and federal levels. Some of the key agencies in this area include OEM, Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of

² Code of Federal Regulations, Chapter 44. Section 201.6, subsection (a), 2015

³ *ibid*, subsection (b). 2015

⁴ *ibid*, subsection (c). 2015

⁵ *ibid*, subsection (d). 2015

Geology and Mineral Industries (DOGAMI) and the Department of Land Conservation and Development (DLCD).

How was the NHMP Developed?

The NHMP was developed by the Josephine County NHMP Steering committee and the steering committees for the participating jurisdictions (Grants Pass and Cave Junction). The Josephine County steering committee formally convened on three occasions to discuss and revise the NHMP. Each of the participating city steering committees met once formally. steering committee members contributed data and maps, reviewed, and updated the community profile, risk assessment, action items, and implementation and maintenance plan.

An open public involvement process is essential to the development of an effective NHMP. To develop a comprehensive approach to reducing the effects of natural disasters, the planning process shall include opportunity for the public, neighboring communities, local and regional agencies, as well as, private and non-profit entities to comment on the NHMP during review.⁶ Josephine County provided an accessible project website for the public to provide feedback on the draft NHMP:

<https://www.co.josephine.or.us/SectionIndex.asp?SectionID=138>. In addition, Josephine County provided a press release on their website to encourage the public to offer feedback on the NHMP update. The County and city websites continue to be a focal point for distribution natural hazard information using hazard viewers, emergency alerts, hazard preparation and annual natural hazard progress reports. In addition, the County administered a survey (see Appendix G) that was used to inform the prioritization of action items. Josephine County Emergency Management also held three local radio interviews that discussed the NHMP and community responsibilities. The radio interviews included public question and answer periods.

How is the NHMP Organized?

Each volume of the NHMP provides specific information and resources to assist readers in understanding the hazard-specific issues facing county and city residents, businesses, and the environment. Combined, the sections work in synergy to create a mitigation plan that furthers the community's mission to reduce or eliminate long-term risk to people and their property from hazards and their effects. This NHMP structure enables stakeholders to use the section(s) of interest to them.

Volume I: Basic Plan

Plan Summary

The NHMP summary provides an overview of the FEMA requirements, planning process and highlights the key elements of the risk assessment, mitigation strategy and implementation and maintenance strategy.

⁶ Code of Federal Regulations, Title 44. Section 201.6, subsection (b). 2015

Section 1: Introduction

The Introduction briefly describes the countywide mitigation planning efforts and the methodology used to develop the NHMP.

Section 2: Hazard Identification and Risk Assessment

This section provides the factual basis for the mitigation strategies contained in Volume I, Section 3. (Additional information is included within Volume III, Appendix C, which contains an overall description of Josephine County and the incorporated cities.) This section includes a brief description of community sensitivities and vulnerabilities. The Risk Assessment allows readers to gain an understanding of each jurisdiction's vulnerability and resilience to natural hazards.

A hazard summary is provided for each of the hazards addressed in the NHMP. The summary includes hazard history, location, extent, vulnerability, impacts and probability. This NHMP addresses the following hazards:

- Drought
- Earthquake
- Flood
- Landslide
- Severe Weather
 - Extreme Heat
 - Windstorm
 - Winter Storm
- Volcanic Event
- Wildfire

Additionally, this section provides information on each jurisdictions' participation in the National Flood Insurance Program (NFIP).

Section 3: Mitigation Strategy

This section documents the NHMP vision, mission, goals, and actions (mitigation strategy) and describes the components that guide implementation of the identified actions. Actions are based on community sensitivity and resilience factors and the risk assessments in Volume I, Section 2 and Volume II.

Section 4: Plan Implementation and Maintenance

This section provides information on the implementation and maintenance of the NHMP. It describes the process for prioritizing projects and includes a suggested list of tasks for updating the NHMP, to be completed at the semi-annual and five-year review meetings.

Volume II: Jurisdictional Addenda

Volume II of the NHMP is reserved for city addenda developed through this multi-jurisdictional planning process. During this update Cave Junction added an addendum to the NHMP and Grants Pass updated their FEMA approved addendum. As such, the five-year update cycle will be the same for all the cities and the county.

Volume III: Appendices

The appendices are designed to provide the users of the Josephine County NHMP with additional information to assist them in understanding the contents of the NHMP and provide them with potential resources to assist with NHMP implementation.

Appendix A: Priority Action Items

This appendix contains the detailed action item forms for each of the priority mitigation strategies identified in this NHMP.

Appendix B: Planning and Public Process

This appendix includes documentation of all the countywide public processes utilized to develop the NHMP. It includes invitation lists, agendas, and sign-in sheets of steering committee meetings as well as any other public involvement methods.

Appendix C: Community Profile

The community profile describes the County from several perspectives to help define and understand the region's sensitivity and resilience to natural hazards. The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the region when the NHMP was updated.

Appendix D: Natural Hazard and Base Maps

This appendix includes base and natural hazard maps that are cited throughout the NHMP, particularly within Volume I, Section 2 and Volume III, Appendix C. Additional maps for participating cities and special districts are provided in Volume II.

Appendix E: Economic Analysis of Natural Hazard Mitigation Projects

This appendix describes the FEMA requirements for benefit cost analysis in natural hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities.

Appendix F: Grant Programs and Resources

This appendix lists state and federal resources and programs by hazard.

Appendix G: Community Survey

This appendix includes the survey instrument and results from the community survey administered by Josephine County.

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SECTION 2: RISK ASSESSMENT

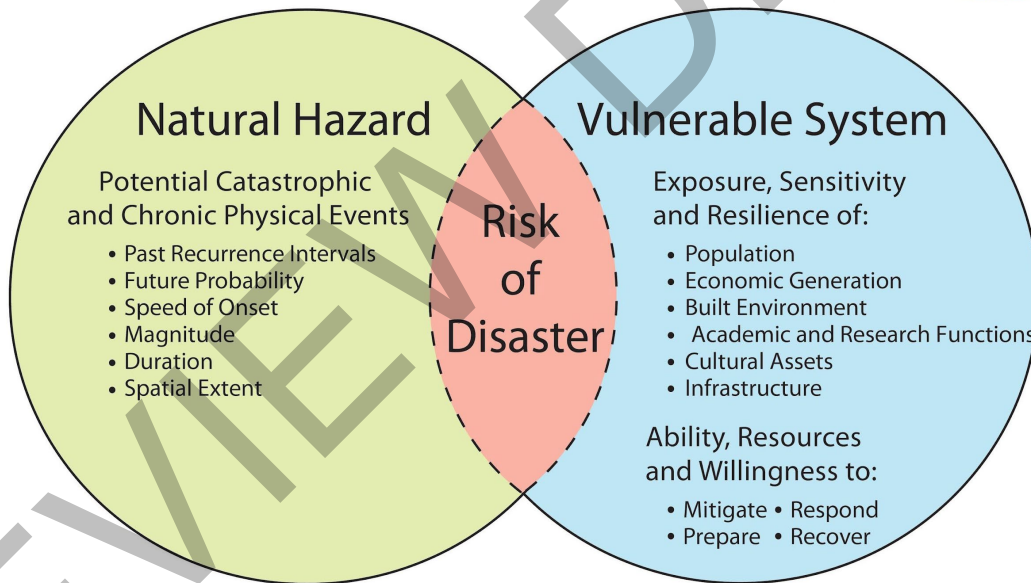
This section of the NHMP addresses 44 CFR 201.6(b)(2) - Risk Assessment. The Risk Assessment applies to Josephine County, the City of Grants Pass, and the City of Cave Junction. We address city specific information where relevant. In addition, this chapter can assist with addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards.

We use the information presented in this section, along with community characteristics presented in the Community Profile Appendix, to inform the risk reduction actions identified in Section 3 – Mitigation Strategy. Figure 2-1 shows how we conceptualize risk in this plan. Ultimately, the goal of hazard mitigation is to reduce the area where hazards and vulnerable systems overlap.

Figure 2-1 Understanding Risk



Understanding Risk



Source: USGS- Oregon Partnership for Disaster Resilience Research Collaboration, 2006

Source: Oregon Partnership for Disaster Resilience.

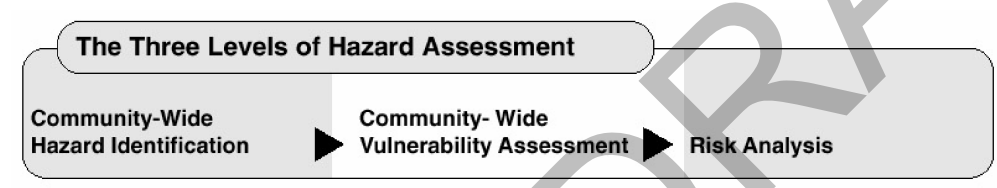
What is a Risk Assessment?

A risk assessment consists of three phases: hazard identification, vulnerability assessment, and risk analysis.

- **Phase 1:** Identify hazards that can affect the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The following figure illustrates the three-phase risk assessment process:

Figure 2-2 Three Phases of a Risk Assessment



Source: Planning for Natural Hazards: Oregon Technical Resource Guide, 1998

This three-phase approach to developing a risk assessment should be conducted sequentially because each phase builds upon data from prior phases. However, gathering data for a risk assessment need not occur sequentially.

Hazard Identification

Josephine County identifies eight natural hazards that could have an impact on the County, Cave Junction, and Grants Pass. The plan summarizes information for each hazard below; additional information pertaining to the types and characteristics of each hazard is available in the State of Oregon Natural Hazard Mitigation Plan Region 4 Risk Assessment. Table 2-1 lists the hazards identified in the county in comparison to the hazards identified in the State of Oregon NHMP for the Southwest Oregon (Region 4), which includes Josephine County.

Table 2-1 Josephine County Hazard Identification

Josephine County Natural Hazards	Oregon NHMP Region 4: Southwest Oregon
Drought	Drought
Earthquake	Earthquake
Flood	Flood
Landslide	Landslide
Volcanic Event	Volcano
Wildfire	Wildfire
Severe Weather	-
Extreme Heat	Extreme Heat
Windstorm	Windstorm
Winter Storm	Winter Storm

Source: Josephine County NHMP Steering Committee (2022) and State of Oregon NHMP, Region 4: Southwest Oregon (2020)

Probability and Vulnerability Summary

Table 2-2 presents the probability scores for each of the natural hazards present in Josephine County for which descriptions are provided herein. Probability assesses the likelihood that a hazard event will take place in the future. Vulnerability assesses the extent to which people are susceptible to injury or other impacts resulting from a hazard as well as the exposure of the built environment or other community assets (social, environmental, economic, etc.) to hazards. The exposure of community assets to hazards is critical in the assessment of the degree of risk a community has to each hazard. Identifying the populations, facilities, and infrastructure at risk from various hazards can assist the County in prioritizing resources for mitigation and can assist in directing damage assessment efforts after a hazard event has occurred. The exposure of County assets to each hazard and potential implications are explained in each hazard section.

Vulnerability includes the percentage of population and property likely to be affected under an “average” occurrence of the hazard. Josephine County evaluated the best available vulnerability data to develop the vulnerability scores presented below.

Table 2-2 Probability and Vulnerability Assessment Summary

Hazard	Josephine County	
	Probability	Vulnerability
Drought	High	Moderate
Earthquake - Cascadia	Moderate	High
Earthquake - Crustal	Low	Moderate
Extreme Heat Event	High	Moderate
Flood - Riverine	High	Moderate
Landslide	Moderate	Low
Volcanic Event	Low	Low
Wildfire	High	High
Windstorm	High	Moderate
Winter Storm (Snow/Ice)	High	High

Source: Josephine County NHMP Steering Committee (2022)

Community vulnerabilities are an important component of the NHMP risk assessment. Changes to population, economy, built environment, critical facilities, and infrastructure have not significantly influenced vulnerability. New development has complied with the standards of the Oregon Building Code and the county's development code including their floodplain ordinance. For more in-depth information regarding specific community vulnerabilities see Volume III, Appendix C.

Hazard Analysis Matrix and Methodology

For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with a sense of hazard priorities but does not predict the occurrence of a hazard.

For the purposes of this NHMP, the County and cities utilized the Oregon Office of Emergency Management (OEM) Hazard Analysis methodology. The hazard analysis methodology in Oregon was first developed by FEMA circa 1983 and gradually refined by OEM over the years.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible). Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score and probability approximately 40%. We include the hazard analysis summary here to ensure consistency between the EOP and NHMP.

The Oregon method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

In this analysis, severity ratings and weight factors, are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario) and probability.

The hazard analysis matrix involves estimating the damage, injuries and costs likely to be incurred in a geographic area over time. Risk has two measurable components: (1) the magnitude of the harm that may result, defined through the vulnerability assessment (assessed in the previous sections) and (2) the likelihood or probability of the harm occurring.

Table 2-3 presents the updated hazard analysis matrix for Josephine County. The hazards are listed in rank order from high to low. The table shows that hazard scores are influenced by each of the four categories combined: past historical events, the probability or likelihood of a hazard event occurring, the vulnerability to the community, and the maximum threat or worst-case scenario. The County ranked wildfire, winter storm, drought, and the Cascadia Subduction Zone earthquake as the top tier hazard threats. Flood, windstorm, extreme heat event, and crustal earthquake constitute the middle tier. Landslide and volcanic event comprise the lowest ranked hazards and the bottom tier.

Table 2-3 Hazard Analysis Matrix – Josephine County

Hazard	Maximum				Total Threat Score	Hazard Rank	Hazard Tiers
	History	Vulnerability	Threat	Probability			
Wildfire	14	40	100	70	224	#1	Top Tier
Winter Storm	16	40	100	63	219	#2	
Drought	16	30	90	70	206	#3	
Earthquake - Cascadia	2	50	100	49	201	#4	
Flood - Riverine	18	20	70	70	178	#5	Middle Tier
Windstorm	14	25	70	63	172	#6	
Extreme Heat Event	8	30	60	63	161	#7	
Earthquake - Crustal	8	25	100	21	154	#8	
Landslide	8	10	40	56	112	#9	Bottom Tier
Volcanic Event	2	5	30	7	44	#10	

Source: Josephine County NHMP Steering Committee (2022)

City Specific Risk Assessment

Multi-jurisdictional Risk Assessment - §201.6(c) (2) (iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction’s risks where they vary from the risks facing the entire planning area.

Each participating jurisdiction (Cave Junction and Grants Pass) in Josephine County completed a jurisdiction specific hazard analysis that assessed each jurisdiction’s risks where they vary from the risks facing the entire planning area. The multi-jurisdictional risk assessment information is located within the addenda of Volume II.

Federal Disaster and Emergency Declarations

Reviewing past events can provide a general sense of the hazards that have caused significant damage in the county. Where trends emerge, disaster declarations can help inform hazard mitigation project priorities.

President Dwight D. Eisenhower approved the first federal disaster declaration in May 1953 following a tornado in Georgia. Since then, federally declared disasters have been approved within every state because of natural hazard related events. As of June 2018, FEMA has

approved a total of 39 major disaster declarations, 95 fire suppression or management assistance declarations and four (4) emergency declarations in Oregon.¹ When governors ask for presidential declarations of major disaster or emergency, they stipulate which counties in their state they want included in the declaration. Table 2-4 summarizes the major disasters declared in Oregon that affected Josephine County, since 1955. The table shows that there have been seven (7) major disaster declarations for the County (one since 2017). Most of which were related to weather events resulting primarily in flooding, snow, and landslide related damage.

Table 2-4 FEMA Major Disaster (DR) for Josephine County

Declaration Number	Declaration Date	Incident Period		Incident	Individual Assistance	Public Assistance Categories
		From	To			
DR-184	12/24/1964	12/24/1964	12/24/1964	Heavy rains and flooding	Yes	A, B, C, D, E, F, G
DR-413	1/25/1974	1/25/1974	1/25/1974	Severe Storms, Snowmelt, Flooding	Yes	A, B, C, D, E, F, G
DR-1160	1/23/1997	12/25/1996	1/6/1997	Severe Winter Storms, Flooding	Yes	A, B, C, D, E, F, G
DR-1632	2/9/1996	2/4/1996	2/21/1996	Severe storms, Flooding	None	A, B, C, D, E, F, G
DR-4296	1/25/2017	12/14/2016	12/17/2016	Severe Winter Storm and Flooding	None	A, B, C, D, E, F, G
DR-4328	8/7/2017	1/7/2017	1/10/2017	Severe Winter Storms, Flooding, Landslides, And Mudslides	None	A, B, C, D, E, F, G
DR-4499	3/28/2020	1/20/2020	continuing	Covid-19 Pandemic	Yes	A, B, C, D, E, F, G

Source: FEMA, Oregon Disaster History. Major Disaster Declarations.

Table 2-5 summarizes fire management assistance and emergency declarations. Fire Management Assistance may be provided after a State submits a request for assistance to the FEMA Regional Director at the time a "threat of major disaster" for a fire emergency exists. There are 14 fire management suppression/assistance declarations on record for the county.

An Emergency Declaration is more limited in scope and without the long-term federal recovery programs of a Major Disaster Declaration. Generally, federal assistance and funding are provided to meet a specific emergency need or to help prevent a major disaster from occurring. Josephine County has three (3) recorded Emergency Declarations related to the 1977 Drought, 2005 Hurricane Katrina evacuation, and 2020 Covid-19 pandemic.

¹ FEMA, *Declared Disasters by Year or State*, http://www.fema.gov/news/disaster_totals_annual.fema#marks. Accessed July 10, 2018.

Table 2-5 FEMA Fire Management (FM) and Emergency Declarations (EM) for Josephine County

Declaration Number	Declaration Date	Incident Period		Incident	Individual Assistance	Public Assistance Categories
		From	To			
FM-2030	8/11/1978	8/11/1978	-	Grave Creek Fire	None	-
FM-2069	8/26/1988	8/23/1988	-	Walker Mountain Fire	None	-
FM-2453	7/28/2002	7/27/2002	-	Florence Fire	None	B
FM-2539	8/4/2004	8/4/2004	8/6/2004	Redwood Highway Fire	None	B, H
FM-2579	8/25/2005	8/25/2005	9/1/2005	Deer Creek	None	B, H
FM-5036	7/19/2013	7/19/2013	7/21/2013	Pacifica Fire	None	B, H
FM-5037	7/28/2013	7/27/2013	8/19/2013	Douglas Fire Complex	None	B, H
FM-5039	8/2/2013	7/28/2013	8/4/2013	Brimstone Fire	None	B, H
FM-5096	8/9/2015	8/8/2015	8/11/2015	Krauss Lane Fire	None	B, H
FM-5153	8/31/2016	8/30/2016	9/1/2016	Gold Canyon Fire	None	B, H
FM-5198	8/20/2017	8/19/2017	9/20/2017	Chetco Bar Fire	None	B, H
FM-5256	7/19/2018	7/18/2018	9/8/2018	Garner Fire Complex	None	B, H
FM-5275	9/3/2018	9/2/2018	9/5/2018	Hugo Road Fire	None	B, H
FM-5369	9/10/2020	9/9/2020	11/3/2020	Slater Fire	None	B, H
EM-3039	4/29/1977	4/29/1977	4/29/1977	Drought	None	A, B
EM-3228	9/7/2005	8/29/2005	10/1/2005	Hurricane Katrina Evacuation	None	B
EM-3429	3/13/2020	1/20/2020	continuing	Covid-19 Pandemic	None	A, B

Source: FEMA, Oregon Disaster History. Major Disaster Declarations.

Hazard Profiles

The following subsections briefly describe relevant information for each hazard. For additional background on the hazards, vulnerabilities and general risk assessment information for hazards in Josephine County, refer to the [Risk Assessment for Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Drought

Significant Changes since Previous NHMP:

Two (2) significant drought events have occurred since the previous NHMP.

Characteristics

A drought is a period of drier than normal conditions. Drought occurs in virtually every climatic zone, but its characteristics vary significantly from one region to another. Drought is a temporary condition; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate. The extent of drought events depends upon the degree of moisture deficiency, and the duration and size of the affected area. Typically, droughts occur as regional events and often affect more than one city and county.

There are four types of droughts: meteorological, agricultural, hydrological, and socioeconomic. *Meteorological drought* is based on the degree of dryness. *Agricultural drought* focuses the amount of soil moisture versus the needs of the crops. *Hydrological drought* is associated with shortfalls of surface and subsurface water supply. *Socioeconomic drought* refers to physical water shortages and its human effect and occurs when the need for water exceeds the supply resulting in a shortfall.

Location and Extent

Droughts occur in every climate zone and can vary from region to region. Drought may occur throughout Josephine County and may have profound effects on the economy, particularly the agricultural and hydro-power sectors. The extent of drought depends upon the degree of moisture deficiency, and the duration and size of the affected area. Typically, droughts occur as regional events and often affect more than one county. In severe droughts, environmental and economic consequences can be significant. The extent of the hazard is shown in Figure 2-1.

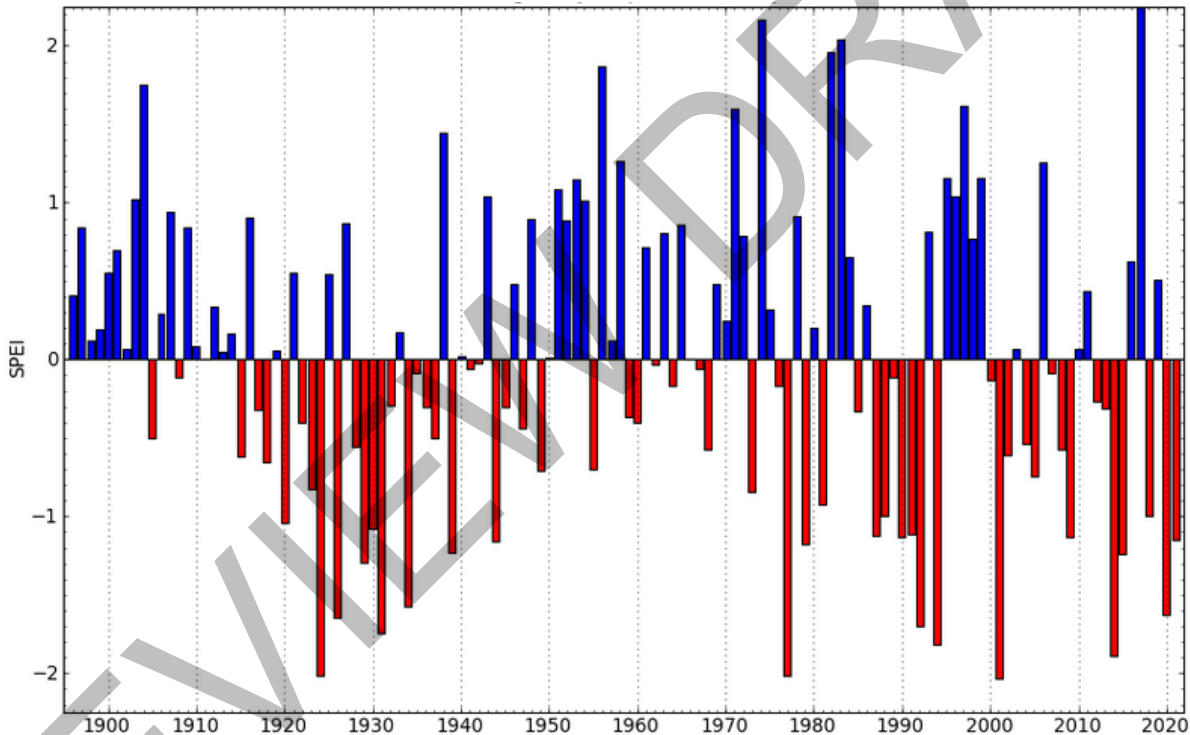
History

Josephine County experiences annual dry conditions typically during the summer months from July through September. Drought is typically measured in terms of water availability in a defined geographical area. It is common to express drought with a numerical index that ranks severity. Most federal agencies use the Palmer Method which incorporates precipitation, runoff, evaporation, and soil moisture. However, the Palmer Method does not incorporate snowpack as a variable. Therefore, it is not believed to provide a very accurate indication of drought conditions in Oregon and the Pacific Northwest.

The Standardized Precipitation-Evapotranspiration Index (SPEI) is an index of water conditions throughout the state. The index is designed to account for precipitation and evapotranspiration to determine drought. The lowest SPEI values, below -2.0, indicate extreme drought conditions. Severe drought occurs at SPEI values between -2.0 and -1.5, and moderate drought occurs between -1.5 and -1.0.

Figure 2-3 shows the water year (October 1 – September 30) history of SPEI from 1895 to 2021 for Josephine County. The SPEI record indicates that the County has experienced three periods of extreme drought (water years 1924, 1977, and 2001) and seven years of severe drought (water years 1926, 1931, 1934, 1992, 1994, 2014, and 2020). In addition, there are 12 years of moderate drought and 39 years of mild drought. Since 1992 there have been nine (9) executive orders declaring drought emergencies by the Governor (1991, 1992, 1994, 2001, 2002, 2014, 2015, 2020, and 2021), two of which were federally declared (2015 and 2020).²

Figure 2-3 Standardized Precipitation-Evapotranspiration Index, 12-Months Ending in September, Josephine County, OR (1896-2021)



Source: Western Regional Climate Center. West Wide Drought Tracker. <https://wrcc.dri.edu/wwdt/time/>. Created February 2, 2022.

El Niño/La Nina

El Niño Southern Oscillation (ENSO) weather patterns can increase the frequency and severity of drought. During El Niño periods, alterations in atmospheric pressure in equatorial regions yield an increase in the surface temperature off the west coast of North America.

² Oregon Water Resources Department Public Declaration Status Report, http://apps.wrd.state.or.us/apps/wr/wr_drought/declaration_status_report.aspx, accessed February 2, 2022.

This gradual warming sets off a chain reaction affecting major air and water currents throughout the Pacific Ocean; La Niña periods are the reverse with sustained cooling of these same areas. In the North Pacific, the Jet Stream is pushed north, carrying moisture laden air up and away from its normal landfall along the Pacific Northwest coast. In Oregon, this shift results in reduced precipitation and warmer temperatures, normally experienced several months after the initial onset of the El Niño. These periods tend to last nine to twelve months, after which surface temperatures begin to trend back towards the long-term average. El Niño periods tend to develop between March and June, and peak from December to April. ENSO generally follows a two to seven-year cycle, with El Niño or La Niña periods occurring every three to five years. However, the cycle is highly irregular, and no set pattern exists. The last major El Niño was during 1997-1998, and in 2015-2016 Oregon experience a “super” El Niño (the strongest in 15 years, the two previous events occurred in 1982-1983 and 1997-1998) that included record rainfall and snowpack in areas of the state.³

Projected Climate Variability

According to OCCRI report “*Fifth Oregon Climate Assessment*”⁴ the probability of future drought conditions (low summer soil moisture, low spring snowpack, low summer runoff, low summer precipitation, and high summer evaporation) is likely to increase.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee assessed the **probability of experiencing a locally severe drought as “High”**, meaning one incident may occur within the next 35 years; *this rating has not changed since the previous plan.*

Droughts are not uncommon in the State of Oregon, nor are they just an “east of the mountains” phenomenon. They occur in all parts of the state, in both summer and winter. Oregon’s drought history reveals many short-term and a few long-term events. The average recurrence interval for severe droughts in Oregon is somewhere between 8 and 12 years.

Vulnerability Assessment

The NHMP Steering Committee rated the county as having a **“moderate” vulnerability to drought hazards**, meaning that between 1% and 10% of the region’s population or assets could be affected by a major drought emergency or disaster; *this rating has not changed since the previous plan.* Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

The environmental and economic consequences can be significant, especially for the agricultural sector. Drought also increases the probability of wildfires – a major natural hazard concern for Josephine County. Drought can affect all segments of Josephine County’s population, particularly those employed in water-dependent activities (e.g., agriculture, hydroelectric generation, recreation, etc.). Also, domestic water-users may be subject to

³ Cho, Renne. “El Nino and global warming – what’s the connection.” Phys.org, February 3, 2016. <https://phys.org/news/2016-02-el-nino-global-warmingwhat.html>

⁴ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

stringent conservation measures (e.g., rationing) as per the county's water management plan and could be faced with significant increases in electricity rates.

All parts of Josephine County are susceptible to drought, however, the following areas and issues are of particular concern:

- Drinking water system
- Power and water enterprises
- Residential and community wells in rural areas
- Fire response capabilities
- Fish and wildlife

Major county water supplies include the east fork of the Illinois River (serving the Cave Junction area), and the Rogue River (serving the Rogue River/Grants Pass watershed)⁵. Potential impacts to these water supplies and the agriculture industry are the greatest threats. Additionally, long-term drought periods of more than a year can impact forest conditions and set the stage for potentially destructive wildfires.

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Earthquake

Significant Changes since Previous NHMP:

There have been no significant updates since the previous plan. The Oregon Resilience Plan (2013) has been cited and incorporated where applicable.

Characteristics

The Pacific Northwest in general is susceptible to earthquakes from four sources: 1) the offshore Cascadia Subduction Zone; 2) deep intraplate events within the subducting Juan de Fuca Plate; 3) shallow crustal events within the North American Plate, and 4) earthquakes associated with volcanic activity.

Crustal Fault Earthquakes

Crustal fault earthquakes are the most common earthquakes and occur at relatively shallow depths of 6-12 miles below the surface.⁶ While most crustal fault earthquakes are smaller than magnitude 4 and generally create little or no damage, they can produce earthquakes of magnitudes up to 7, which cause extensive damage.

⁵ "Source Water Assessment Results for Public Water Systems Using Surface Water ." Oregon DEQ: Water Quality. Accessed November 2, 2016. <http://www.deq.state.or.us/wq//dwp/swrpts.asp>.

⁶ Madin, Ian P. and Zhenming Wang. Relative Earthquake Hazard Maps Report. (1999) DOGAMI.

Deep Intraplate Earthquakes

Occurring at depths from 25 to 40 miles below the earth's surface in the subducting oceanic crust, deep intraplate earthquakes can reach up to magnitude 7.5.⁷ The February 28, 2001 earthquake in Washington State was a deep intraplate earthquake. It produced a rolling motion that was felt from Vancouver, British Columbia to Coos Bay, Oregon and east to Salt Lake City, Utah. A 1965 magnitude 6.5 intraplate earthquake centered south of Seattle-Tacoma International Airport caused seven deaths.⁸

Subduction Zone Earthquakes

The Pacific Northwest is located at a convergent plate boundary, where the Juan de Fuca and North American tectonic plates meet. The two plates are converging at a rate of about 1-2 inches per year. This boundary is called the Cascadia Subduction Zone (CSZ). It extends from British Columbia to northern California. Subduction zone earthquakes are caused by the abrupt release of slowly accumulated stress.⁹

Subduction zones like the CSZ have produced earthquakes with magnitudes of 8 or larger. Historic subduction zone earthquakes include the 1960 Chile (magnitude 9.5) and 1964 southern Alaska (magnitude 9.2) earthquakes¹⁰ with more recent events being the 2004 Indian Ocean (magnitude 9.1) and 2011 Japan (magnitude 9).

Volcanic Earthquakes

Volcanic earthquakes are usually smaller than magnitude 2.5, roughly the threshold for shaking felt by observers close to the event. Swarms of small earthquakes may persist for weeks to months before eruptions, but little or no earthquake damage would occur to buildings in surrounding communities. Some volcanic related swarms may include earthquakes as large as about magnitude 5.

Location and Extent

There are no Class A or B faults in Josephine County. The nearest faults are located west (Curry County and the Pacific Ocean) and east (Klamath County) of the County. The extent of the earthquake hazard is measured in magnitude. Figure 2-4 shows a generalized geologic map of Josephine County and includes the areas for potential low and moderate liquefaction. These areas of liquefiable soft soils are concentrated around corridors of the Rogue, Applegate, and Illinois Rivers and Williams, Grave, Louse, and Jump Off Joe Creek. Most of the earthquakes shown in the figure below are low-impact events below M 3.0, although one mapped event is shown with M 2-3. The larger events may have been slightly felt but little to no structural/property damage resulted. Thus, the seismic hazard for Josephine County arises predominantly from major earthquakes on the Cascadia Subduction Zone. Smaller, crustal earthquakes in or near Josephine County could be locally damaging but would not be expected to produce widespread or major damage.

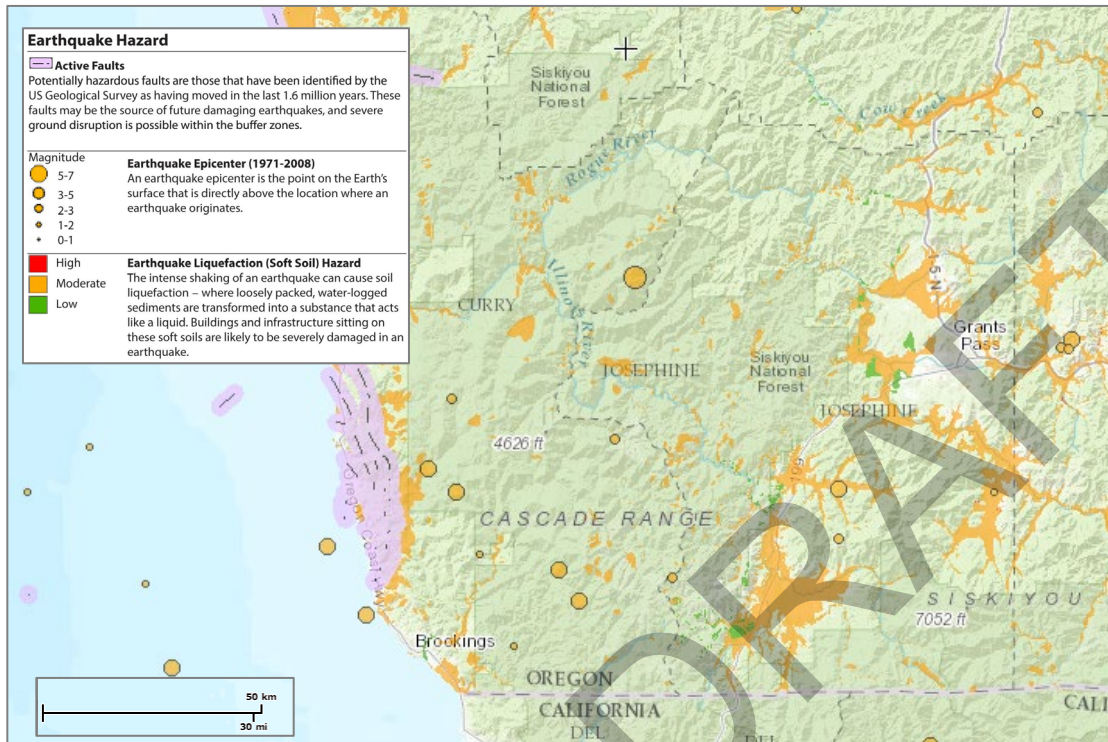
⁷ Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000), Ch. 8, pp. 8.

⁸ The Oregonian. "A region at risk." March 4, 2001.

⁹ Questions and Answers on Earthquakes in Washington and Oregon (February 2001)
www.geophys.washington.edu/seis/pnsn/info_general/faq.html.

¹⁰ The Oregonian. "A region at risk." March 4, 2001.

Figure 2-4 Earthquake Epicenters (1971-2008), Active Faults, and Soft Soils



The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has undertaken a rigorous program in Oregon to identify seismic hazards, including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides. DOGAMI has published several seismic hazard maps that are available for communities to use. The maps show liquefaction, ground motion amplification, landslide susceptibility, and relative earthquake hazards. OPDR used the DOGAMI Statewide Geohazards Viewer to present a visual map of recent earthquake activity, active faults, and liquefaction; ground shaking is generally expected to be higher in the areas marked by soft soils in the map above. The severity of an earthquake is dependent upon several factors including: 1) the distance from the earthquake's source (or epicenter); 2) the ability of the soil and rock to conduct the earthquake's seismic energy; 3) the degree (i.e., angle) of slope materials; 4) the composition of slope materials; 5) the magnitude of the earthquake; and 6) the type of earthquake.

For more information, see the following reports:

- Statewide Cascadia earthquake hazard data (2013, [O-13-06](#))
- Cascadia Subduction Zone earthquakes: A magnitude 9.0 earthquake scenario, (2013, [O-13-22](#))
- Multi-Hazard and Risk Study for the Mount Hood Region (2011, [O-11-16](#)). *Portions of the earthquake section superseded by the Multi-Hazard Risk Report for the Lower Columbia-Sandy Watershed.*

- Statewide seismic needs assessment: Implementation of Oregon 2005 Senate Bill 2 relating to public safety, earthquakes, and seismic rehabilitation of public buildings, (2007, [O-07-02](#)).
- Map of selected earthquakes for Oregon: 1841-2002 (2003, [O-03-02](#)).
- Interpretive Map Series: IMS-9 - Relative earthquake hazard maps for selected urban areas in western Oregon (2000, [IMS-9](#)).
- Earthquake damage in Oregon, Preliminary estimates of future earthquake losses (1999, [SP-29](#))

Additional reports are available via DOGAMI's Publications Search website:

<http://www.oregongeology.org/pubs/search.php>

Other agency/ consultant reports:

[Oregon Resilience Plan \(2013\)](#)

History

Josephine County has not experienced any major earthquake events in recent history. Seismic events do, however, pose a significant threat. There have been several significant recent earthquakes in the region, primarily located in Klamath and Lake Counties in southern Oregon. The region has also been shaken historically by crustal and intraplate earthquakes and prehistorically by subduction zone earthquakes centered outside Central Oregon. A Cascadia Subduction Zone (CSZ) event could produce catastrophic damage and loss of life in Josephine County.

While Josephine County has not experienced any significant earthquakes in recent history, earthquakes in Oregon that have affected the county are listed below¹¹ (there have not been any significant earthquake events since the previous plan):

- **January 16, 2003:** 6.3 offshore quake at that Blanco Fracture Zone, Oregon
- **September 20, 1993:** Klamath Falls Earthquakes, Two (2) magnitude 6.0 earthquakes that caused \$7.5 million in damages and killed two (2; one heart attack, one crushed by a boulder while driving); felt in Southern Oregon.
- **September 20-mid December 1983:** Series of quakes M5.1 – 6.0. No record of reported damage in Josephine County.
- **April 14, 1920:** Quake centered near Crater Lake – No record of reported damage.
- **November 23, 1873:** 6.75 quake near California Boarder. Damage was reported along the coast and in Josephine and Jackson Counties.
- **January 1700:** Offshore, Cascadia Subduction Zone (CSZ)- Approximate 9.0 magnitude earthquake generated a tsunami that struck Oregon, Washington, and Japan; destroyed Native American villages along the coast.
- **Approximate Years: 1400 BCE, 1050 BCE, 600 BCE, 400, 750, 900:** Offshore, Cascadia Subduction Zone (CSZ)- probably 8-9 based on studies of earthquake and tsunami at Willapa Bay, Washington; these are the mid-points of the age ranges for these six events. Most likely affected local Native American populations.

¹¹ Ivan Wong and Jacqueline D.J. Bolt, 1995, "A Look Back at Oregon's Earthquake History, 1841-1994", Oregon Geology, pp. 125-139.

The Pacific Northwest Seismic Network: Notable Pacific Northwest Earthquakes since 1993

Probability Assessment

Based on the available data, the new data from the state, and research for Josephine County, the NHMP Steering Committee determined the **probability of experiencing a Cascadia Subduction Zone (CSZ 3-5 min) is “moderate”**, meaning one incident may occur within the next 35 to 75 years. Additionally, the **probability of a crustal earthquake (1 min) is “low”**, meaning one incident may occur within the next 35 to 75 years. *These ratings have not changed since the previous plan.*

Josephine County is susceptible to deep intraplate events within the Cascadia Subduction Zone (CSZ), where the Juan de Fuca Plate is diving beneath the North American Plate, and shallow crustal events within the North American Plate.

Establishing a probability for crustal earthquakes is difficult given the small number of historic events in the region. Earthquakes generated by volcanic activity in Oregon’s Cascade Range are possible, but likewise unpredictable. The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has undertaken a rigorous program in Oregon to identify seismic hazards, including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides. DOGAMI estimates that Grants Pass has a 32-45% chance of experiencing damaging shaking over the next 100 years.¹² For more information, see DOGAMI reports linked above.

According to the Oregon NHMP, the return period for the largest of the CSZ earthquakes (Magnitude 9.0+) is 530 years with the last CSZ event occurring 314 years ago in January of 1700. The probability of a 9.0+ CSZ event occurring in the next 50 years ranges from 7 - 12%. Notably, 10 - 20 “smaller” Magnitude 8.3 - 8.5 earthquakes occurred over the past 10,000 years that primarily affected the southern half of Oregon and northern California. The average return period for these events is roughly 240 years. The combined probability of any CSZ earthquake occurring in the next 50 years is 37 - 43%.

Vulnerability Assessment

The NHMP Steering Committee rated the county as having a **“high” vulnerability for the Cascadia Subduction Zone (CSZ) earthquake hazard** and a **“moderate” vulnerability for crustal earthquake event**, meaning that more than 10% of the region’s population or assets could be affected by a major CSZ emergency 1-10% for the crustal earthquake event. *These ratings have not changed since the previous plan.* Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

The local faults, the county’s proximity to the Cascadia Subduction Zone, potential slope instability, and the prevalence of certain soils subject to liquefaction and amplification combine to give the county a high-risk profile. Due to the expected pattern of damage resulting from a CSZ event, the Oregon Resilience Plan divides the State into four distinct zones and places Josephine County predominately within the “Valley” zone (Valley Zone, from the summit of the Coast Range to the summit of the Cascades), however, portions of the county are within the “Coastal Zone” (the area outside of the tsunami zone, from the

¹² DLCD. *Oregon State Natural Hazard Mitigation Plan*. 2020.

Oregon coastline to the summit of the Coast Range)¹³. Within the Southwest Oregon region, damage and shaking is expected to be strong and widespread - an event will be disruptive to daily life and commerce, and the main priority is expected to be restoring services to business and residents.¹⁴

A brief overview of expected losses due to a CSZ event can be seen in Table 2-6. For more information on expected losses, see the [Oregon Resilience Plan](#).

Table 2-6 Estimated Damages and Losses in Region 4 Associated with Two Earthquake Models

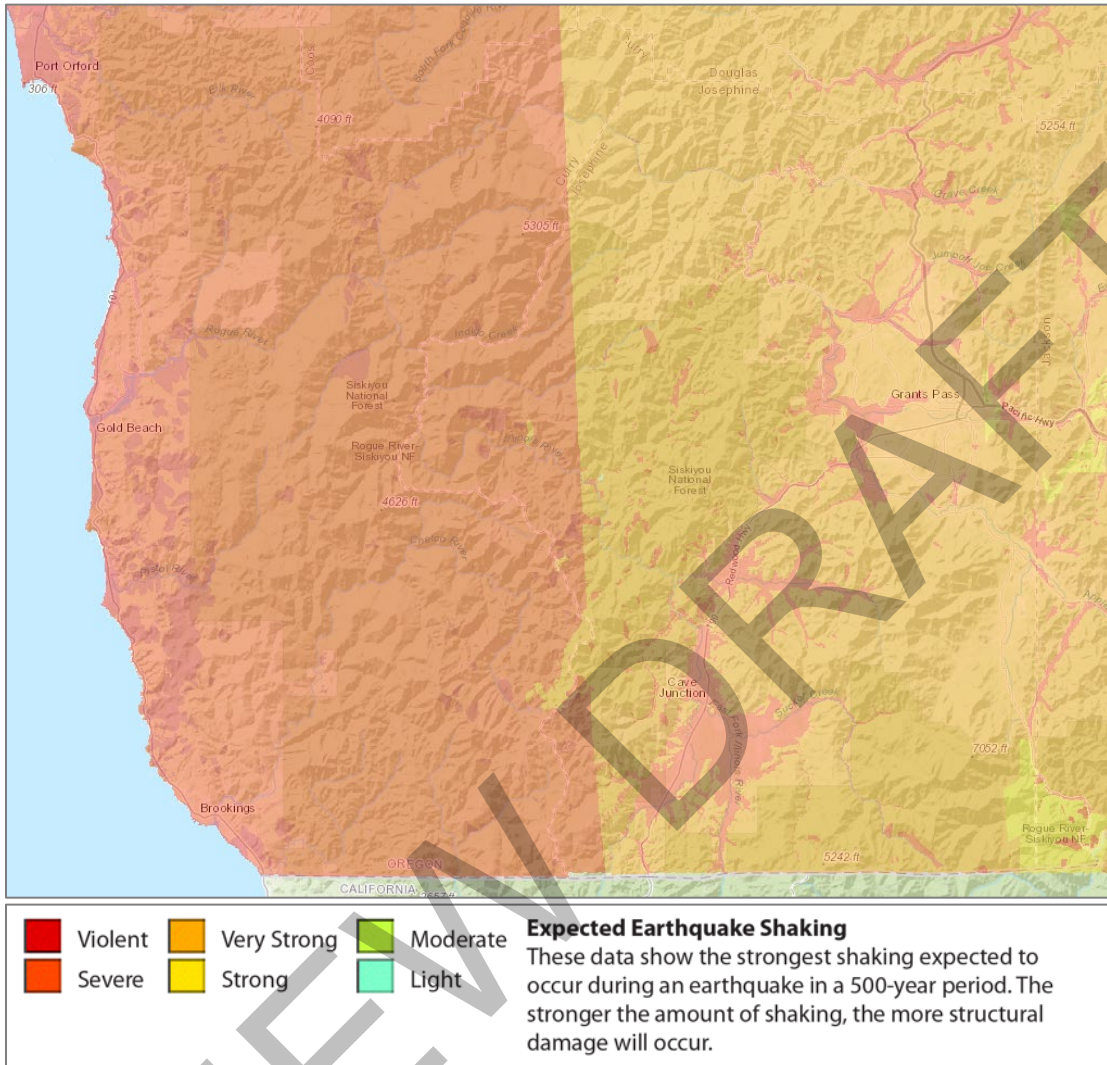
Damage/Loss Type	M8.5 CSZ Event			500-Year Model ¹		
	Douglas	Jackson	Josephine	Douglas	Jackson	Josephine
Injuries	151	428	418	294	930	585
Deaths	2	8	7	4	18	11
Displaced households	255	650	573	534	1,458	872
Economic losses for buildings ²	\$275 m	\$538 m	\$593 m	\$546 m	\$1.2 b	\$847 m
Operational the "day after" the event ³ :						
Fire stations	66%	75%	22%	N/A	N/A	N/A
Police stations	57%	62%	45%	N/A	N/A	N/A
Schools	44%	70%	34%	N/A	N/A	N/A
Bridges	74%	84%	73%	N/A	N/A	N/A
Economic losses to:						
Highways	\$43 m	\$10 m	\$16 m	\$69 m	\$34 m	\$29 m
Airports	\$5 m	\$2 m	\$5 m	\$9 m	\$8 m	\$10 m
Communications	\$7 m	\$2 m	\$4 m	\$12 m	\$9 m	\$8 m
Debris generated (thousands of tons)	222	434	476	411	889	614
Notes: "b" is billion; "m" is million						
¹ Every part of Oregon is subject to earthquakes. The 500-year model is an attempt to quantify the risk across the state. The estimate does not represent a single earthquake. Instead, the 500-year model includes many faults, each with a 10% chance of producing an earthquake in the next 50 years. The model assumes that each fault will produce a single "average" earthquake during this time. More and higher magnitude earthquakes than used in this model may occur (DOGAMI, 1999).						
² There are numerous unreinforced masonry structures (URMs) in Oregon, the currently available default building data does not include any URMs. Thus, the reported damage and loss estimates may seriously under-represent the actual threat" (Wang, 1998, p. 5)						
³ Because the 500-year model includes several earthquakes, the number of facilities operational the "day after" cannot be calculated.						

Source: Wang and Clark (1999)

¹³ Oregon Seismic Safety Policy Advisory Commission, *Oregon Resilience Plan* (2013)

¹⁴ Ibid.

Figure 2-5 Cascadia Subduction Zone Damage Potential



Source: [Oregon HazVu: Statewide Geohazards Viewer \(HazVu\)](#)

2007 Rapid Visual Survey

Building codes were implemented in Oregon in the 1970s, however, stricter standards did not take effect until 1991 and early 2000s. As noted in the community profile approximately 76% of residential buildings were built prior to 1990, which increases the county's vulnerability to the earthquake hazard.

In 2007, DOGAMI completed a rapid visual screening (RVS) of educational and emergency facilities in communities across Oregon, as directed by the Oregon Legislature in Senate Bill 2 (2005). RVS is a technique used by FEMA ([FEMA P-154](#)) to identify, inventory and rank buildings that are potentially vulnerable to seismic events. DOGAMI ranked each building surveyed with a 'low,' 'moderate,' 'high,' or 'very high' potential for collapse in the event of an earthquake. It is important to note that these rankings represent a probability of collapse based on limited observed and analytical data and are therefore approximate rankings. To fully assess a buildings potential for collapse, a more detailed engineering study completed

by a qualified professional is required, but the RVS study can help to prioritize which buildings to survey.

Table 2-7 Rapid Visual Survey Scores (2007)

Facility	Site ID*	Level of Collapse Potential			
		Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Schools					
Ft Vannoy Elementary (5250 Upper River Rd)	Jose_sch10		X	XX	
Fleming Middle (6001 Monument Dr)	Jose_sch08	XXXXX		X	
Hidden Valley High (651 Murphy Creek Rd)	Jose_sch15			X	
Jerome Prairie Elementary (2555 Walnut Ave)	Jose_sch11	XX	X	X	
Lincoln Savage Elementary (8551 New Hope Rd)	Jose_sch12	XXXXX	XX		
Madrona Elementary (520 Detrick Dr)	Jose_sch19	XXXX	X		
Manzanita Elementary (310 San Francisco St)	Jose_sch14	XX	X	X	
North Valley High (6741 Monument Dr)	Jose_sch17			X	
Rogue CC -Café - Redwood (3345 Redwood Hwy)	Jose_coc05	X			
Rogue CC - Building U (Gym) (3345 Redwood Hwy)	Jose_coc01		X		
Rogue CC - Coats Hall (3345 Redwood Hwy)	Jose_coc02				X
Rogue CC - Library & Wiseman Tutoring Ctr (3345 Redwood Hwy)	Jose_coc03		X		
Rogue CC - K Building (3345 Redwood Hwy)	Jose_coc06			X	
Public Safety					
Applegate Valley RFPD (1076 Kubli Rd)	Jose_fir07	X			
Applegate Valley RFPD (12100 Williams Hwy)	Jose_fir08	X			
Williams RFPD (215 E Fork Rd)	Jose_fir09	X			
Wolf Creek RFPD (100 Coyote Creek Rd)	Jose_fir10	X			

Source: [DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment](#). Notes: "*" – Site ID is referenced on the [RVS Josephine County Map](#); *Light grey italicized text* indicates a facility that has benefited from seismic mitigation (see success stories for detail). DOGAMI, Open-File Report O-20-11, Josephine County Natural Hazard Risk Report (2020).

In addition, Josephine County notes that the County Courthouse (Justice Building) is likely to collapse during a seismic event. Per a 2017 geo-engineer assessment it was determined that most services of this building be relocated to less vulnerable locations. The historic and

culturally important structure will remain. Future seismic assessments will determine retrofit options.

Mitigation Successes

Seismic retrofits have occurred to the following facilities through local funds (construction bonds, etc.) and/or grant awards per the [Seismic Rehabilitation Grant Program](#)¹⁵.

- Three Rivers School District – Hidden Valley High Gym: \$1,493,953 (2019 SRGP)

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Flood

Significant Changes since Previous NHMP:

This section has updated data for the National Flood Insurance Program and hazard history.

Characteristics

Flooding results when rain and snowmelt creates water flow that exceed the carrying capacity of rivers, streams, channels, ditches, and other watercourses. In Oregon, flooding is most common from October through April when storms from the Pacific Ocean bring intense rainfall. Most of Oregon’s destructive natural disasters have been floods.¹⁶

The principal types of flooding that occur in Josephine County include riverine flooding, shallow area flooding, and urban flooding.

Floods frequently occur in Josephine County during periods of heavy rainfall. The primary sources of riverine flooding include the Rogue River, the Illinois River, and the Applegate River and their tributaries within the Rogue/Umpqua Basin. Additional flooding events have been attributed to Slate Creek and Butcher Knife Creek.

Riverine Flooding

Riverine flooding is the overbank flooding of rivers and streams. The natural processes of riverine flooding add sediment and nutrients to fertile floodplain areas. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers. Figure 2-8 shows the various river basins in Josephine County.

Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the 100-year flood with flood depths of only one to three feet. These areas are generally flooded by low velocity sheet flows of water.

¹⁵ The Seismic Rehabilitation Grant Program (SRGP) is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public schools and emergency services facilities (police/fire).

¹⁶ Taylor, George H. and Chris Hannan. *The Oregon Weather Book*. Grants Pass, OR: Oregon State University Press. 1999

Urban flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds to the ground, and into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in floodwaters that rise very rapidly and peak with violent force.

Incorporated areas of the County have a high concentration of impermeable surfaces that either collect water or concentrate the flow of water in unnatural channels. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with vegetative debris causing additional, localized flooding.

Location and Extent

Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. Flood studies often use historical records, such as streamflow gages, to determine the probability of occurrence for floods of different magnitudes. The probability of occurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year.

The magnitude of flood used as the standard for floodplain management in the United States is a flood having a probability of occurrence of one percent in any given year. This flood is also known as the 100-year flood or base flood. The most readily available source of information regarding the 100-year flood is the system of Flood Insurance Rate Maps (FIRMs) prepared by FEMA. These maps are used to support the NFIP. The FIRMs show 100-year floodplain boundaries for identified flood hazards. These areas are also referred to as Special Flood Hazard Areas (SFHAs) and are the basis for flood insurance and floodplain management requirements. See Figures 2-6 and 2-12.

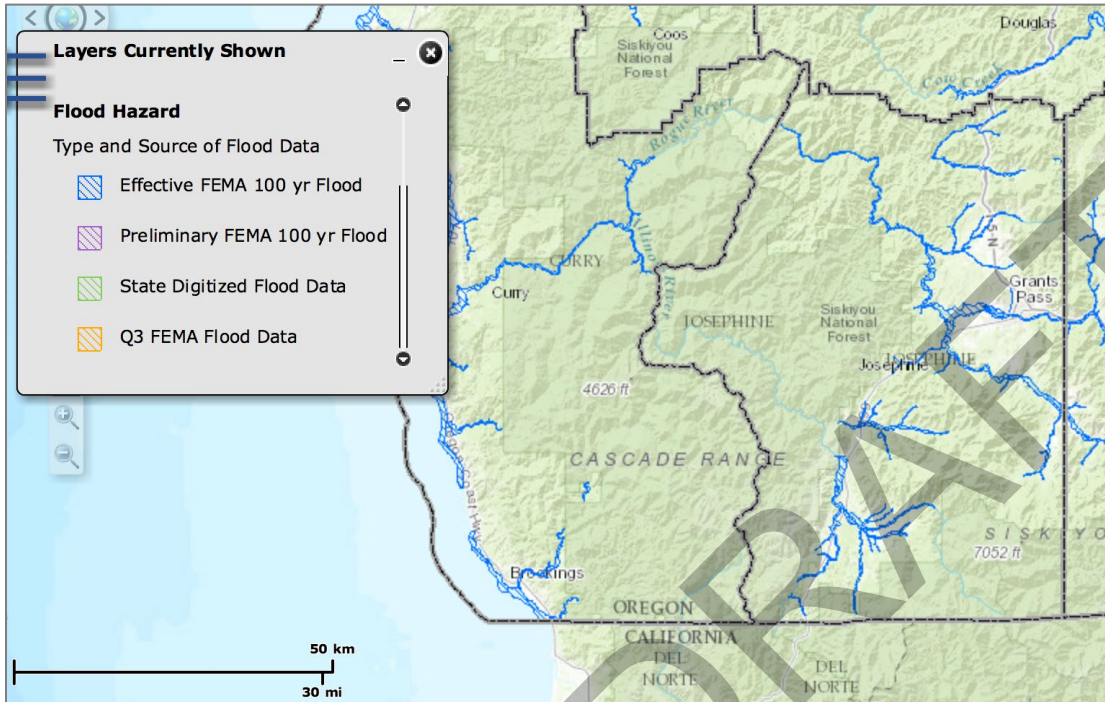
Areas with significant development in the mapped floodplains include Cave Junction (Illinois floodplain), Kerby, O'Brien, Wilderville (Applegate floodplain), North Redwood (Rogue floodplain), Southern Grants Pass (Rogue floodplain), the northern and western portions of Merlin (Jump Off Joe Creek floodplain), and portions of Wolf Creek along Highway 99 (Wolf Creek floodplain). Portions of the following smaller communities are also within FEMA-mapped floodplains: Galice, New Hope, Murphy, Provolt, and Applegate. For more information, refer to the following Flood Insurance Study (FIS) and associated Flood Insurance Rate Maps (FIRM):

- [Josephine County FIS Vol 1 - 2009](#)
- [Josephine County FIS Vol 2 - 2009](#)

Additional reports are available via DOGAMI's Publications Search website:

<http://www.oregongeology.org/pubs/search.php>

Figure 2-6 Special Flood Hazard Area



Source: [Oregon HazVu: Statewide Geohazards Viewer](#) – To view map in more detail click hyperlink to left.

History

Between the 1850's and the present, human activity significantly changed the hydrology of the Rogue, Illinois, and Applegate watersheds, including changes to Hydroelectric dams and flood control systems were constructed throughout the drainage basin. Private and public organizations engaged in the dewatering of wetlands, the draining of floodplains, and diking along some sections of the river. More recently, increasing urbanization has contributed to changes in basin hydrology. Prior to human alteration of the river system, rivers in the region flooded larger areas more often.

Listed below are historical flooding events that affected the Rogue/Umpqua River Basin and including events related to the Illinois and Applegate Rivers and tributary streams.

- **1861** - Rogue River Crests at 43 feet at Grants Pass (175,000 cfs)
- **1890** - Rogue River Crests at 36 feet at Grants Pass.
- **1927** - Rogue River Crests at 32 feet at Grants Pass.
- **October 1950** - Severe flooding in Region 4. Six fatalities. Bridges and roads destroyed.
- **1955** - Rogue River Crests at 32.6 feet at Grants Pass.
- **December 1964** – Statewide flooding event; benchmark event with record flows on the Rogue and Umpqua rivers. Rogue River Crests at 35.15 feet at Grants Pass; flood stage is 24.5 feet. \$90 million in damages (2004 dollars) Rogue and Illinois Valleys isolated with roads (including I-5) temporarily closed; 10 inches of rain over a six-day period.

- **December 1996** - Wolf Creek small stream flooding. A series of storms dumped several inches of rain within a four-day period, Dec. 7 through Dec. 10; caused mudslides and flooding.
- **January, 1997** – 4 inches of rain over 48 hours; 90,100 cfs in Grants Pass; \$10 million in damages. Governor Kitzhaber declared a state of emergency.
- **1999** - Wilderville/ Selma, February 28, 1999. Small stream Flood Warning issued in County; Shade Creek reported out of banks and threatening nearby road; Deer Creek above bank
- **December 27, 2002** - Numerous reports of flooding with rainfall between 2 and 4 inches countywide;
- **April 2005** - 3.6 inches of rain fell in one hour in Grants Pass Warning Area (2.0 inches in 45 minutes in Merlin) flooding city streets; mud and debris on county roads.
- **December 2005** - \$2,840,000 in flood damage centered in Douglas, Jackson and Josephine counties.
- **January and March 2012** The Mountain Man RV Park about halfway between O'Brien and Cave Junction was partially evacuated due to flooding.
- **November 2012** Local roads near O'Brien were flooded in multiple areas.
- **February 2015** High water closed 2 of the 4 lanes on Highway 199 near Sauer's Flat. Water was also over Highway 238 between mileposts 20 and 23 near Applegate. Riverbank road near Wilderville was flooded in places with the worst flooding near Griffin Park. One foot of water was reported on Highway 199 near Selma. Many roads were closed near Selma and O'Brien due to flooding. Butch Knife Creek near Selma flooded.
- **December 2015** Flooding, downed trees, and widespread power outages were reported throughout the county.
- **January 2016** At least one street in Grants Pass was closed due to flooding.

No significant flood events have been added since the previous plan. No serious flooding events have occurred since 2005.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee determined the **probability of experiencing a riverine flood is “high”**, meaning one incident may occur within the next 10 to 35 year period; *this rating has not changed since the previous plan.*

The Federal Emergency Management Agency (FEMA) has mapped the 10, 50, 100, and 500-year floodplains in portions of Josephine County (see referenced 2009 FIS for more information). This corresponds to a 10%, 2%, 1% and 0.2% chance of a certain magnitude flood in any given year. The 100-year flood is the benchmark upon which the National Flood Insurance Program (NFIP) is based.

Future Climate Projection:

According to OCCRI report “*Fifth Oregon Climate Assessment*”¹⁷ the intensity of extreme precipitation is expected to increase as the atmosphere warms. The primary factor for the increase in intensity is because warmer air can hold more moisture that is available to fall as

¹⁷ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

rain or snow in a warmer climate. Secondly, magnitudes are expected to increase since rainfall driven floods tend to have larger flood peaks than snowmelt driven floods. Lastly, precipitation is expected to increase, greater precipitation implies a higher likelihood of wetter soil and reduced depth to ground water which enables flooding. There are also expected to be an increase in atmospheric river events.

Vulnerability Assessment

The NHMP Steering Committee rated the county as having a **“moderate” vulnerability to flood hazards**, meaning that between 1-10% of the region’s population or assets could be affected by a major flood event; *this rating has not changed since the previous plan*. Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Flooding can occur every year depending on rainfall, snowmelt, or how runoff from development impacts streams and rivers. Surveys by the Department of Geology & Mineral Industries (DOGAMI), the county, and FEMA have established the 100-year floodplain.

The floodplains in Josephine County are generally located along the Illinois, Rogue, and Applegate, and Umpqua Rivers. Josephine County development regulations restrict, but do not prohibit, new development in areas identified as floodplain. This reduces the impact of flooding on future buildings. As new land has been brought into the regional Urban Growth Boundary, the applicable development codes have been applied to prevent the siting of new structures in flood prone areas.

National Flood Insurance Program (NFIP)

FEMA’s Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs) are effective as of December 3, 2009. Table 2-8 shows that as of January 2022, the unincorporated County has 305 National Flood Insurance Program (NFIP) policies in force, representing just under \$76 million in coverage. Of those, 147 are for structures that were constructed before the initial FIRMs. The last Community Assistance Visit (CAV) for the unincorporated County was on May 19, 2005. The table shows that most flood insurance policies are for residential structures (94%), primarily single-family homes. Flood insurance covers only the improved land, or the actual building structure. There has been a total of 64 paid claims totaling \$487,328.

The County complies with the NFIP through enforcement of their flood damage prevention ordinance and their floodplain management program.

The NFIP’s Community Rating System (CRS) recognizes jurisdictions for participating in floodplain management practices that exceed NFIP minimum requirements. The County does not participate in the CRS and, therefore, property owners do not receive discounted flood insurance premiums within the unincorporated areas of the County.

The Community Repetitive Loss record for the City identifies six (6) Repetitive Loss Properties¹⁸ and no Severe Repetitive Loss Properties¹⁹.

Table 2-8 Flood Insurance Detail

	Josephine County	Unincorporated Josephine County
Effective FIRM and FIS	12/3/2009	12/3/2009
Initial FIRM Date	6/1/1982	6/1/1982
Total Policies	558	305
Pre-FIRM Policies	228	147
Policies by Building Type		
Single Family	521	282
2 to 4 Family	7	1
Other Residential	6	5
Non-Residential	22	16
Minus Rated A Zone	71	26
Insurance in Force	\$142,389,400	\$75,966,600
Total Paid Claims	85	64
Pre-FIRM Claims Paid	53	37
Substantial Damage Claims	3	2
Total Paid Amount	\$589,774	\$487,328
Repetitive Loss Structures	9	6
Severe Repetitive Loss Properties	0	0
CRS Class Rating	-	NP
Last Community Assistance Visit	-	5/19/2005

Source: Department of Land Conservation and Development, January 2022. NP = Not Participating.

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

¹⁸ A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

¹⁹ A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP, and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000, and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Landslide

Significant Changes since Previous NHMP:

One (1) significant landslide event has occurred since the previous NHMP. Landslide susceptibility information based on updated Lidar data provided by DOGAMI (O-16-02) has also been included.

Characteristics

A landslide is any detached mass of soil, rock, or debris that falls, slides, or flows down a slope or a stream channel. Landslides are classified according to the type and rate of movement and the type of materials that are transported. In a landslide, two forces are at work: 1) the driving forces that cause the material to move down slope, and 2) the friction forces and strength of materials that act to retard the movement and stabilize the slope. When the driving forces exceed the resisting forces, a landslide occurs.

Josephine County is subject to landslides or debris flows (mudslides), especially in the Coast Range, which may affect buildings, roads, and utilities.

Additionally, landslides often occur together with other natural hazards, thereby exacerbating conditions, as described below:

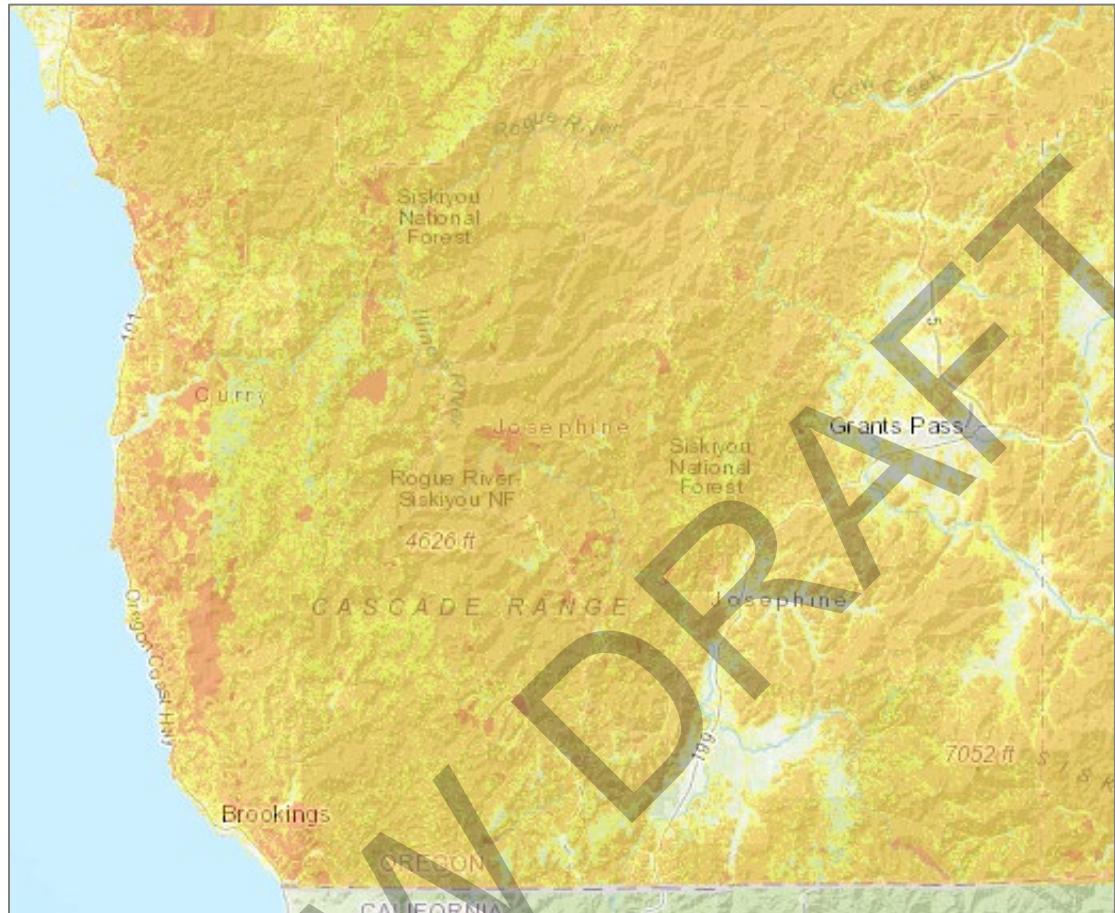
- Shaking due to earthquakes can trigger events ranging from rockfalls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Landslides into a reservoir can indirectly compromise dam safety, and a landslide can even affect the dam itself.
- Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential.

Location and Extent

The characteristics of the minerals and soils present in Josephine County indicate the potential types of hazards that may occur. Rock hardness and soil characteristics can determine whether an area will be prone to geologic hazards such as landslides.

Landslides and debris flows are possible in any of the higher slope portions of Josephine County, including much of the eastern portion of the county. Landslide prone areas also include portions of the communities of Grants Pass and Williams.

Figure 2-7 Landslide Susceptibility Exposure



Low	Landsliding unlikely. Areas classified as Landslide Density = Low (less than 7%) and areas classified as Slopes Prone to Landsliding = Low.
Moderate	Landsliding possible. Areas classified as Landslide Density = Low to Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = Moderate OR areas classified as Landslide Density = Moderate (7%-17%) and areas classified as Slopes Prone to Landsliding = Low.
High	Landsliding likely. Areas classified as Landslide Density = High (greater than 17%) and areas classified as Slopes Prone to Landsliding = Low and Moderate OR areas classified as Landslide Density = Low and Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = High.
Very High	Existing landslides Landslide Density and Slopes Prone to Landsliding data were not considered in this category. Note: the quality of landslide inventory (existing landslides) mapping varies across the state.

Source: [Oregon Explorer: Map Viewer](#) – To explore and view map detail click hyperlink to left.

More detailed landslide hazard assessment at specific locations requires a site-specific analysis of the slope, soil/rock, and groundwater characteristics at a specific site. Such assessments are often conducted prior to major development projects in areas with moderate to high landslide potential, to evaluate the specific hazard at the development site.

For Josephine County, many high landslide potential areas are in hilly-forested areas. Landslides in these areas may damage or destroy some timber and impact logging roads. Many of the major highways in Josephine County are at risk for landslides at one or more

locations with a high potential for road closures and damage to utility lines. Especially in the central-western portions of Josephine County, with a limited redundancy of road network, such road closures may isolate some communities. In addition to direct landslide damages to roads and highways, affected communities are also subject to the economic impacts of road closures due to landslides, which may disrupt access to/egress from communities.

Table 2-9 shows landslide susceptibility exposure for Josephine County and the cities of Cave Junction and Grants Pass. Approximately 69.8% of the county land has High or Very High landslide susceptibility exposure. Josephine County cities have very low percentages of high and very high landslide exposure susceptibility (about 7% in Cave Junction and Grants Pass). Grants Pass has the highest percentage of Moderate exposed land area (20.6%) compared to Cave Junction or Josephine County. *Note that even if a county or city has a high percentage of area in a high or very high landslide exposure susceptibility zone, this does not mean there is a high risk, because risk is the intersection of hazard and assets.*

Table 2-9 Landslide Susceptibility Exposure

Jurisdiction	Area, ft ²	Low	Moderate	High	Very High
Josephine County	45,768,477,096	12.4%	17.8%	68.5%	1.3%
Cave Junction	49,309,811	74.8%	18.2%	7.0%	0.0%
Grants Pass	306,611,299	72.8%	20.6%	6.6%	0.0%

Source: DOGAMI Open-File Report, O-16-02, Landslide Susceptibility Overview Map of Oregon (2016)

The severity or extent of landslides is typically a function of geology and the landslide triggering mechanism. Rainfall initiated landslides tend to be smaller, and earthquake induced landslides may be very large. Even small slides can cause property damage, result in injuries, or take lives.

- Statewide Landslide Susceptibility (2016, [O-16-02](#)).
- Landslide susceptibility analysis of lifeline routes in the Oregon Coast Range (2015, [O-15-01](#)).
- Geologic Map of Josephine County (2004, [O-04-03](#))
- Slope failures in Oregon: GIS inventory for three 1996/97 storm events (2000, [Special Paper 34](#)).

Additional reports are available via DOGAMI’s Publications Search website:

<http://www.oregongeology.org/pubs/search.php>

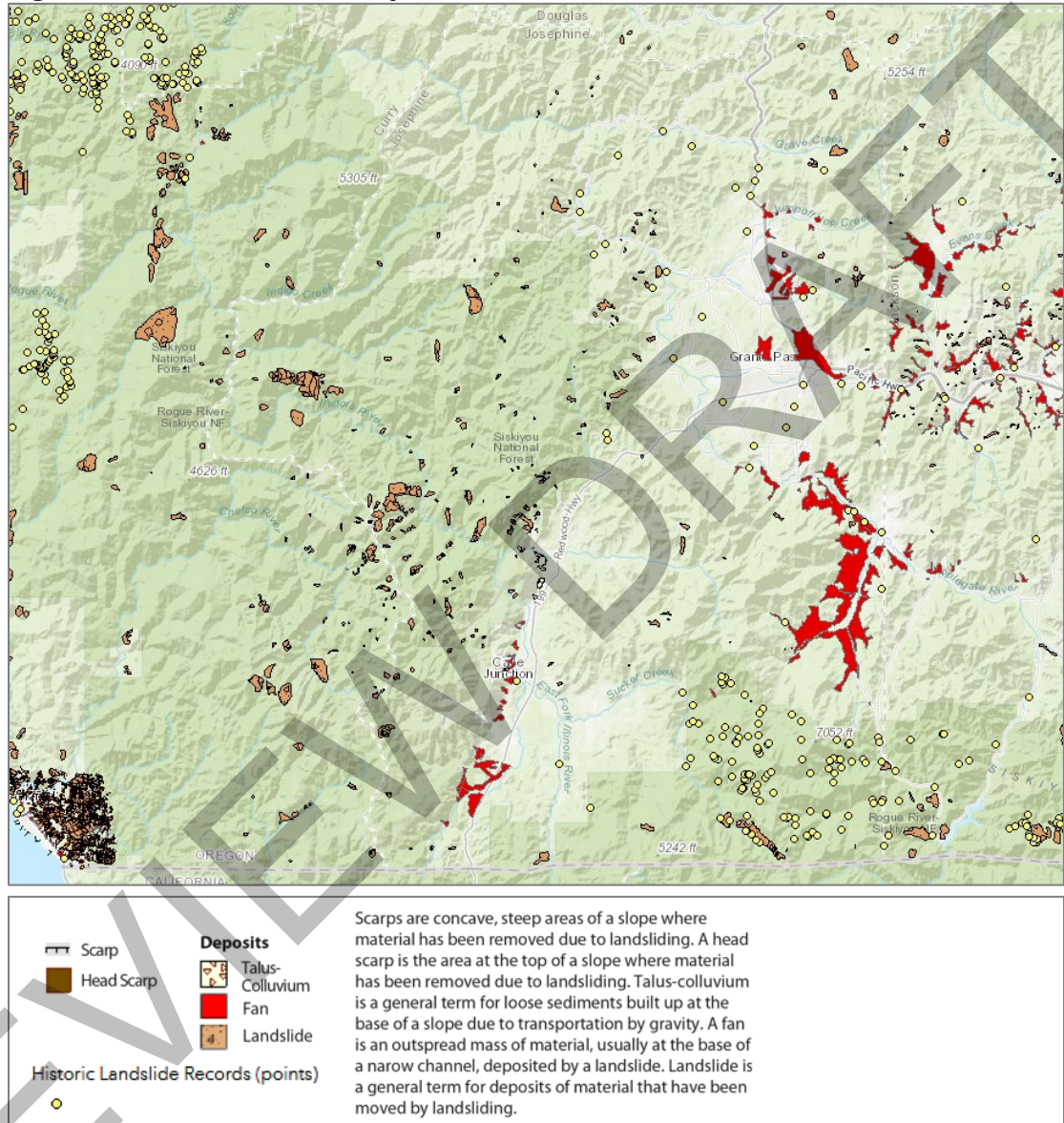
History

Landslides may happen at any time of the year. In addition to landslides triggered by a combination of slope stability and water content, earthquakes may also trigger landslides. Areas prone to seismically triggered landslides are generally the same as those prone to ordinary (i.e., non-seismic) landslides. As with ordinary landslides, seismically triggered landslides are more likely for earthquakes that occur when soils are saturated with water.

Debris flows and landslides are a very common occurrence in hilly areas of Oregon, including portions of Josephine County. Many landslides occur in undeveloped areas and thus may go unnoticed or unreported. For example, DOGAMI conducted a statewide survey of landslides from four winter storms in 1996 and 1997 and found 9,582 documented landslides, with the actual number of landslides estimated to be many times the documented number. For the

most part, landslides become a problem only when they impact developed areas and have the potential to damage buildings, roads, or utilities. Figure 2-8 shows the landslide inventory for Josephine County, for additional information see the [Statewide Landslide Information Database for Oregon](#).

Figure 2-8 Landslide Inventory



Source: SLIDO: [Statewide Landslide Information Layer for Oregon](#)

Below are listed the most severe landslide events, as well as the two (2) landslide event/s have been added since the previous plan (as shown in *italics* below):

- **1974** - Canyon Creek near Canyonville in Douglas County. Nine people were killed.
- **1996/1997** - Severe storms caused damage across the state. Josephine County experienced many slope failures.
- **February 2002** - Slide on Galice Access Road at milepost 4.6;

- **December 2005** – January 2006: Josephine County was one of 19 counties that were included in a presidentially declared disaster for severe storms, flooding, landslides and mudslides. Direct damage in Josephine County is not known.
- **May 2010** - Landslide on Southside Road caused by erosion related with the Applegate River
- **January 2012** – On February 16, 2012, Governor John A. Kitzhaber, M.D. requested a major disaster declaration due to a severe winter storm, flooding, landslides, and mudslides during the period of January 17- 21, 2012. The Governor requested a declaration for Individual Assistance for five counties, Public Assistance for 12 counties (including Josephine) and Hazard Mitigation statewide.
- **February 2014** – On March 21, 2014, Governor John A. Kitzhaber requested a major disaster declaration due to a severe winter storm, flooding, landslides, and mudslides during the period of February 6-14, 2014. The Governor requested a declaration for Public Assistance for seven counties (including Josephine) and Hazard Mitigation statewide.
- **February 2016** – A major 10,000 cubic-yard landslide occurred near the 13-mile mark along Galice Road. Total clean-up costs of the affected road areas were over \$140,000 and the route was closed for 6 weeks.
- **December 2016 – FEMA 4296-DR** – Landslides in Josephine and Lane county between the period of December 14-17, 2016. Had a Public Assistance Cost Estimate of \$113,000 for Josephine County.
- **January 2017 – FEMA 4328-DR** – Many Landslides withing the county, between the period of January 7-10 with closed roads including OR-36, OR-58, and OR103. Part of a Severe Winter Storm that put all of Oregon into a State of Emergency (Executive Order 17-02). Had a Public Assistance Cost Estimate of \$468,000 for Josephine County.
- **Fall 2020** - following the Slater Fire (FM-5369) the NWS did issue a "Flash Flood Alert" for the southeastern most portion of JO Co in the burn - there was reported temporary silt impacts to local tributaries and a couple USFS road culvert fills, road cuts, but no reported resident losses or damages.

For additional history see flood section above for events that included landslides.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee determined the **probability of experiencing a landslide or debris flow is "moderate"**, meaning at least one incident may occur within the next 35 to 70-year period. *This rating has not changed since the previous plan.*

The probability of rapidly moving landslide occurring depends on several factors, including steepness of slope, slope materials, local geology, vegetative cover, human activity, and water. There is a strong correlation between intensive winter rainstorms and the occurrence of rapidly moving landslides (debris flows). Consequently, the National Weather Service tracks storms during the rainy season, monitors rain gauges and snow melt and issues warnings as conditions warrant. Given the correlation between precipitation, snowmelt, and rapidly moving landslides, it could be feasible to construct a probability curve. The installation of slope indicators or the use of more advanced measuring techniques could provide information on slower moving slides.

Geo-engineers with DOGAMI estimate widespread landslides about every 20 years; landslides at a local level can be expected every two or three years.²⁰

Future Climate Projection:

According to OCCRI report “*Fifth Oregon Climate Assessment*”²¹ the intensity of extreme precipitation is expected to increase as the atmosphere warms. Landslides, triggered by precipitation are expected to increase with the intensity of extreme precipitation events. Additionally, landslides may increase in wildfire impacted landscapes.

Vulnerability Assessment

The NHMP Steering Committee rated the county as having a “**low**” **vulnerability to landslide hazards**, meaning that less than 1% of the region’s population or assets could be affected by a major disaster; *this rating has not changed since the previous plan*. Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Landslides can affect utility services, transportation systems, and critical lifelines. Communities may suffer immediate damages and loss of service. Disruption of infrastructure, roads, and critical facilities may also have a long-term effect on the economy. Utilities, including potable water, wastewater, telecommunications, natural gas, and electric power are all essential to service community needs. Loss of electricity has the most widespread impact on other utilities and on the whole community. Natural gas pipes may also be at risk of breakage from landslide movements as small as an inch or two.

In addition to the immediate damage and loss of services, serious disruption of roads, infrastructure and critical facilities and services may also have longer term impacts on the economy of the community and surrounding area. Lifelines and critical facilities should remain accessible if possible, during a natural hazard event. The impact of closed transportation arteries may be increased if the closed road or bridge is a critical lifeline to hospitals or other emergency facilities. Therefore, inspection and repair of critical transportation facilities and routes is essential and should receive high priority. Losses of power and phone service are also potential consequences of landslide events. Due to heavy rains, soil erosion in hillside areas can be accelerated, resulting in loss of soil support beneath high voltage transmission towers in hillsides and remote areas.

A quantitative landslide hazard assessment requires overlay of landslide hazards (frequency and severity of landslides) with the inventory exposed to the hazard (value and vulnerability) by considering:

1. Extent of landslide susceptible areas;
2. Inventory of buildings and infrastructure in landslide susceptible areas;
3. Severity of earthquakes or winter storm event (inches of rainfall in 24 hours);
4. Percentage of landslide susceptible areas that will move and the range of movements (displacements) likely; and
5. Vulnerability (amount of damage for various ranges of movement).

²⁰Mills, K. 2002. Oregon’s Debris Flow Warning System. Cordilleran Section–98th Annual Meeting. Corvallis.

²¹ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

Currently, data does not allow for specific estimates of life and property losses during a given scenario.

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Severe Weather

Severe weather in Josephine County can account for a variety of intense and potentially damaging weather events. These events include windstorms, winter storms, and extreme heat. The following section describes the unique probability and vulnerability of each identified county weather hazard. Other more abrupt or irregular events such as hail are also described in this section.

Future Climate Projections

According to OCCRI report “*Fifth Oregon Climate Assessment*”²² projected climate variations are expected to increase the frequency and intensity of some weather incidents. Oregon and the Pacific Northwest experience a variety of extreme weather incidents ranging from severe winter storms and floods to drought and dust storms, often resulting in morbidity and mortality among people living in the impacted regions. Hot summer days are expected to increase and night overnight lows will continue to be warmer. Additionally, the frequency, intensity, and duration of extreme heat events is also expected to increase.

These variations pose risks for increased injuries, illnesses, and deaths from both direct and indirect effects. Incidents of extreme weather (such as floods, droughts, severe storms, heat waves and fires) can directly affect human health as well as cause serious environmental and economic impacts. Indirect impacts can occur when climate change alters or disrupts natural systems.

Extreme Heat

Significant Changes since Previous NHMP:

The Extreme Heat section has been added to the NHMP.

Characteristics

Excessive Heat Events are a geographically widespread temperature spike with days reaching over 90 degrees in all parts of the Region (Region 4 under the state’s NHMP). Josephine County has the potential to become a place of extreme temperature events. Extreme temperature events have the potential to inflict serious health damage especially during summer months. In extreme heat environments, the body must work harder to maintain a normal temperature, potentially causing dehydration and heatstroke from over-exposure. These heat-related illnesses are particularly impactful among vulnerable population types²³. Between 1979 and 2003, heat waves killed at least 8,015 Americans, according to the Centers for Disease Control and Prevention. That’s more than hurricanes,

²² Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

²³ FEMA “Extreme Heat” <http://www.ready.gov/heat>

lightning, tornadoes, floods, and earthquakes combined. And it's largely an urban problem—the bulk of those deaths occur in cities.⁴⁹

Location and Extent

Excessive Heat Events are generally region wide. Josephine County, like the rest of Southern Oregon, experiences some of the hottest temperatures in the state and is projected to experience greater frequency of extreme temperatures. Extreme Heat can occur yearly; Josephine County has an average of 13 extreme heat days per year.²⁴ Grants Pass has about 55 days annually when the high temperature is over 90°, which is one of the hottest places in Oregon.²⁵ Cave Junction is typically even hotter with around 62 days annually when the high temperature is over 90°.

It is extremely likely (>95%) that the frequency and severity of extreme heat events will increase over the next several decades across Oregon due to current projected climate variations (very high confidence). Table 2-10 shows the historic number of excessive heat days per year, as well as the projected change within 30 years.

Table 2-10 Annual Number of Days Exceeding Heat Index ≥ 90°F for Region 4 Counties

County	Average Number of Days Over 90°	
	Historic Baseline	2050s Future
Douglas	6	28
Jackson	9	33
Josephine	13	40

Source: Oregon State NHMP 2020²⁶

History

The following extreme heat episodes have occurred within Josephine County -- ten (10) extreme heat events were added to this hazard history section since the previous plan:²⁷

- **2017 (Aug 1-4) - Excessive Heat Event** - Strong high pressure brought record breaking heat to many parts of southwest, south central, and northwest Oregon. Reported high temperatures during this interval ranged from 87 to 109 degrees in Josephine County.
- **2018 (Jul 12-17) - Excessive Heat Event** - Strong high pressure coupled with very dry air brought very hot temperatures to the area during this interval. High temperatures ranged from 91 to 104 degrees in Josephine County.

²⁴ Oregon State NHMP 2020, 844.

²⁵ https://www.bestplaces.net/climate/city/oregon/grants_pass

²⁶ Note: Numbers represent the multi-model mean from 18 CMIP5 Climate models.

²⁷ Taylor, George H., and Ray Hatton, 1999, The Oregon Weather Book; The Spatial Hazard Events and Losses Database for the United States, [Online Database]. Columbia, SC: University of South Carolina. Available at <http://www.sheldus.org>; U.S. Department of Commerce. National Climatic Data Center. Available at <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwevent~storms>; National Weather Service Forecast Office. Available at <http://www.wrh.noaa.gov/pqr/paststorms/wind.php>

- **2019 (Jun 11-12) - Excessive Heat Event** - Strong high pressure and a very dry air mass made for hot conditions over southwest Oregon during this interval. Reported high temperatures ranged from 88 to 105 degrees in Josephine County.
- **2019 (Aug 27-28) - Excessive Heat Event** - High pressure aloft forced a thermal trough near the coast to move inland, bringing hot and dry conditions to the inland west side valleys in southwest Oregon. Reported high temperatures ranged from 92 to 106 degrees in Josephine County.
- **2020 (Aug 14-17) - Excessive Heat Event** - High pressure and a dry air mass supported very hot temperatures over inland areas during this interval. Minimum temperatures were quite warm as well. The heat was occasionally tempered by high clouds streaming over the area. High temperatures in the county ranged from 86 to 111 degrees in Josephine County.
- **2020 (Sep 6-7) - Excessive Heat Event** - Strong high pressure aloft combined with a hot air mass already in place made for very hot conditions over southern Oregon. Reported high temperatures in this zone ranged from 87 to 104 degrees in Josephine County.
- **2021 (Jun 20-21) - Excessive Heat Event** - Strong ridging aloft and strong surface heating made for hot temperatures across inland portions of southwest Oregon. Reported high temperatures ranged from 86 to 108 degrees in Josephine County.
- **2021 (Jun 26-30) - Excessive Heat Event** - A historic heat wave affected the Pacific Northwest during this interval. It was caused by a strong upper-level ridge that created dry and stable conditions over the area with strong subsidence. Many daily, monthly, and all-time high temperature records were set over southwest and south-central Oregon. Reported high temperatures ranged from 92 to 108 degrees in Josephine County.
- **2021 (Jul 29-31) - Excessive Heat Event** - Strong high pressure brought another heat wave to southern Oregon. Reported high temperatures ranged from 90 to 105 degrees in Josephine County. Executive Order NO. 21-26 was called by Governor Kate Brown regarding this event's burden on local governments to provide health and safety to residents.
- **2021 (Aug 10-15) - Excessive Heat Event** - A strong ridge supported a heat wave over inland areas of southwest and south-central Oregon during this interval. Reported high temperatures ranged from 86 to 102 degrees in Josephine County. Executive Order NO. 21-27 was called by Governor Kate Brown regarding this event's burden on local governments to provide health and safety to residents.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee determined the **probability of experiencing an extreme heat event is "high"**, meaning one incident may occur within the next 10 to 35-year period; *this rating has not changed since the previous plan.*

Extreme heat events occur every few years within the region, however, they are generally not long lasting. Climate models for Oregon suggest future regional climate changes include increases in temperature around 0.2-1°F per decade in the 21st Century, along with warmer and drier summers.

Vulnerabilities

The Josephine NHMP Steering Committee rated the county as having a **“medium” vulnerability to extreme heat events**, meaning that between 1 and 10% of the region’s population or assets could be affected by a major disaster; *this rating has not changed since the previous plan*. Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Due to the high level of exposure to a climatic hazard event such as extreme heat in Josephine County, many special needs populations and other demographics are especially susceptible to the greatest impacts.

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Windstorm

Significant Changes since Previous NHMP:

The windstorm hazard section has been edited to reference new history since the previous NHMP.

Characteristics

A windstorm is generally a short duration event involving straight-line winds and/or gusts more than 50 mph. Although windstorms can affect the entirety of Josephine County, they are especially dangerous near developed areas with large trees or tree stands. The extent of any windstorm is determined by its track, intensity, and local terrain.²⁸ In southwest Oregon, wind speed is typically 60 mph for 25-year storm events, 70 mph for 50-year storm events and 80 mph for 100-year storm events. Josephine County has experienced multiple 25-, 50-, and 100-year windstorm events over the past century with impacts often occurring county wide. A windstorm will frequently knock down trees and power lines, damage homes, businesses, public facilities, and create tons of storm related debris. Windstorms are a common, chronic hazard in Josephine County.

Location and Extent

The most common type of wind pattern affecting Josephine County is straight-line winds, which originate as a downdraft of rain-cooled air and reach the ground and spread out rapidly. Straight-line winds can produce gusts of up to 100 mph. For Josephine County, the wind hazard levels are generally highest closer to the western portion of the county and then uniform across most of the rest of the county. In the mountainous areas, however, the level of wind hazard is strongly determined by local specific conditions of topography and vegetation cover. Mountainous terrain slows down wind movement, which is why Oregon’s sheltered valley areas have the slowest wind speed in the state. However, in the foothills, the wind speeds may increase due to down-sloping winds from the mountains. Table 2-19 shows the expected wind speeds from windstorm events in Josephine County.

²⁸ State of Oregon Natural Hazards Mitigation Plan (2015)

Although windstorms can affect the entirety of the county, they are especially dangerous in developed areas with significant tree stands and major infrastructure, especially above ground utility lines. A windstorm will frequently knock down trees and power lines, damage homes, businesses, public facilities, and create tons of storm related debris.

History

Windstorms occur yearly; more destructive storms occur once or twice per decade, most recently in April 2017²⁹. The following windstorms have occurred within, and/or near Josephine County, two (2) windstorm events were added to this hazard history section since the previous plan (shown in *italics* below)³⁰:

- **1962 (Oct)** - Known as the “Columbus Day Storm” this storm produced wind speeds of up to 179 mph and wind gusts of 58 mph, the National weather service minimum for “High Wind Criteria,” or higher were reported from California to British Columbia. Damage from this event was the greatest in the Willamette Valley. The storm killed 38 people and left over \$200 million in damage. More than 50,000 homes suffered some damage and nearly 100 were destroyed. Entire fruit and nut orchards were destroyed, and livestock killed as barns collapsed and trees blew over.
- **1961 (Feb 24)** - Southwest Oregon Windstorm. Severe winds. 30’x55’ chunk of roof was ripped off Union High School in Grants Pass, carried by 70 mph winds, no injuries, school closed for several weeks.
- **1981 (Nov)** - Two windstorms struck Oregon and Washington over the course of three days. At Sexton Pass, the first storm on November 13 produced 73mph wind speeds while the second, on November 15, produced 43mph wind speeds.
- **1995 (Dec)** - This extreme wind produced by this storm impacted Oregon and Washington. Already wet soil condition left many trees vulnerable, and they were toppled. Cave Junction reported wind gusts of 64mph.
- **2006 (Dec)** - High winds up to 90 mph caused \$150,000 in damages in Douglas and Josephine. The storm also impacted Coos and Curry Counties for a storm damage total of \$300,000.
- **2007 (July)** - Severe thunderstorms with winds up to 60 mph down numerous trees damaging vehicles and trailers. Lightning struck the steeple of a church in Josephine County, causing \$60,000 in damages.
- **2011 (Mar)** - A severe windstorm took down numerous large trees in Grants Pass doing significant damage at Riverside Park and in several housing developments in and around the community.
- **2016 (Apr)** - A severe windstorm that produced broken branches 2-3 inches in diameter, and power outages. The Illinois Valley Fire Department reported numerous trees down from Cave Junction to Selma. Some branches were 26-30

²⁹ <http://www.ncdc.noaa.gov/stormevents/eventdetails.jsp>

³⁰ Taylor, George H., and Ray Hatton, 1999, The Oregon Weather Book; The Spatial Hazard Events and Losses Database for the United States, [Online Database]. Columbia, SC: University of South Carolina. Available at <http://www.sheldus.org>; U.S. Department of Commerce. National Climatic Data Center. Available at <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwwevent~storms>; National Weather Service Forecast Office. Available at <http://www.wrh.noaa.gov/pqr/paststorms/wind.php>

inches in diameter. An estimated 3,619 customers were without power for approximately 10 hours (11:30am – 9:40pm)³¹.

- **2016 (Oct 15)** - A strong front brought high winds to several locations around southwest and south-central Oregon. The Oregon Department of Transportation reported that semi-trailers were being blown off the road on Interstate 5 and reported a tree on Highway 46, which closed the road at milepost 2. A member of the public sent a picture of an uprooted tree in Grants Pass.
- **2017 (Apr 6-7)** - A strong developing low off the coast brought high winds. At the peak of the storm, more than 60,000 people in many cities were without power, mostly in Josephine County. Pacific Power reported the loss of one high voltage line, one major substation and five satellite substations. Many trees were down, including a number onto power lines. School closures occurred in Grants Pass.
- **2020 Labor Day Wildfires and Straight-line Winds (DR-4562)** – An historic wind event impact much of western Oregon. The east winds help burn hundreds of thousands of acres statewide.

Several additional, small windstorm events have occurred since the previous plan, see the [Storm Events Database](#) provided by the National Oceanic and Atmospheric Administration for more information.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee determined the **probability of experiencing a windstorm is “high”**, meaning one incident may occur within the next 10 to 35-year period; *this rating has not changed since the previous plan.*

Windstorms in the county usually occur in the winter from October to March, and their extent is determined by their track, intensity (the air pressure gradient they generate), and local terrain. Summer thunderstorms may also bring high winds along with heavy rain and/or hail. The National Weather Service uses weather forecast models to predict oncoming windstorms, while monitoring storms with weather stations in protected valley locations throughout Oregon.

Table 2-11 shows the wind speed probability intervals that structures 33 feet above the ground would expect to be exposed to within a 25, 50 and 100-year period. The table shows that structures in Region 2, which includes Clackamas County, can expect to be exposed to 65 mph winds in a 25-year recurrence interval (4% annual probability).

Table 2-11 Probability of Severe Wind Events (Region 2)

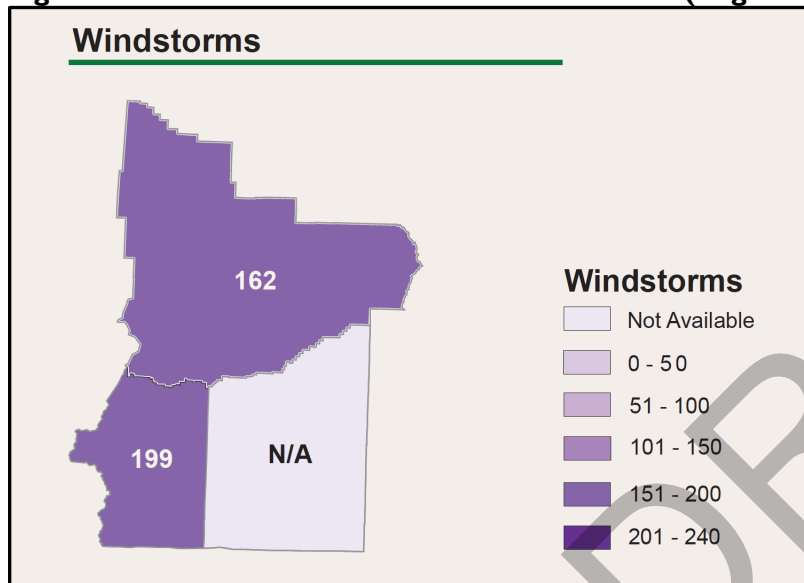
	25-Year Event (4% annual probability)	50-Year Event (2% annual probability)	100-Year Event (1% annual probability)
Region 4:			
Southwest Oregon	60 mph	70 mph	80 mph

Source: Oregon State Natural Hazard Mitigation Plan, 2012

³¹ http://www.kdrv.com/news/Almost_9000_People_Without_Power_in_Medford.html

Figure 2-9 shows the perceived risk of severe wind events in Region 4, which contains Josephine County. The table shows that Josephine County has a perceived risk score of 199 (out of a maximum of 240) indicating that people who live in the county believe that there is a considerably high risk of experiencing severe wind events.

Figure 2-9 Perceived Risk of Severe Wind Events (Region 4)



Source: Oregon State Natural Hazard Mitigation Plan, 2012

Vulnerabilities

The NHMP Steering Committee rated the county as having a **“moderate” vulnerability to windstorm hazards**, meaning that between 1-10% of the region’s population or assets could be affected by a major disaster; *this has not changed since the previous plan*. Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Many buildings, utilities, and transportation systems within Josephine County are vulnerable to wind damage. This is especially true in open areas, such as natural grasslands or farmlands. It is also true in forested areas, along tree-lined roads and electrical transmission lines, and on residential parcels where trees have been planted or left for aesthetic purposes. Structures most vulnerable to high winds include insufficiently anchored manufactured homes and older buildings in need of roof repair.

Fallen trees are especially troublesome. They can block roads and rails for long periods of time, impacting emergency operations. In addition, up-rooted or shattered trees can down power and/or utility lines and effectively bring local economic activity and other essential facilities to a standstill. Much of the problem may be attributed to a shallow or weakened root system in saturated ground. In Josephine County, trees are more likely to blow over during the winter (wet season).

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Winter Storm

Significant Changes since Previous NHMP:

The winter storm hazard section has been edited to reference new history since the previous NHMP.

Characteristics

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Heavy snow can immobilize a region by stopping the flow of supplies and disrupting emergency and medical services. In rural areas, unprotected livestock can be lost while, in urban areas, the cost of snow removal, damage repair, and lost business can have severe economic impacts. Severe winter storms, while possible, do not normally affect Coos County; the strength and severity of such storms are low.

The winter storms that affect Josephine County are typically not local events affecting only small geographic areas. Rather, the winter storms are usually large cyclonic low-pressure systems that move in from the Pacific Ocean and affect large areas of Oregon and/or the whole Pacific Northwest. These storms are most common from October through March.

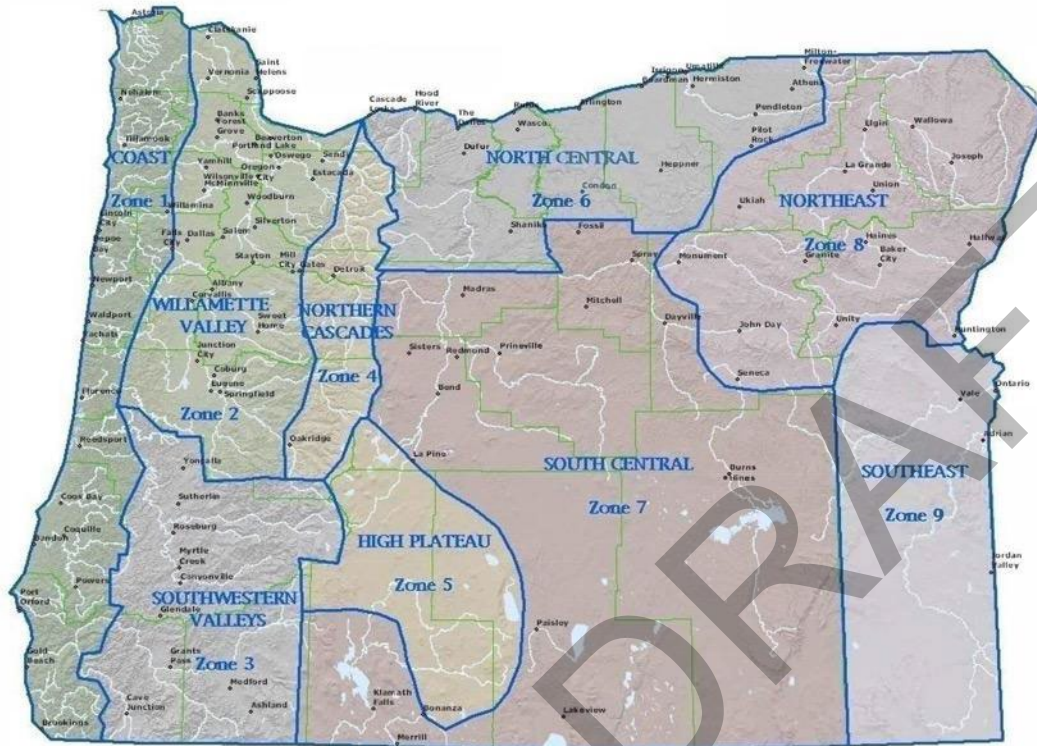
Ice storms are comprised of cold temperatures and moisture, but subtle changes can result in varying types of ice formation which may include freezing rain, sleet, and hail. Of these, freezing rain can be the most damaging of ice formations.

Outside of mountainous areas, significant snow accumulations are much less likely in western Oregon than on the east side of the Cascades.

Location and Extent

The National Climatic Data Center has established climate zones in the United States for areas that have similar temperature and precipitation characteristics. Oregon's latitude, topography, and proximity to the Pacific Ocean give the state diversified climates. Josephine County is located within Zone 3: Southwest Valleys. Winter storm events have relatively predictable and longer speeds of onset and the effects of winter storms are often long lasting. These wet winters result in potentially destructive winter storms that produce heavy snow, ice, rain and freezing rain, and high winds.

Figure 2-10 Oregon Climate Divisions



Source: Oregon Climate Service

The principal types of winter storms that occur include:

- **Snowstorms:** require three ingredients: cold air, moisture, and air disturbance. The result is snow, small ice particles that fall from the sky. In Oregon, the further inland and north one moves, the more snowfall can be expected. Blizzards are included in this category.
- **Ice storms:** are a type of winter storm that forms when a layer of warm air is sandwiched by two layers of cold air. Frozen precipitation melts when it hits the warm layer and refreezes when hitting the cold layer below the inversion. Ice storms can include sleet (when the rain refreezes before hitting the ground) or freezing rain (when the rain freezes once hitting the ground).
- **Extreme Cold:** Dangerously low temperatures accompany many winter storms. This is particularly dangerous because snow and ice storms can cause power outages, leaving many people without adequate heating.

Unlike most other hazards, it is not simple to systematically map winter storm hazard zones. The entire County is susceptible to damaging severe weather. Winter storms that bring snow and ice can impact infrastructure, business, and individuals. Those resources that exist at higher elevations will experience more risk of snow and ice, but the entire County can face damage from winter storms and, for example, the hail or life threateningly cold temperatures that winter storms bring.

History

Winter storms occur yearly; more destructive storms occur once or twice per decade. The following winter storms have occurred within, and/or near Josephine County:³²

- **2017 (Jan 1-4) - Winter Weather** – This storm had an unusually severe impact due to the low snow levels. Some areas that usually only get a few inches of snow in a season got as much as two feet over several days. There were numerous reports of power outages and tree damage. Traffic along major highways, including Interstate 5, was shut down at times, and there were numerous traffic accidents. Many people were stranded on the roads or in their homes. There were widespread school closures, many closed for the entire week. There was one fatality due to a traffic accident.
- **2018 (Feb 22) - Heavy Snow** - A brief but intense snow event over the area. Numerous school closures and delays were reported across the area. Traffic was slowed considerably due to accidents and chain requirements along major highways including Interstate 5.
- **2018 (Mar 1-3) – Heavy Snow** – Heavy Precipitation due to abnormal cold mass caused travel delays on the highways due to snowy conditions and traffic accidents. There were numerous weather-related power outages. Many schools were closed or had delayed openings on 03/02/18.
- **2019 (Feb 9-15) – Heavy Snow** - Several storms in February brought heavy snow to unusually low elevations, making a great impact in some areas. Highway 199 was closed at the Oregon/California border due to numerous trees down on the road on the morning of the 10th. On the 13th, Over 2,500 customers lost power in the Grants Pass and Cave Junction areas, as well as O’Brien. On the 15th, I-5 was closed due to heavy snow.
- **2019 (Nov 11-12) – Blizzard** - A major winter storm caused by a rapidly deepening bomb cyclone brought heavy snow and high winds to the area, creating blizzard-like conditions. Numerous accidents and road closures, including Interstate 5, were reported. Around 8000 customers lost power due to downed power lines.
- **2020 (Jan 15) - Heavy Snow** – Heavy snowfalls in the valleys that led to numerous power outages reported with up to 20,000 people without power -- most of them in Josephine County.
- **2021 (Jan 26-27) - Heavy Snow** – An extended period of heavy snow led to 45,000 customers without power in the Josephine County area.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee determined the **probability of experiencing a winter storm is “high”**, meaning one incident may occur within the next 10 to 35-year period; *this rating has not changed since the previous plan.*

³² Taylor, George H., and Ray Hatton, 1999, The Oregon Weather Book; The Spatial Hazard Events and Losses Database for the United States, [Online Database]. Columbia, SC: University of South Carolina. Available at <http://www.sheldus.org>; U.S. Department of Commerce. National Climatic Data Center. Available at <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwevent~storms>; National Weather Service Forecast Office. Available at <http://www.wrh.noaa.gov/pqr/paststorms/wind.php>

The recurrence interval for a moderate to severe winter storm is about once every year; however, there can be many localized storms between these periods. Severe winter storms occur in western Oregon regularly from November through February. Josephine County experiences winter storms a couple times every year, to every other year.

Vulnerabilities

The NHMP Steering Committee rated the county as having a **“high” vulnerability to winter storm hazards**, meaning that greater than 10% of the region’s population or assets could be affected by a major disaster; *this rating has not changed since the previous plan*. Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Given current available data, no quantitative assessment of the risk of winter storm was possible at the time of this NHMP update. However, assessing the risk to the county from winter storms should remain an ongoing process determined by community characteristics and physical vulnerabilities. Weather forecasting can give County resources (emergency vehicles, warming shelters) time to prepare for an impending storm, but the changing character of the county population and resources will determine the impact of winter storms on life and property in Josephine County.

The most likely impact of snow and ice events on Josephine County are road closures limiting access/egress to/from some areas, especially roads to higher elevations. Winter storms with heavy wet snow or high winds and ice storms may also result in power outages from downed transmission lines and/or poles.

Winter storms which bring snow, ice and high winds can cause significant impacts on life and property. Many severe winter storm deaths occur because of traffic accidents on icy roads, heart attacks may occur from exertion while shoveling snow, and hypothermia from prolonged exposure to the cold. The temporary loss of home heating can be particularly hard on the elderly, young children, and other vulnerable individuals.

Property is at risk due to flooding and landslides that may result if there is a heavy snowmelt. Additionally, ice, wind and snow can affect the stability of trees, power and telephone lines and TV and radio antennas. Down trees and limbs can become major hazards for houses, cars, utilities, and other property. Such damage in turn can become major obstacles to providing critical emergency response, police, fire and other disaster recovery services.

Severe winter weather also can cause the temporary closure of key roads and highways, air and train operations, businesses, schools, government offices and other important community services. Below freezing temperatures can also lead to breaks in un-insulated water lines serving schools, businesses, industries, and individual homes. All of these effects, if lasting more than several days, can create significant economic impacts for the affected communities, surrounding region, and region. In the rural areas of Oregon severe winter storms can isolate small communities, farms, and ranches.

At the time of this update, sufficient data was not available to determine winter storm vulnerability in terms of explicit types and numbers of existing and future buildings, infrastructure, or critical infrastructure.

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Volcanic Event

Significant Changes since Previous NHMP:

Updated report formatting.

Characteristics

The Pacific Northwest lies within the “ring of fire,” an area of very active volcanic activity surrounding the Pacific Basin. Volcanic eruptions occur regularly along the ring of fire, in part because of the movement of the Earth’s tectonic plates. The Earth’s outermost shell, the lithosphere, is broken into a series of slabs known as tectonic plates. These plates are rigid, but they float on a hotter, softer layer in the Earth’s mantle. As the plates move about on the layer beneath them, they spread apart, collide, or slide past each other. Volcanoes occur most frequently at the boundaries of these plates and volcanic eruptions occur when molten material, or magma, rises to the surface.

The primary threat to lives and property from active volcanoes is from violent eruptions that unleash tremendous blast forces, generate mud and debris flows, or produce flying debris and ash clouds. The immediate danger area in a volcanic eruption generally lies within a 20-mile radius of the blast site.

Location and Extent

Volcanic eruption is not an immediate threat to the residents of Josephine County, as there are no active volcanoes within the county. Nevertheless, the secondary threats caused by volcanoes in the Cascade region must be considered. Volcanic ash can contaminate water supplies, cause electrical storms, create health problems, and collapse roofs.

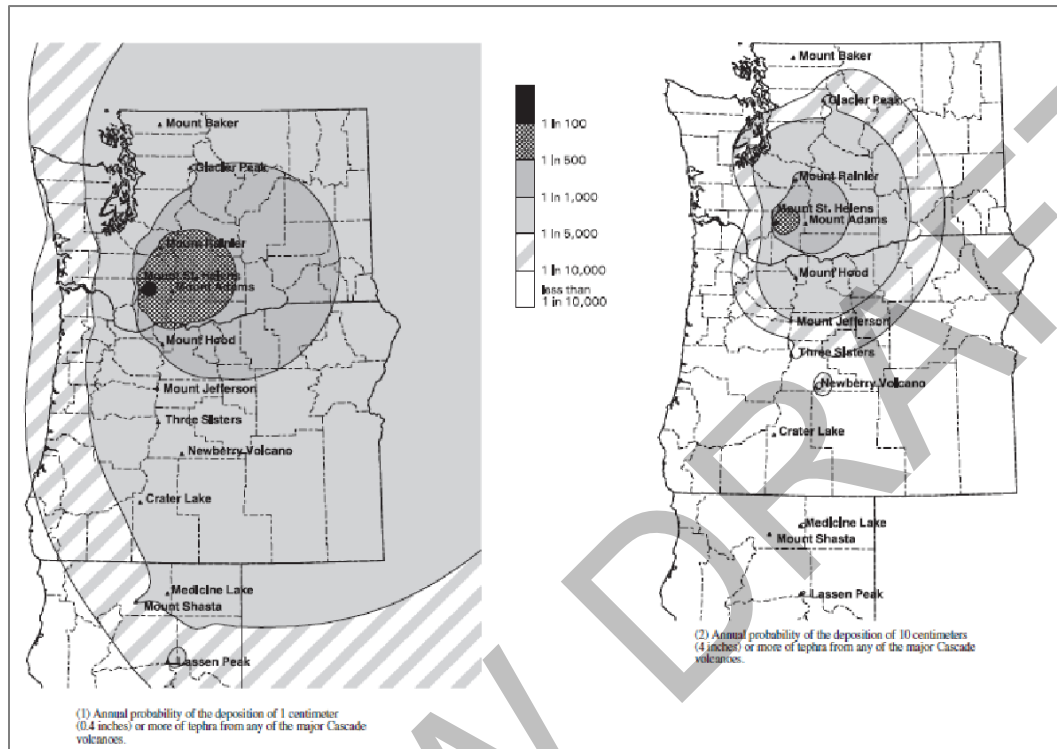
Josephine County is located on the Pacific Rim. Tectonic movement within the earth's crust can renew nearby dormant volcanoes resulting in ash fallout. Volcanic activity is possible from Mount Hood and Mount Saint Helens, Three Sisters, Mount Bachelor, and the Newberry Crater areas. Because the distance to these potentially active volcanic areas is so great, the only adverse effect that would impact areas of Josephine County is tephra (ash) fallout, with perhaps some impact on water supplies. The area affected by tephra (ash) fallout depends upon the height attained by the eruption column and the atmospheric conditions at the time of the eruption.

Geologic hazard maps have been created for most of the volcanoes in the Cascade Range by the USGS Volcano Program at the Cascade Volcano Observatory in Vancouver, WA and are available at http://vulcan.wr.usgs.gov/Publications/hazards_reports.html.

Scientists use wind direction to predict areas that might be affected by volcanic ash; during an eruption that emits ash, the ash fall deposition is controlled by the prevailing wind direction. The predominant wind pattern over the Cascades originates from the west, and previous eruptions seen in the geologic record have resulted in most ash fall drifting to the east of the volcanoes. Regional tephra fall shows the annual probability of ten centimeters

or more of ash accumulation from Pacific Northwest volcanoes. Figure 2-11 depicts the potential and geographical extent of volcanic ash fall more than ten centimeters from a large eruption of Mt. St. Helens.

Figure 2-11 Regional Tephra-fall Maps



Source: USGS “Volcano Hazards in the Mount Jefferson Region, Oregon”

Geologic hazard maps have been created for most of the volcanoes in the Cascade Range (including Mt. St. Helens, Mt. Adams, Mt. Hood, and Mt. Jefferson) by the USGS Volcano Program at the Cascade Volcano Observatory in Vancouver, WA and are available at http://vulcan.wr.usgs.gov/Publications/hazards_reports.html. Volcanic activity from more distant volcanoes will have less impact upon the County.

Additional reports are available via DOGAMI’s Publications Search website:

<http://www.oregongeology.org/pubs/search.php>

Other agency/ consultant reports:

- Ewert, J.W., Diefenbach, A.K., and Ramsey, D.W., 2018, 2018 update to the U.S. Geological Survey national volcanic threat assessment: U.S. Geological Survey Scientific Investigations Report 2018–5140, 40 p., <https://doi.org/10.3133/sir20185140>.

History

Mount Hood and Mount St. Helens are two active volcanoes in the vicinity of Josephine County. Mount Hood is northeast of the county and is more than 500,000 years old. It has had two significant eruptive periods, one about 1,500 years ago and another about 200

years ago. Mount St. Helens is in southern Washington State and has been active throughout its 50,000-year lifetime. In the past 200 years, seven of the Cascade volcanoes have erupted, including (from north to south): Mt. Baker, Glacier Peak, Mt. Rainier, Mount St. Helens (Washington); Mt. Hood (Oregon); Mt. Shasta, and Mt. Lassen (California).

There has been no recent volcanic activity near the county. The 1980 explosion of Mount St. Helens in southern Washington State is the latest on record; both Mount St. Helens and Mount Hood remain listed as active volcanoes. The closest potentially active volcanoes to Josephine County are Crater Lake, Medicine Lake, Mount Shasta, Newberry, and the Three Sisters.

Probability Assessment

Based on the available data and research for Josephine County the NHMP Steering Committee determined the **probability of experiencing volcanic activity is “low”**, meaning one incident may occur within the next 75 to 100-year period; *this rating has not changed since the previous plan.*

The United States Geological Survey-Cascades Volcano Observatory (CVO) produced volcanic hazard zonation reports for Mount St. Helens and Mount Hood in 1995 and 1997. The reports include a description of potential hazards that may occur to immediate communities. The CVO created an updated annual probability of tephra (ash) fall map for the Cascade region in 2001, which could be a rough guide for Josephine County in forecasting potential tephra hazard problems. The map identifies the location and extent of the hazard.

The CVO Volcanic tephra fall map is based on the combined likelihood of tephra-producing eruptions occurring at Cascade volcanoes. Probability zones extend farther east of the range because winds blow from westerly directions most of the time. The map shows annual probabilities for a fall of one centimeter (about 0.4 inch). The patterns on the map show the dominating influence of Mount St. Helens as a tephra producer. Because small eruptions are more numerous than large eruptions, the probability of a thick tephra fall at a given locality is lower than that of a thin tephra fall. The annual probability of a fall of one centimeter or more of tephra is about 1 in 10,000 for Josephine County. This is small when compared to other risks faced by the county. The USGS map on the previous page illustrates potential tephra fall in the region.

Vulnerabilities

The NHMP Steering Committee rated the county as having a **“low” vulnerability to volcanic activity**, meaning that less than 1% of the region’s population or assets could be affected by a major disaster (volcanic ash); *this rating has not changed since the previous plan.* Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Risks for Josephine County associated with regional volcanic activity would be ash fall, air quality, and possible economic or social disruption due to air traffic issues due to the ash cloud.

At the time of this update, sufficient data was not available to determine volcanic eruption vulnerability in terms of explicit types and numbers of existing and future buildings, infrastructure, or critical infrastructure.

Though unlikely, the impacts of a significant ash fall are substantial. Persons with respiratory problems are endangered, transportation, communications, and other lifeline services are interrupted, drainage systems become overloaded/ clogged, buildings can become structurally threatened, and the economy takes a major hit. Any future eruption of a nearby volcano (e.g., Hood, St. Helens, or Adams) occurring during a period of easterly winds would likely have adverse consequences for the county.

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

Wildfire

Significant Changes since Previous NHMP:

Thirteen (13) significant wildfire events have occurred since the previous NHMP. Data from the Wildfire Risk Explorer was incorporated with this update.

The [Rogue Valley Integrated Community Wildfire Protection Plan \(RVICWPP\)](#) was completed in 2017 and revised in 2019. RVICWPP is hereby incorporated into this NHMP by reference, and it will serve to supplement the wildfire section in this addendum. The following presents a summary of key information (and includes content from the Oregon Wildfire Risk Explorer); refer to the full RVICWPP for a complete description and evaluation of the wildfire hazard. There are two additional Community Wildfire Protection Plans (CWPPs) to augment the RVICWPP to provide more detailed identification of fuels reduction projects, and to better prepare for wildfire. The two stand-alone CWPPs are the Illinois Valley Community Wildfire Protection Plan and the Wolf Creek Community Wildfire Protection Plan.

Characteristics

Wildfires occur in areas with large amounts of flammable vegetation that require a suppression response due to uncontrolled burning. Fire is an essential part of Oregon's ecosystem but can also pose a serious threat to life and property particularly in the state's growing rural communities. Wildfire can be divided into three categories: interface, wildland, and firestorms. The increase in residential development in interface areas has resulted in greater wildfire risk. Fire has historically been a natural wildland element and can sweep through vegetation that is adjacent to a combustible home. New residents in remote locations are often surprised to learn that in moving away from built-up urban areas, they have also left behind readily available fire services providing structural protection. Recent fires in Oregon and across the western United States have increased public awareness over the potential losses to life, property, and natural and cultural resources that fire can pose. For instance, the Biscuit Fire which burned nearly 500,000 acres in Josephine and neighboring counties, threatening 3,400 homes and cost taxpayers over \$150 million. In response to such fires, the Josephine County Commissioners directed County agencies to

work with other public agencies, fire districts and community organizations throughout the County to develop an integrated fire plan³³.

The following three factors contribute significantly to wildfire behavior and can be used to identify wildfire hazard areas.

Topography: As slope increases, the rate of wildfire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridgetops may mark the end of wildfire spread, since fire spreads more slowly or may even be unable to spread downhill.

Fuel: The type and condition of vegetation plays a significant role in the occurrence and spread of wildfires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the “fuel load”). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel’s continuity, both horizontally and vertically, is also an important factor.

Weather: The most variable factor affecting wildfire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. By contrast, cooling and higher humidity often signals reduced Wildfire occurrence and easier containment.

The frequency and severity of wildfires is also dependent upon other hazards, such as lightning, drought, equipment use, railroads, recreation use, arson, and infestations. If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildfires may severely affect livestock and pets. Such events may require emergency watering/feeding, evacuation, and shelter.

The indirect effects of wildfires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams, thereby enhancing flood potential, harming aquatic life and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards, as described above.

Location and Extent

Wildfire hazard areas are commonly identified in regions of the Wildland Urban Interface (WUI). The interface is the urban-rural fringe where homes and other structures are built into a densely forested or natural landscape. If left unchecked, it is likely that fires in these areas will threaten lives and property. One challenge Josephine County faces is from the increasing number of houses being built in the urban/rural fringe. The “interface” between urban or suburban areas and the resource lands has significantly increased the threat to life

³³ Josephine County Integrated Fire Plan, 2019

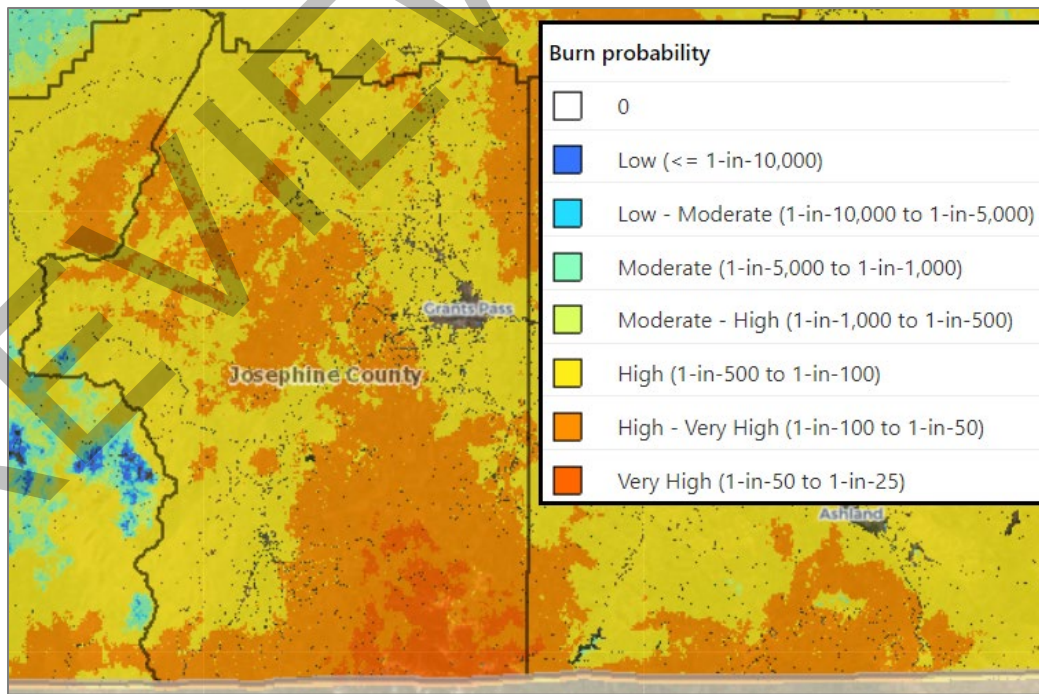
and property from fires. Responding to fires in the expanding Wildland Urban Interface area may tax existing fire protection systems beyond original design or current capability.

Ranges of wildfire hazard are further determined by the ease of fire ignition due to natural or human conditions and the difficulty of fire suppression. The wildfire hazard is also magnified by several factors related to fire suppression/control, such as the surrounding fuel load, weather, topography, and property characteristics.

Fire susceptibility throughout the county dramatically increases in late summer and early autumn as summer thunderstorms with summer lightning strikes more common and vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. However, various other factors, including humidity, wind speed and direction, fuel load and fuel type, and topography can contribute to the intensity and spread of wildland in other seasons. In addition, common causes of Wildfires include arson and negligence from industrial and recreational activities.

The extent of the hazard is greatest along the mountainous southern boundaries (Figure 2-12). In these areas, there is high burn probability with expected flame lengths greater than 11-feet under normal weather conditions. The Rogue and Illinois Valleys has less severe (moderate) wildfire burn probability that include expected flame lengths less than 8-feet under normal weather conditions. However, conditions vary widely and with local topography, fuels, and local weather (including wind) conditions. For example, burn probability is considerably higher along Highway 199 between Grants Pass and Cave Junction, which creates the potential of a wildfire cutting the Illinois Valley from the rest of the state. Under warm, dry, windy, and drought conditions expect higher likelihood of fire starts, higher intensity with more ember activity, and a more difficult to control wildfire that will include more impacts.

Figure 2-12 Extent of Wildfire Hazard (Burn Probability)



Source: [Oregon Wildfire Risk Explorer](#)

History

Josephine County has a long history of wildfires in the county. From 2010 to 2019 there were 1,175 incidents of fire in Josephine County; about 20% of which were caused by lightning³⁴ (the remainder were human caused). There have been 13 significant wildfire events, state-wide states of emergency declarations, or presidential disaster declarations since the previous plan:

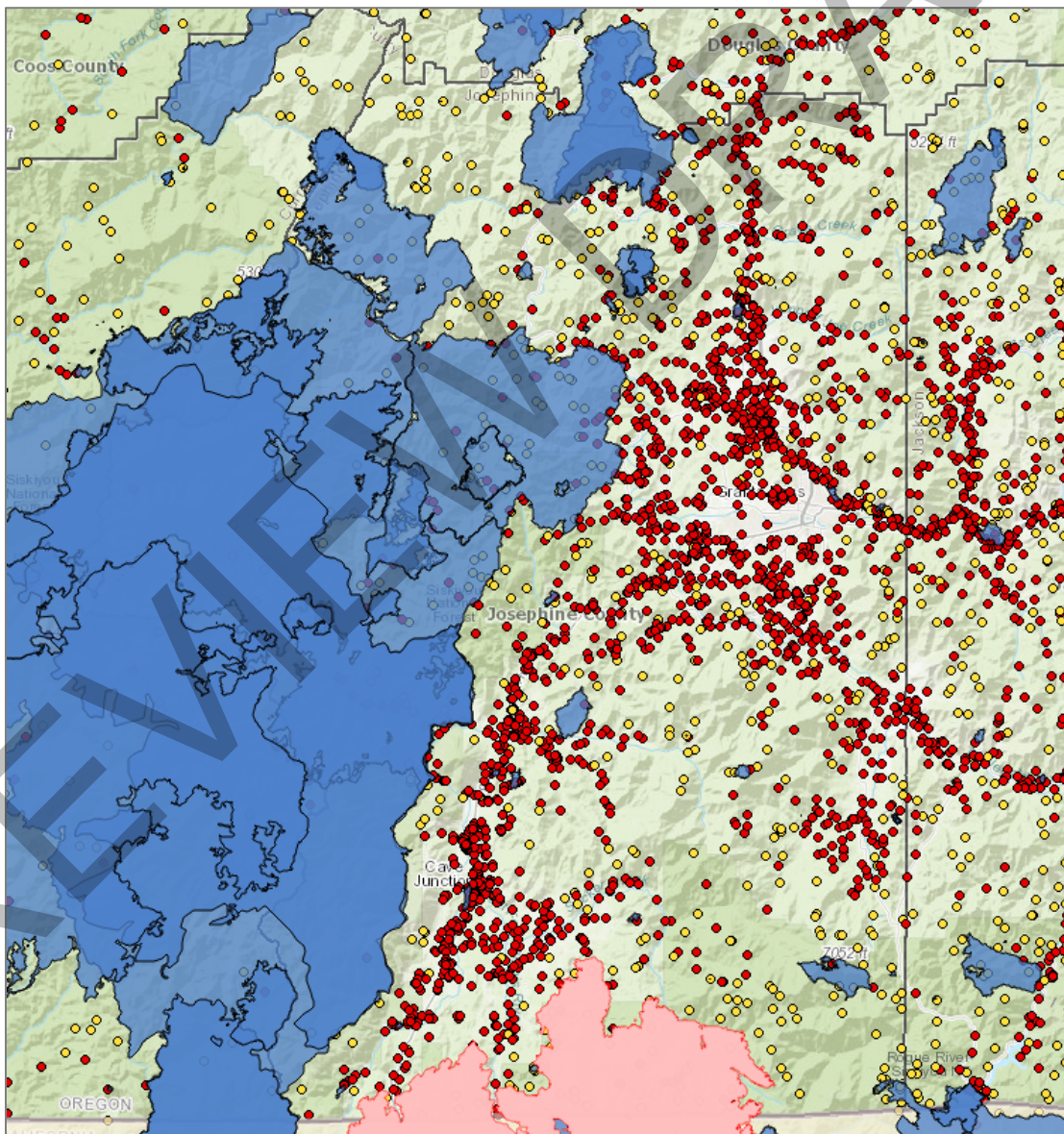
- **2017 (Jul 12) – Chetco Bar Fire-** Over 190,000 acres burned from lightning strike in the Kalmiopsis Wilderness. Over \$70 million dollars was spent fighting the fire.
- **2017 (Jul 29) – North Pelican Fire-** Over 48,411 acres burned from lightning strike in the Rogue River-Siskiyou National Forest. Fire burned with about 20 other fires to create the High Cascades Complex Fires.
- **2018 (Jul 15) – Hendrix Fire-** ~1,082 acres burned from lightning strike in the Rogue River-Siskiyou National Forest in the Southeast corner of Josephine County. Over \$10.6 million dollars was spent fighting the fire.
- **2018 (Jul 15) – Taylor Creek Fire-** Over 52,000 acres burned from lightning strike in the Rogue River-Siskiyou National Forest near Galice. Over \$34 million dollars was spent fighting the fire. The Taylor Creek Fire was initially part of the Garner Complex Fire but was split off under a separate management team. It was the largest wildfire in Oregon in 2018.
- **2018 (Jul 15) – Garner Complex Fire-** ~8,886 acres burned from lightning strike in the Rogue River-Siskiyou National Forest near Cave Junction. Over \$36 million dollars was spent fighting the fire. It was the largest fire affecting the Rural Metro Service area in 40 years. Executive Order NO. 18-15 was called by Governor Kate Brown to assist Josephine County in fighting the fire.
- **2018 (Jul 15) – Klondike Fire-** Over 175,000 acres burned from lightning strike in the Rogue River-Siskiyou National Forest. Over \$105 million dollars was spent fighting the fire. It was the largest wildfire in Oregon in 2018.
- **2018 (Jul 15) – Granite Fire-** A fire caused by a lightning strike in the Rogue River-Siskiyou National Forest. Merged with the Klondike Fire.
- **2018 (Sep 5) – Hugo Road Fire -** ~200 acres burned from a tree falling into the power line near Grants Pass. The fire destroyed 2 homes, 13 outbuildings, 2 RVs, 11 cars, and had one confirmed fatality. It was the largest fire affecting the Rural Metro Service area in 40 years. Executive Order NO. 18-24 was called by Governor Kate Brown to assist Josephine County in fighting the fire.
- **2019 (Aug 9) – Ward Fire-** ~1,301 acres burned from lightning strike in Josephine County. Over \$3 million dollars was spent fighting the fire.
- **2019 (Sep 5) – Gopher Fire-** Numerous thunderstorms moved across the area on 9/5/19. Dozens of fires were initiated by lightning. ~354 acres burned from lightning strike in the Siskiyou Mountains along with the other smaller fires. ~\$5 million dollars was spent fighting the fire.

³⁴ Oregon Wildfire Risk Explorer, Area of Interest Report, Clackamas County, accessed January 25 9, 2022. https://tools.oregonexplorer.info/OE_HTMLViewer/index.html?viewer=wildfireplanning

- **2020 (Sep 4) – Grizzly Creek Fire-** ~325 acres burned from a human-induced event in the Siskiyou Mountains. Over \$1 million dollars was spent fighting the fire.
- **2020 (Sep 8) – Slater Fire -** Over 166,000 acres burned from an unknown ignition source in the Rogue River-Siskiyou National Forest (originally started in California). Over \$1 million dollars was spent fighting the fire. The fire killed 2 firefighters, injured 11 people, and caused highway closures in and around Josephine County. Caused over \$54 million in damages. Executive Order NO. 20-25 was called by Governor Kate Brown to assist Josephine County in fighting the fire.

While most fire ignitions occurred along travel corridors and the edges of major urban areas, the fires that escape initial suppression efforts tend to be in more remote areas and are more likely to occur in some portions of the landscape than others (Figure 2-13).

Figure 2-13 Large Fire Perimeters (2000 – 2020) and Fire Starts (1992 – 2019)



Source: [Oregon Wildfire Risk Explorer](#)

Probability Assessment

Based on the available data and research for Josephine County, the NHMP Steering Committee determined the **probability of experiencing a Wildfire is “high”**, meaning one incident may occur within the next 10 to 35-year period; *this rating has not changed since the previous plan.*

Certain conditions must be present for significant interface fires to occur. The most common are hot, dry, and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel, topography, weather, drought, and development. Many of these conditions are demonstrated across large areas within Josephine County, creating a significant collective risk.

Future Climate Projection:

According to OCCRI report “*Fifth Oregon Climate Assessment*”³⁵ wildfire risk is expected to increase as the frequency of higher fire danger days per year increases under the higher emissions scenario compared with the historical baseline.

Vulnerability Assessment

The NHMP Steering Committee rated the county as having a **“high” vulnerability to Wildfire hazards**, meaning that more than 10% of the region’s population or assets could be affected by a major disaster; *The previous NHMP rated the wildfire vulnerability as moderate.* Due to insufficient data and resources, Josephine County is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

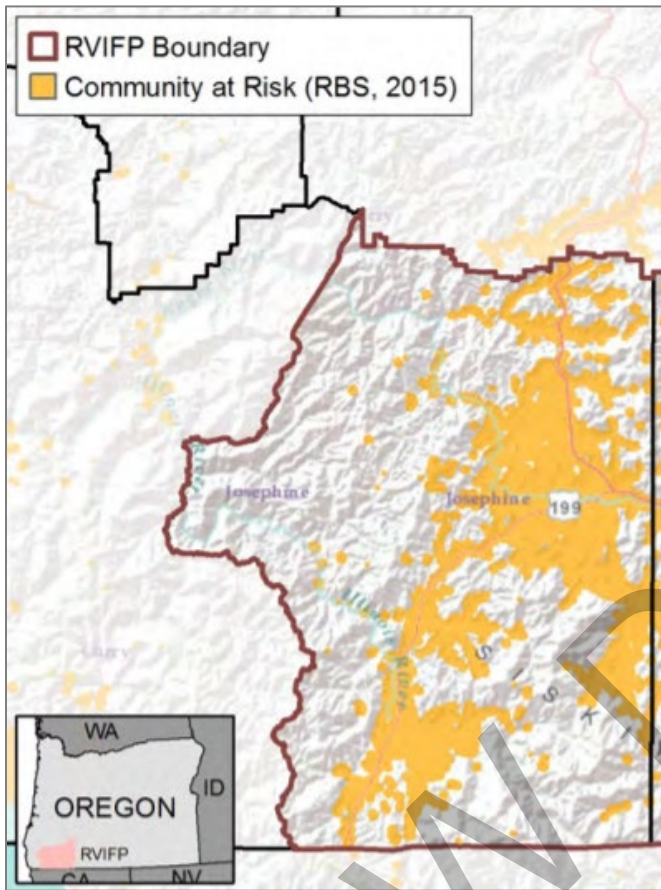
The RVICWPP defines a community at risk as “a geographic area within and surrounding permanent dwellings (at least 1 home per 40 acres) with basic infrastructure and services, under a common fire protection district jurisdiction, government, or tribal trust or allotment, for which there is a significant threat due to a wildfire.”³⁶ Figure 2-14 shows a map of communities at risk in Josephine County. Most of the county population is within the area identified as “Community at Risk”, including the following communities:

- Applegate Valley (Provolt and Murphy)
- Cave Junction
- Grants Pass
- Grants Pass Unprotected
- Josephine County Unprotected
- Illinois Valley
- Williams
- Wolf Creek
- Oregon Caves

³⁵ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

³⁶ Rogue Valley Integrated Community Wildfire Protection Plan. 2019

Figure 2-14 Communities at Risk of Wildfire in Josephine County



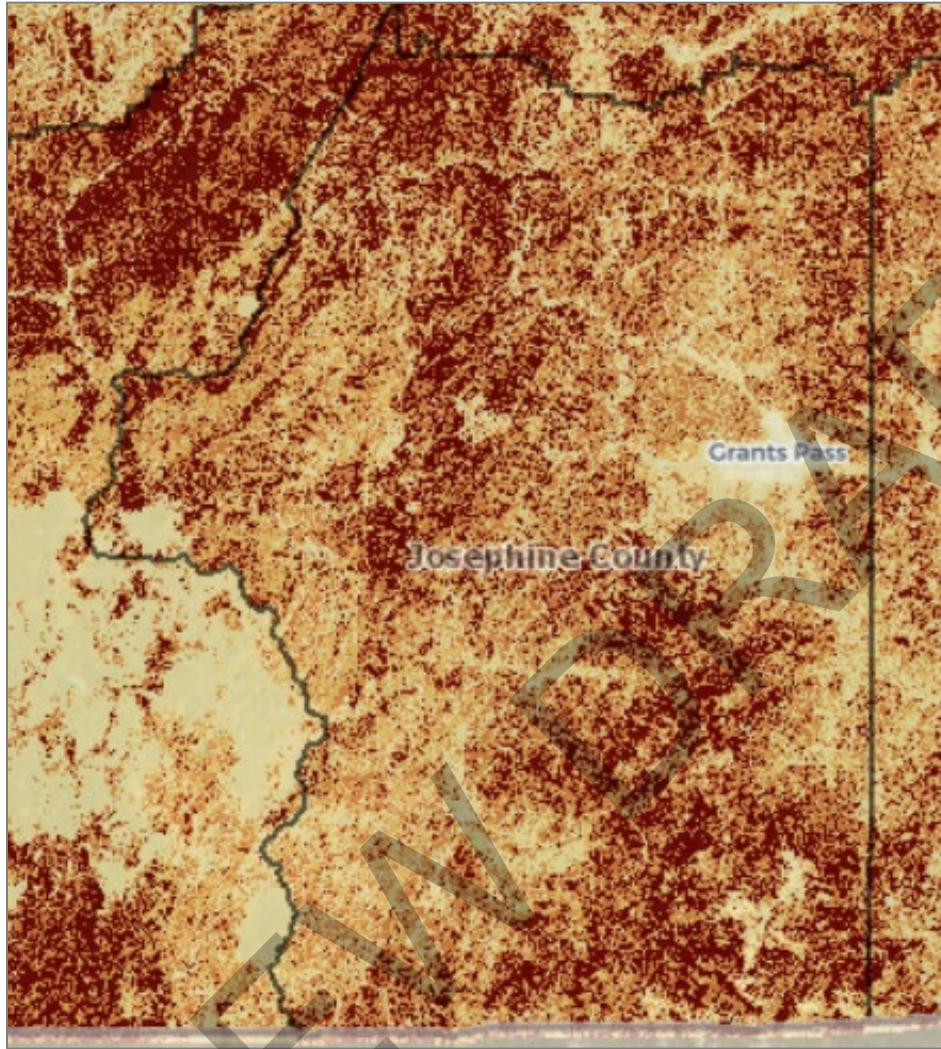
Source: Figure 3.22 Rogue Valley Integrated Fire Plan (2019).

The RVICWPP was updated in 2019, the update of the plan includes updates to the Risk Assessment, mitigation activities, priority fuels actions, and highest priority areas for mitigation for both Jackson and Josephine Counties. This integrated Fire Plan development process also included an analysis of Josephine County's relative fire hazard risk. As a complete wildfire mitigation planning document, the plan has been incorporated into this NHMP through reference³⁷. For more information on wildfire risk and fuels reduction projects see the [Rogue Valley Integrated Fire Plan \(2019\)](#).

Potential impact to structure from wildfire is shown in Figure 2-15, darker areas have higher risk to structures if fire ignites nearby. The areas of greater risk are generally located in more rural parts of the county, that are hillier, and more heavily vegetated and forested.

³⁷ Josephine County and Jackson County Integrated Fire Plan, 2019

Figure 2-15 Oregon Wildfire Risk Explorer – Potential Impact to Structure



Source: [Oregon Wildfire Risk Explorer](#)

Additional wildfire hazard information for Josephine County and cities is available via Oregon Explorer's Wildfire Risk Explorer: <http://oregonexplorer.info/topics/wildfire-risk?ptopic=62>

More information on this hazard can be found in the Risk Assessment for [Region 4, Southwest Oregon, of the Oregon NHMP \(2020\)](#).

SECTION 3: MITIGATION STRATEGY

This section outlines Josephine County's strategy to reduce or avoid long-term vulnerabilities to the identified hazards. Specifically, this section presents a mission and specific goals and actions thereby addressing the mitigation strategy requirements contained in 44 CFR 201.6(c). The NHMP Hazard Mitigation Advisory Committee (steering committee) viewed and updated the mission, goals, and action items documented in this NHMP. Additional planning process documentation is in Volume III, Appendix B.

Mitigation Plan Mission

The NHMP mission states the purpose and defines the primary functions of Josephine County's NHMP. It is intended to be adaptable to any future changes made to the NHMP and need not change unless the community's environment or priorities change.

The mission of the Josephine County NHMP is to:

To promote public policy and mitigation activities which will enhance the safety to life and property from natural hazards.

This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

Note: The 2022 NHMP update Steering Committee reviewed the 2017 plan mission statement and revised it to describe the overall purpose and intent of this plan more accurately.

Mitigation Plan Goals

Mitigation plan goals are more specific statements of direction that Josephine County residents and public and private partners can take while working to reduce the County's risk from natural hazards. These statements of direction form a bridge between the broad mission statement and action items. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

Meetings with the steering committee, previous hazard event reports, and the previous county NHMPs served as methods to obtain input and identify priorities in developing goals for reducing risk and preventing loss from natural hazards in Josephine County.

The 2022 Josephine County NHMP steering committee reviewed the previous NHMP goals in comparison to the State NHMP (2017) goals and determined that they would update their goals to better emphasize protecting all members of their community, collaborating with other governments and organizations, and promoting a stronger economy in the advent of a disaster.

All the NHMP goals are important and are listed below in no order of priority. Community priorities are identified within action items. Establishing action item (mitigation strategy) priorities neither negates nor eliminates any goals, but it establishes which action items to consider implementing first, should funding become available.

Goal 1: Protect life and reduce injuries resulting from natural hazards.

Goal 2: Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.

Goal 3: Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Josephine County.

Goal 4: Minimize the impact of natural hazards while protecting, restoring, and sustaining environmental processes.

Goal 5: Enhance and maintain local capability to implement a comprehensive hazard loss reduction strategy.

Goal 6: Document and evaluate progress in achieving hazard mitigation strategies and action items.

Goal 7: Motivate the public, private sector, and government agencies to mitigate the effects of natural hazards through information and education.

Goal 8: Apply development standards that mitigate or eliminate the potential impacts of natural hazards.

Goal 9: Mitigate damage to historic and cultural resources from natural hazards.

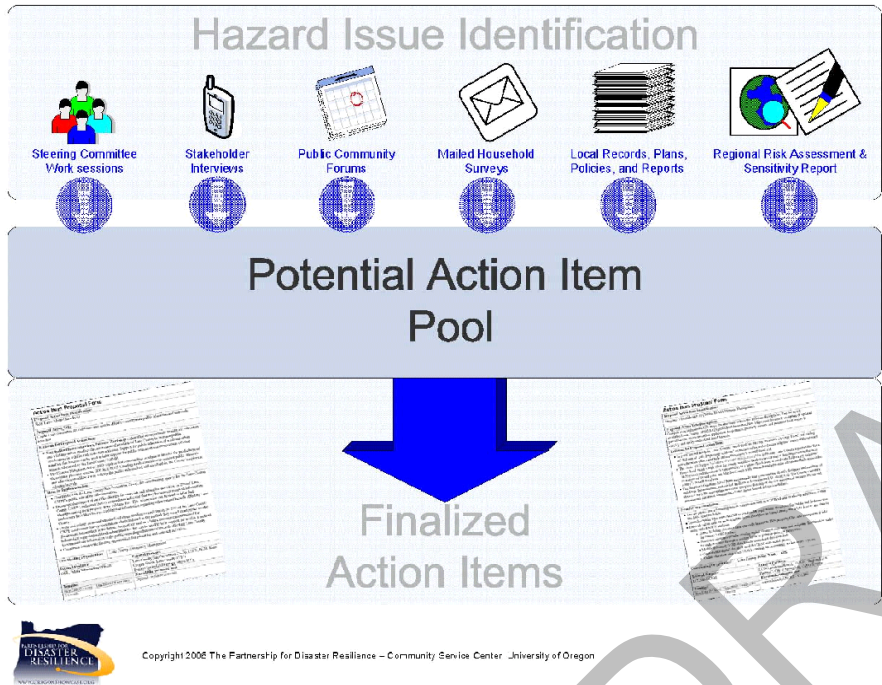
Goal 10: Increase communication, collaboration, and coordination among agencies at all levels of government and the private sector to mitigate natural hazards.

Goal 11: Integrate local NHMPs with comprehensive plans and implementing measures.

Action Item Development Process

Action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens, and others could engage in to reduce risk. Development of action items was a multi-step, iterative process that involved brainstorming, discussion, review, and revisions. Action items can be developed through many sources. Figure 3-1 illustrates some of these sources.

Figure 3-1 Development of Action Items



Most of the action items were first created during the previous NHMP planning processes. During these processes, the steering committee developed maps of local vulnerable populations, facilities, and infrastructure in respect to each identified hazard. Review of these maps generated discussion around potential actions to mitigate impacts to the vulnerable areas. The Oregon Partnership for Disaster Resilience (OPDR) provided guidance in the development of action items by presenting and discussing actions that were used in other communities. OPDR also took note of ideas that came up in steering committee meetings and drafted specific actions that met the intent of the steering committee. All actions were then reviewed by the steering committee, discussed at length, and revised as necessary before becoming a part of this document.

Action Item Matrix

The action item matrix (Table 3-1) portrays the overall action plan framework and identifies linkages between the NHMP goals, partnerships (coordination and partner organizations), and actions. The matrix documents a brief description of the action, lead agency, timeline (ongoing, short-term, medium-term, long-term), and approximate cost (low, medium, high). Refer to Volume III, Appendix A for detailed information for each action.

Action Item Framework

Many of the Josephine County NHMP’s recommendations are consistent with the goals and objectives of the County’s existing plans and policies. Where possible, Josephine County will implement the NHMP’s recommended actions through existing plans and policies. Plans and policies already in existence have support from residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the NHMP’s action items through such plans and policies increases their likelihood of being supported and implemented.

Action Item Prioritization

The County's action items were developed through a two-stage process. In stage one, OPDR facilitated a work session with the steering committee to discuss the County's risk and to identify potential issues. In the second stage, OPDR, working with the steering committee, developed potential actions based on the hazards and the issues identified by the steering committee.

During the update process the County re-evaluated the hazard mitigation strategy (Action Items). During this process action items were updated, noting what accomplishments had been made, and whether the actions were still relevant; any new action items were identified at this time (see Volume III, Appendix B for more information).

The County's mitigation actions are shown in Table 3-1. The steering committee developed action items priorities to reflect current conditions, needs, and capacity. High priority actions are shown in **bold text** with **orange highlight**. The County will focus their attention and resource availability upon these achievable, high leverage activities over the next five years. Although this methodology provides a guide for the steering committee in terms of implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding. Mitigation actions that were not prioritized will be considered for prioritization during the quarterly maintenance meetings. Refer to Appendix A for detailed information on each high priority action.

See Volume II for the Actions for each participating city.

Table 3-1 Josephine County Action Items

Mitigation Action Item		Lead Agency	Timeline	Cost
Multi-Hazard				
1.1	Continue to improve and sustain public information and education programs about potential hazards in the county, the need for personal preparedness, and mitigation actions possible.	Emergency Management, Get Ready Rogue Campaign	Short-Term	Low
1.2	Develop and maintain a mapped inventory of hazards, vulnerable locations, and critical infrastructure and facilities, to include medical offices, hospitals, and urgent care.	GIS	Medium-Term	Medium
1.3	Continue to participate on the Regional Vulnerable Populations Committee to support the resilience of vulnerable and special needs populations in Josephine County.	Public Health, GIS	Ongoing	Low
1.4	Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration with an emphasis in Grants Pass as a private business hub	Planning, Public Works	Ongoing	Medium
1.5	Cities collaborate with the County to maintain a GIS inventory of vulnerable locations and critical facilities	GIS, Planning	Long-Term	Medium
1.6	Starting with the critical facilities identified in the “Josephine County Solar + Storage Microgrid Feasibility” project, complete solar + storage microgrid feasibility studies and implement projects with assistance from Energy Trust.	Emergency Management	Medium-Term	High
1.7	Develop strategies to assist local businesses to be more prepared in the advent of a disaster and strategies to assist local businesses to stay in the region after a disaster occurred.	Planning, Community Development	Long-Term	Medium
1.8	Acquire non-energy reliant, or energy grid independent, communication systems between the County and the Cities	Public Works, Emergency Management	Short-Term	High
1.9	Work with Josephine County residents in creating and promoting disaster drills	Emergency Management	Short-Term	Medium
1.10	Create and encourage neighborhood-preparedness groups	Emergency Management	Ongoing	Medium
1.11	Acquire permanent language translation/culture translation support to improve education and outreach regarding natural disasters	Emergency Management	Medium-Term	Medium

Mitigation Action Item		Lead Agency	Timeline	Cost
Drought				
2.1	Collaborate with state and federal law enforcement to reduce the illegal marijuana farms in the county and find solutions to reduce the impact of illegal marijuana farms on local water tables	Sheriff's Office, State, FBI	Short-Term	Medium
2.2	Promote water conservation measures among county residents focusing on domestic use	Community Development	Ongoing	Low
Earthquake				
3.1	Identify existing critical facilities needing structural and non-structural retrofits; prioritize projects, develop funding strategy, and implement.	Emergency Management	Medium-Term	High
3.2	Utilize the completed bridge seismic evaluation reports (~20) to prioritize projects and develop bridge retrofit funding strategy.	Public Works	Medium-Term	High
3.3	Publicize and facilitate the implementation of both structural and non-structural seismic mitigation measures for homeowners, business owners, renters, and contractors	Public Works, Community Development, Planning	Ongoing	Medium
3.4	Assess vulnerable county and city buildings to identify safety zones and earthquake mitigations for employee offices and high-traffic visitor areas. This includes historic buildings such as the County Courthouse and the unreinforced historic masonry buildings of core downtown business, government, and public use.	Emergency Management	Short-Term	Medium
3.5	Relocate the County Courthouse/Justice Building services to more seismically resilient locations. The historic and culturally important structure will remain. Future seismic assessments will determine retrofit options.	Emergency Management, Public Works, Facilities	Long-Term	High
3.6	Repair the McMullen Dam (Lake Selmac) that is at risk of failure.	Emergency Management, County Parks Department	Short-Term	High

Mitigation Action Item		Lead Agency	Timeline	Cost
Flood				
4.1	Annually assess the County's interest in and ability to participate in the National Flood Insurance Program's Community Rating System. As capacity is available consider additional activities to lower the city's CRS level and increase the discount provided to policyholders.	Planning	Ongoing	Low
4.2	Assist with relocating Grants Pass's Wastewater Treatment Plant to a lower-risk flood area.	Public Works, Planning	Medium-Term	High
4.3	Include needed culvert upgrades in the short-term County Capital Improvements Plan.	Public Works, Planning	Medium-Term	High
Landslide				
5.1	Collaborate with the Oregon Department of Geology and Mineral Industries (DOGAMI) on future acquisition of landslide data and creation of updated landslide maps for the county.	Planning	Long-Term	Low
Severe Weather				
6.1	Collaborate with local community organizations to develop community sites for use as a warming shelter in the winter, a cooling shelter in the summer, and a clean air refuge site when needed.	Emergency Management	Short-Term	Low
6.2	Create an Early Warning System for snow and ice over local passes and bridges	Public Works, Community Development	Ongoing	High
6.3	Collaborate with PacifiCorp to remove trees along the power line systems that have a higher potential to fall on power lines	Public Works, PacifiCorp	Short-Term	Medium
6.4	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Planning	Ongoing	Medium
6.5	Promote the benefits of tree-trimming and tree replacement programs and help to coordinate local efforts by public and private agencies.	Community Development, Human Resources	Ongoing	Low
6.6	Improve damage assessment capability for disaster events which require documented damage assessments and similar reports.	Emergency Management	Short-Term	Low

Mitigation Action Item		Lead Agency	Timeline	Cost
Wildfire				
7.1	Continue to support the Firewise Program for communities throughout the county. Utilize Firewise guidance to promote the Firewise Communities/USA” recognition program to promote wildfire resilience.	Emergency Management	Ongoing	High
7.2	Acquire and Install fire detection cameras for the Northern part of the county	Emergency Management	Medium-Term	High
7.3	Implement wildfire mitigation action items listed in the Rogue Valley (Jackson and Josephine counties) Integrated Community Wildfire Protection Plan (RVCWPP) and continue to participate with ongoing maintenance and updates.	Emergency Management	Ongoing	High
7.4	Promote wildfire mitigation through public education, fuels reductions and the improvement of transportation corridors.	Emergency Management, Community Development, Human Resources	Medium-Term	Medium
7.5	Reduce the risk of wildfire around the developed areas on and around Dollar Mountain.	Emergency Management	Ongoing	Medium
7.6	Update wildfire codes and ordinances utilizing guidance provided by DLCD/ODF/BCD as part of SB 762.	Planning, Community Development	Ongoing	Low
7.7	Collaborate with ODOT to create fire breaks along Highway 199 between Grants Pass and Cave Junction	Public Works, ODOT	Medium-Term	High

Source Josephine County NHMP Steering Committee, updated 2022

Cost: Low (less than \$50,000), Medium (\$50,000-\$100,000), High (more than \$100,000)

Timing: Ongoing (continuous), Short (1-2 years), Medium (3-5 years), Long (5 or more years)

Priority Actions: Identified with **bold text** and **orange highlight**.

SECTION 4:

PLAN IMPLEMENTATION AND MAINTENANCE

This section details the formal process that will ensure that the NHMP remains an active and relevant document. The NHMP implementation and maintenance process includes a schedule for monitoring and evaluating the NHMP quarterly, as well as producing an updated NHMP every five years. Finally, this section describes how the County will integrate public participation throughout the NHMP maintenance and implementation process.

Implementing the NHMP

The success of the Josephine County NHMP depends on how well the outlined action items are implemented. To ensure that the activities identified are implemented, the following steps will be taken: 1) the NHMP will be formally adopted, 2) a Steering committee will be assigned, 3) a convener shall be designated, 4) quarterly meetings will be held, 5) the identified activities will be prioritized and evaluated, and 6) the NHMP will be implemented through existing plans, programs, and policies.

NHMP Adoption

The Josephine County NHMP was developed and will be implemented through a collaborative process. After the NHMP is locally reviewed and deemed complete, the Josephine County Emergency Manager, or their designee, shall submit it to the State Hazard Mitigation Officer (SHMO) at the Oregon Office of Emergency Management (OEM). OEM submits the NHMP to FEMA-Region 10 for review. This review addresses the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the County will adopt the NHMP via resolution. At that point, the County will gain eligibility for the Building Resilient Infrastructure and Communities (BRIC) Grant Program, the Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA) grant program funds. Following adoption by the County, the participating jurisdictions should convene local decision makers and adopt the Josephine County Multijurisdictional NHMP.

Convener

The Board of County Commissioners (BCC) will adopt the Josephine County NHMP, and the steering committee will take responsibility for plan implementation. The County Administrator or designee (Josephine County Emergency Manager) will serve as the NHMP convener to facilitate the steering committee meetings and will assign tasks such as updating and presenting the NHMP to the members of the committee.

- Coordinate steering committee meeting dates, times, locations, agendas, and member notification.
- Document the discussions and outcomes of committee meetings.
- Serve as a communication conduit between the steering committee and the public/stakeholders.
- Identify emergency management-related funding sources for natural hazard mitigation projects.
- Utilize the Risk Assessment as a tool for prioritizing proposed natural hazard risk reduction projects.

NHMP implementation and evaluation will be a shared responsibility among all steering committee members.

Steering committee

The steering committee serves as the coordinating body for the NHMP and is responsible for coordinating implementation of NHMP action items and undertaking the formal review process. The BCC will assign representatives from county agencies, including, but not limited to, the current steering committee members.

Roles and responsibilities of the steering committee include:

- Attending future meetings.
- Prioritizing projects and recommending funding for natural hazard risk reduction projects.
- Participation in the NHMP update process.
- Documenting successes and lessons learned.
- Evaluating and updating the NHMP following a disaster.
- Evaluating and updating the NHMP in accordance with the prescribed maintenance schedule.
- Development and coordination of ad hoc and/or standing subcommittees as needed.

Steering committee Members

The following jurisdictions, agencies and/or organizations were represented and served on the steering committee during the development of the Josephine County NHMP and may be represented during implementation and maintenance phase (for a list of individuals see *Acknowledgements*):

County Departments

Emergency Management

Public Works

Public Health

Local Public Safety Coordinating Council

Participating Cities

City of Grants Pass

City of Cave Junction

Other

Asante

Bureau of Land Management

Cow Creek Band of Umpqua Tribe of Indians

Illinois Valley Fire District

Jackson County

Oregon Department of Forestry

Oregon Water Resources Department

PacifiCorp/Pacific Power

Rogue Valley Community College

To make the coordination and review of the Josephine County NHMP as broad and useful as possible, the steering committee will engage additional stakeholders and other relevant

hazard mitigation organizations and agencies to implement the identified action items. Specific organizations have been identified as partners in the action item matrices.

Implementation through existing programs

The NHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the county. Within the NHMP, FEMA requires the identification of existing programs that might be used to implement these action items. Josephine County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvement plans, mandated standards and building codes. To the extent possible, Josephine County and participating cities will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the recommendations contained in the NHMP are consistent with the goals and objectives of the participating City and County's existing plans and policies. Where possible, Josephine County and participating cities should implement the recommended actions contained in the NHMP through existing plans and policies. Plans and policies already in existence often have support from residents, businesses, and policy makers. Many land-use, comprehensive and strategic plans get updated regularly and can adapt easily to changing conditions and needs. Implementing the action items contained in the NHMP through such plans and policies increases their likelihood of being supported and implemented.

Examples of plans, programs or agencies that may be used to implement mitigation activities include:

- City and County Budgets
- Community Wildfire Protection Plans
- Comprehensive Land Use Plans
- Economic Development Action Plans
- Zoning Ordinances and Building Codes

For additional examples of plans, programs or agencies that may be used to implement mitigation activities refer to list of plans in Volume I, Section 2.

NHMP Maintenance

NHMP maintenance is a critical component of the NHMP. Proper maintenance of the NHMP ensures that it will maximize the County and participating Cities' efforts to reduce the risks posed by natural hazards. This section was developed by OPDR and includes a process to ensure that a regular review and update of the NHMP occurs. The steering committee and local staff are responsible for implementing this process, in addition to maintaining and updating the NHMP through a series of meetings outlined in the maintenance schedule below.

Meetings

The steering committee will meet quarterly to complete the following tasks (the County flood group meets semi-monthly). The Josephine County Steering Committee will be responsible for:

- Reviewing existing action items to determine funding suitability.
- Reviewing existing and new risk assessment data to identify issues that may not have been identified during NHMP creation.
- Educating and training new Steering Committee members on the NHMP and mitigation actions in general.
- Assisting in the development of funding proposals for priority action items.
- Discussing methods for continued public involvement.
- Documenting successes and lessons learned during the year.

The County's convener will host a meeting at least once a year with the NHMP leads for participating jurisdictions. This meeting is an opportunity for the cities to report back to the county on progress that has been made towards their NHMP Addenda. This meeting will also serve as a means for the County's convener to provide information regarding potential funding sources for mitigation projects, as well as provide additional support for the cities steering committees.

The convener will be responsible for documenting the outcome of the quarterly meetings in Volume III, Appendix B. The process the coordinating body will use to prioritize mitigation projects is detailed in the section below. The NHMP's format allows the county and participating jurisdictions to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a NHMP that remains current and relevant to the participating jurisdictions.

Project Prioritization Process

Chapter 3 describes the process the steering committee used to establish the current prioritization of action items. Understanding that priorities may change over time depending on new events or resource availability, the Disaster Mitigation Act of 2000 requires that jurisdictions identify a process for future action item prioritization. Potential mitigation activities often come from a variety of sources; therefore, the project prioritization process needs to be flexible. Committee members, local government staff, other planning documents or the risk assessment may be the source to identify projects. Figure 4-1 illustrates the project development and prioritization process that the steering committee can use in the future.

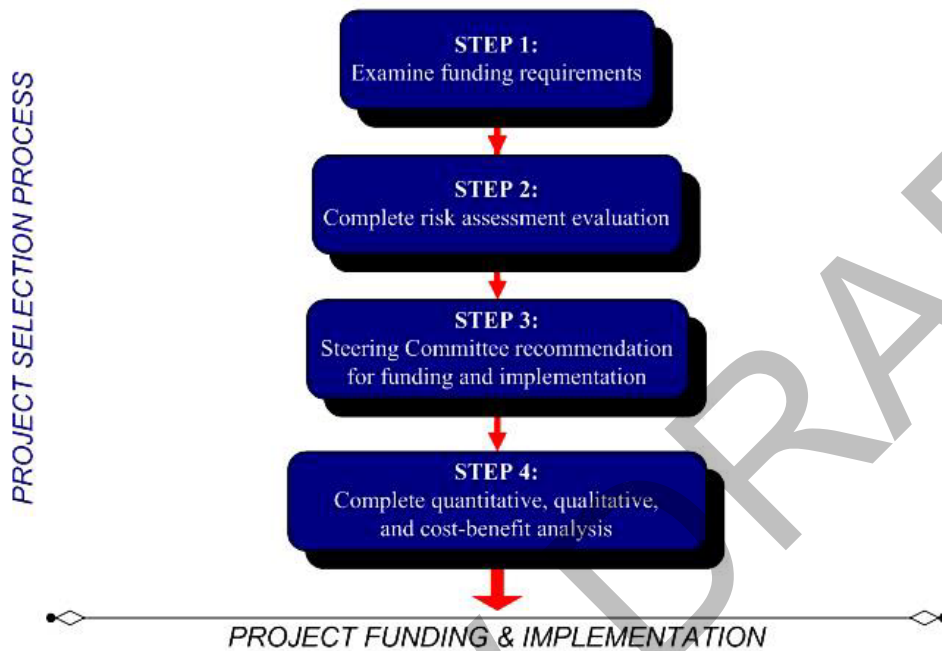
Step 1: Examine funding requirements

The first step in prioritizing the NHMP's action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the County's proposed mitigation projects. Examples of mitigation funding sources include but are not limited to FEMA's Building Resilient Infrastructure and Communities (BRIC) competitive grant program, Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) grant program, National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds and private foundations, among others. Please see Volume II, Appendix E for a more comprehensive list of potential grant programs.

Because grant programs open and close on differing schedules, the steering committee will examine upcoming funding streams' requirements to determine which mitigation activities would be eligible. The steering committee may consult with the funding entity, OEM, or other appropriate state or regional organizations about project eligibility requirements. This

examination of funding sources and requirements will happen during the steering committee's quarterly NHMP maintenance meetings.

Figure 4-1 Action Item and Project Review Process



Source: Oregon Partnership for Disaster Resilience, 2008.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the NHMP's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The steering committee will determine whether the NHMP's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas and whether community assets are at risk. The steering committee will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future or are likely to result in severe/catastrophic damages.

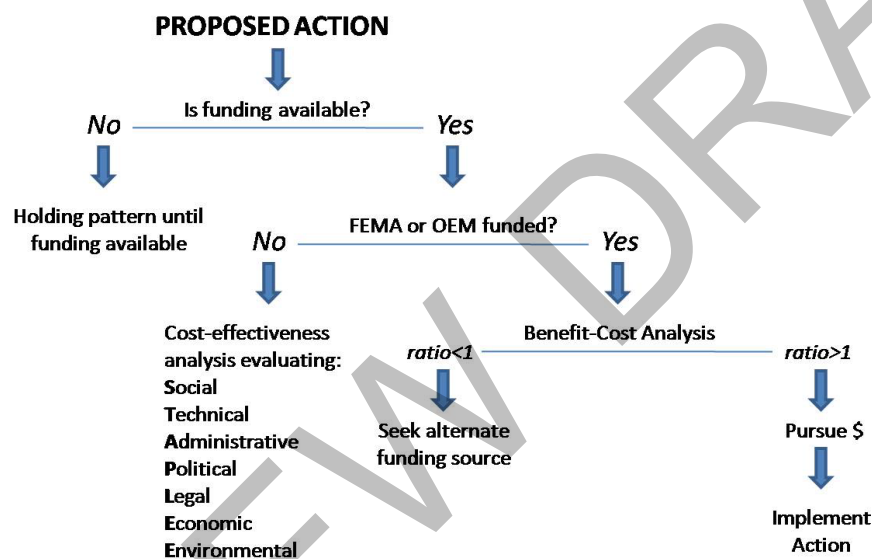
Step 3: Steering committee Recommendation

Based on the steps above, the steering committee will recommend which mitigation activities should be moved forward. If the steering committee decides to move forward with an action, the coordinating organization designated in the matrix will be responsible for taking further action and, if applicable, documenting success upon project completion. The steering committee will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

Step 4: Complete quantitative and qualitative assessment and economic analysis

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures, or projects. Two categories of analysis that are used in this step are: (1) cost-benefit analysis and (2) cost-effectiveness analysis. Conducting cost-benefit analysis for a mitigation activity assists in determining whether a project is worth undertaking now, to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 4-2 shows decision criteria for selecting the appropriate method of analysis.

Figure 4-2 Benefit Cost Decision Criteria



Source: Oregon Partnership for Disaster Resilience, 2010.

If the activity requires federal funding for a structural project, the steering committee will use a FEMA-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a cost-benefit ratio of greater than one to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project's cost effectiveness. The steering committee will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness. OPDR at the University of Oregon's Community Service Center has tailored the STAPLE/E technique for use in natural hazard action item prioritization.

Continued Public Involvement and Participation

The participating jurisdictions are dedicated to involving the public directly in the continual reshaping and updating of the Josephine County NHMP. Although members of the steering committee represent the public to some extent, the public will be provided opportunities to continue to provide feedback about the NHMP and hazard mitigation strategies.

To ensure that these opportunities will continue, the County and participating jurisdictions will:

- Post copies of their NHMP on corresponding websites.
- Place articles in the local newspaper directing the public where to view and provide feedback.
- Use existing newsletters such as schools and utility bills to inform the public where to view and provide feedback.
- Continue to host a booth at countywide events and present information about hazard mitigation.
- Josephine County Emergency Management will continue to utilize their social media platforms to involve the public.

In addition to the involvement activities listed above, Josephine County will ensure continued public involvement by posting the Josephine County NHMP on the County's website: <https://www.co.josephine.or.us/Page.asp?NavID=1867>.

Five-Year Review of NHMP

This NHMP will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. **The Josephine County NHMP is due to be updated before July XX, 2027.** The Convener will be responsible for organizing the steering committee to address NHMP update needs. The steering committee will be responsible for updating any deficiencies found in the NHMP and for ultimately meeting the Disaster Mitigation Act of 2000's NHMP update requirements.

The following 'toolkit' can assist the Convener in determining which NHMP update activities can be discussed during regularly scheduled NHMP maintenance meetings and which activities require additional meeting time and/or the formation of sub-committees.

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Table 4-1 Natural Hazard Mitigation Plan Update Toolkit

Question	Yes	No	Plan Update Action
Is the planning process description still relevant?			Modify this section to include a description of the plan update process. Document how the planning team reviewed and analyzed each section of the plan, and whether each section was revised as part of the update process. (This toolkit will help you do that).
Do you have a public involvement strategy for the plan update process?			Decide how the public will be involved in the plan update process. Allow the public an opportunity to comment on the plan process and prior to plan approval.
Have public involvement activities taken place since the plan was adopted?			Document activities in the "planning process" section of the plan update
Are there new hazards that should be addressed?			Add new hazards to the risk assessment section
Have there been hazard events in the community since the plan was adopted?			Document hazard history in the risk assessment section
Have new studies or previous events identified changes in any hazard's location or extent?			Document changes in location and extent in the risk assessment section
Has vulnerability to any hazard changed?			Document changes in vulnerability in the risk assessment section
Have development patterns changed? Is there more development in hazard prone areas?			Document changes in vulnerability in the risk assessment section
Do future annexations include hazard prone areas?			Document changes in vulnerability in the risk assessment section
Are there new high risk populations?			Document changes in vulnerability in the risk assessment section
Are there completed mitigation actions that have decreased overall vulnerability?			Document changes in vulnerability in the risk assessment section
Did the plan document and/or address National Flood Insurance Program repetitive flood loss properties?			Document any changes to flood loss property status

Source: Oregon Partnership for Disaster Resilience, 2010.

Table 4-1 Natural Hazard Mitigation Plan Update Toolkit (continued)

Question	Yes	No	Plan Update Action
Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?			1) Update existing data in risk assessment section, or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Did the plan identify data limitations?			If yes, the plan update must address them: either state how deficiencies were overcome or why they couldn't be addressed
Did the plan identify potential dollar losses for vulnerable structures?			1) Update existing data in risk assessment section, or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Are the plan goals still relevant?			Document any updates in the plan goal section
What is the status of each mitigation action?			Document whether each action is completed or pending. For those that remain pending explain why. For completed actions, provide a 'success' story.
Are there new actions that should be added?			Add new actions to the plan. Make sure that the mitigation plan includes actions that reduce the effects of hazards on both new and existing buildings.
Is there an action dealing with continued compliance with the National Flood Insurance Program?			If not, add this action to meet minimum NFIP planning requirements
Are changes to the action item prioritization, implementation, and/or administration processes needed?			Document these changes in the plan implementation and maintenance section
Do you need to make any changes to the plan maintenance schedule?			Document these changes in the plan implementation and maintenance section
Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?			If the community has not made progress on process of implementing mitigation into existing mechanisms, further refine the process and document in the plan.

Source: Oregon Partnership for Disaster Resilience, 2010.

**Volume II:
Jurisdictional Addenda**

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City of Cave Junction Addendum to the Josephine County Multi-Jurisdictional Hazard Mitigation Plan



Photo Credit: City of Cave Junction

Effective:

June XX, 2022 through June XX, 2027



Prepared for:
City of Cave Junction

Prepared by:
University of Oregon
Institute for Policy Research and Engagement
Oregon Partnership for Disaster Resilience

This Natural Hazard Mitigation Plan was prepared by:



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Purpose

This report constitutes the 2022 City of Cave Junction addendum to the Josephine County Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP). This addendum supplements information contained in Volume I (Basic Plan), which serves as the NHMP foundation, and Volume III (Appendices), which provide additional information. This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Cave Junction adopted its addendum to the Josephine County Multi-jurisdictional NHMP on **July XX, 2022**. FEMA Region X approved the Josephine County NHMP on **July XX, 2022** and the City's addendum on **July XX, 2022**. With approval of this NHMP the City is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through **July XX, 2027**.

Mitigation Plan Mission

The NHMP mission states the purpose and defines the primary functions of the NHMP. It is intended to be adaptable to any future changes made to the NHMP and need not change unless the community's environment or priorities change.

The City supports the mission statement developed during the Josephine County planning process (Volume I, Section 3):

To promote public policy and mitigation activities which will enhance the safety to life and property from natural hazards.

The Cave Junction Steering Committee concurs with the NHMP mission statement and overall purpose and intent of this plan. The Cave Junction Steering Committee believes the wording of the mission statement reflects the desired outcomes of the planning process, as well as allowing for a comprehensive approach to mitigation planning.

Mitigation Plan Goals

Mitigation plan goals are more specific statements that Cave Junction residents, and public and private partners can apply while working to reduce the City's risk from natural hazards. These statements form a bridge between the broad mission statement and help guide agencies and organizations as they implement mitigation action items.

The City supports the goals developed during the Josephine County planning process (Volume I, Section 3). All NHMP goals are important and are listed below in no order of priority. City mitigation priorities are identified within action items. Establishing mitigation priorities neither negates nor eliminates any goals, but establishes which action items to consider implementing first, should funding become available.

Goal 1: Protect life and reduce injuries resulting from natural hazards.

Goal 2: Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.

Goal 3: Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Josephine County.

Goal 4: Minimize the impact of natural hazards while protecting, restoring, and sustaining environmental processes.

Goal 5: Enhance and maintain local capability to implement a comprehensive hazard loss reduction strategy.

Goal 6: Document and evaluate progress in achieving hazard mitigation strategies and action items.

Goal 7: Motivate the public, private sector, and government agencies to mitigate the effects of natural hazards through information and education.

Goal 8: Apply development standards that mitigate or eliminate the potential impacts of natural hazards.

Goal 9: Mitigate damage to historic and cultural resources from natural hazards.

Goal 10: Increase communication, collaboration, and coordination among agencies at all levels of government and the private sector to mitigate natural hazards.

Goal 11: Integrate local NHMPs with comprehensive plans and implementing measures.

Process and Participation

This section of the NHMP addendum addresses 44 CFR 201.6(a)(3), *Participation*.

In addition to establishing a comprehensive city-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K), and the regulations contained in 44 CFR 201, require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local adoption and federal approval of this NHMP ensures that a city will remain eligible for pre- and post-disaster mitigation project grants.

The Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Institute for Policy Research and Engagement (IPRE) collaborated with the Oregon Department of Emergency Management (OEM), Josephine County, and City of Cave Junction to update their NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (DR-4562-06-P-OR). Members of the Cave Junction NHMP Steering Committee also participated in the County NHMP update process (Volume III, Appendix B).

The Josephine County NHMP, and Cave Junction addendum, are the result of a collaborative effort between residents, public agencies, non-profit organizations, the private sector, and regional organizations. The Cave Junction NHMP Steering Committee guided the process of developing the NHMP.

Convener and Committee

The City of Cave Junction Mayor convened the Cave Junction Steering Committee and will take the lead in implementing, maintaining, and updating the city's addendum to the Josephine County NHMP. During development of the City's NHMP addendum, the Cave Junction Steering Committee focused on the plan's risk assessment and mitigation strategies. This addendum reflects the choices decided upon at the designated meetings and through subsequent work and communication with OPDR.

The following representatives comprised the Cave Junction Steering Committee:

- *Convener*, Meadow Martell, Mayor
- Rebecca Patton, City Recorder
- Alex Ponder, Public Works Director
- Cameron Smith, Public Works

Public Participation

Posting the NHMP publicly provided community members the opportunity to make comments and suggestions during the review process. Community members were also provided an opportunity for comment via a survey administered by IPRE (Volume III, Appendix F). **Public comments are pending (Attachment B).**

Mitigation Plan Implementation

The Cave Junction City Council will be responsible for adopting the Cave Junction addendum to the Josephine County NHMP. As noted previously, this addendum designates a steering committee and a convener to oversee the development and implementation of Cave Junction action items. Since the Cave Junction addendum is part of Josephine County's multi-jurisdictional NHMP, the City will look for opportunities to partner with the County.

The Cave Junction Steering Committee will convene annually after adoption of the addendum. Josephine County meets quarterly and will provide opportunities for the jurisdictions to report on NHMP implementation and maintenance during their meetings. The Cave Junction Steering Committee will be responsible for:

- Reviewing existing action items to determine funding suitability;
- Reviewing existing and new risk assessment data to identify issues that may not have been identified during NHMP creation;
- Educating and training new Steering Committee members on the NHMP and mitigation actions in general;
- Assisting in the development of funding proposals for priority action items;
- Discussing methods for continued public involvement; and
- Documenting successes and lessons learned during the year.

The convener will also remain active in Josephine County's NHMP implementation and maintenance process (Volume I, Section 4).

The City will utilize the same action item prioritization process as the County (Volume I, Section 4).

Government Structure

The City is governed by an elected volunteer City Council and Mayor.

- **City Recorder:** The City Recorder office provides research and support to assist the City Council in its decision making and works to ensure that Council's goals and policies are implemented. The position also provide administrative support to the City as well as acts as liaison between the City and its residents.
- **Planning Commission:** The City Council, acting as Planning Commission ensures safe, orderly growth by providing information to the public and the development community on the City's land use policies, Comprehensive Land Use Plan, and relevant Statewide Planning goals. Planning Division staff implement applicable plans through the daily application of the Zoning and Development Code.
- **Fire Protection:** The Illinois Valley Fire Protection District provides fire suppression, fire prevention, and emergency medical services.
- **Public Safety:** The City of Cave Junction contracts with the Josephine County Sheriff for law enforcement services. Cave Junction is in the Illinois Valley Fire District, which serves the communities of Cave Junction, Selma, Takilma, and O'Brien.
- **Water and Sewer Services:** Water and sewer services include the wastewater treatment plant, which provides treatment and disinfection of wastewater from residences and businesses to levels specified in the City's National Pollutant Discharge Elimination System permit, as well as the water treatment plant, where water is taken from the Illinois River and Daisy Hill Well to provide safe drinking water to the City.

This NHMP is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policies. It does: (1) provide a foundation for coordination and collaboration among City agencies and the public; (2) identify and prioritize future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The Cave Junction NHMP addendum works in conjunction with other City plans and programs including the Comprehensive Land Use Plan and Building Codes, as well as the [Josephine County NHMP](#), and the [State of Oregon NHMP](#).

The mitigation actions described herein (and in Attachment A) are intended to be implemented through existing plans and programs within the City. Plans and policies already in existence have support from residents, businesses, and policy makers. City plans are updated regularly, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented. Implementation opportunities are further defined in action items where applicable.

Future development without proper planning may result in worsening problems associated with natural hazards. Cave Junction's acknowledged comprehensive plan is the City of Cave Junction Comprehensive Plan. The City implements its Comprehensive Plan through municipal code ordinances.

Existing Plans and Policies

Cave Junction adopted its first Comprehensive Land Use Plan in 1984. The City implements the plan through ordinances. The City has amended various sections of the plan on multiple occasions. Goal 7 - Areas Subject to Natural Hazards focuses primarily on geologic, slope and

soil hazards and on flood and fire. The Comprehensive Plan does not currently address volcanic activities, earthquake, or severe weather. In addition, the following plans directly or indirectly address natural hazards mitigation. For a complete list visit the City's [website](#).

- [Comprehensive Plan](#) (November 1984).
- [Public Infrastructure Design Standards Manual](#) (March 2021).
- [Parks and Recreation Master Plan](#) (July 2017).
- [Transportation System Plan](#) (December 2014).
- [Water Master Plan](#) (December 2013).
- [Code of Ordinances](#) (1994). Last updated November 2021.

The City also convenes several committees, commissions, and boards. Several of these entities have direct or indirect connection to natural hazard, community vulnerability, or risk reduction (preparedness or mitigation) issues. Where applicable and appropriate, Cave Junction will engage these committees, commissions, and boards in the hazard mitigation process. The following committees are relevant to hazard mitigation planning:

- Budget Committee
- Parks & Recreation Commission
- Planning Commission

Community Organizations

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g., elderly, children, low income). The City can use existing social systems as resources for implementing communication-related activities. Three involvement methods are defined below.

Education and outreach – organization could partner with the City to inform and educate the public or provide outreach assistance on natural hazard preparedness and mitigation.

Information dissemination – organization could partner with the City to provide hazard-related information to target audiences.

Plan/project implementation – organization may have plans and/or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

The following organizations are actively engaging with the community on issues related to natural hazards and mitigation and may be potential partners for implementing mitigation actions.

Klamath-Siskiyou Wildlands Center

Protects and restores the natural areas of the Klamath Siskiyou area. They provide a free toolkit for the Siskiyou region called "Forest & Fire: Rural Living in the Siskiyou" that has a focus on climate change and prescribed burning practices.

Community Emergency Response Team (CERT)

CERT is a community training program about readiness, people helping people, rescuer safety, and doing the greatest good for the greatest number. CERT is an approach to emergency and disaster situations where residents will be initially on their own. Through training, residents can manage utilities and put out small fires; provide basic medical aid; search for and rescue victims safely; and organize themselves and spontaneous volunteers to be effective.

Rogue Basin Partnership (RBP)

Formerly the Stream Restoration Alliance of the Middle Rogue / Middle Rogue Watershed Council, the RBP is a coalition of organizations working to prioritize and to help accelerate the scale and effectiveness of conservation and restoration/enhancement in the Rogue River Basin. In 2015, the group completed the Rogue Restoration Action Plan. The purpose of the plan is to benefit water quality, water quantity, and fish and wildlife habitats over the next ten years (2015-2025). The purpose of the RBP is to provide focus and accountability throughout the region. RBP members include the following groups/organizations:

- Applegate Partnership & Watershed Council
- Cow Creek Band of Umpqua Tribe of Indians
- Illinois Valley Watershed Council
- Jackson Soil & Water Conservation District
- Lomakatsi
- Lower Rogue Watershed Council
- Rogue Riverkeeper
- Rogue River Watershed Council
- Rogue Valley Council of Governments
- Seven Basins Watershed Council
- Southern Oregon Climate Action Now
- Southern Oregon Forest Restoration Collaborative
- Southern Oregon Land Conservancy
- The Freshwater Trust
- Trout Unlimited
- WaterWatch of Oregon

Three Rivers School District

The Three Rivers School District and the City have developed a partnership to ensure the safety of students and school employees. Quarterly inspections of school facilities include a non-structural hazards assessment and revisions to the Three Rivers School District Emergency Operations Plan.

Illinois Valley Soil and Water Conservation District

The Illinois Valley Soil and Water Conservation District was founded in 1949 to direct agricultural producers to technical resources. The organization played an instrumental role in forming the Illinois Valley Watershed Council and leverages funding for agricultural revitalization and cleaner water.

Continued Public Participation

An open public involvement process is essential to the development of an effective NHMP. To develop a comprehensive approach to reducing the effects of natural disasters, the planning process should include opportunities for the public; neighboring communities; local, and regional agencies; as well as private, and nonprofit entities to comment on the NHMP during review. Keeping the public informed of efforts to reduce risk to future natural hazard events is important for successful NHMP implementation and maintenance. The City is committed to involving the public in the NHMP review and update process (Volume I, Section 4). The City posted the plan update for public comment before FEMA approval, and after approval will maintain their addendum to the NHMP on the City's website: <https://www.cavejunctionoregon.us/>.

In addition, natural hazards information dissemination is conducted throughout the year when opportunities present themselves via City departments and the City's website.

Mitigation Plan Maintenance and Update

The Josephine County Multi-Jurisdictional Natural Hazards Mitigation Plan and Cave Junction addendum will be updated every five years in accordance with the update schedule outlined in the federal Disaster Mitigation Act of 2000. During the County plan update process, the City will review and update its addendum (see Volume I, Section 4, *Plan Implementation and Maintenance*, for more information). The Cave Junction NHMP Convener will be responsible for convening the City Steering Committee to address the following questions:

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the City successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the City?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the City's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the City been affected by any disasters? Did the plan accurately address the impacts of this/these event(s)?

These questions will help the City Steering Committee determine what components of the mitigation plan need updating. The City Steering Committee will be responsible for updating any deficiencies found in the plan.

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3)(iv), *Mitigation Strategy*.

The City's action items were developed through a two-stage process. In stage one, OPDR facilitated a work session with the City Steering Committee to discuss the City's risk and to identify potential issues. In the second stage, OPDR, working with the City Steering Committee, developed potential actions based on the hazards and the issues identified by the City Steering Committee.

The City's mitigation actions are shown in Table CJA-1. The steering committee developed action items priorities to reflect current conditions, needs, and capacity. High priority actions are shown in **bold text** with **orange highlight**. The City will focus their attention and resource availability upon these achievable, high leverage activities over the next five years. Although this methodology provides a guide for the steering committee in terms of implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding. Mitigation actions that were not prioritized will be considered for prioritization during the annual maintenance meetings. Refer to Attachment A for detailed information on each high priority action.

Mitigation Successes

Josephine County, working with the Energy Trust of Oregon, recently explored the feasibility of solar + storage microgrid installation on critical facilities. Rather than assessing feasibility solely on the structural capacity of a building to host a solar + storage microgrid, this project sought to incorporate other factors as well. They considered the location and ownership of critical facilities, as well as the location of vulnerable populations in Josephine County. By taking all these factors into account, the results and recommendations from the project can more holistically support clean energy goals, mitigate risks to critical community lifelines and the communities who depend on those lifelines, and lead to increased energy independence.

Facilities that were recommended to prioritize include: **Cave Junction Wastewater Plant**, County EOC and SAR, Fires Station 4 Holland, **Fire Station 1 Cave Junction**, Fire Station 3 O'Brien, Grants Pass Wastewater Treatment Plant, Grants Pass Airport, **Illinois Valley Airport**, Josephine County Food Bank, Josephine County Public Works (Kerby), Kerby Belt Building (Illinois Valley Learning Center), and North Valley High School.

Table CJA-I City of Cave Junction Action Items

Mitigation Action Item		Lead Agency	Timeline	Cost
Multi-Hazard				
1.1	Improve and maintain public information and education programs focused on potential hazards, the need for personal preparedness, and household mitigation actions.	City of Cave Junction	Long-Term	Low
1.2.	Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration.	City of Cave Junction	Long-Term	Low
1.3.	Identify and maintain additional evacuation routes out of the Illinois Valley	City of Cave Junction, ODOT	Short-Term	Medium
1.4	Acquire non-energy reliant, or energy grid independent, communication systems between Cave Junction and Josephine County	City of Cave Junction, Josephine County	Short-Term	Medium
1.5	Improve internet and cellular phone coverage in and around Cave Junction	Public Works	Long-Term	Medium
Drought				
2.1	Create a Water Conservation Management Plan	City of Cave Junction	Short-Term	Medium
Earthquake				
3.1	Identify, prioritize, and develop funding strategies for critical facilities that need structural or non-structural retrofits, notably Lorna Byrne Middle School and Evergreen Elementary School.	City of Cave Junction, Josephine County	Long-Term	Low
3.2	Encourage all new critical facilities be built to the highest earthquake building code standards; consider Institute for Business and Home Safety (IBHS) "Fortified for Safer Business" standards.	City of Cave Junction, Josephine County	Long-Term	Low

Mitigation Action Item		Lead Agency	Timeline	Cost
Flood				
4.1	Annually assess the City's interest in and ability to participate in the National Flood Insurance Program's Community Rating System.	City of Cave Junction	Long-Term	Low
4.2	Collaborate with Josephine County to create and disseminate outreach materials on how to minimize erosion of soils and banks during flood events of varying magnitudes for property owners and tenants along stream and riverbanks.	City of Cave Junction, Josephine County	Long-Term	Low
Landslide				
5.1	Collaborate with Josephine County to create and disseminate outreach materials for property owners and tenants in high-risk debris flow and landslide areas.	City of Cave Junction	Long-Term	Low
Severe Weather				
6.1	Collaborate with state agencies, utilities, and community organizations to designate and/or construct a building to be used as a warming shelter, a cooling shelter, and/or a clean air refuge.	City of Cave Junction, Local Community Organizations	Medium-Term	High
6.2	Collaborate with PacifiCorp to remove trees that have a higher potential to fall on power lines	City of Cave Junction, PacifiCorp	Ongoing	Medium
6.3	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	City of Cave Junction, PacifiCorp	Ongoing	Low
6.4	Promote the benefits of tree-trimming and tree replacement programs; help coordinate public and private agency efforts.	City of Cave Junction	Ongoing	Low
Wildfire				
7.1	Develop a Cave Junction Park and Recreation Maintenance Plan	City of Cave Junction Parks and Recreation	Short-Term	Medium

Mitigation Action Item		Lead Agency	Timeline	Cost
7.2	Collaborate with ODOT and Josephine County to create fire breaks along Highway 199 between Grants Pass and Cave Junction	City of Cave Junction, ODOT, Josephine County	Medium-Term	High
7.3	Promote wildfire mitigation through public education, fuels reductions, and transportation corridor improvements.	City of Cave Junction	Long-Term	Low
7.4	Promote wildfire education and awareness and the Firewise program	City of Cave Junction	Ongoing	Low
7.5	Increase wildfire fuels reduction around River Valley Village Mobile Home Park	Public Works	Medium-Term	Medium
7.6	Increase wildfire fuels reduction around the fire camera and water tank off South Old Stage Rd. Harden the tank to better resist fire damage on Old Stage Rd.	Public Works	Medium-Term	Medium

Source: City of Cave Junction NHMP Steering Committee, 2022.

Cost: Low (less than \$50,000), Medium (\$50,000-\$100,000), High (more than \$100,000)

Timing: Ongoing (continuous), Short-Term (1-2 years), Medium-Term (3-5 years), Long-Term (more than 5 years)

Priority Actions: Identified with **bold text** and **orange highlight**.

REVIEW DRAFT

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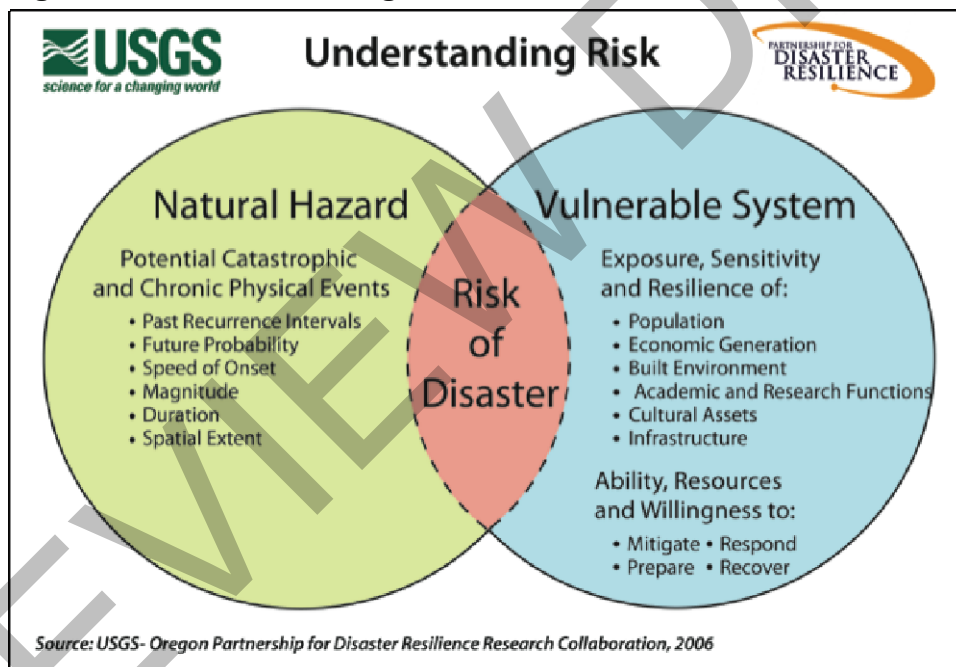
Risk Assessment

This section of the NHMP addendum addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazard risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Volume I, Section 2, and Volume III, Appendix C. The risk assessment process is graphically depicted in Figure CJA-1. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure CJA-1 Understanding Risk



Hazard Analysis

The Cave Junction NHMP Steering Committee reviewed and revised the plan’s Hazard Analysis and Risk Assessment section and refined the County’s Hazard Vulnerability Assessment (HVA) where appropriate to reflect distinctions in probability, vulnerability, and risk from natural hazards unique to the City.

Table CJA-2 depicts the hazard analysis matrix for Cave Junction and illustrates that hazard scores are influenced by each of the four categories combined. For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard priorities but does not predict the occurrence of a hazard. Volume I, Section 2: Risk Assessment of the Josephine County NHMP, describes the methodology.

The hazards are listed in rank order from high to low. The table shows that hazard scores are influenced by each of the four categories combined: past historical events, the probability or likelihood of a hazard event occurring, the vulnerability to the community, and the maximum threat or worst-case scenario. The City ranked wildfire, winter storm, Cascadia Subduction Zone earthquake, and windstorm as the top tier hazard threats. Drought, extreme heat events riverine flood, and crustal earthquake constitute the middle tier. Landslides and volcanic events comprise the lowest ranked hazards and the bottom tier.

Table CJA-2 Hazard Analysis Matrix – City of Cave Junction

Hazard	Maximum				Total Threat Score	Hazard Rank	Hazard Tiers
	History	Vulnerability	Threat	Probability			
Wildfire	18	45	100	70	233	#1	Top Tier
Winterstorm	16	40	100	63	219	#2	
Earthquake - Cascadia	2	50	100	49	201	#3	
Windstorm	16	40	70	63	189	#4	
Drought	16	15	70	70	171	#5	Middle Tier
Extreme Heat Event	8	30	60	63	161	#6	
Flood - Riverine	16	20	50	70	156	#8	
Earthquake - Crustal	8	25	100	21	154	#7	
Landslide	8	10	40	35	93	#9	Bottom Tier
Volcanic Event	2	5	30	7	44	#10	

Source: City of Cave Junction NHMP Steering Committee (2022)

Table CJA-3 categorizes the probability and vulnerability scores from the hazard analysis for the City and compares the results to the assessment completed by the County (areas of differences are noted with **bold** text within the City ratings).

Table CJA-3 Probability and Vulnerability Comparison

Hazard	Cave Junction		County	
	Probability	Vulnerability	Probability	Vulnerability
Drought	High	Low	High	Moderate
Earthquake - Cascadia	Moderate	High	Moderate	High
Earthquake - Crustal	Low	Moderate	Low	Moderate
Extreme Heat Event	High	Moderate	High	Moderate
Flood - Riverine	High	Moderate	High	Moderate
Landslide	Moderate	Low	High	Low
Volcanic Event	Low	Low	Low	Low
Wildfire	High	High	High	High
Windstorm	High	High	High	Moderate
Winter Storm (Snow/Ice)	High	High	High	High

Source: City of Cave Junction and Josephine County NHMP Steering Committees (2022)

Community Characteristics

Table CJA-4, Appendix C (Volume III), and the following section provide information on City specific demographics and assets. Many of these community characteristics can affect how natural hazards impact communities, and how communities choose to plan for natural hazard mitigation. Considering city-specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation. Between 2014 and 2021 the City of Cave Junction grew by 244 people (13%).¹ According to the State’s official coordinated population forecast, between 2021 and 2040 the City’s population is forecasted to grow by 15% to 2,461.² Median household income decreased by seven percent (7%) between 2014 and 2019.³ The City has an educated population with 88% of residents 25 years, and older holding a high school degree, but only about 12% have a bachelor’s degree or higher. As of 2021, the three high schools within the the Three Rivers School District had graduation rates ranging from 87% to 93%.⁴

Cave Junction is in the Illinois Valley in southwest Oregon. The Illinois River runs through the City. This area differs from the rest of southwest Oregon in that there is less ocean influence, cooler winters, and warmer drier summers. The town is at an elevation of approximately 950 feet.

The region experiences hot, short summers and generally mild winters, though severe winter storms are not uncommon. The climate in Cave Junction is moderate. Average monthly temperatures range from lows of 32-47° F (in December) to highs of 52° F- 94° F (in July). The driest months are July and August. The wettest months are November through January with average precipitation ranging from 8.0 to 13.0 inches per month. Cave Junction has an average annual precipitation of approximately 61.2 inches.

¹ Portland State University, Population Research Center, "Annual Population Estimates", 2021.

² Portland State University, Population Research Center, "Oregon Population Forecast Program Cycle 1 (2014-2017)", 2017.

³ Social Explorer, Table T57, U.S. Census Bureau, 2015-2019 and 2010-2014 American Community Survey Estimates.

⁴ Three Rivers School District: <https://www.publicschoolreview.com/oregon/three-rivers-josephine-county-school-district/4106900-school-district>

Table CJA-4 Community Characteristics

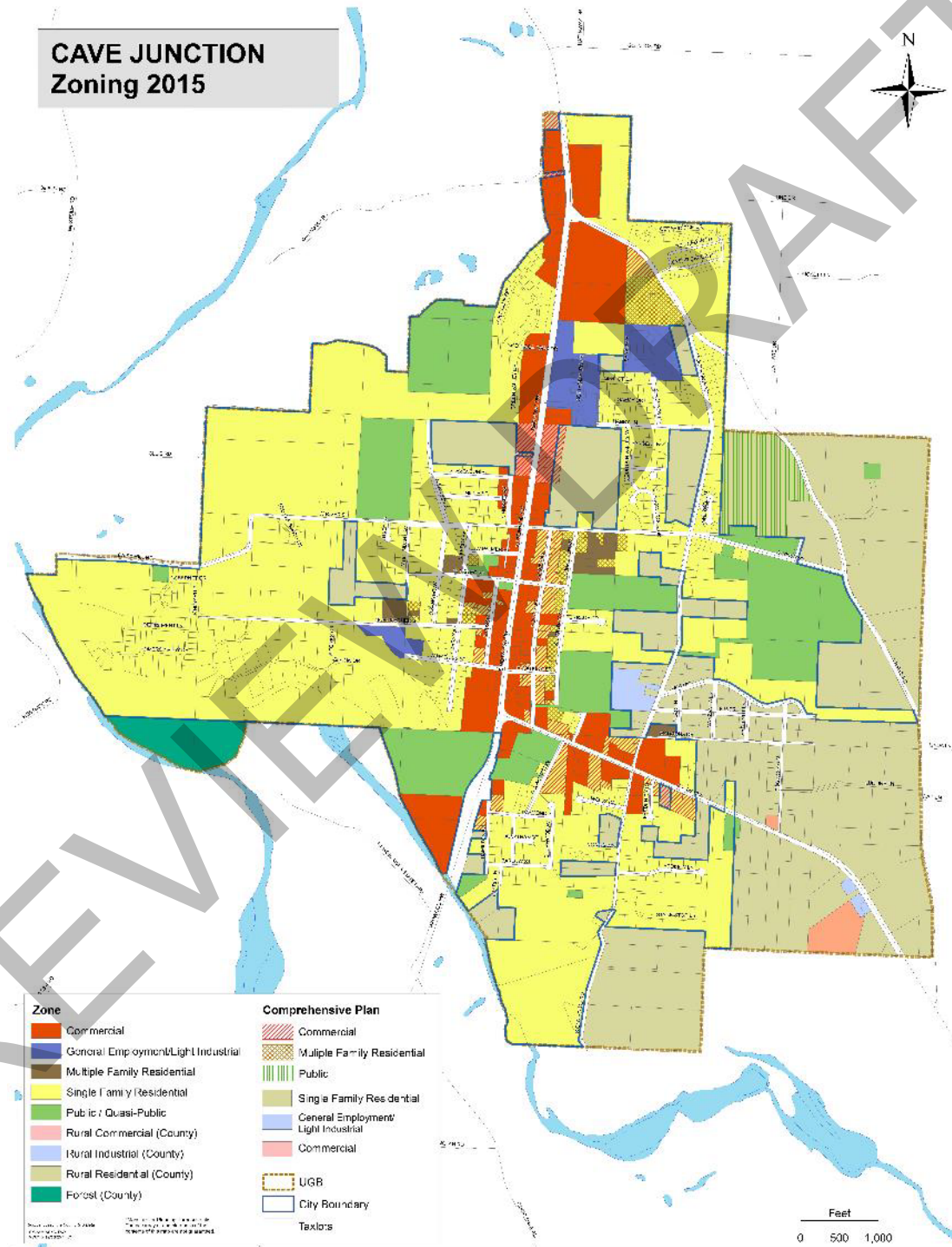
Population Characteristics			Household and Employment Characteristics		
2014 Population	1,905		Housing Units		
2021 Population	2,149		Single-Family	694	63%
2040 Forecasted Population	2,461		Multi-Family	107	10%
Race (non-hispanic or latino) and Ethnicity (Hispanic)			Mobile Homes	298	27%
American Indian and Alaska Native	< 1%		Household Type		
Asian	2%		Family Household	613	60%
Black/ African American	1%		Married couple (w/ children)	290	28%
Native Hawaiian and Other Pacific Islander	0%		Single (w/ children)	249	24%
White	96%		Living Alone 65+	235	23%
Some Other Race	0%		Year Structure Built		
Two or More Races	< 1%		Pre-1970	183	17%
Hispanic or Latino (of any race)			1970-1989	413	38%
Limited or No English Spoken	11	< 1%	1990-2009	484	44%
Vulnerable Age Groups			2010 or later	19	2%
Less than 5 Years	137	6%	Housing Tenure and Vacancy		
Less than 15 Years	712	29%	Owner-occupied	545	50%
65 Years and Older	545	22%	Renter-occupied	481	44%
85 Years and Older	70	3%	Seasonal	25	2%
Age Dependency Ratio		102.9	Vacant	48	4%
Disability Status			Vehicles Available (Occupied Units)		
Total Population	377	15%	No Vehicle	144	14%
Children (Under 18)	6	< 1%	One	409	40%
Working Age (18 to 64)	223	9%	Two	342	33%
Seniors (65 and older)	148	6%	Three or more	131	13%
Income Characteristics			Employment Characteristics		
Households by Income Category			Labor Force		
Less than \$15,000	251	25%	In labor Force	606	33%
\$15,000-\$29,999	333	33%	Unemployed	50	3%
\$30,000-\$44,999	160	16%	Occupation (Top 5)		
\$45,000-\$59,999	126	12%	Professional and Related	120	22%
\$60,000-\$74,999	30	3%	Healthcare Support	87	16%
\$75,000-\$99,999	33	3%	Transportation/Material Moving	86	16%
\$100,000-\$199,999	86	8%	Production	84	15%
\$200,000 or more	7	1%	Construction, Extraction, Maint.	42	8%
Median Household Income		\$26,578	Health Insurance		
Gini Index of Income Inequality		0.48	No Health Insurance	149	6%
Poverty Rates			Public Health Insurance	1,801	73%
Total Population	1,051	42%	Private Health Insurance	961	39%
Children (Under 18)	437	61%	Transportation to Work		
Working Age (18 to 64)	561	46%	Drove Alone	415	75%
Seniors (65 and older)	53	10%	Carpooled	27	5%
Housing Cost Burden (Cost > 30% of household income)			Public Transit	0	0%
Owners with a Mortgage	108	38%	Motorcycle	0	0%
Owners without a Mortgage	80	30%	Bicycle/Walk	59	11%
Renters	331	69%	Work at Home	55	10%

Source: U.S. Census Bureau, 2015-2019 and 2010-2014 American Community Survey; Portland State University, Population Research Center, "Annual Population Estimates", 2021. Portland State University, Population Research Center, "Oregon Population Forecast Program Cycle 1 (2014-2017)". 2021. Note: ACS 2014 and 2019 dollars adjusted for 2021 via Social Explorer's Inflation Calculator

Cave Junction spans 1.8 square miles. City zoning is dominated by single-family residential with commercially zoned land concentrated along the highway corridors (Figure CJA-2).

Since 2017 the city has annexed two (2) lots located near 329 Hawthorne and 1029 N Old Stage Rd. New development has complied with the standards of the [Oregon Building Code](#), and the City's Development Code, including the floodplain ordinance.

Figure CJA-2 Zoning Map, City Limits, Urban Growth Boundary



Source: [City of Cave Junction](#)

Economy

Cave Junction's commercial areas developed along primary transportation routes and residential development followed nearby (Figure CJA-2).

Median income can be used as an indicator of the strength of the region's economic stability. In 2019, the median household income in Cave Junction was \$26,578; \$2,066 less than the 2014 value (2021 inflation adjusted values). Although it can be used to compare areas, this number does not reflect how income is divided among area residents.

Asset Identification

The following assets have been identified by the Institute of Policy, Research, and Engagement at the University of Oregon in collaboration with the City of Cave Junction. These assets were confirmed and updated by the City Steering Committee during the 2021-2022 update process.

Cultural and Historic Resources

Historical and cultural resources such as historic structures and landmarks can help distinguish a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important. Cave Junction does not have any historic resources listed in the National Historic Register.⁵ There is one property identified by the State Historic Preservation Office (SHPO) as eligible/contributing located at 131 N Redwood Highway (ca. 1930).

Parks and Open Space

The City of Cave Junction has two designated park areas: Jubilee Park, the City's only developed city park; and Old Stage Park, a 40-acre, undeveloped plot of land along the Illinois River. Recreation options are available on public school sites through the Three Rivers School District. Other recreational assets surrounding Cave Junction that are not City-owned include the Rogue-Siskiyou National Forest, the Klamath National Forest, Illinois River Forks State Park, and Oregon Caves National Monument & Preserve. In addition, Great Cats World Park and Rough and Ready Botanical Wayside Nature Preserve provide recreation and tourism opportunities along Highway 199 between Cave Junction and the Illinois Valley Airport.

⁵ Oregon State Historic Preservation Office, https://www.oregon.gov/oprd/oh/pages/default.aspx?utm_source=OPRD&utm_medium=egov_redirect&utm_campaign=https%3A%2F%2Fwww.oregon.gov%2Foprd%2Fhcd%2Fpages%2Findex.aspx

Figure CJA-3 Current and General Future Park Locations, 2017



Source: Cave Junction Comprehensive Park & Recreation Master Plan, 2017

Critical Facilities & Infrastructure

Critical facilities are those that support government and first responders' ability to act in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Individual communities should inventory their critical facilities to include locally designated shelters and other essential assets, such as fire stations, and water and wastewater treatment facilities. Additional information is provided in Table CJA-7 (Attachment D) on each of the facilities listed below. Included in the table is loss estimation from the Oregon NHMP.

Cave Junction has the following critical facilities:

Fire Station(s)

- Illinois Valley Fire District: 681 Caves Hwy

Health Clinic

- Siskiyou Community Health Center: 25647 Redwood Hwy

Schools

- Evergreen Elementary School: 520 W River St
- Lorna Byrne Middle School: 101 S Junction Ave
- Illinois Valley High School: 625 E River St
- Southern Oregon Headstart Preschool (Private): 620 E River St
- Community Christian Academy (Private): 113 S Caves Ave

Civic Building(s)

- Cave Junction City Hall/Josephine County Sheriff's Office: 222 Lister St
- City Maintenance Shop: 410 Hamilton Ave

Water and Wastewater Treatment Centers

- Cave Junction Water Treatment Plant: 466 S Junction Ave
- Cave Junction Wastewater Plant: 1300 N Sawyer Ave
 - Water Intake Stations
 - Illinois River Raw Water Intake: US Hwy 199
 - Daisy Hill Well House: Daisy Hill Rd
- Four reservoirs (2.8 Million Gallon capacity)
 - South Old Stage Tank: S. Old Stage Road (0.3 mGal capacity).
 - Clearwell Storage Tank: 466 S Junction Ave (0.5mGal capacity).
 - Laurel Road Reservoir 3: Laurel Rd (0.5 mGal Capacity).
 - Laurel Road Reservoir 4: Laurel Rd (1.5 mGal Capacity).

Airport(s)

- Illinois Valley Airport: 30904 Redwood Hwy (about 5 miles south of Cave Junction)

Energy

- Pacific Power substations

Essential Facilities

Communication Towers:

- Reservoir 1 – 3 Shared Towers (IV Data, Verizon, AT&T, US Cellular)

Post Office

- Cave Junction Post Office: 102 S Hussey Ave

Emergency Shelters

- None identified

Museums and Libraries

- Illinois Valley Branch Library: 209 W Palmer St
- Kerbyville Museum: 24195 Redwood Hwy, Kerby
- Smoke Jumper Base Museum: 30902 Redwood Hwy

Transportation

Mobility plays an important role in Cave Junction and the daily experience of its residents and businesses. Motor vehicles represent the dominant mode of travel through, and within the City. Cave Junction is located on Highway 199 with most residents living within one-half to one-mile from the highway. The City is also the starting point of Oregon Highway 46, which connects Cave Junction to Oregon Caves National Monument to the east. Notably, Highway 199 crosses the Illinois River in Cave Junction. The City classifies its roads as arterial, collector, local collector, local, or private streets.

Cave Junction relies upon Highway 199 as the primary paved road to use for evacuation during disaster events. This presents a vulnerability to residents and visitors who face potential evacuation restrictions if this route is unavailable. The only other paved roads that leave the Illinois Valley connect to Grayback Road south of the City. Grayback Road, an isolated mountain road that goes over the Siskiyou Mountains and drops into Happy Camp, CA, is often closed during winter storms. Additionally, the route is vulnerable to the impacts of wildfire; most recently it was closed for over a year following the Slater Creek Fire.⁶

Roads/Seismic Lifelines

Seismic lifeline routes help maintain transportation facilities for public safety and resilience in the case of natural disasters. Following a major earthquake, it is important for response and recovery agencies to know which roadways are most prepared for a major seismic event. The Oregon Department of Transportation has identified lifeline routes to provide a secure lifeline network of streets, highways, and bridges to facilitate emergency services response after a disaster.⁷

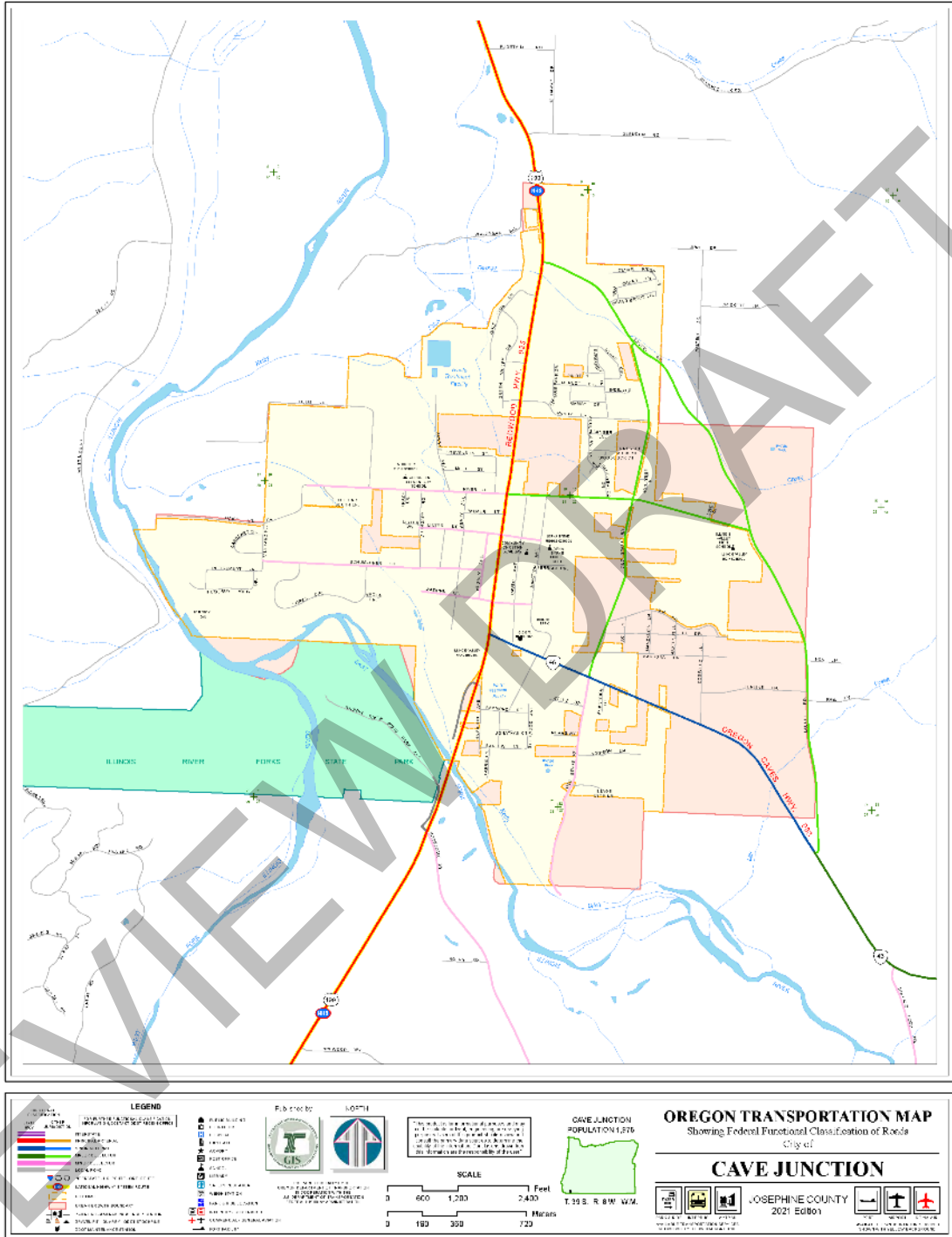
System connectivity and key geographical features were used to identify a three-tiered seismic lifeline system. Routes identified as Tier 1 are considered the most significant and necessary to ensure a functioning statewide transportation network. The Tier 2 system provides additional connectivity to the Tier 1 system, allowing for direct access to more locations and increased traffic volume capacity. The Tier 3 lifeline routes provide additional connectivity to the systems provided by Tiers 1 and 2.

Highway 199 (Tier 3) is the major north-south transportation route connecting Cave Junction to Grants Pass and California (Figure CJA-4). There is no major east-west route in Cave Junction other than Highway 46 connecting Cave Junction to Oregon Caves National Monument.

⁶ Source: Jaime Parfitt, KDRV News. https://www.kdrv.com/news/firewatch/grayback-road-reopens-to-local-traffic-almost-a-year-after-slater-fire/article_e0c653b3-ec3c-5bf7-8df3-6528b79e136d.html

⁷ Oregon Department of Transportation. Oregon Seismic Lifeline Evaluation, Vulnerability Synthesis, and Identification, *Oregon Seismic Lifeline Routes*, May 15 2012.

Figure CJA-4 Cave Junction Seismic Program Highways



Source: Oregon Department of Transportation - [Link](#)

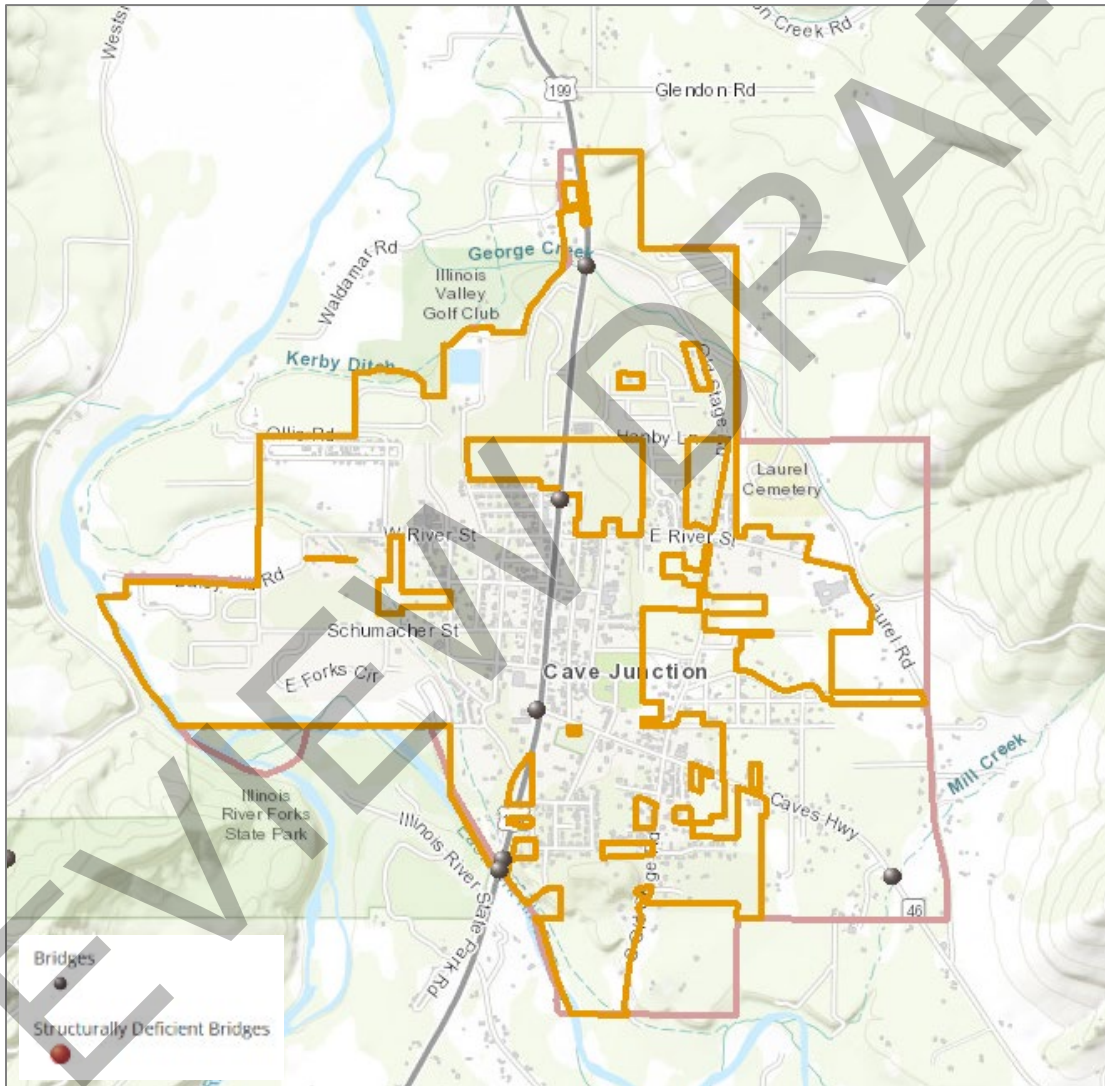
Bridges

The seismic vulnerability of the City’s bridges is an important issue due to earthquake risk. Non-functional bridges can disrupt emergency operations, sever lifelines, and disrupt local and freight traffic. There are no structurally deficient bridges on Highway 199 from the

California Border to Grants Pass nor are there any on Highway 46. These disruptions may exacerbate local economic losses if industries are unable to transport goods. Bridges within the City that are critical or essential include (Figure CJA-5):

- (bridge) George Creek, HWY 199 (ca. 2008), (Bridge ID 20391), Condition: Good
- (culvert) US 199 @ MP 28.29 (ca. 1925), (Bridge ID 01152), Condition: Good
- (culvert) US 199, Kerby Canal (ca. 1925), (Bridge ID 03802), Condition: Fair
- (bridge) E. Fork Illinois R, HWY 199 (ca. 2006), (Bridge ID 19267), Condition: Fair
- (culvert) OR 46 (ca. 1925), (Bridge ID 01145), Condition: Fair

Figure CJA-5 Cave Junction Bridges



Source: Oregon Department of Transportation, ODOT TransGIS, accessed March 13, 2022

More information on Seismic Design of bridges is on the ODOT website:

<https://www.oregon.gov/odot/Bridge/Pages/Seismic.aspx>

Railroads

- There are no railroad lines that go through Cave Junction.

Airports

The public Illinois Valley Airport is located southwest of the City along Highway 199. The closest commercial air service is located roughly a 55-mile drive northeast of Cave Junction in Medford through Grants Pass.

Utilities

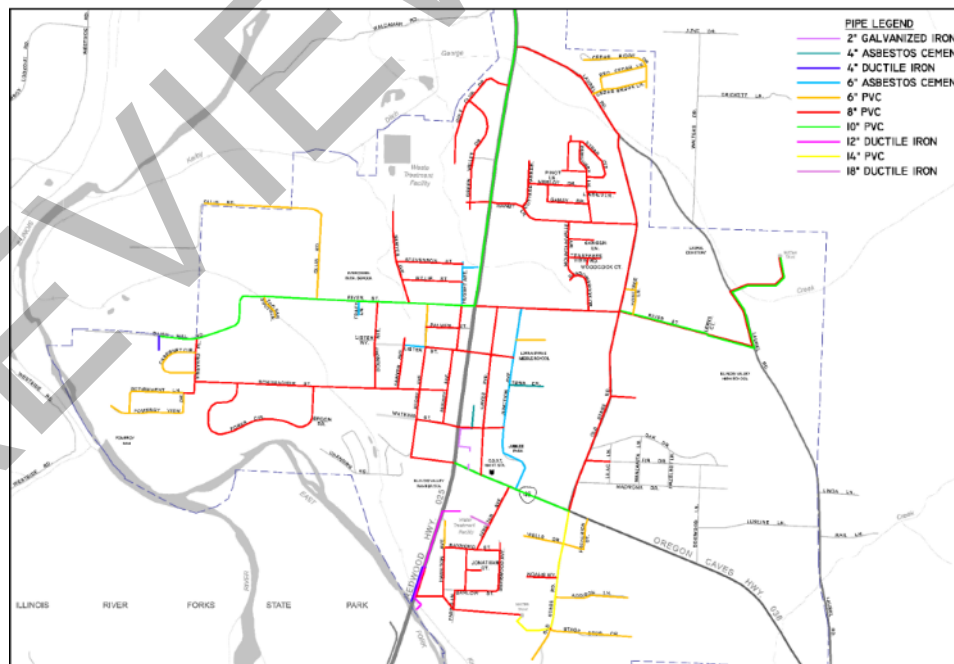
Utility lifelines are the resources that the public relies on daily and include power, fuel, and communication lines. If these lines fail or are disrupted, the essential functions of the community can become severely impaired. Utility lifelines are closely related to physical infrastructures, like dams and power plants, as they transmit the power generated from these facilities.

Generally, the network of electricity transmission lines running throughout the City is operated by Pacific Power.

Water

The City of Cave Junction treats and distributes over two billion gallons of water annually. The Illinois River and the Daisy Hill Well are the City's water supply sources. Historical water demand in Cave Junction is between 0.337 and 1.18 million gallons per day. The City maintains a single water treatment plant. The City's distribution system has one (1) pressure zone served by four (4) gravity storage reservoirs and one (1) booster pump station in Kerby. The City's distribution piping includes approximately 18 miles of pipe in sizes up to 18 inches in diameter. Additional facility maintenance and mitigation activities are contained in the Water Distribution Master Plan. According to the City's Water Master Plan, water supply is currently available and sufficient to meet demand.

Figure CJA-6 Cave Junction Existing Water System Service Area and Distribution System



Source: City of Cave Junction Water Master Plan (2013).

Hazard Profiles

The following sections briefly describe relevant information for each profiled hazard. More information on Josephine County hazards can be found in Volume I, Section 2, Risk Assessment, and in the [Risk Assessment for Region 4, Southwest Oregon, Oregon SNHMP \(2020\)](#).

Drought

The Cave Junction Steering Committee determined that the City's probability for drought is **high**, meaning at least one incident may occur within the next 10 years and that its vulnerability to drought is **Low** meaning that less than 1% of the City's population or property could be affected by a major drought event.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of drought hazards, as well as the history, location, extent, and probability of a potential event. Droughts are common in southern Oregon. The City and County impacts from drought vary slightly due to the difference between urban and rural water infrastructure. Josephine County has experienced nine drought declarations since 1991, two since the previous NHMP (2020, 2021).

Cave Junction's water supplies comes from the Illinois River and the Daisy Hill Well. The City has four storage reservoirs/high pressure tanks with 2.8 million gallons of treated water storage capacity. The water treatment plant has allowed the City to treat at maximum 2 million gallons per day. Currently, the city is only using about 31% (1.46 cubic feet per second (cfs) out of a maximum 4.6 cfs) of its water rights, which will enable Cave Junction to meet future demands. The Oregon Water Resources Department coordinates with municipalities to implement water conservation or curtailment plans when drought emergencies are declared. The City's Water Master Plan addresses conservation and rationing protocols and includes a water management and conservation plan.

Future Climate Projection

According to the Oregon Climate Change Research Institute (OCCRI) report "*Fifth Oregon Climate Assessment*"⁸ the probability of future drought conditions (low summer soil moisture, low spring snowpack, low summer runoff, low summer precipitation, and high summer evaporation) is likely to increase.

Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Statewide droughts have historically occurred in Oregon and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the Cave Junction's local economy have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

⁸ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

In addition to reduced water supplies, a drought will increase the chances of wildfire and significantly reduce tourism activities. If hotels, for example, are unable to accommodate guests, the City's economy would greatly suffer.

At the 2022 NHMP Steering Committee meeting, stakeholders expressed little concern for running out of water since Cave Junction is not close to reaching the upper limit of its water rights. The City sells excess water to nearby unincorporated areas. However, the City is concerned about the increased pressure on water use presented by the growing cannabis industry (Josephine County has placed a moratorium on new hemp business licenses).

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The Cave Junction Steering Committee determined that the City's probability for a Cascadia Subduction Zone (CSZ) earthquake event is **moderate**, meaning one incident may occur within the next 35 to 75 years and that its vulnerability to a CSZ event is **high**, meaning that more than 10% of the City's population or property could be affected by a major CSZ earthquake event. The steering committee determined that the City's probability for a crustal earthquake event is **low**, meaning one incident may occur within the next 100 years and that its vulnerability to a crustal earthquake event is **moderate**, meaning that between 1% and 10% of the City's population or property could be affected by a major crustal earthquake event.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of earthquake hazards, as well as the history, location, extent, and probability of a potential event. Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any site. In many major earthquakes, damages have primarily been caused by the behavior of the soil.

The Pacific Northwest experienced a subduction zone earthquake estimated at magnitude 9 on January 26, 1700. The earthquake generated a tsunami that caused damage as far away as Japan. The largest Cascadia Subduction Zone (CSZ) earthquakes have a return period of about 530 years. The time between events has been as short as 100 to 200 years and as long as 1,000 years. The probability of a large CSZ event is estimated at 7 to 12% over the next 50 years.⁹

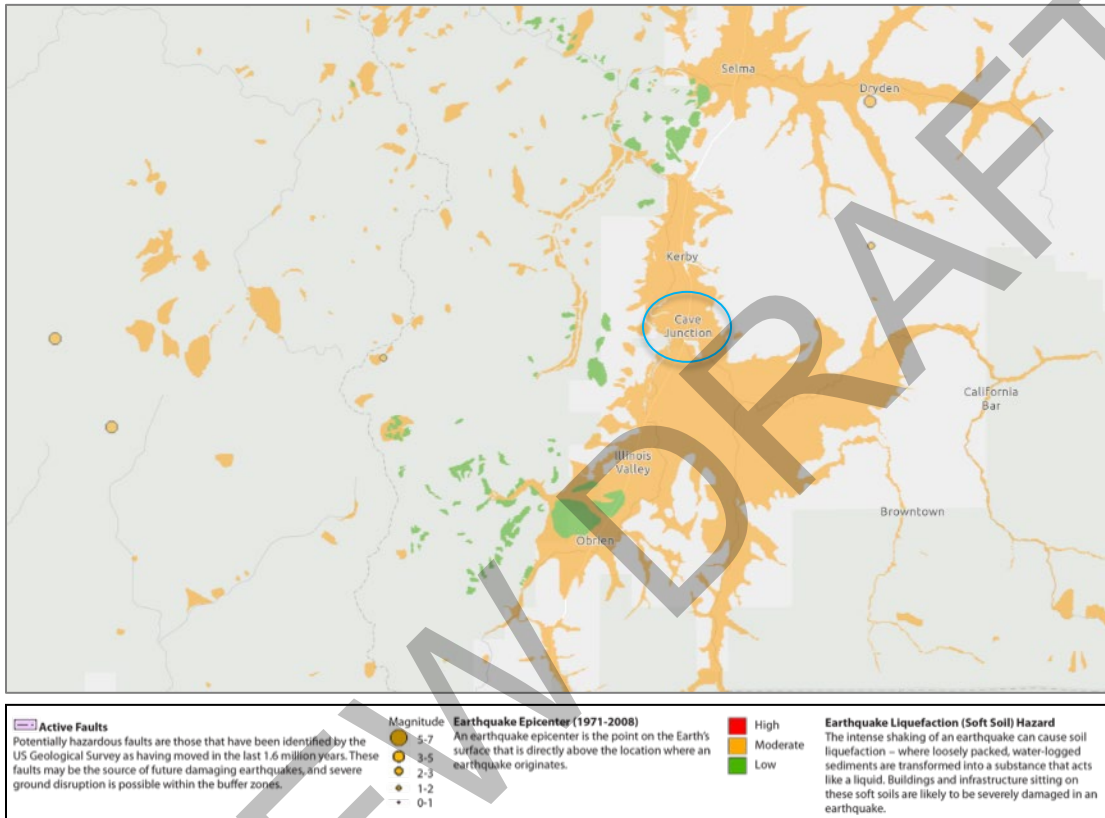
The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has undertaken a rigorous program in Oregon to identify seismic hazards, including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides. DOGAMI estimates that Cave Junction has a 32-45% chance of experiencing damaging shaking over the next 100 years.¹⁰

⁹ Oregon Department of Land Conservation and Development. *Oregon State Natural Hazard Mitigation Plan*. 2020.

¹⁰ Ibid.

Figure CJA-7 shows the areas for potential regional active faults, earthquake history (1971-2008), and soft soils (liquefaction) hazard for the City. Cave Junction (blue oval) is within a moderate region regarding soil liquefaction (orange areas). There are no active fault lines in its immediate vicinity (areas of concern lie in Klamath County to the east and Curry County to the west).

Figure CJA-7 Active Crustal Faults, Epicenters (1971-2008), and Soft Soils



Source: Oregon [HazVu: Statewide Geohazards Viewer \(DOGAMI\)](#)

Note: To view detail click the link above to access Oregon HazVu

Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform an in-depth quantitative risk assessment, or exposure analysis, for this hazard. The extent of the damage to structures and injury and death to people will depend upon the type of earthquake, proximity to the epicenter and the magnitude and duration of the event. The City's infrastructure, particularly older buildings, are highly vulnerable to a severe earthquake event. Cave Junction also has many manufactured homes, which are especially vulnerable to earthquake events. The City would expect significant damage to roads and bridges following a CSZ event, as well as deaths and severe injuries regionwide. Education and outreach regarding earthquakes is an ongoing endeavor in Cave Junction. In addition to building damages, utility (electric power, water, wastewater, natural gas) and transportation systems (bridges, pipelines) are also likely to experience significant damage. There is a low probability that a major earthquake will result in failure of upstream dams. Because of the "one way in, one way out" feature of the Illinois Valley, Cave Junction is particularly vulnerable to being cut off from the rest of Oregon following an earthquake event.

2007 Rapid Visual Survey

Oregon implemented building codes in the 1970s, however, stricter standards did not take effect until 1991 and early 2000s. As noted in the community characteristics section (Table CJA-4), approximately 55% of Cave Junction’s residential buildings were built prior to 1990, which increases the City’s vulnerability to the earthquake hazard. Information on specific public building (schools and public safety) estimated seismic resistance, determined by DOGAMI in 2007, is shown in Table CJA-5. Of the facilities evaluated by DOGAMI using its Rapid Visual Survey (RVS) that have not been retrofitted, no buildings have a very high (100% chance) collapse potential, however, three (3) buildings have a high (greater than 10% chance) collapse potential. To fully assess a building’s potential for collapse, a more detailed engineering study completed by a qualified professional is required although the RVS can help prioritize buildings to survey.

Mitigation Successes

Seismic retrofits have occurred to the following facility through local funds (construction bonds, etc.) and/or grant awards per the [Seismic Rehabilitation Grant Program](#)¹¹: Three Rivers School District – Illinois Valley High Gym: \$1,373,979 (2019 SRGP)

Table CJA-5 Rapid Visual Survey Scores (2007)

Facility	Site ID*	Level of Collapse Potential			
		Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Schools					
Evergreen Elementary (520 W River St)	Jose_sch07	XXX	X	X	
Lorna Byrne Middle (101 S Junction Ave)	Jose_sch13			X	
Illinois Valley High (625 E River St)	Jose_sch21			X	

Source: [DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment](#). Notes: “*” – Site ID is referenced on the [RVS Josephine County Map](#); *Light grey* text indicates a facility that has benefited from seismic mitigation (see Mitigation Successes above for detail). DOGAMI, Open-File Report O-20-11, Josephine County Natural Hazard Risk Report (2020).

Buildings not included in the RVS study include:

- **Illinois Valley Fire District:** 681 Caves Hwy
- **Siskiyou Community Health Center:** 25647 Redwood Hwy
- **Southern Oregon Headstart Preschool (Private):** 620 E River St
- **Community Christian Academy (Private):** 113 S Caves Ave
- **Cave Junction City Hall/Josephine County Sheriff’s Office:** 222 Lister St
- **Cave Junction Wastewater Plant:** 1300 N Sawyer Ave
- **Illinois Valley Airport:** 30904 Redwood Hwy (*in County*)

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

¹¹ The Seismic Rehabilitation Grant Program (SRGP) is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public schools and emergency services facilities (police/fire).

Flood

The Cave Junction Steering Committee determined that the City's probability for riverine flood is **high**, meaning at least one incident may occur within the next 35-year period and that its vulnerability to riverine flood is **moderate**, meaning that between 1% and 10% of the City's population or property could be affected by a major riverine flood event.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of coastal and riverine flood hazards, as well as the history, location, extent, and probability of a potential event. There is no recent history of major flooding in Cave Junction.

Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide the most readily available source of information for the extent of the flood hazard. These maps represent a snapshot in time and do not account for later changes that occurred in the floodplains. FIRMs delineate 100-year (a flood with a one (1) percent probability of occurring within any given year) and 500-year (a flood with a 0.2 percent probability of occurring within any given year) floodplain boundaries. The 100-year flood is used as the standard for floodplain management in the United States and is referred to as a base flood; it also known as the Special Flood Hazard Area (SFHA). The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

FEMA has mapped the flood-prone waterways in Cave Junction for 100- and 500-year flood events (Figure CJA-8).

Future Climate Projection:

According to OCCRI report "*Fifth Oregon Climate Assessment*"¹² the intensity of extreme precipitation is expected to increase as the atmosphere warms. The primary factor for the increase in intensity is because warmer air can hold more moisture that is available to fall as rain or snow in a warmer climate. Secondly, magnitudes are expected to increase since rainfall driven floods tend to have larger flood peaks than snowmelt driven floods. Lastly, precipitation is expected to increase. Greater precipitation implies a higher likelihood of wetter soil and reduced depth to groundwater, which enables flooding. An increase in atmospheric river events is also expected.

Vulnerability Assessment

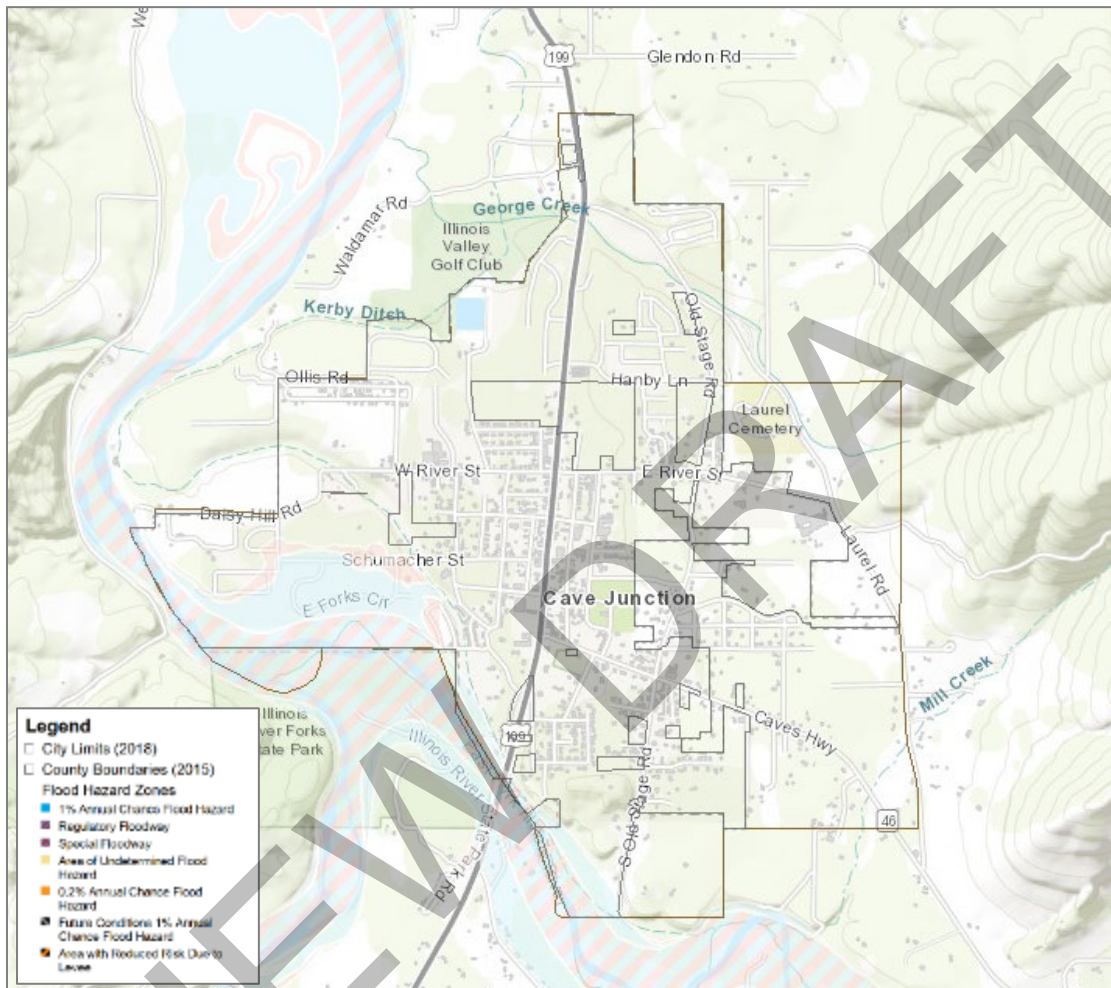
Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. A floodplain vulnerability assessment combines the floodplain boundary, generated through hazard identification, with an inventory of the property within the floodplain. Understanding the population and property exposed to natural hazards will assist in reducing risk and preventing loss from future events.

The mapped 100- and 500-year flood zones are concentrated in the center of the City adjacent to the Illinois River (Figure CJA-8). Cave Junction participates in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage.

¹² Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities.

Figure CJA-8 Special Flood Hazard Area



Source: Oregon Explorer: Map Viewer – To explore and view map detail click hyperlink to left.

National Flood Insurance Program (NFIP)

FEMA’s Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs) are effective as of December 3, 2009. Table CJA-6 shows that as of January 2022, the City has 15 National Flood Insurance Program (NFIP) policies in force, representing about \$4.5 million in coverage. Of those, none are for properties or structures that were constructed before the initial FIRMs. The City has never had a Community Assistance Visit (CAV) from FEMA. The table shows that all the flood insurance policies are for single-family residential structures. Flood insurance covers only the improved land or the actual building structure. There have not been any paid claims.

The City complies with the NFIP through enforcement of their flood damage prevention ordinance and their floodplain management program.

The NFIP’s Community Rating System (CRS) recognizes jurisdictions for participating in floodplain management practices that exceed NFIP minimum requirements. Cave Junction

does not participate in the Community Rating System (CRS) therefore property owners do not receive discounted flood insurance premiums.

The Community Repetitive Loss record for the City does not include any Repetitive Loss Properties¹³ or Severe Repetitive Loss Properties¹⁴.

Table CJA-6 Flood Insurance Detail

	Josephine County	Cave Junction
Effective FIRM and FIS	12/3/2009	12/3/2009
Initial FIRM Date	6/1/1982	6/1/1982
Total Policies	558	15
Pre-FIRM Policies	228	0
Policies by Building Type		
Single Family	521	15
2 to 4 Family	7	0
Other Residential	6	0
Non-Residential	22	0
Minus Rated A Zone	71	9
Insurance in Force	\$142,389,400	\$4,553,400
Total Paid Claims	85	0
Pre-FIRM Claims Paid	53	0
Substantial Damage Claims	3	0
Total Paid Amount	\$589,774	\$0
Repetitive Loss Structures	9	0
Severe Repetitive Loss Properties	0	0
CRS Class Rating	-	NP
Last Community Assistance Visit	-	No CAV History

Source: Department of Land Conservation and Development, January 2022. NP = Not Participating.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

¹³ A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

¹⁴ A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP, and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000, and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Landslide

The Cave Junction Steering Committee determined that the City's probability for landslide is **moderate**, meaning at least one incident may occur within 35 to 75 years, and that its vulnerability to landslide is **low**, meaning that less than 1% of the City's population or property could be affected by a major landslide event.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of landslide hazards, as well as the history, location, extent, and probability of a potential event. There have been no landslide events of significance in the past five years in Cave Junction.

The severity or extent of landslides is typically a function of geology and the landslide triggering mechanism. Rainfall initiated landslides tend to be smaller and earthquake induced landslides may be very large. Even small slides can cause property damage, result in injuries, or take lives. Cave Junction Steering Committee members confirmed that landslides in the City are limited due to soil type and topography.

Landslide susceptibility exposure for Cave Junction is shown in Figure CJA-9. Approximately 7% of the City has very high or high, and 18% moderate landslide susceptibility exposure.¹⁵ *Note that even if an area has a high percentage of land in a high or very high landslide exposure susceptibility zone, this does not mean there is a high risk (vulnerability), because risk is the intersection of a hazard and assets.*

Future Climate Projection:

According to OCCRI report "*Fifth Oregon Climate Assessment*"¹⁶ the intensity of extreme precipitation is expected to increase as the atmosphere warms. Landslides, triggered by precipitation, are expected to increase with the intensity of extreme precipitation events. Additionally, landslides may increase in wildfire impacted landscapes.

Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Potential landslide-related impacts are adequately described within the County's plan, and include infrastructure damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. In general, the areas of greater risk are located adjacent to the City to the west and east. There are also areas adjacent to the Illinois River that indicate the potential for riverine erosion.

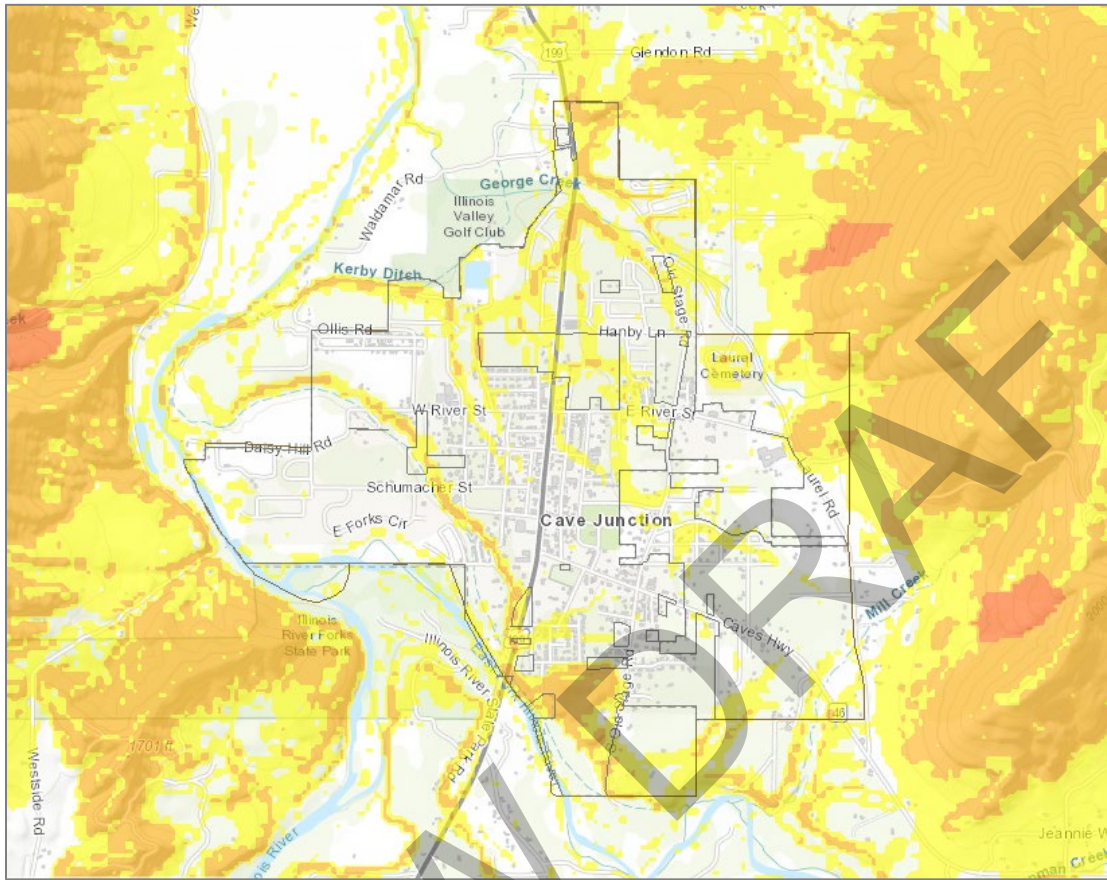
Rain-induced landslides and debris flows can potentially occur during any winter in Josephine County, and thoroughfares beyond city limits are susceptible to obstruction as well. As such, Cave Junction is vulnerable to isolation for an extended period.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

¹⁵ DOGAMI. [Open-File Report, O-16-02](#), *Landslide Susceptibility Overview Map of Oregon* (2016)

¹⁶ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

Figure CJA-9 Landslide Susceptibility Exposure



Low	Landsliding unlikely. Areas classified as Landslide Density = Low (less than 7%) and areas classified as Slopes Prone to Landsliding = Low.
Moderate	Landsliding possible. Areas classified as Landslide Density = Low to Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = Moderate OR areas classified as Landslide Density = Moderate (7%-17%) and areas classified as Slopes Prone to Landsliding = Low.
High	Landsliding likely. Areas classified as Landslide Density = High (greater than 17%) and areas classified as Slopes Prone to Landsliding = Low and Moderate OR areas classified as Landslide Density = Low and Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = High.
Very High	Existing landslides Landslide Density and Slopes Prone to Landsliding data were not considered in this category. Note: the quality of landslide inventory (existing landslides) mapping varies across the state.

Source: [Oregon Explorer: Map Viewer](#) – To explore and view map detail click hyperlink to left.

Severe Weather

Severe wind events may occur throughout Oregon during all seasons. Often originating in the Pacific Ocean, westerly winds pummel the coast, slowing as they cross the coastal mountain range and head into the inland valleys. Similarly, severe winter storms consisting of rain, freezing rain, ice, snow, cold temperatures, and wind originate from troughs of low pressure offshore in the Gulf of Alaska or in the central Pacific Ocean that ride along the jet

stream during fall, winter, and early spring months.¹⁷ In summer, the most common wind directions are from the west or northwest; in winter, they are from the south and east. Local topography, however, plays a major role in wind direction.

Future Climate Projections

According to OCCRI report “*Fifth Oregon Climate Assessment*”¹⁸ projected climate variations are expected to increase the frequency and intensity of some weather incidents. Oregon and the Pacific Northwest experience a variety of extreme weather incidents ranging from severe winter storms and floods to drought and dust storms, often resulting in morbidity and mortality among people living in the impacted regions. Hot summer days are expected to increase and overnight lows will continue to be warmer. Additionally, the frequency, intensity, and duration of extreme heat events is also expected to increase.

These variations pose risks for increased injuries, illnesses, and deaths from both direct and indirect effects. Incidents of extreme weather (such as floods, droughts, severe storms, heat waves and fires) can directly affect human health as well as cause serious environmental and economic impacts. Indirect impacts can occur when climate change alters or disrupts natural systems.

Extreme Heat Event

The Cave Junction Steering Committee determined that the City’s probability for an extreme heat event is **high**, meaning at least one severe incident may occur within the next 35-year period, and that its vulnerability to extreme heat is **moderate**, meaning that between 1% and 10% of the City’s population or property could be affected by an extreme heat event.

Josephine County’s NHMP Volume I, Section 2, adequately describes the causes and characteristics of extreme heat, as well as the history, location, extent, and probability of a potential event. Generally, an event that affects the County is likely to affect the City as well. A severe heat episode or “heat wave” occurs about every two to three years, and typically lasts two to three days but can last as many as five days. A severe heat episode can be defined as consecutive days of upper 90s to around 100-degrees Fahrenheit. Severe heat hazard in southern Oregon can be described as the average number of days with temperatures greater than or equal to 90-degrees Fahrenheit.¹⁹

Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Extreme heat events can and have occurred in the Cave Junction area, and while they typically do not cause loss of life; they are becoming more frequent and have the potential to impact economic activity as well as quality of life.

¹⁷ DLCD. *Oregon State Natural Hazard Mitigation Plan*. 2020.

¹⁸ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

¹⁹ DLCD. *Oregon State Natural Hazard Mitigation Plan*. 2020.

The City of Cave Junction has not experienced any life-threatening consequences from the few historical extreme heat events, although changes in climate indicate that the area should expect to see more extreme heat events.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Windstorm

The Cave Junction Steering Committee determined that the City's probability for windstorm is **high** meaning at least one severe incident may occur within the next 35-year period, and that its vulnerability to windstorm is **high**, meaning that greater than 10% of the City's population or property could be affected by a major windstorm event.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of windstorm hazards, as well as the history, location, extent, and probability of a potential event.

Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. In Cave Junction, power outages are the greatest concern during windstorms. Building codes require new developments to place power lines below ground. Without power, communication is lost, and fuel and food stores shut down.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Winter Storm (Snow/ Ice)

The Cave Junction Steering Committee determined that the City's probability for winter storm is **high**, meaning at least one severe incident may occur within the next 35-year period, and that its vulnerability to winter storm is **high**, meaning that more than 10% of the City's population or property could be affected by a major winter storm event.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of winter storm hazards, as well as the history, location, extent, and probability of a potential event. Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the City typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from October through March.

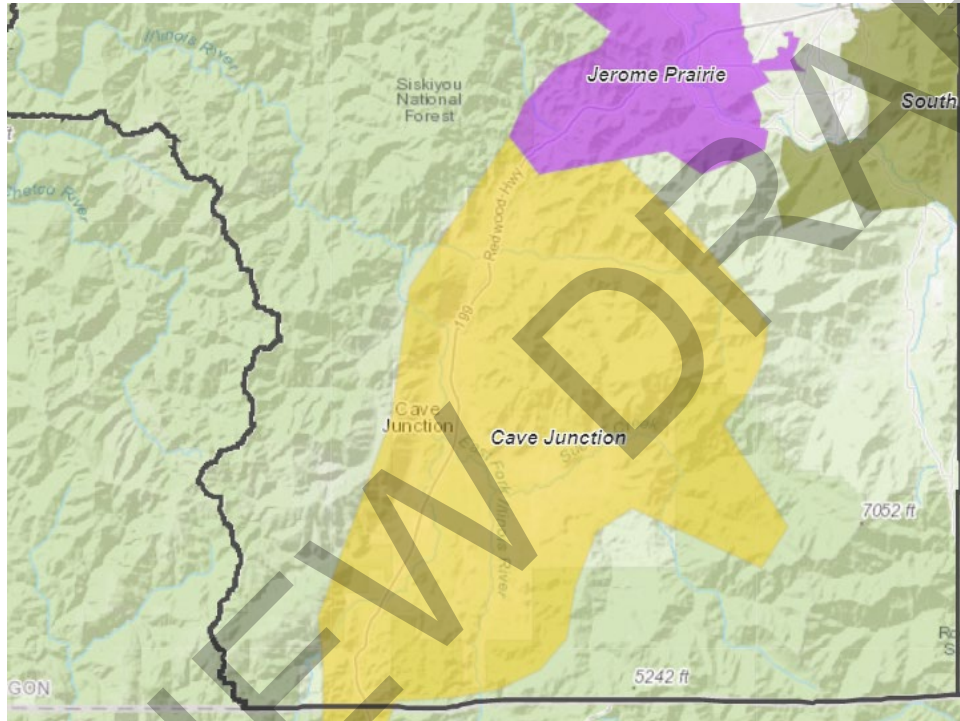
Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Major winter storms can and have occurred in the Cave Junction area, and while they typically do not cause significant damage; they are frequent and have the potential to impact economic activity. Road closures on Highway 199 due to winter weather are an uncommon occurrence but can interrupt commuter and large truck traffic. Power outages are a concern during winter storms (snow/ice can impact electric utilities with the accumulation of snow and ice on

power lines and trees that may then disrupt service). Building codes require new developments to place power lines below ground. Without power, communication is lost, and fuel and food stores shut down.

Cave Junction is more vulnerable to the effects of winter storms than the rest of Josephine County due to the “one way in, one way out” nature of the Illinois Valley. A winter storm along Highway 199 could lead the City being stranded from the rest of Oregon, and/or disrupt the economy by blocking the passes into California. In the advent of a winter storm affecting power lines, all of Cave Junction and the Illinois Valley could be cut off from power for an extended period.

Figure CJA-10 Potential Power Shutoff Areas



Source: Josephine County GIS

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcanic Event

The Cave Junction Steering Committee determined that the City’s probability for volcanic event is **low**, meaning one incident may occur within the next 75 to 100-year period, and that its vulnerability to volcanic event is **low**, meaning that less than 1% of the City’s population or property would be affected by a major volcanic event (ash).

Josephine County NHMP’s Volume I, Section 2, adequately describes the causes and characteristics of volcanic event hazards, as well as the history, location, extent, and probability of a potential event. Generally, an event that affects the County is likely to affect Cave Junction as well.

Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Cave Junction is unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the City received small amounts of ashfall, but not enough to cause significant health and/or economic damages. The Oregon State NHMP 2020 plan states that Josephine County is extremely unlikely to be affected by volcanic activity.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

The Cave Junction Steering Committee determined that the City's probability for wildfire is **high**, meaning one incident may occur within the next 35-year period, and that its vulnerability to wildfire is **high**, meaning that more than 10% of the City's population or property could be affected by a major wildfire event.

The [Rogue Valley Integrated Community Wildfire Protection Plan](#) (JCICWPP) was completed in 2017 and revised in 2019. The JCICWPP is hereby incorporated into this NHMP addendum by reference, and it will serve to supplement the wildfire section in this addendum. The following presents a summary of key information and includes content from the Oregon Wildfire Risk Explorer. Refer to the full RVICWPP for a complete description and evaluation of the wildfire hazard. The Illinois Valley Community Wildfire Protection Plans (CWPP) is a stand-alone CWPP intended to augment the RVICWPP and provide more detailed identification of fuels reduction projects, and to better prepare for wildfire.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of wildfire hazards, as well as the history, location, extent, and probability of a potential event. The location and extent of a wildfire vary depending on fuel, topography, and weather conditions. Wildfires within the last five years have been particularly devastating in Josephine County, but these wildfires have mostly been in unincorporated areas of the County. Recent large wildfires near Cave Junction include the Slater wildfire in 2020 (about 157,429 acres), Taylor Creek wildfire in 2018 (about 53,000 acres), Klondike wildfire in 2018 (about 175,300 acres), Chetco Bar wildfire in 2017 (about 191,250 acres), Gold Canyon wildfire in 2016 (about 61 acres), Buckskin wildfire in 2015 (about 5,350 acres), Reeves Creek wildfire in 2014 (about 187 acres), Onion Mountain wildfire in 2014 (about 4,100 acres), Deer Creek wildfire in 2005 (about 1,550 acres), 27588 Redwood Highway wildfire in 2004 (about 190 acres, including land within the City's urban growth boundary), Sour Biscuit wildfire in 2002 (about 45,700 acres), Biscuit wildfire in 2002 (500,300 acres), and the Florence wildfire in 2002 (about 262,800 acres).

Future Climate Projection:

According to OCCRI report "*Fifth Oregon Climate Assessment*"²⁰ wildfire risk is expected to increase as the frequency of higher fire danger days per year increases under the higher emissions scenario compared with the historical baseline.

²⁰ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

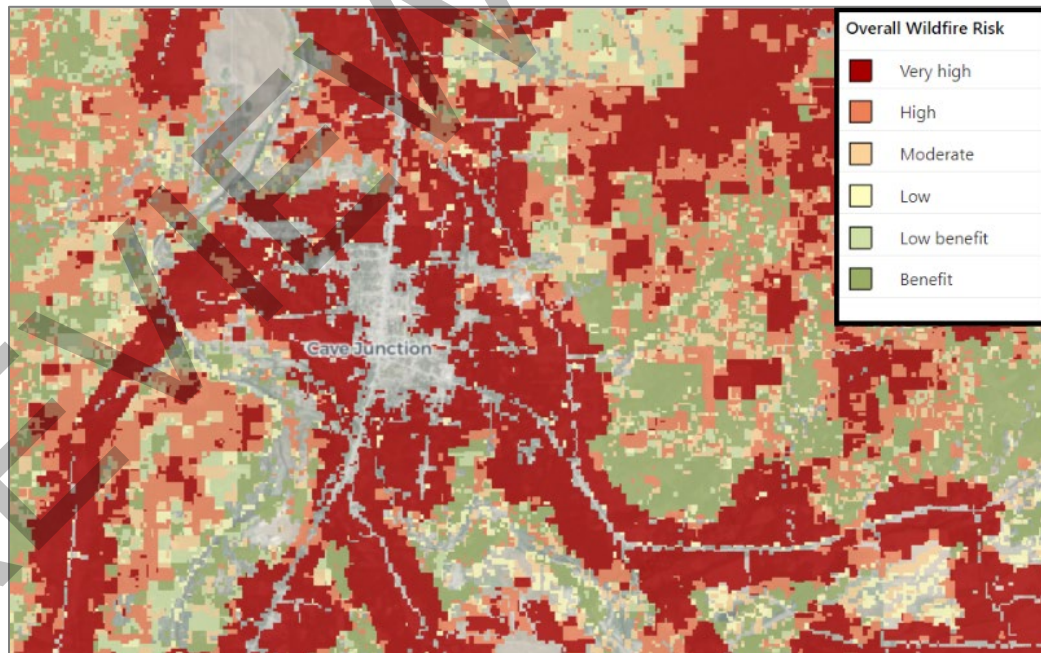
Vulnerability Assessment

Due to insufficient data and resources, Cave Junction is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Cave Junction experiences greater vulnerability to wildfire than the County overall due to the larger population that would be affected and the limited evacuation opportunities due to its specific geography. *NOTE: The Oregon Department of Forestry is currently updating the Oregon Wildfire Risk Assessment per SB 762, which should be completed in late 2022. Changes to the risk assessment may be incorporated into the plan during the implementation and maintenance phase.*

Property can be damaged or destroyed with one fire as structures, vegetation, and other flammables easily merge to become unpredictable and hard to manage. Other factors that affect ability to effectively respond to a wildfire include access to the location and to water; response time from the fire station; availability of personnel and equipment; and weather (e.g., heat, low humidity, high winds, and drought). Cave Junction is not a Firewise USA Community.

As shown in Figure CJA-11, developed parts of the City have mostly low wildfire risk, however the City's wildland urban interface includes high to very high overall wildfire risk. Due to the prevailing wind patterns (i.e., from the north or south), it is expected that the east and south ends of the City might be the most at risk. Additionally, power, and phone lines run through the forest to the east of the City and may be impacted by a wildfire in that area. Commercial logging and recreation activity occurs in the forestland outside the City, potentially increasing the risk of wildfire activity.

Figure CJA-11 Overall Wildfire Risk



Source: [Oregon Explorer: Map Viewer](#) – To explore and view map detail click hyperlink to left.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

ATTACHMENT A: ACTION ITEM FORMS

Table CJA-1 provides a summary list of actions for the city. Each high priority action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

DESCRIPTION/RATIONALE FOR PROPOSED ACTION ITEM

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from several sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in this addendum and within Volume I, Section 2. The worksheet provides information on the activities that have occurred since the previous plan for each action item.

LEAD (COORDINATING) ENTITY:

The lead entity is the entity with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation.

PARTNERS (INTERNAL AND EXTERNAL):

The partner entities listed in the action item are potential partners recommended by the steering committee but not necessarily contacted during the development of the plan. The coordinating entity should contact the identified partner entities to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action item.

TIMELINE:

All broad scale action items have been determined to be ongoing, as opposed to short (1 to 2 years), medium (3-5 years), or long (more than 5 years). This is because the action items are broad ideas, and although actions may be implemented to address the broad ideas, the efforts should be ongoing.

POTENTIAL FUNDING SOURCE

Where possible potential funding sources have been identified. Example funding sources may include Federal Hazard Mitigation Assistance programs, state funding sources such as the Oregon Seismic Rehabilitation Grant Program, or local funding sources such as capital improvement or general funds. An action item may include several potential funding sources.

ESTIMATED COST

A rough estimate of the cost for implementing each action item is included. Costs are shown in general categories showing low, medium, or high cost. The estimated cost for each category is outlined below:

Low - Less than \$50,000

Medium - \$50,000 – \$100,000

High - More than \$100,000

HIGH PRIORITY ACTIONS

The steering committee will focus their attention and resource availability over the next five-years on high priority actions that are considered achievable, high leverage activities. Although this provides a guide for the steering committee in terms of implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not currently listed as the highest priority.

Each high priority action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The rest of this appendix includes the high priority action item worksheets.

Cave Junction Multi-Hazard Action Item 1.3		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought	<input checked="" type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat
<input type="checkbox"/> Earthquake	<input checked="" type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire	<input checked="" type="checkbox"/> Windstorm
<input type="checkbox"/> Winter Storm			
Description	Identify and maintain additional evacuation routes out of the Illinois Valley		
Benefits	Cave Junction has limited evacuation routes. Identifying and maintaining additional routes will increase resilience during hazard events.		
Lead	City of Cave Junction		
Partners	ODOT, Josephine County Roads		
Potential Funding Source	Local funding resources, grants (HMGP, SHSP)		
Estimated Cost		Timing	
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)	
<input checked="" type="checkbox"/> Medium (\$50,000 to \$100,000)	<input checked="" type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)	
<input type="checkbox"/> High (\$100,000 or more)			

Cave Junction Drought Action Item 2.1		<input checked="" type="checkbox"/> High Priority Action	
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire	<input type="checkbox"/> Windstorm
<input type="checkbox"/> Winter Storm			
Description	Create a Water Conservation Management Plan		
Benefits	A WMCP provides a description of the water system, identifies the sources of water used by the community or district, and explains how the water supplier will manage and conserve supplies to meet future needs. Preparation of a WMCP is intended to represent a proactive evaluation of the management and conservation measures that suppliers can undertake.		
Lead	City of Cave Junction		
Partners	Josephine County Public Works, Oregon Water Resources Department, Illinois Valley Fire District, Water Master		
Potential Funding Source	Local funding resources, grants (HMGP, SHSP), OWRD		
Estimated Cost		Timing	
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)	
<input checked="" type="checkbox"/> Medium (\$50,000 to \$100,000)	<input checked="" type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)	
<input type="checkbox"/> High (\$100,000 or more)			

Cave Junction Severe Weather Action Item 6.1		<input checked="" type="checkbox"/> High Priority Action
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire
		<input type="checkbox"/> Extreme Heat
		<input type="checkbox"/> Windstorm
		<input type="checkbox"/> Winter Storm
Description	Collaborate with state agencies, utilities, and community organizations to designate and/or construct a building to be used as a warming shelter, a cooling shelter, and/or a clean air refuge.	
Benefits	Pre-planned community shelter sites (for extreme weather events) with pre-planned agreements of use and operations between community partners may reduce loss of life and injuries due to extreme weather exposures.	
Lead	City of Cave Junction, Local Community Organizations	
Partners	County Public Health, Oregon Department of Human Services, local faith organizations, local non-profits, local government	
Potential Funding Source	Local funding resources, private investment	
Estimated Cost		Timing
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input checked="" type="checkbox"/> Medium Term (3 to 5 years)
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)
<input checked="" type="checkbox"/> High (\$100,000 or more)		

REVIEW

Cave Junction Wildfire Action Item 7.2		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Volcanic Event		<input type="checkbox"/> Extreme Heat <input type="checkbox"/> Windstorm	
<input type="checkbox"/> Earthquake <input type="checkbox"/> Landslide <input checked="" type="checkbox"/> Wildfire		<input type="checkbox"/> Winter Storm	
Description	Collaborate with ODOT and Josephine County to create fire breaks along Highway 199 between Grants Pass and Cave Junction.		
Benefits	A fire break along the transportation corridor will enhance resilience. Maintained fuel breaks are generally dominated by grass fuel types and early seral stage vegetation. Lower fireline intensity due to reduced fuel loads and non-continuous fuels, reduces the resistance to control of a fire by enhancing the effectiveness of retardants, foams, water, and constructed fire line.		
Lead	City of Cave Junction		
Partners	Jackson County Emergency Management, OR Department of Forestry, local fire districts, ODOT		
Potential Funding Source	Title III funds, ODF, HMA (BRIC, HMGP)		
Estimated Cost		Timing	
<input type="checkbox"/> Low (Less than \$50,000) <input type="checkbox"/> Medium (\$50,000 to \$100,000) <input type="checkbox"/> High (\$100,000 or more)		<input type="checkbox"/> Ongoing <input type="checkbox"/> Medium Term (3 to 5 years) <input type="checkbox"/> Short Term (0 to 2 years) <input type="checkbox"/> Long Term (More than 5 years)	

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ATTACHMENT B: PUBLIC INVOLVEMENT SUMMARY

Members of the Cave Junction Steering Committee provided edits and updates to the NHMP addendum prior to the public review period as reflected in the final document.

To provide the public information regarding the draft NHMP addendum, and provide an opportunity for comment, an announcement (see text below) was announced on the County's website and reference on the City's social media and a feedback form was provided for public comment.

Section to be updated. Public comments are pending.

REVIEW DRAFT

Cave Junction Steering Committee

Steering Committee members possessed familiarity with the Cave Junction community and how it's affected by natural hazard events. The Steering Committee guided the plan development process through several steps including goal confirmation and prioritization, action item development and information sharing to develop the NHMP and to make the NHMP as comprehensive as possible. The Steering Committee met formally on the following date:

Meeting #1: Cave Junction Steering Committee, February 23, 2022 (via Zoom)

During this meeting, the Steering Committee reviewed the County NHMP, and were provided information on hazard mitigation planning, the NHMP process, and project timeline. The Steering Committee provided information on:

- history of hazard events in the city
- reviewed and confirmed the County NHMP's mission and goals
- discussed the NHMP public outreach strategy
- reviewed and provided feedback on the draft risk assessment including community vulnerabilities and hazard information
- developed their mitigation strategy (actions)
- discussed the NHMP implementation and maintenance program

Meeting Attendees:

- *Convener*, Meadow Martell, Mayor
- Rebecca Patton, City Recorder
- Alex Ponder, Public Works Director
- Cameron Smith, Public Works



AGENDA

Meeting: Josephine County NHMP Update: Cave Junction Meeting

Date: February 23, 2022

Time: 9:00am – 10:00am

Location: Zoom:

<https://uoregon.zoom.us/j/96386922180?pwd=Rk1TUjJOVDJYdVhBbHpZkl3a3NYdz09>

- I. Welcome and Background**
 - a. Introductions
 - b. Project context
- II. Natural Hazard Mitigation Planning**
 - a. Emergency Management Overview
 - b. Natural Hazard Mitigation Plans (NHMP) Overview
- III. NHMP Overview and Review**
 - a. Risk Assessment
 - b. Mitigation Strategies (Actions)
 - c. Implementation and Maintenance
 - d. Public Outreach
- IV. Wrap Up and Next Steps**

ATTACHMENT C: ACTION ITEM FORM TEMPLATE

Cave Junction Action Item			<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat	<input type="checkbox"/> Windstorm
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire	<input type="checkbox"/> Winter Storm	
Description				
Benefits				
Lead				
Partners				
Potential Funding Source				
Estimated Cost	Timing			
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)		
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)		
<input type="checkbox"/> High (\$100,000 or more)				

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ATTACHMENT D: CRITICAL FACILITIES AND LOSS ESTIMATION

Table CJA-7 Critical Facilities, Community Lifelines, and Loss Estimation

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Cave Junction (DMV)	103 S. Kerby, Cave Junction						X			Low	Not in SFHA	Low	Not in Lahar Zone	Low
Cave Junction City Hall/Sheriff's Office	222 Lister St, Cave Junction	X				X								
Cave Junction Human Services Department	535 E River Street, Cave Junction						X			Low	Not in SFHA	Low	Not in Lahar Zone	Low
Cave Junction Wastewater	1300 N Sawyer Road, Cave Junction		X					X	1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Cave Junction Water Treatment Plant	466 S Junction Ave		X					X						
City Maintenance Shop	410 Hamilton Ave, Cave Junction													
Community Christian Academy	113 S Caves Ave, Cave Junction		X						1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Evergreen Elementary School	520 W River St , Cave Junction		X						1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Illinois Valley High School	625 E River St , Cave Junction		X						1976	Low	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low to High
Illinois Valley RFPD - Main Station (Cave Junction)	681 Caves Hwy, Cave Junction	X							1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Lorna Byrne Middle School	101 S Junction Ave , Cave Junction		X						1950	Low	Not in SFHA	Low	Not in Lahar Zone	Low to High
Rogue River-Siskiyou National Forest Law Enforcement - Wild Rivers Ranger Station	26568 Redwood Hwy, Cave Junction	X							1900	Low	Not in SFHA	Low	Not in Lahar Zone	High
Siskiyou Community Health Center	25647 Redwood Hwy, Cave Junction			X					1921	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Southern Oregon Headstart Preschool	620 E River St, Cave Junction		X											
Cave Junction Post Office	102 S Hussey Ave, Cave Junction					X								
Illinois Valley Branch Library	209 W Palmer St, Cave Junction		X											
Smoke Jumper Base Museum	30902 Redwood Highway, Cave Junction													
Kerbyville Museum	24195 Redwood Highway, Kerby													

Source: Cave Junction NHMP Steering Committee; Department of Land Conservation and Development, Oregon Natural Hazard Mitigation Plan. 2020. 2020 Statewide Loss Estimates (Appendices 9.1.8 and 9.1.9). Loss estimate data aggregated at the facility level by IPRE. Facilities without loss estimation data were not included in the analysis in the OR NHMP (2020).

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City of Grants Pass Addendum to the Josephine County Multi-Jurisdictional Hazard Mitigation Plan



Photo Credits: Gary Halvorson, Oregon State Archives

Effective:

June XX, 2022 through June XX, 2027

Prepared for:
City of Grants Pass

Prepared by:
University of Oregon
Institute for Policy Research and Engagement
Oregon Partnership for Disaster Resilience

This Natural Hazard Mitigation Plan was prepared by:



UNIVERSITY OF
OREGON

School of Planning, Public
Policy and Management

Institute for Policy
Research and Engagement

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FEMA

Federal Emergency Management Agency (FEMA)
Hazard Mitigation Grant Program
Project Award Number: DR-4562-06-P-OR

Additional Support Provided by:



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Purpose

This is the 2022 update of the City of Grants Pass addendum to the Josephine County Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP). The City of Grants Pass' original addendum to Josephine County's NHMP was completed and approved by FEMA in 2009 (updated in 2015). This addendum supplements information contained in Volume I (Basic Plan) which serves as the NHMP foundation, and Volume III (Appendices) which provide additional information. This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Updates to Grants Pass' addendum are further discussed throughout the NHMP, and within Volume III, Appendix B, which provides an overview of alterations to the document that took place during the update process.

Grants Pass adopted their addendum to the Josephine County Multi-jurisdictional NHMP on **July XX, 2022**. FEMA Region X approved the Josephine County NHMP on **July XX, 2022** and the City's addendum on **July XX, 2022**. With approval of this NHMP the City is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through **July XX, 2027**.

Mitigation Plan Mission

The NHMP mission states the purpose and defines the primary functions of the NHMP. It is intended to be adaptable to any future changes made to the NHMP and need not change unless the community's environment or priorities change.

The City supports the mission statement developed during the Josephine County planning process (Volume I, Section 3):

To promote public policy and mitigation activities which will enhance the safety to life and property from natural hazards.

The Grants Pass Steering Committee concurs with NHMP mission statement and overall purpose and intent of this plan. The Steering Committee believes the new wording of the mission statement better reflects the desired outcomes of the planning process, as well as allowing for a comprehensive approach to mitigation planning.

Mitigation Plan Goals

Mitigation plan goals are more specific statements that Cave Junction residents, and public and private partners can apply while working to reduce the City's risk from natural hazards. These statements form a bridge between the broad mission statement and help guide agencies and organizations as they implement mitigation action items.

The City supports the goals developed during the Josephine County planning process (Volume I, Section 3). All NHMP goals are important and are listed below in no order of priority. City mitigation priorities are identified within action items. Establishing mitigation

priorities neither negates nor eliminates any goals, but establishes which action items to consider implementing first, should funding become available.

Goal 1: Protect life and reduce injuries resulting from natural hazards.

Goal 2: Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.

Goal 3: Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Josephine County.

Goal 4: Minimize the impact of natural hazards while protecting, restoring, and sustaining environmental processes.

Goal 5: Enhance and maintain local capability to implement a comprehensive hazard loss reduction strategy.

Goal 6: Document and evaluate progress in achieving hazard mitigation strategies and action items.

Goal 7: Motivate the public, private sector, and government agencies to mitigate the effects of natural hazards through information and education.

Goal 8: Apply development standards that mitigate or eliminate the potential impacts of natural hazards.

Goal 9: Mitigate damage to historic and cultural resources from natural hazards.

Goal 10: Increase communication, collaboration, and coordination among agencies at all levels of government and the private sector to mitigate natural hazards.

Goal 11: Integrate local NHMPs with comprehensive plans and implementing measures.

Process and Participation

This section of the NHMP addendum addresses 44 CFR 201.6(a)(3), *Participation*.

In addition to establishing a comprehensive city-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K), and the regulations contained in 44 CFR 201, require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local adoption, and federal approval of this NHMP ensures that the city will remain eligible for pre-, and post-disaster mitigation project grants.

The Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Institute for Policy Research and Engagement (IPRE) collaborated with the Oregon Department of Emergency Management (OEM), Josephine County, and City of Grants Pass to update their NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (DR-4562-06-P-OR). Members of the Grants Pass NHMP Steering Committee also participated in the County NHMP update process (Volume III, Appendix B).

The Josephine County NHMP, and Grants Pass addendum, are the result of a collaborative effort between residents, public agencies, non-profit organizations, the private sector, and

regional organizations. The Grants Pass NHMP Steering Committee guided the process of developing the NHMP.

Convener and Committee

The City of Grants Pass Public Works Director convened the Grants Pass Steering Committee and will take the lead in implementing, maintaining, and updating the City's addendum to the Josephine County NHMP. The steering committee reviewed and revised the city's previous addendum, with focus on the plan's risk assessment and mitigation strategy (action items). The current version of the addendum reflects changes decided upon at the designated meetings and through subsequent work and communication with OPDR.

Changes include revisions to the city's Risk Assessment and Hazard Identification sections, Action Items, and Community Profile. See Volume III, Appendix B for additional information.

The following representatives comprised the Grants Pass Steering Committee:

- Convener, Jason Canady, Public Works Director
- Randy DeLonge, Fire Rescue, Deputy Chief
- Wade Elliott, Public Works, Assistant Director
- Rick McClintock, Fire Rescue, Firewise Coordinator
- Donna Rupp, Community Development, Associate Planner

Public Participation

Posting the NHMP publicly provided community members the opportunity to make comments and suggestions during the review process. Community members were also provided an opportunity for comment via a survey administered by IPRE (Volume III, Appendix F). **Public comments are pending (Attachment B).**

Mitigation Plan Implementation

The City Council will be responsible for adopting the Grants Pass addendum to the Josephine County NHMP. As noted previously, this addendum designates a steering committee and a convener to oversee the development and implementation of Grants Pass action items. Since the City addendum is part of the County's multi-jurisdictional NHMP, the City will look for opportunities to partner with the County.

The Grants Pass Steering Committee will convene annually after adoption of the addendum. Josephine County meets quarterly and will provide opportunities for the jurisdictions to report on NHMP implementation and maintenance during their meetings. The Cave Junction Steering Committee will be responsible for:

- Reviewing existing action items to determine funding suitability;
- Reviewing existing and new risk assessment data to identify issues that may not have been identified during NHMP creation;
- Educating and training new Steering Committee members on the NHMP and mitigation actions in general;
- Assisting in the development of funding proposals for priority action items;
- Discussing methods for continued public involvement; and
- Documenting successes and lessons learned during the year.

The convener will also remain active in the County's implementation, and maintenance process (Volume I, Section 4).

The City will utilize the same action item prioritization process as the County (Volume I, Section 4).

Government Structure

The City is governed by an elected volunteer City Council and Mayor. The Council oversees city government and employs a city manager who oversees the city staff and departments. City staff includes employees of the following departments:¹

Administration: The Administration Office provides research and support to assist the City Council in its decision making and works to ensure that Council's goals and policies are implemented.

Community Development: The Community Development Department provides development services that coordinate the functions of planning, building, engineering, and parks.

Economic Development: With core goals of diversifying the economy, improving the standard of living for its residents, and focusing on smaller, local businesses, the City's economic development program uses key tools, programs, and partnerships to achieve success.

Finance Department: The Finance Department strives to work together with mutual trust and respect to provide fiscal integrity and efficient service through communication, technology, and teamwork.

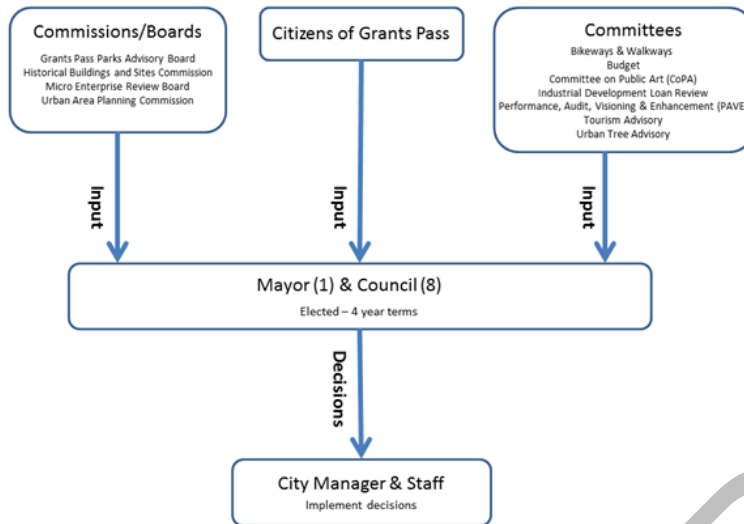
Fire Department: The Fire Department provides fire suppression, fire prevention, and emergency medical services.

Human Resources: The Human Resource Department is responsible for the administration of personnel policies, classification and compensation plans, employee benefits, maintaining records and processing payroll; directing negotiations; and providing for management and employee development.

Police Department: The Police Department provides law enforcement services for the City's residents and visitors 24 hours every day and places emphasis on responding to the community's calls for service, investigating crimes and traffic enforcement.

Public Works: Our divisions consist of Water Treatment, Water Distribution, Wastewater Restoration, Wastewater Collection, Streets and Drainage and our Fleet Division. These divisions are unique but share one goal - to allow people to live together in a healthy, environmentally safe manner.

Figure GPA-I Grants Pass Decision Making Structure



Source: City of Grants Pass

This NHMP is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policies. It does: (1) provide a foundation for coordination and collaboration among City agencies and the public; (2) identify and prioritize future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The Cave Junction NHMP addendum works in conjunction with other City plans and programs including the Comprehensive Land Use Plan and Building Codes, as well as the [Josephine County NHMP](#), and the [State of Oregon NHMP](#).

The mitigation actions described herein (and in Attachment A) are intended to be implemented through existing plans and programs within the City. Plans and policies already in existence have support from residents, businesses, and policy makers. City plans are updated regularly, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented. Implementation opportunities are further defined in action items where applicable.

Future development without proper planning may result in worsening problems associated with natural hazards. Grants Pass's acknowledged comprehensive plan is the City of Grants Pass Comprehensive Plan. The City implements its Comprehensive Plan through municipal code ordinances.

Existing Plans and Policies

Grants Pass adopted its first Comprehensive Land Use Plan in 1982. The City implements the plan through ordinances. The City has amended various sections of the plan on multiple occasions. [Section 5.00](#): Areas Subject to Natural Hazards was last amended in 2009. The section focuses primarily on geologic, slope and soil hazards and on flood. The section does not address wildfire or severe weather. The most recent update in 2021 pertained to the city's Scenic, Rogue River, Historic, & Natural Resources element (Section 3.00) with the implementation of the Wetlands Resource Plan. (April 2016)

Importantly, many of these infrastructure and service plan updates focus attention on and include strategies and projects related to infrastructure risk reduction and hazard mitigation improvements. Refer to the city's priority actions for specific projects. This also demonstrates specifically how the city is implementing mitigation through other planning mechanisms. Additionally, Grants Pass has the following plans that directly or indirectly address natural hazard mitigation. For a complete list visit the city's [website](#):

- [Comprehensive Plan](#) (The Grants Pass and Urbanizing Area Comprehensive Community Development Plan was first adopted by Ordinance 4471 on December 15, 1982. It was last amended on April 7, 2021)
- [Grants Pass Development Code \(Most recent updates in 2022\)](#)
- [Grants Pass Master Transportation Plan](#) (The Grants Pass Urban Area Master Transportation Plan was adopted in December 1997, and was revised by Ordinance 5022 on September 20, 2000, Ordinance 5195 on October 1, 2003, Ordinance 5438 on April 2, 2008, and Ordinance 5447 on May 21, 2008)
- [Total Maximum Daily Load Management Plan](#) (2008)
- [Public Safety strategic Plan](#) (2007)
- [Parks & Recreation Master Plan](#) (2010)
- City of Grants Pass Water Distribution Systems Master Plan (April 2016)
- City of Grants Pass Water Management and Conservation Plan (June 2014)
- City of Grants Pass Water Treatment Plant Facility Plan Update (January 2014)
- City of Grants Pass Water Restoration Plant Facility Plan, Final Report and Appendices (May 2014)
- Wastewater Collection System Master Plan, City of Grants Pass (July 2016)
- Redwood Sanitary Sewer Service District Engineering Report (April 1999)
- City of Grants Pass Stormwater Master Plan (February 2016)

The City of Grants Pass also convenes several committees, commissions, and boards. Several of these entities have direct or indirect connection to natural hazard, community vulnerability, or risk reduction (preparedness or mitigation) issues. Where applicable and appropriate, Grants Pass will engage these committees, commissions, and boards in the hazard mitigation process. The following committees are relevant to hazard mitigation planning:

- Bikeways / Walkways Committee
- Budget Committee
- Collaborative Economic Development Committee
- Grants Pass Parks Advisory Board
- Historical Buildings and Sites Commission
- Performance Audit, Visioning & Enhancement
- Solid Waste Agency
- Tourism Advisory Committee
- Urban Area Planning Commission
- Urban Tree Advisory Committee

Community Organizations

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In

planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g., elderly, children, low income). The City can use existing social systems as resources for implementing such communication-related activities. Three involvement methods are defined below.

Education and outreach – organization could partner with the City to inform and educate the public or provide outreach assistance on natural hazard preparedness and mitigation.

Information dissemination – organization could partner with the City to provide hazard-related information to target audiences.

Plan/project implementation – organization may have plans and/or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

The following organizations are actively engaging with the community on issues related to natural hazards and mitigation and may be potential partners for implementing mitigation actions.

Rogue Valley Fire Prevention Co-op

The co-op is an interagency nonprofit fire service organization with the goals of: 1) uniting agencies engaged in fire prevention and public education; 2) Promoting an interagency exchange of ideas, programs and resources in the area of fire prevention and public education; 3) Promoting, coordinating and actively supporting interagency participation in fire prevention activities; 4) Acting as a central agency for the exchange of professional information among its members; and 5) Obtaining a reduction in the number of preventable fires within the jurisdiction of the cooperative.

Members of the cooperative help spread the fire prevention message by: 1) Taking Smokey Bear and his helpers to first-grade classrooms every spring to talk about wildfire prevention; 2) Teaching children about home fire safety in the co-op's mobile Fire Safety House; 3) Organizing and supporting a local wildfire prevention and education team; 4) Making its members available for speaking engagements to groups of kids or adults

Community Emergency Response Team (CERT)

CERT is a community training program about readiness, people helping people, rescuer safety, and doing the greatest good for the greatest number. CERT is an approach to emergency and disaster situations where residents will be initially on their own. Through training, residents can manage utilities and put out small fires; provide basic medical aid; search for and rescue victims safely; and organize themselves and spontaneous volunteers to be effective.

Rogue Basin Partnership (RBP)

Formerly the Stream Restoration Alliance of the Middle Rogue / Middle Rogue Watershed Council, the RBP is a coalition of organizations working to prioritize and to help accelerate the scale and effectiveness of conservation and restoration/enhancement in the Rogue River Basin. In 2015, the group completed the Rogue Restoration Action Plan. The purpose of the plan is to benefit water quality, water quantity, and fish and wildlife habitats over the next ten years (2015-2025). The purpose of the RBP is to provide focus and accountability throughout the region. RBP members include the following groups/organizations:

- Applegate Partnership & Watershed Council
- Cow Creek Band of Umpqua Tribe of Indians
- Illinois Valley Watershed Council
- Jackson Soil & Water Conservation District
- Lomakatsi
- Lower Rogue Watershed Council
- Rogue Riverkeeper
- Rogue River Watershed Council
- Rogue Valley Council of Governments
- Seven Basins Watershed Council
- Southern Oregon Climate Action Now
- Southern Oregon Forest Restoration Collaborative
- Southern Oregon Land Conservancy
- The Freshwater Trust
- Trout Unlimited
- WaterWatch of Oregon

Three Rivers School District

The Three Rivers School District and the City have developed a partnership to ensure the safety of students and school employees. Quarterly inspections of school facilities by the Department of Public Safety include a non-structural hazards assessment and revisions to the Three Rivers School District Emergency Operations Plan

Grants Pass School District #7

Grants Pass School District #7 has established Emergency Response Guides for each facility and conducts outreach to parents, faculty and staff about inclement weather and school closures.

The district also trains high school students basic emergency response skills through the Student Emergency Response Team (S-ERT) program.

Grants Pass Irrigation District

The Grants Pass Irrigation District, located in Oregon's Josephine and Jackson Counties, was organized in 1916 to provide adequate irrigation water for lands in the Rogue Valley. The district is dedicated to operating and maintaining a distribution system that economically and environmentally enhances the community.

Continued Public Participation

An open public involvement process is essential to the development of an effective NHMP. To develop a comprehensive approach to reducing the effects of natural disasters, the planning process should include opportunities for the public; neighboring communities; local, and regional agencies; as well as private, and nonprofit entities to comment on the NHMP during review. Keeping the public informed of efforts to reduce risk to future natural hazard events is important for successful NHMP implementation and maintenance. The City is committed to involving the public in the NHMP review and update process (Volume I, Section 4). The City posted the plan update for public comment before FEMA approval, and after approval will maintain their addendum to the NHMP on the City's website:

<https://www.grantspassoregon.gov/>.

In addition, natural hazards information dissemination is conducted throughout the year when opportunities present themselves via City departments and the City's website.

Mitigation Plan Maintenance and Update

The Josephine County Multi-Jurisdictional Natural Hazards Mitigation Plan and Grants Pass addendum will be updated every five years in accordance with the update schedule outlined in the federal Disaster Mitigation Act of 2000. During the County plan update process, the City will review and update its addendum (see Volume I, Section 4, *Plan Implementation and Maintenance*, for more information). The Grants Pass NHMP Convener will be responsible for convening the City Steering Committee to address the following questions:

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the City successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the City?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the City's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the City been affected by any disasters? Did the plan accurately address the impacts of this/these event(s)?

These questions will help the City Steering Committee determine what components of the mitigation plan need updating. The City Steering Committee will be responsible for updating any deficiencies found in the plan.

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3(iv), *Mitigation Strategy*.

The City's action items were developed through a two-stage process. In stage one, OPDR facilitated a work session with the steering committee to discuss the city's risk and to identify potential issues. In the second stage, OPDR, working with the local steering committee, developed potential actions based on the hazards and the issues identified by the steering committee.

During the update process the city re-evaluated the hazard mitigation strategy (Action Items). During this process action items were updated, noting what accomplishments had been made, and whether the actions were still relevant; any new action items were identified at this time (see Attachment A and Volume III, Appendix B for more information).

The City's mitigation actions are shown in Table GPA-1. The steering committee developed action items priorities to reflect current conditions, needs, and capacity. High priority actions are shown in **bold text** with **orange highlight**. The City will focus their attention and resource availability upon these achievable, high leverage activities over the next five years. Although this methodology provides a guide for the steering committee in terms of

implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding. Mitigation actions that were not prioritized will be considered for prioritization during the annual maintenance meetings. Refer to Attachment A for detailed information on each high priority action.

Mitigation Successes

Josephine County, working with the Energy Trust of Oregon, recently explored the feasibility of solar + storage microgrid installation on critical facilities. Rather than assessing feasibility solely on the structural capacity of a building to host a solar + storage microgrid, this project sought to incorporate other factors as well. They considered the location and ownership of critical facilities, as well as the location of vulnerable populations in Josephine County. By taking all these factors into account, the results and recommendations from the project can more holistically support clean energy goals, mitigate risks to critical community lifelines and the communities who depend on those lifelines, and lead to increased energy independence.

Facilities that were recommended to prioritize include: Cave Junction Wastewater Plant, **County EOC and SAR**, Fires Station 4 Holland, Fire Station 1 Cave Junction, Fire Station 3 O'Brien, **Grants Pass Wastewater Treatment Plant, Grants Pass Airport**, Illinois Valley Airport, **Josephine County Food Bank**, Josephine County Public Works (Kerby), Kerby Belt Building (Illinois Valley Learning Center), and North Valley High School.

Table GPA-1 City of Grants Pass Action Items

Mitigation Action Item		Lead Agency	Timeline	Cost
Multi-Hazard				
1.1	Continue to improve and sustain City-wide public information and education programs about potential hazards in the county, the need for personal preparedness, and mitigation actions possible.	Grants Pass Emergency Management	Ongoing	Low
1.2.	Collaborate with the County to maintain a GIS inventory of vulnerable locations and critical facilities.	Grants Pass Community Development	Ongoing	Low
1.3.	Collaborate with DOGAMI to conduct a Multi-hazard Risk Assessment to map hazard areas, estimate potential losses, and at-risk structures and populations.	Grants Pass Community Development	Medium-Term	Low
1.4	Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration in Grants Pass.	Grants Pass Community Development	Ongoing	Low
1.5	Integrate the goals and action items from the Natural Hazards Mitigation Plan into existing regulatory documents and programs where appropriate (Comprehensive Plan)	Grants Pass Community Development	Medium-Term	Low
1.6	Implement an effective emergency communication system between Grants Pass and Josephine County. The system should have built in redundancies, including power sources (e.g., electrical, fuel, solar).	Grants Pass Public Works	Short-Term	Medium
1.7	Develop strategies to assist local businesses to be more prepared in the advent of a disaster and strategies to assist local businesses to stay in the region after a disaster occurred.	Grants Pass Community Development	Short-Term	Medium
Drought				
2.1	Complete a Grants Pass drought contingency plan	Grants Pass Public Works	Short-Term	Medium
2.2	Promote water conservation measures among city residents focusing on domestic use	Grants Pass Community Development	Ongoing	Low

Mitigation Action Item		Lead Agency	Timeline	Cost
2.3	Replace higher-water use landscaping plants in parks and city-owned property with low-water-use plants and promote water-conserving landscaping, drought-tolerant landscaping, and smart scaping in public spaces.	Grants Pass Community Development	Medium-Term	Medium
Earthquake				
3.1	Complete structural and non-structural retrofit projects on the following critical facilities: City Hall, Department of Public Safety, and City Yard.	Grants Pass Community Development, Public Works	Long-Term	High
3.2	Complete structural and non-structural retrofit projects on the water reservoirs and pump stations.	Grants Pass Public Works	Long-Term	High
3.3	Encourage that all new critical facilities be built to highest earthquake building code standards; consider Institute for Business and Home Safety (IBHS) "Fortified for Safer Business" standards.	Grants Pass Community Development	Ongoing	Low
Flood				
4.1	Annually assess the city's interest in and ability to participate in the National Flood Insurance Program's Community Rating System. As capacity is available consider additional activities to lower the city's CRS level and increase the discount provided to policyholders.	Grants Pass Community Development	Ongoing	Low
4.2	Implement identified Capital Improvement Program projects to complete flood mitigation and retrofit activities at the Water Restoration Plant until a more suitable location is identified (see Flood 2.3).	Grants Pass Public Works	Ongoing	High
4.3	Relocate the Wastewater Treatment Plant and the Water Filtration Plant to a lower-risk flood area.	Grants Pass Public Works	Medium-Term	High
4.4	Collaborate with the Josephine County to develop outreach materials for property owners and tenants along stream and riverbanks to share information about how to minimize erosion of soils and banks during flood events of varying magnitudes.	Grants Pass Community Development	Ongoing	Low
Landslide				
5.1	Identify project opportunities in high-risk debris flow and landslide areas.	Grants Pass Community Development	Medium-Term	Low

Mitigation Action Item		Lead Agency	Timeline	Cost
Severe Weather				
6.1	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Grants Pass Community Development	Ongoing	Low
6.2	Enhance communication between City first responders (e.g., Public Safety, Public Works), public utilities, ODOT and the Emergency Coordination Committee (ECC) to ensure common understanding of priorities in response and recovery.	Grants Pass Public Safety	Ongoing	Low
6.3	Collaborate with local community organizations to develop community sites for use as a warming shelter in the winter, a cooling shelter in the summer, and a clean air refuge site when needed.	Grants Pass Community Development	Short-Term	Medium
6.4	Collaborate with PacifiCorp/Pacific Power to remove trees along the power line systems that have a higher potential to fall on power lines.	Grants Pass Public Works	Ongoing	Low
6.5	Promote the benefits of tree-trimming and tree replacement programs and help to coordinate local efforts by public and private agencies.	Grants Pass Public Works	Ongoing	Low
Wildfire				
7.1	Promote wildfire education and awareness, as well as the Firewise Community program.	Grants Pass Public Safety - Fire; Firewise Coordinator	Ongoing	Low
7.2	Collaborate with Josephine County with hazard fuel reduction on county-owned forest land adjacent to communities at risk.	Grants Pass Public Safety - Fire; Firewise Coordinator	Medium-Term	Medium
7.3	Promote wildfire mitigation through public education, fuels reductions, and the improvement of transportation corridors.	Grants Pass Public Safety - Fire; Firewise Coordinator	Ongoing	Low

Mitigation Action Item		Lead Agency	Timeline	Cost
7.4	Reduce the risk of wildfire around the developed areas on/around Dollar Mountain.	Grants Pass Public Safety - Fire; Firewise Coordinator	Short-Term	High

Source City of Grants Pass NHMP Steering Committee, updated 2022

Cost: Low (less than \$50,000), Medium (\$50,000-\$100,000), High (more than \$100,000)

Timing: Ongoing (continuous), Short (1-2 years), Medium (3-5 years), Long (5 or more years)

Priority Actions: Identified with **bold text** and **orange highlight**.

REVIEW DRAFT

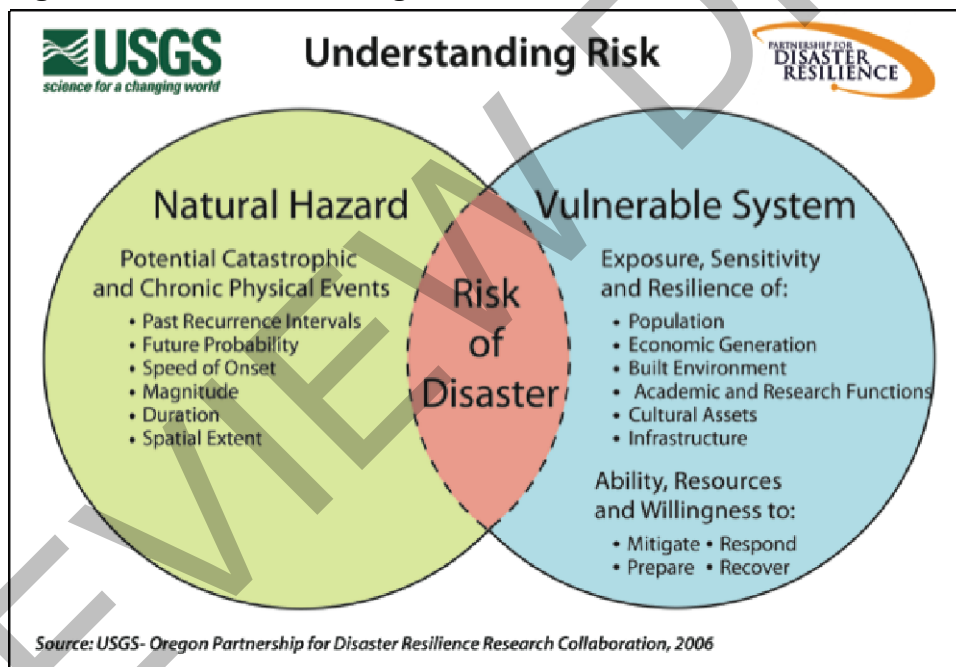
Risk Assessment

This section of the NHMP addendum addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazard risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Volume I, Section 2, and Volume III, Appendix C. The risk assessment process is graphically depicted in Figure GPA-2. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure GPA-2 Understanding Risk



Hazard Analysis

The Grants Pass NHMP Steering Committee reviewed and revised the plan’s Hazard Analysis and Risk Assessment section and refined the County’s Hazard Vulnerability Assessment (HVA) where appropriate to reflect distinctions in probability, vulnerability, and risk from natural hazards unique to the City.

Table GPA-2 depicts the hazard analysis matrix for Grants Pass and illustrates that hazard scores are influenced by each of the four categories combined. For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard priorities but does not predict the occurrence of a hazard. Volume I, Section 2: Risk Assessment of the Josephine County NHMP, describes the methodology.

The hazards are listed in rank order from high to low. The table shows that hazard scores are influenced by each of the four categories combined: past historical events, the probability or likelihood of a hazard event occurring, the vulnerability to the community, and the maximum threat or worst-case scenario. The City ranked wildfire, winter storm, drought, and Cascadia Subduction Zone earthquake as the top tier hazard threats. Riverine flood, windstorm, extreme heat event, and crustal earthquake constitute the middle tier. Landslide and volcanic event comprise the lowest ranked hazards and the bottom tier.

Table GPA-2 Hazard Analysis Matrix – City of Grants Pass

Hazard	Maximum				Total Threat Score	Hazard Rank	Hazard Tiers
	History	Vulnerability	Threat	Probability			
Wildfire	14	40	100	70	224	#1	Top Tier
Winter Storm	16	40	100	63	219	#2	
Drought	16	30	90	70	206	#3	
Earthquake - Cascadia	2	50	100	49	201	#4	
Flood - Riverine	18	25	70	70	183	#5	Middle Tier
Windstorm	14	25	70	63	172	#6	
Extreme Heat Event	8	30	60	63	161	#7	
Earthquake - Crustal	8	25	100	21	154	#8	
Landslide	8	10	40	35	93	#9	Bottom Tier
Volcanic Event	2	5	30	7	44	#10	

Source: City of Grants Pass NHMP Steering Committee (2022)

Table GPA-3 categorizes the probability and vulnerability scores from the hazard analysis for the city and compares the results to the assessment completed by the County (areas of differences are noted with **bold** text within the city ratings).

Table GPA-3 Probability and Vulnerability Comparison

Hazard	Grants Pass		County	
	Probability	Vulnerability	Probability	Vulnerability
Drought	High	Moderate	High	Moderate
Earthquake - Cascadia	Moderate	High	Moderate	High
Earthquake - Crustal	Low	Moderate	Low	Moderate
Extreme Heat Event	High	Moderate	High	Moderate
Flood - Riverine	High	Moderate	High	Moderate
Landslide	Moderate	Low	High	Low
Volcanic Event	Low	Low	Low	Low
Wildfire	High	High	High	High
Windstorm	High	Moderate	High	Moderate
Winter Storm (Snow/Ice)	High	High	High	High

Source: City of Grants Pass and Josephine County NHMP Steering Committees (2022)

Community Characteristics

Table GPA-4, Appendix C (Volume III), and the following section provide information on City specific demographics and assets. Many of these community characteristics can affect how natural hazards impact communities, and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation. Between 2014 and 2021 the City grew by 4,419 people (13%).¹ According to the State's official coordinated population forecast, between 2021 and 2040 the City's population is forecasted to grow by 29% to 51,092.² The City has an educated population with 91% of residents 25 years, and older holding a high school degree, but only about 16% have a bachelor's degree or higher. As of 2019, Grants Pass and Three Rivers school districts have high school graduation rates of 78% and 77% respectively.³

Grants Pass is in the Rogue Valley in Southwest Oregon. The Rogue River runs through the City. This area differs from the rest of Southwest Oregon in that there is less ocean influence, cooler winters, and warmer drier summers. The town is at an elevation of approximately 950 feet.

The region experiences hot, short summers and generally mild winters, though severe winter storms are not uncommon. The climate in Grants Pass is moderate. Average monthly temperatures range from lows of 35 - 46° F (in December) to highs of 56° F- 91° F (in July). The driest months are July and August. The wettest months are November through January with average precipitation ranging from 4.4 to 6.6 inches per month. Grants Pass has an average annual precipitation of approximately 31.3 inches.

Economy

Grants Pass' commercial areas developed along primary transportation routes and residential development followed nearby.

Median income can be used as an indicator of the strength of the region's economic stability. In 2019, the median household income in Grants Pass was \$44,737, \$8,357 more than the 2014 value (2021 inflation adjusted values). Although it can be used to compare areas, this number does not reflect how income is divided among area residents.

According to the Oregon Office of Economic Analysis, "While the Grants Pass metro area suffered a very severe recession – job losses twice the national average – strong growth has returned in recent years. Josephine County's employment is now effectively back to pre-recession peak levels, as is the local unemployment rate."⁴

¹ Portland State University, Population Research Center, "Annual Population Estimates", 2019.

² Portland State University, Population Research Center, "Oregon Population Forecast Program Cycle 1 (2014-2017)". 2017.

³ Grants Pass School District: <https://schools.oregonlive.com/grads/Grants-Pass/>; Three Rivers School District: <https://www.publicschoolreview.com/oregon/three-rivers-josephine-county-school-district/4106900-school-district>

⁴ Oregon Office of Economic Analysis. November, 2016. Poverty and Progress, Josephine County Edition. <https://oregoneconomicanalysis.com/2016/11/03/poverty-and-progress-josephine-county-edition/>

Table GPA-4 Community Characteristics

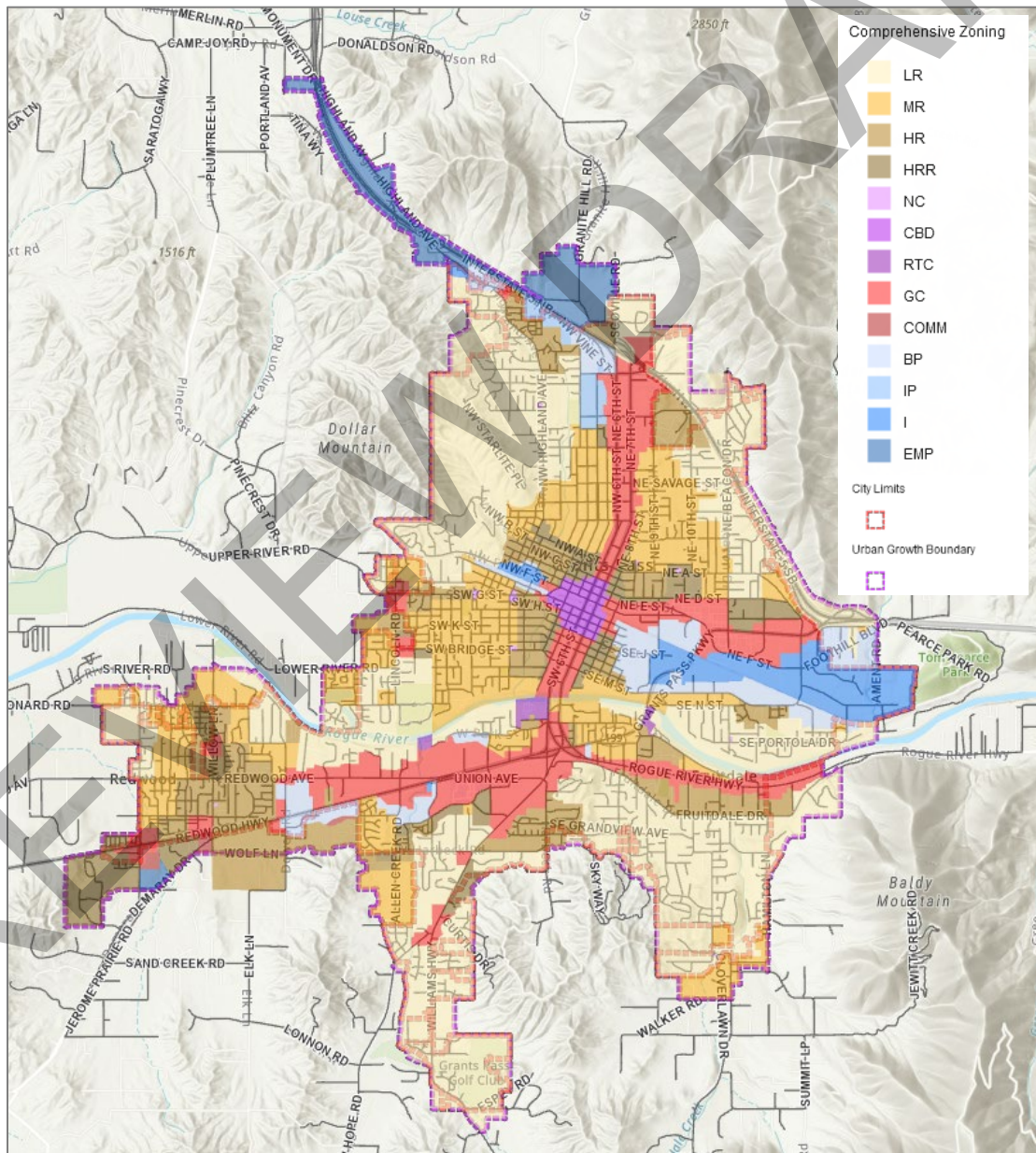
Population Characteristics			Household and Employment Characteristics		
2014 Population	35,060		Housing Units		
2021 Population	39,479		Single-Family	11,490	69%
2040 Forecasted Population	51,092		Multi-Family	4,229	26%
Race (non-hispanic or latino) and Ethnicity (Hispanic)			Mobile Homes	910	5%
American Indian and Alaska Native	1%		Household Type		
Asian	1%		Family Household	9,699	62%
Black/ African American	1%		Married couple (w/ children)	5,260	33%
Native Hawaiian and Other Pacific Islander	0%		Single (w/ children)	2,186	14%
White	90%		Living Alone 65+	2,262	14%
Some Other Race	2%		Year Structure Built		
Two or More Races	5%		Pre-1970	5,612	34%
Hispanic or Latino/a (of any race)			1970-1989	4,908	30%
Limited or No English Spoken	552	2%	1990-2009	5,639	34%
Vulnerable Age Groups			2010 or later	470	3%
Less than 5 Years	2,245	6%	Housing Tenure and Vacancy		
Less than 15 Years	8,515	23%	Owner-occupied	7,899	48%
65 Years and Older	7,422	20%	Renter-occupied	7,882	47%
85 Years and Older	1,100	3%	Seasonal	146	1%
Age Dependency Ratio		102.9	Vacant	702	4%
Disability Status			Vehicles Available (Occupied Units)		
Total Population	4,129	11%	No Vehicle	1,498	10%
Children (Under 18)	726	2%	One	5,301	34%
Working Age (18 to 64)	1,813	5%	Two	5,578	35%
Seniors (65 and older)	1,590	4%	Three or more	3,404	22%
Income Characteristics			Employment Characteristics		
Households by Income Category			Labor Force		
Less than \$15,000	2,441	16%	In labor Force	16,897	56%
\$15,000-\$29,999	2,813	18%	Unemployed	1,078	4%
\$30,000-\$44,999	2,735	17%	Occupation (Top 5)		
\$45,000-\$59,999	2,327	15%	Professional and Related	2,686	17%
\$60,000-\$74,999	1,609	10%	Management, Busines, Financial	2,062	13%
\$75,000-\$99,999	1,863	12%	Office and Administrative	1,967	13%
\$100,000-\$199,999	1,687	11%	Sales	1,618	10%
\$200,000 or more	306	2%	Healthcare Support	1,272	8%
Median Household Income		\$44,737	Health Insurance		
Gini Index of Income Inequality		0.44	No Health Insurance	3,238	9%
Poverty Rates			Public Health Insurance	20,550	56%
Total Population	6,312	17%	Private Health Insurance	18,982	51%
Children (Under 18)	1,711	21%	Transportation to Work		
Working Age (18 to 64)	4,013	19%	Drove Alone	12,675	81%
Seniors (65 and older)	588	8%	Carpooled	1,525	10%
Housing Cost Burden (Cost > 30% of household income)			Public Transit	91	< 1%
Owners with a Mortgage	1,867	38%	Motorcycle	27	< 1%
Owners without a Mortgage	289	10%	Bicycle/Walk	738	5%
Renters	4,447	57%	Work at Home	524	3%

Source: U.S. Census Bureau, 2015-2019 and 2010-2014 American Community Survey; Portland State University, Population Research Center, "Annual Population Estimates", 2021. Portland State University, Population Research Center, "Oregon Population Forecast Program Cycle 1 (2014-2017)". 2021. Note: ACS 2014 and 2019 dollars adjusted for 2021 via Social Explorer's Inflation Calculator

Grants Pass spans 11.7 square miles and includes industrial, commercial, and residential zones. Employment land is concentrated along all highway corridors as well as downtown. The downtown core includes government offices and additional retail use and is concentrated between B and M Street. Populated areas outside city limits include Redwood, New Hope, Merlin, and Murphy CDPs, Granite Hill, as well as development along Highway 99, Interstate 5, Merlin Road, Demaray Drive, and Plumtree Lane/Pinecrest Drive. The city's Comprehensive Plan identifies land use within the city and its urban growth boundary. Figure GPA-3 shows the City of Grants Pass' comprehensive plan map.

Since the previous NHMP (2017) the city has annexed 76.66 acres including subdivisions, parks, and other parcels. New development has complied with the standards of the [Oregon Building Code](#), and the City's Development Code, including their floodplain ordinance.

Figure GPA-3 Grants Pass Comprehensive Plan Map



Source: [City of Grants Pass GIS](#)

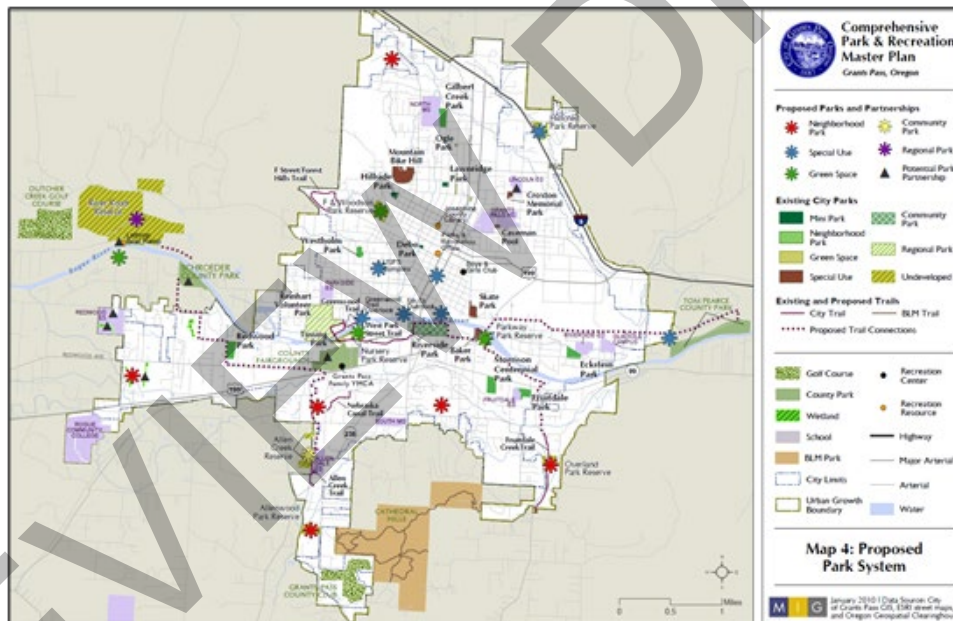
Asset Identification

The following assets have been identified by the Institute of Policy, Research, and Engagement at the University of Oregon in collaboration with the City of Grants Pass. These assets were confirmed and updated by the City steering committee during the 2021-2022 update process.

Parks and Open Space

Grants Pass maintains 507 acres of park and open space across 32 individual sites (Figure GPA-4). Of these, 24 sites are developed. These include special recreation sites such as pools, boat launches, and a skate park. Recent improvements include, among others, new multi-use paths, tree plantings, playfield improvements, signage, and security improvements. Recent park maintenance activities have addressed flood damage and storm damage (including tree removal and minor facility damage). Planned park projects include upgrades to existing park facilities and major investments in new park development (e.g. Hillcrest Park Reserve, Allen Creek Sports Park, and Riverside Park next to the “Caveman Bridge”).

Figure GPA-4 Current and General Future Park Locations, 2010



Source: Grants Pass Comprehensive Park & Recreation Master Plan, 2011

Cultural and Historic Resources

Historical and cultural resources such as historic structures and landmarks can help distinguish a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important.

Table GPA-5 identifies the number of eligible/significant (ES), eligible/contributing (EC) sites are in Grants Pass. There are a total of 417 historic sites in Josephine County. There are 32 eligible significant and 74 eligible contributing historic sites in the Grants Pass. Of those here are a total of 90 nationally registered historic places in Josephine County, 51 sites are within Grants Pass (75% of the County total).

Table GPA-5 Josephine County Historic Places

Eligible Sites	Total Sites	Grants Pass	
Eligible Significant	68	32	47%
Eligible Contributing	274	74	27%
Not Eligible / Contributing	52	21	40%
Not Eligible / Out of Period	8	8	100%
Undetermined	15	7	47%
	417	142	34%

Nationally Registered Sites			
Individually	57	24	42%
Within an Historic District	32	26	81%
Individually & in a Historic District	1	1	100%
	90	51	57%

Source: Oregon Historic Sites Database

Table GPA-6 (next page) displays the nationally registered historic places in Josephine County.

Table GPA-6 Josephine County Nationally Registered Historic Places

Property Name	Year Built	Eligibility	Status	Historic District
Ahlf, John & Susanna, House	1902	eligible/significant	Individually Listed	
Calhoun, George, House	1909	eligible/significant	Individually Listed	
Clark-McConnell House	1936	eligible/significant	Individually Listed	
Clark-Norton House	1903	eligible/significant	Individually Listed	
Clemens, Michael, House	1905	eligible/significant	Individually Listed	
Croxton, Thomas, House	1866	eligible/significant	Individually Listed	
Dimmick-Judson House	c.1865	eligible/significant	Individually Listed	
Fetzner, Joseph, House	1894	eligible/significant	Individually Listed	
Flanagan, Dr William H, House	1905	eligible/significant	Individually Listed	
Grants Pass City Hall & Fire Station (Old)	1912	eligible/significant	Individually Listed	
Grants Pass G Street Historic District	1889	eligible/significant	Individually Listed	Grants Pass G Street Historic
Grants Pass Supervisor's Warehouse	1933	eligible/significant	Individually Listed	
Kienlen-Harbeck Building	1900	eligible/significant	Listed Individually & in Historic District	Grants Pass G Street Historic
Lundburg, George H, House	c.1914	eligible/significant	Individually Listed	
McLean, Robert & Lucy, House	1890	eligible/significant	Individually Listed	
Newell, Edwin, House	1885	eligible/significant	Individually Listed	
Newman United Methodist Church	1889	eligible/significant	Individually Listed	
Redwoods Hotel	1925	eligible/significant	Individually Listed	
Smith, Herbert & Katherine, House	1908	eligible/significant	Individually Listed	
Voorhies, Amos E, House	1929	eligible/significant	Individually Listed	
Cornell, Albert B & Mary, House	1925	eligible/significant	Individually Listed	
Schmidt, Claus & Hannchen, House	1901	eligible/significant	Individually Listed	
Rogue Theater	1938	eligible/significant	Individually Listed	
Hotel Josephine Annex	1905	eligible/significant	Individually Listed	
Calhoun Brothers Grocery	1893	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Kesterson Building	1905	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Sauer & Fenner Building	1894	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Dixon's Dry Goods	1894	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Rogue River Hardware Tin Shop	1904	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Scott, Joseph L, Building	1894	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Sherer-Judson Building	1889	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Closet Catalyst, Apartments	c.1920	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Grants Pass Steam Laundry	1903	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Schmidt Cigar Store	1894	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Booth-Cornell Grocery Building	1894	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Lempke Building	1900	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Kessler-Harper Building	1900	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Wade, E A, Building	1894	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Chiles/City Market Building	1902	eligible/contributing	Listed in Historic District	Grants Pass G Street Historic
Palace Hotel	1900	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Grocery Warehouse	c.1900	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Jewell Warehouse	c.1900	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Grants Pass Hardware Warehouse	c.1900	not eligible/non-contributing	Listed in Historic District	Grants Pass G Street Historic
Petes Discount Office Supply	c.1950	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Captain Copy	c.1960	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Mr Harvey's Hair Design	c.1978	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Animal Kingdom	c.1978	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Everton, W E, House Site	c.1960	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Isham Warehouse	1932	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Blackburn Hotel Site	c.1965	not eligible/out of period	Listed in Historic District	Grants Pass G Street Historic
Riverside Park		eligible/significant	Individually Listed	

Source: Oregon Historic Sites Database

Critical Facilities & Infrastructure

Critical facilities are those that support government and first responders' ability to act in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Individual communities should inventory their critical facilities to include locally designated shelters and other essential assets, such as fire stations, and water and wastewater treatment facilities. Additional information is provided in Table GPA-9(Attachment D) on each of the facilities listed below. Included in the table is loss estimation from the Oregon NHMP.

Grants Pass has the following critical facilities:

Fire Stations:

- Grants Pass Public Safety Center: 800 E Park St
- Grants Pass Fire & Rescue: 615 NW 5th St
- Grants Pass Fire & Rescue Operations Division Station 2 (SE M St)
- Hillcrest Fire Station: 199 NW Hillcrest Dr
- Parkway Fire Station: 800 East Park St
- Rural Metro Fire Station: 2428 Williams Hwy
- Rural Metro Fire Station: 807 NE 6th St

Hospitals and Satellites

- Asante Three Rivers Medical Center: 500 SW Ramsey Ave
- Three Rivers Community Hospital – Washington Campus: 1507 NW Washington Blvd
- Three Rivers Community Hospital – Asante Women's Imaging: 1075 SW Grandview Ave

Health Clinics

- Siskiyou Community Health Center: 1701 NW Hawthorne Ave
- Planned Parenthood – Grants Pass Health Center: 160 NW Franklin Blvd
- Grants Pass Family Medicine: 1690 NE Lynda Ln
- One Peak Medical: 1325 NE 7th St
- Cascade West Primary Care Clinic: 201 NE Savage St
- Valley Immediate Care – Grants Pass: 162 NE Beacon Dr, #103
- Bear Valley Medical Clinic: 1833 SW Nebraska Ave
- Grants Pass VA Clinic: 1877 Williams Hwy
- DaVita Grants Pass li Dialysis: 1055 Redwood Ave
- DaVita Redwood Dialysis: 201 SW L St

Schools

- Allen Dale Elementary: 2320 Williams Hwy
- Fruitdale Elementary: 1560 Bill Baker Way
- Highland Elementary: 1845 NW Highland Ave
- Lincoln Elementary: 1132 NE 10th St
- Parkside Elementary: 735 SW Wagner Meadows Dr
- Redwood Elementary: 3163 Leonard Rd

- Riverside Elementary: 1200 Se Harvey Dr
- North Middle: 1725 NW Highland Ave
- South Middle: 350 W Harbeck Rd
- Gladiola High: 1137 SE Gladiola Dr
- Grants Pass High: 830 NE 9th St
- New Bridge High: 2001 NE F St (Rogue Valley Youth Correctional Facility)
- Brighton Academy (Private): 1121 NE 7th St
- Grants Pass Seventh Day Adventist (Private): 2250 NW Heidi Ln
- Rogue Valley Christian (Private): 1515 Redwood Ave
- St. Anne Catholic (Private): 1131 NE 10th St

Law Enforcement and Jails

- Grants Pass Police Department: 101 NW A St
- Josephine County Sheriff's Office: 1901 NE F St
- Josephine County Community Corrections Department: 510 NW 4th St
- Josephine County Jail: 1901 NE F ST
- Oregon State Police: 1463 NE 7th St
- Public Safety with City EOC and Dispatch: 726 NE 7th St
- Rogue Valley Youth Correctional Facility: 2001 NE F St

Civic Buildings

- Grants Pass City Hall: 101 NW A St
- Josephine County Courthouse: 500 NW 6th St
- Josephine County Circuit Court: 301 NW F St
- Josephine County Public Works: 201 River Heights Way
- Josephine County Planning Office: 700 NW Dimmick St

Water and Wastewater Treatment Centers

- Grants Pass Water Filtration Plant: 821 SE M St
- Grants Pass Wastewater Plant: 1200 SW Greenwood Ave
- Thirteen (13) remote pumping stations
 - Water Treatment Plant, Lawnridge, Madrone, Harbeck, Hilltop, New Hope, Meadow Wood, Champion, Starlight, Laurel Ridge, Williams Crossing, Panoramic Loop, Hefley, and North Valley
- Eight (8) reservoirs (20.53 Million Gallon capacity)
 - 500 Woodson Dr
 - 1500 Ridge Rd
 - 1400 Sherman Ln
 - Heiglin Loop Rd
 - 1420 Denton TI
 - 1700 Sunset Ln
 - 3900 Highland Ave

Airports

- Grants Pass Airport: 1441 Brookside Blvd

Railroad

- Central Oregon & Pacific Railroad

Energy

- Power substations
- Williams gas transmission line

Essential Facilities

Communication Towers:

- Five

Post Offices

- Grants Pass Post Office: 1636 NW Washington Blvd
- Grants Pass Post Office: 132 NW 6th St

Emergency Shelters

- Allen Dale Elementary School: 2320 Williams Hwy
- Community of Christ Church: 2033 Harbeck Rd
- Grants Pass High School: 830 NE 9th St
- Highland Elementary School: 1845 NW Highland Ave
- Josephine County Fairgrounds: 1451 Fairgrounds Rd
- North Middle School: 1725 NW Highland Ave
- Redwood Grange: 1830 Redwood Ave
- Riverside Elementary School: 1200 Se Harvey Dr
- Saint Luke's Episcopal Church: 224 NW D St
- South Middle School: 350 W Harbeck Rd

Museums and Libraries

- Grants Pass Museum of Art: 229 SW G St
- Josephine County Library: 200 NE C St
- Schmidt House Museum: 508 SW 5th St
- Parkway Community Church: 229 NE Beacon Dr

Other facilities:

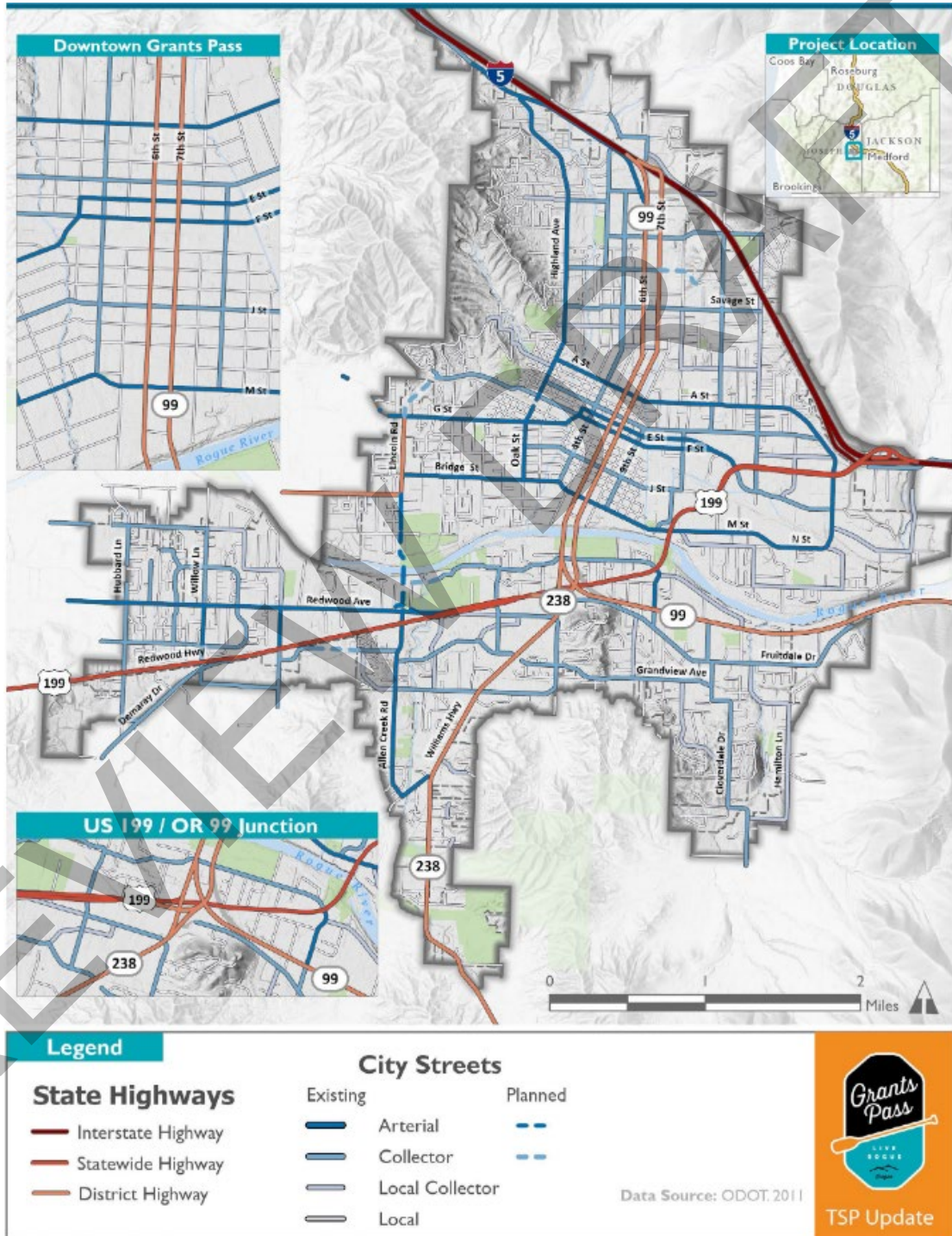
- Boys and Girls Club Grants Pass: 203 SE 9th St
- Edgewater Christian Fellowship Grants Pass: 101 Assembly Circle
- Reaching our Community Food Pantry: 564 SE Foundry St
- River Valley Church Grants Pass: 405 NE 6th St
- St Anne Church: 1131 NE 10th St
- Church of Jesus Christ of Latter-Day Saints: 1969 Williams Hwy
- Salvation Army of Grants Pass: 2543 Redwood Ave

Transportation

Mobility plays an important role in Grants Pass, and the daily experience of its residents, and businesses. Motor vehicles represent the dominant mode of travel through, and within

the City. The City maintains a standard set of arterial, collector, local collector, local and private streets (Figure GPA-5). Grants Pass is located on the I-5 corridor, with the bulk of the City lying south/southwest of the interstate. The City is bisected by US Route (National Highway) 199 and State Highways 99 and 238. Notably, Highway 199 crosses the Rogue River in Grants Pass.

Figure GPA-5 Street Functional Classification Map



Source: [2040 Transportation System Plan \(2020\)](#)

Roads/Seismic lifelines

Seismic lifeline routes help maintain transportation facilities for public safety and resilience in the case of natural disasters. Following a major earthquake, it is important for response and recovery agencies to know which roadways are most prepared for a major seismic event. The Oregon Department of Transportation has identified lifeline routes to provide a secure lifeline network of streets, highways, and bridges to facilitate emergency services response after a disaster.⁵

System connectivity and key geographical features were used to identify a three-tiered seismic lifeline system. Routes identified as Tier 1 are considered the most significant and necessary to ensure a functioning statewide transportation network. The Tier 2 system provides additional connectivity to the Tier 1 system, it allows for direct access to more locations and increased traffic volume capacity. The Tier 3 lifeline routes provide additional connectivity to the systems provided by Tiers 1 and 2.

Interstate-5 (Tier I) is the major north-south transportation route through the city. Highway 199 (Tier III) is the major east-west transportation routes connecting Grants Pass to Cave Junction and California.

Bridges

Figure GPA-6 shows the bridges in Grants Pass. There are many bridges in the city, mostly along Interstate-5 and Where Highway 199 and Highway 99 meet near the Rogue River. None of the ODOT bridges in Grants Pass are structurally deficient. The OR-99 (Hwy 25) Bridge (SW 6th Street – Caveman Bridge) over the Rogue River was previously structurally deficient according to the 2015 ODOT Bridge Condition Report. The bridge was listed in the 2017 State Transportation Improvement Program and as of February 2022 is no longer considered deficient.

Railroads

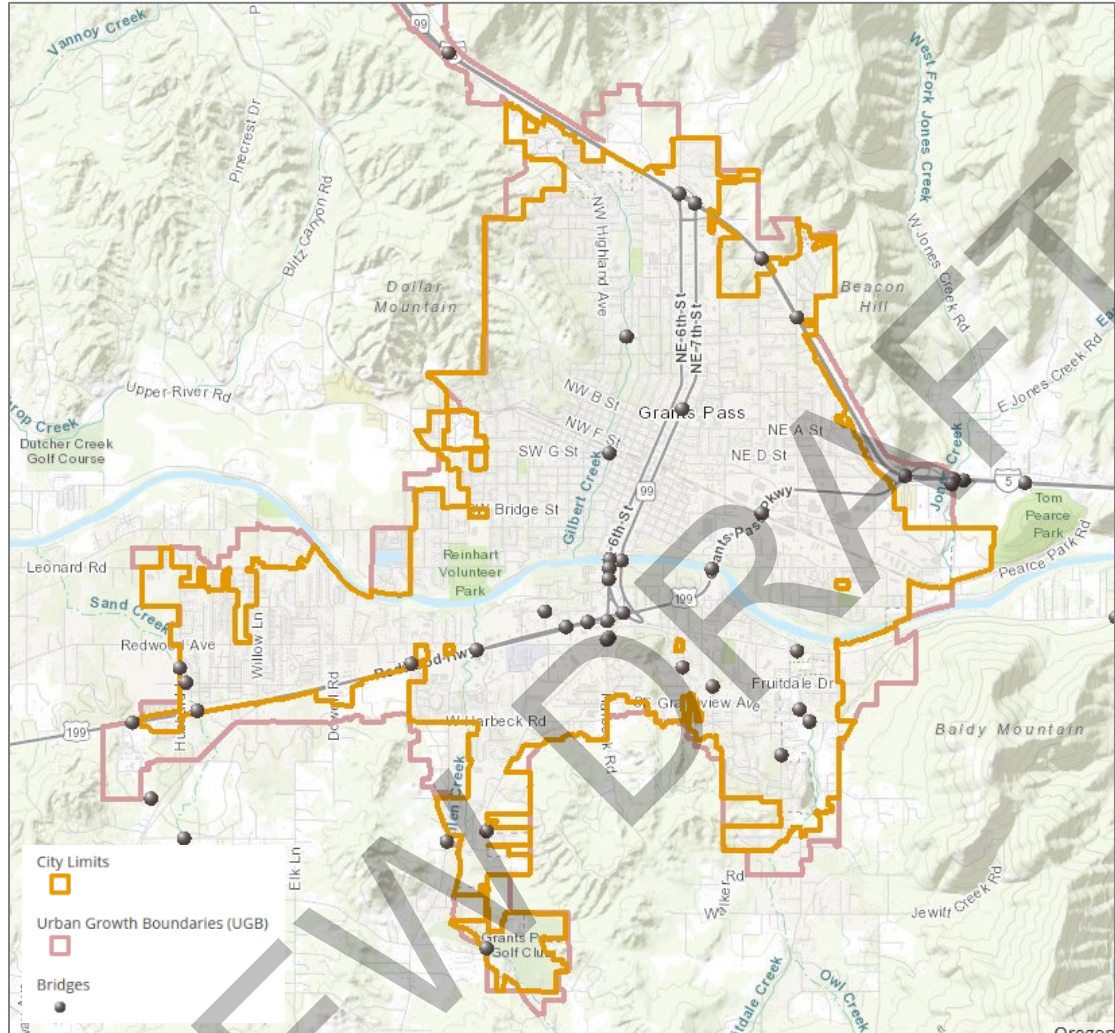
Grants Pass is served with limited rail service via a Union Pacific line that runs east/west through the city. Historically, service was provided by the Central Oregon and Pacific Railroad, a Class II Railroad. Recently (2015), CORP made improvements to the line and began operations between Eugene, Oregon and Weed, California.

Airports

The public Grants Pass Airport is located northwest of the city. The closest commercial air service is located roughly 30-miles south of Grants Pass in Medford.

⁵ Oregon Department of Transportation. Oregon Seismic Lifeline Evaluation, Vulnerability Synthesis, and Identification, *Oregon Seismic Lifeline Routes*, May 15 2012.

Figure GPA-6 Grants Pass Bridges



Source: Oregon Department of Transportation, ODOT TransGIS, accessed March 6, 2022
More information on Seismic Design of bridges is on the ODOT website:
<https://www.oregon.gov/odot/Bridge/Pages/Seismic.aspx>

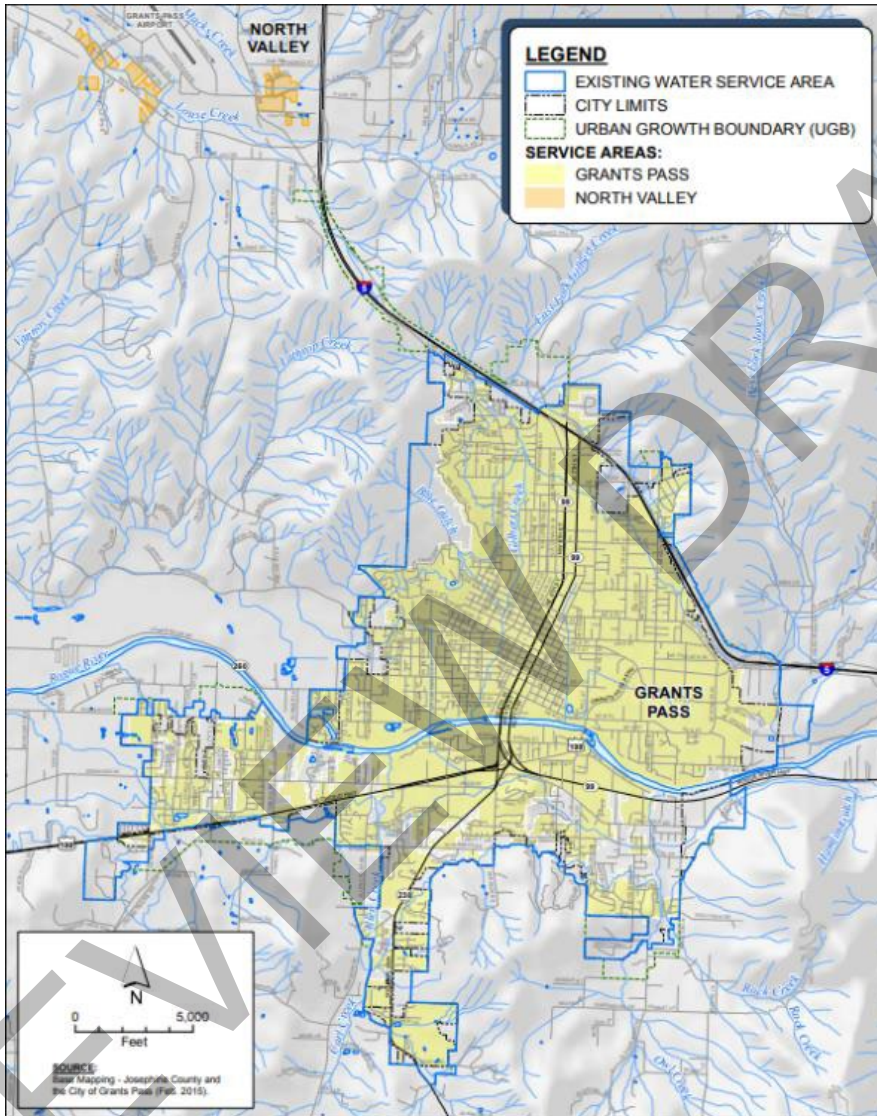
Utilities

Water

The City of Grants Pass treats and distributes over two-billion gallons of water annually (Figure GPA-7). The Rogue River is the City's sole water supply source. Historical water demand in Grants Pass is between 10.0 and 15.2 million gallons per day. Winter average is 3.3 million gallons with an annual average of roughly 5.5 million gallons. The City maintains a single water treatment plant. Recent updates to the Water Treatment Facility Plan include mitigation measures for flood and earthquake hazards. The City's distribution system is divided into five primary pressure zones served by eight gravity storage reservoirs and 13 booster pump stations (Figure GPA-8). The City's distribution piping includes approximately 188 miles of pipe in sizes up to 36 inches in diameter. Additional facility maintenance and mitigation activities are contained in the recently developed Water Distribution Master Plan.

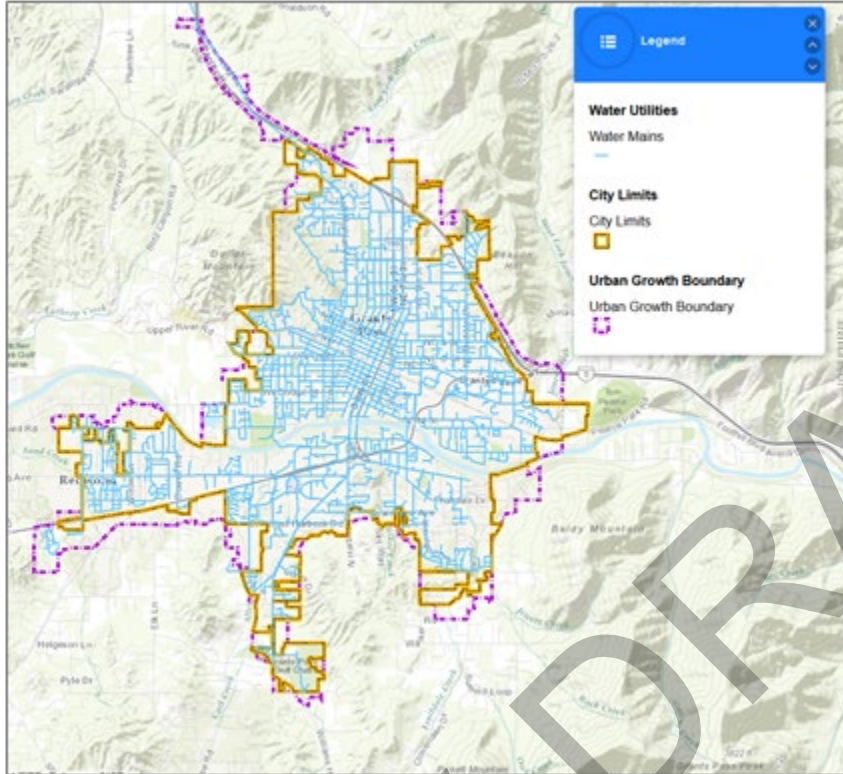
According to the [City's Water Distribution Master Plan](#), water supply is currently available and sufficient to meet demand. Based on current population forecasts, "saturation development" is expected to occur in 30 years. Notably, the City completed a water system seismic resilience study in 2019. The study identified system vulnerabilities that will be completed as funding allows or in conjunction with other projects to meet seismic response and recovery goals for water utilities presented in the Oregon Resilience Plan.

Figure GPA-7 Grants Pass Existing Water System Service Area



Source: City of Grants Pass Water Distribution System Master Plan (2016).

Figure GPA-8 Grants Pass Water Transmission



Source: [City of Grants Pass GIS](#)

Mitigation Successes

Water Reservoir Replacement

In 2013, Grants Pass replaced and expanded the capacity of an existing 3.5 million gallon water reservoir (Reservoir Number 3). Originally constructed in the 1940s, reservoir inspections and assessments conducted in 2009 identified existing maintenance and structural deficiencies. Following further evaluation, Grants Pass initiated a project to replace and expand the capacity of the reservoir with new prestressed concrete reservoir to provide a safe, reliable water storage facility. The new reservoir meets current seismic standards and includes many state-of-the-art systems including inlet isolation valves, flexible expansion joints for critical connections, and floor-to-wall seismic cabling. In addition to addressing multiple water system vulnerabilities, the project received the American Public Works Association – Oregon “Public Works Project of the Year” in 2014. For more information about this multi-objective risk reduction project, refer to: [AAPWA – Oregon: Public Works Project of the Year 2014](#).

Stormwater Master Plan Update and Adoption

With adoption of the updated Stormwater Master Plan in February of 2016, Grants Pass completed NHMP action item 2.4. Stormwater problems are more than just a periodic and temporary nuisance. The purpose of the stormwater system is to keep Grants Pass a vibrant and livable community. The stormwater system helps to address destructive flooding and erosion. This in turn supports community resilience by reducing impacts to lives and property. In addition, it supports emergency services by ensuring access and transportation routes are open and available.

Hazard Profiles

The following sections briefly describe relevant information for each profiled hazard. More information on Josephine County hazards can be found in Volume I, Section 2 *Risk Assessment* and in the [Risk Assessment for Region 4, Southwest Oregon, Oregon SNHMP \(2020\)](#).

Drought

The steering committee determined that the city's probability for drought is **high**, meaning at least one incident may occur within the next 35 years and that its vulnerability to drought is **moderate**, meaning that between 1% and 10% of the city's population or property could be affected by a major drought event. *These ratings have not changed since the previous NHMP.*

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of drought hazards, as well as the history, location, extent, and probability of a potential event. Droughts are common in southern Oregon. The City and County impacts from drought vary slightly due to the difference between urban and rural water infrastructure. Josephine County has experienced nine drought declarations since 1991, two since the previous NHMP (2020, 2021).

Grants Pass' only water supply comes from the Rogue River. The city has eight storage reservoirs, and eight pressure tanks with about 20.5 million gallons of treated water storage capacity. The water treatment plant has allowed the city to treat about 20 million gallons per day. Currently, the city is only using about 35% (19.9 mgd out of a maximum 56.6 mgd) of its water rights, which will enable Grants Pass to meet future demands as it . The Oregon Water Resources Department, coordinates with municipalities to implement water conservation or curtailment plans when drought emergencies are declared. The city's [Water Distribution Master Plan](#) addresses conservation and rationing protocols and includes a [Water Management and Conservation Plan](#).

Future Climate Projection:

According to the Oregon Climate Change Research Institute (OCCRI report) "*Fifth Oregon Climate Assessment*"⁶ the probability of future drought conditions (low summer soil moisture, low spring snowpack, low summer runoff, low summer precipitation, and high summer evaporation) is likely to increase.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Statewide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the Grants Pass' local economy have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

⁶ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

In addition to reduced water supplies, a drought will increase the chances of wildfire and significantly reduce tourism activities. If hotels, for example, are unable to accommodate guests, the city's economy would greatly suffer. Currently, the city has a water curtailment plan that will go into effect in the event of a drought (Section 4 of the Water Management and Conservation Plan)

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The steering committee determined that the city's probability for a Cascadia Subduction Zone (CSZ) earthquake event is **moderate**, meaning one incident may occur within the next 35 to 75 years and that its vulnerability to a CSZ event is **high**, meaning that more than 10% of the City's population or property could be affected by a major CSZ earthquake event. The steering committee determined that the city's probability for a crustal earthquake event is **low**, meaning one incident may occur within the next 100 years and that its vulnerability to a crustal earthquake event is **moderate**, meaning that between 1% and 10% of the city's population or property could be affected by a major crustal earthquake event. *These ratings have not changed since the previous plan.*

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of earthquake hazards, as well as the history, location, extent, and probability of a potential event. Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any site. In many major earthquakes, damages have primarily been caused by the behavior of the soil.

The Pacific Northwest experienced a subduction zone earthquake estimated at magnitude 9 on January 26, 1700. The earthquake generated a tsunami that caused damage as far away as Japan. The largest Cascadia Subduction Zone earthquakes have a return period of about 530 years. The time between events has been as short as 100 to 200 years and as long as 1,000 years. The probability of a large CSZ event is estimated at 7 to 12% over the next 50 years.⁷

The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has undertaken a rigorous program in Oregon to identify seismic hazards, including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides. DOGAMI estimates that Grants Pass has a 32-45% chance of experiencing damaging shaking over the next 100 years.⁸

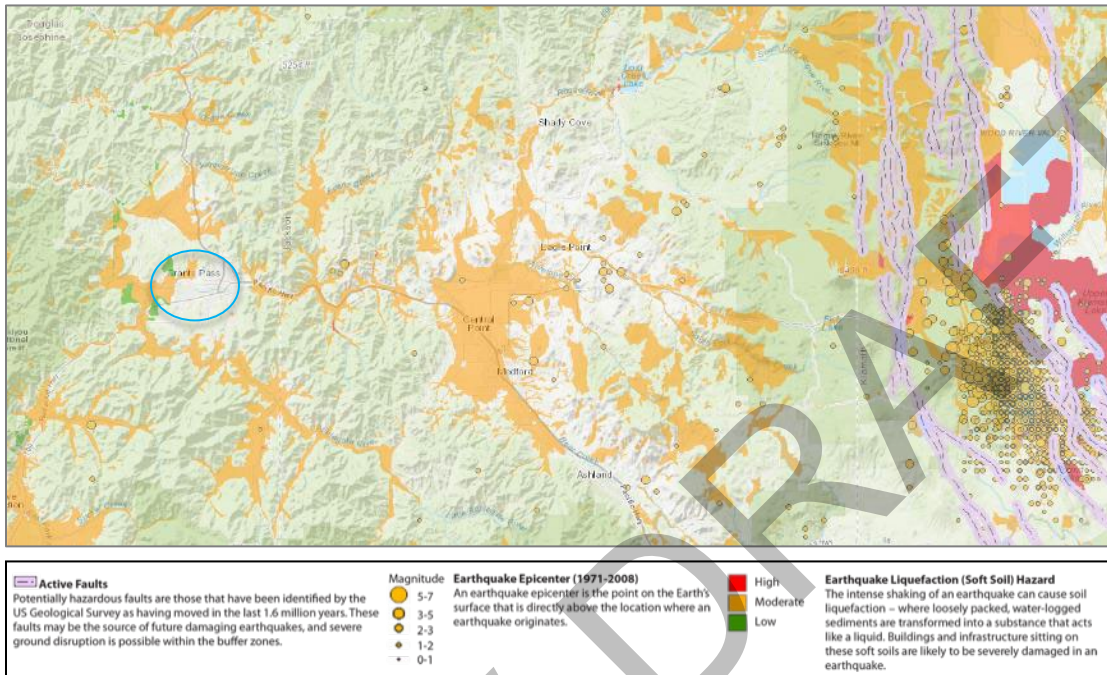
Figure GPA-9 shows the areas for potential regional active faults, earthquake history (1971-2008), and soft soils (liquefaction) hazard for the city. Grants Pass (**blue oval**) is not in any

⁷ Oregon Department of Land Conservation and Development, *Oregon State Natural Hazard Mitigation Plan*. 2020.

⁸ Ibid.

known danger regarding soil liquefaction (orange areas), nor does it have any active fault lines in its immediate vicinity (areas of concern lie in Klamath County to the east).

Figure GPA-9 Active Crustal Faults, Epicenters (1971-2008), and Soft Soils



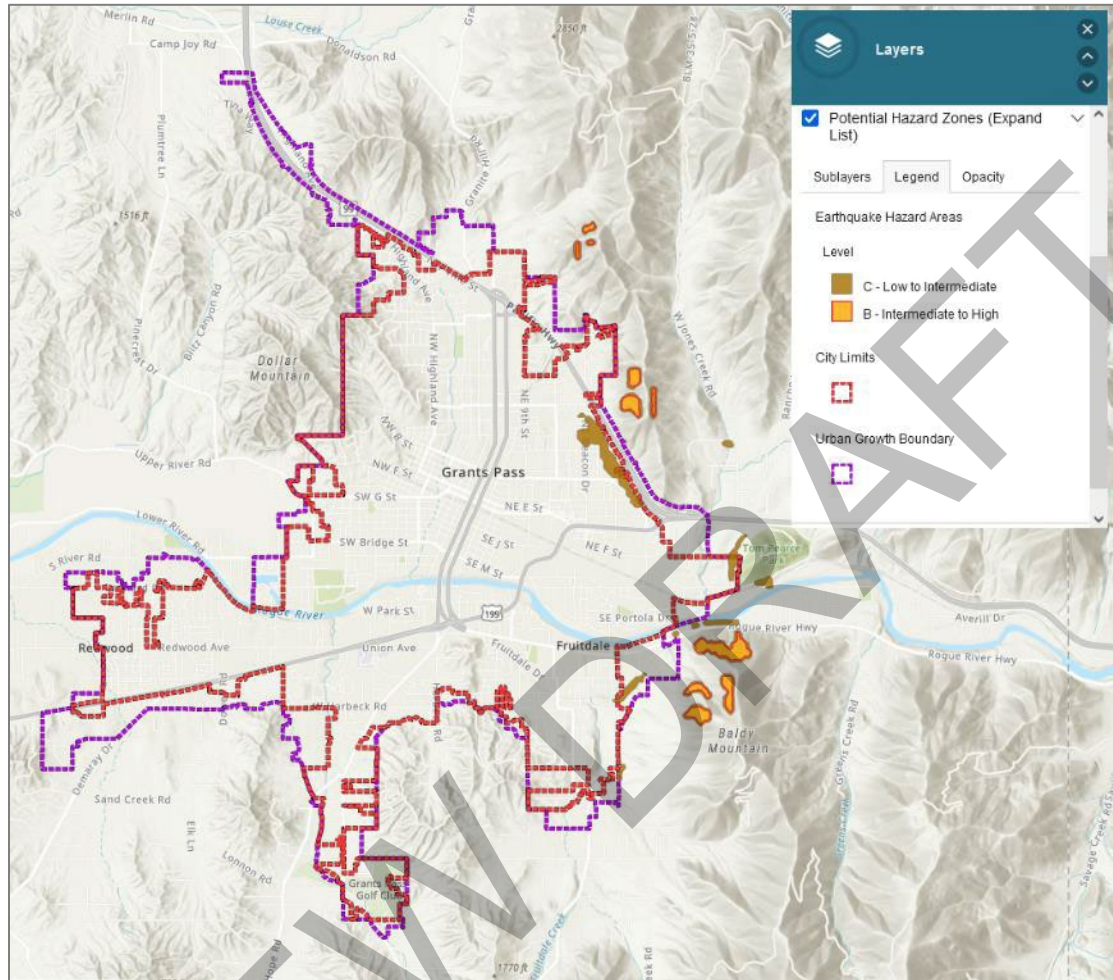
Source: Oregon [HazVu: Statewide Geohazards Viewer \(DOGAMI\)](#)

Note: To view detail click the link above to access Oregon HazVu

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a in depth quantitative risk assessment, or exposure analysis, for this hazard. The extent of the damage to structures and injury and death to people will depend upon the type of earthquake, proximity to the epicenter and the magnitude and duration of the event. The city's infrastructure, particularly the older buildings in Grants Pass, are highly vulnerable to a severe earthquake event (Figure GPA-10). The city would expect significant damage to roads and bridges following a Cascadia Subduction Zone event, as well as deaths and severe injuries region wide. In addition, the city's supply of food and fuel will be limited due to several factors following an earthquake including loss of utility infrastructure (electricity, natural gas), transportation lifelines (roads and bridges may not be passable), and availability of fuel (Oregon's liquid fuel depot in NW Portland is highly susceptible to liquefaction). Education and outreach regarding earthquakes is an ongoing endeavor in Grants Pass. In addition to building damages, utility (electric power, water, wastewater, natural gas) and transportation systems (bridges, pipelines) are also likely to experience significant damage. There is a low probability that a major earthquake will result in failure of upstream dams.

Figure GPA-10 Earthquake Hazard Areas



Source: [City of Grants Pass GIS](#)

2007 Rapid Visual Survey

Oregon implemented building codes in the 1970s, however, stricter standards did not take effect until 1991 and early 2000s. As noted in the community characteristics section (Table GPA-4), approximately 64% of Grants Pass’s residential buildings were built prior to 1990, which increases the City’s vulnerability to the earthquake hazard. Information on specific public buildings’ (schools and public safety) estimated seismic resistance, determined by DOGAMI in 2007, is shown in Table GPA-5. Of the facilities evaluated by DOGAMI using its Rapid Visual Survey (RVS) that have not been retrofitted, one (1) building has a very high (100% chance) collapse potential, and one (1) building has a high (greater than 10% chance) collapse potential. To fully assess a buildings potential for collapse, a more detailed engineering study completed by a qualified professional is although the RVS can help prioritize buildings to survey.

In addition, both Josephine County and the City of Grants Pass note that the County Courthouse (Justice Building) is likely to collapse during a seismic event. Per a 2017 ge-engineer assessment it was determined that most services of this building be relocated to less vulnerable locations. The historic and culturally important structure will remain. Future seismic assessments will determine retrofit options.

Table GPA-7 Rapid Visual Survey Scores (2007)

Facility	Site ID*	Level of Collapse Potential			
		Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Schools					
Allen Dave Elementary (2320 Williams Hwy)	Jose_sch20	X	X		
Fruitdale Elementary (1560 Bill Baker Way)	Jose_sch09	X			
Highland Elementary (1845 NW Highland Ave)	Jose_sch21		X		
Grants Pass High (830 NE 9th St)	Jose_sch06	X			
Lincoln Elementary (1132 NE 10th St)	Jose_sch01			X	
<i>North Middle</i> (1725 NW Highland)	<i>Jose_sch02</i>	X	XX		
Parkside Elementary (735 SW Wagner Meadows Dr)	Jose_sch18	X			
Redwood Elementary (3163 Leonard Rd)	Jose_sch03		X		
<i>Riverside Elementary</i> (1200 SE Harvey Dr)	<i>Jose_sch04</i>	X		X	
<i>South Middle</i> (350 W Harbeck Rd)	<i>Jose_sch05</i>			X	
Rogue CC - Firehouse Art Ctr/Small Business Ctr (214 SW Fourth St)	Jose_coc04				X
Public Safety					
Rural/Metro Fire Department (2375 Foothill Blvd)	Jose_fir06	X			
Rural/Metro Fire Department (807 NE 6th St)	Jose_fir20		X		
<i>Grants Pass Fire and Rescue - Hillcrest</i> (199 NW Hillcrest Dr)	<i>Jose_fir23</i>			X	
Josephine Co Sheriff/Grants Pass Police (500 NW 6th St)	Jose_pol01				
Hospitals					
Three Rivers Community Hospital (500 Ramsey Ave)	Jose_hos01	X			

Source: [DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment](#). Notes: "*" – Site ID is referenced on the [RVS Josephine County Map](#); *Light grey italicized text* indicates a facility that has benefited from seismic mitigation (see success stories for detail). DOGAMI, Open-File Report 0-20-11, Josephine County Natural Hazard Risk Report (2020).

The buildings listed below were not included in the RVS study:

- **Gladiola High School:** 1137 SE Gladiola Dr
- **Grants Pass SD 7 (Office):** 725 NE Dean Dr
- **New Bridge High:** 2001 NE F St (Rogue Valley Youth Correctional Facility)
- **Brighton Academy (Private):** 1121 NE 7th St

- **St Anne Catholic School (Private):** 1131 NE 10th St
- **Grants Pass Seventh Day Adventist (Private):** 2250 NW Heidi Ln
- **Inn Sight Alternative Education (Private):** 618 J St
- **Rogue Valley Christian (Private):** 1515 Redwood Ave

Mitigation Successes

Seismic retrofits have occurred to the following facilities through local funds (construction bonds, etc.) and/or grant awards per the [Seismic Rehabilitation Grant Program](#)⁹.

- **Hillcrest Public Safety Building:** \$477,024 (2010-11 SRGP)
- **Grants Pass School District –Highland Elementary:** \$1,499,065 (2015-17 P2, SRGP)
- **Grants Pass School District –Allen Dale Elementary:** \$1,497,255 (2015-17 P2, SRGP)
- **Grants Pass School District – Riverside Elementary:** \$1,499,800 (2015-17 P1 SRGP)
- **Grants Pass School District – South Middle School:** \$1,499,900 (2015-17 P1 SRGP)
- **Grants Pass School District – North Middle School:** \$2,364,855 (2019 SRGP P2)

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Flood

The steering committee determined that the city’s probability for riverine flood is **high**, meaning at least one incident is likely within the next 35-year period and that its vulnerability to riverine flood is **moderate**, meaning that between 1% and 10% of the City’s population or property could be affected by a major coastal or riverine flood event. *These ratings have not changed since the previous plan.*

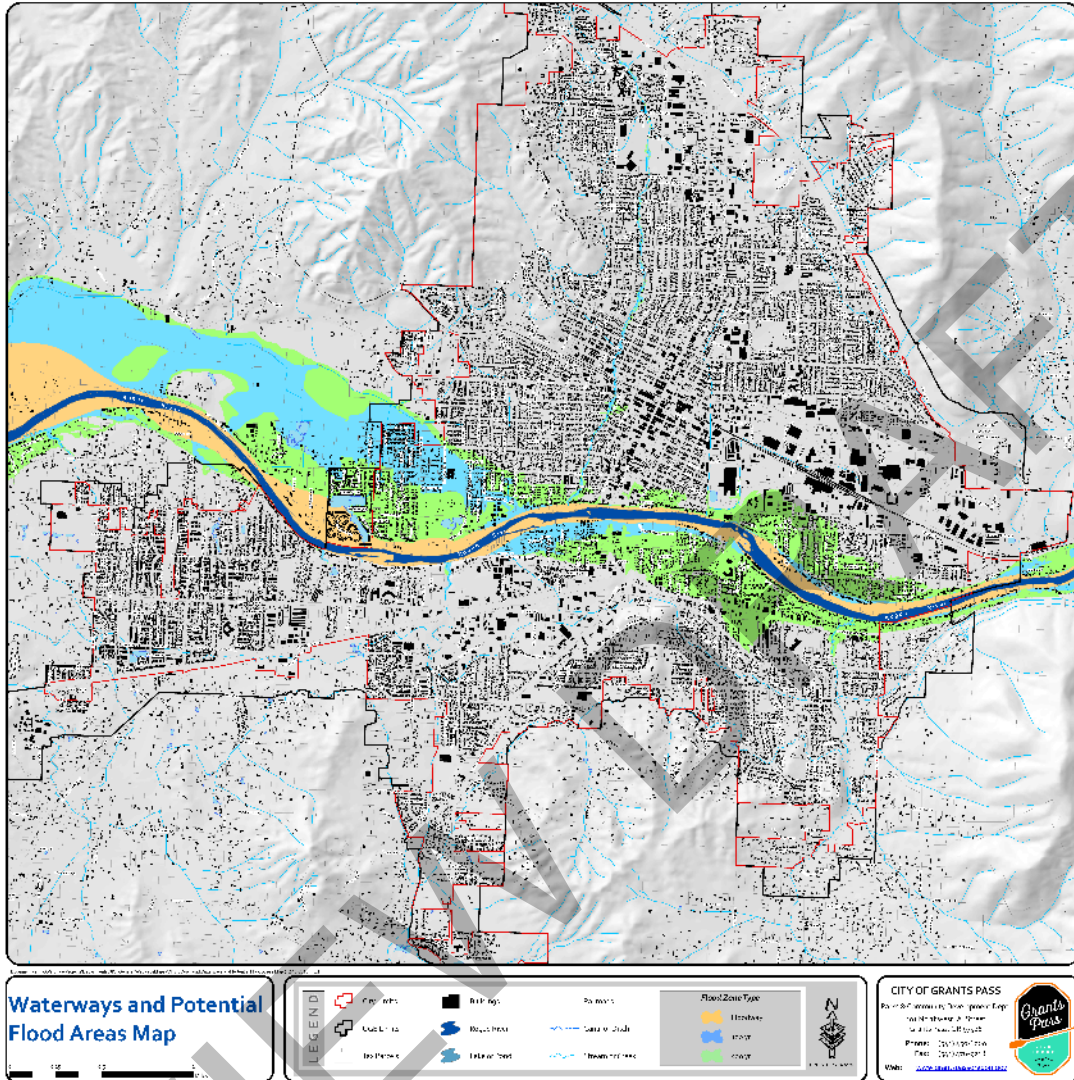
Josephine County’s NHMP Volume I, Section 2, adequately describes the causes and characteristics of coastal and riverine flood hazards, as well as the history, location, extent, and probability of a potential event. There is no recent history of major flooding in Grants Pass. However, some bank stabilization and erosion issues have been noted near East Park Street. Flooding in January 2016 closed at least one street in Grants Pass.

Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide the most readily available source of information for the extent of the flood hazard. These maps represent a snapshot in time, and do not account for later changes which occurred in the floodplains. FIRMs delineate the floodway, the 100-year (a flood with a one percent probability of occurring within any given year), and the 500-year (a flood with a 0.2-percent probability of occurring within any given year) floodplain boundaries. The 100-year flood is used as the standard for floodplain management in the United States and is referred to as a base flood; also known as the Special Flood Hazard Area (SFHA). The SFHA is the area where the National Flood Insurance Program’s (NFIP’s) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

FEMA has mapped the flood-prone waterways in Grants Pass for 100- and 500-year flood events (Figure GPA-11).

⁹ The Seismic Rehabilitation Grant Program (SRGP) is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public schools and emergency services facilities (police/fire).

Figure GPA-II Special Flood Hazard Area



Source: [City of Grants Pass GIS](https://www.grantspass.gov/gis/)

Future Climate Projection:

According to OCCRI report “*Fifth Oregon Climate Assessment*”¹⁰ the intensity of extreme precipitation is expected to increase as the atmosphere warms. The primary factor for the increase in intensity is because warmer air can hold more moisture that is available to fall as rain or snow in a warmer climate. Secondly, magnitudes are expected to increase since rainfall driven floods tend to have larger flood peaks than snowmelt driven floods. Lastly, precipitation is expected to increase. Greater precipitation implies a higher likelihood of wetter soil and reduced depth to groundwater, which enables flooding. An increase in atmospheric river events is also expected.

¹⁰ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. A floodplain vulnerability assessment combines the floodplain boundary, generated through hazard identification, with an inventory of the property within the floodplain. Understanding the population and property exposed to natural hazards will assist in reducing risk and preventing loss from future events.

The mapped 100- and 500-year flood zones are concentrated in the center of the city adjacent to the Rogue River (Figure GPA-11). According to the City, approximately nine percent (9%) of the land within Grants Pass is located within the SFHA. Grants Pass participates in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities.

Grants Pass experiences greater vulnerability than the County overall due to the location of several key pieces of infrastructure in the floodway and floodplain. The Water Filtration plant's intake structure lies in the floodway. Relatedly, the increasing turbidity of the river has stressed the water intake system. Turbidity, and the presences of general debris in the river, can be exacerbated by flood.

Additionally, because the City is bisected by the river, connectivity of the community is vulnerable to floods that might damage the main transportation routes. There is only one hospital and one predetermined Emergency Operations Facility and significant riverine or urban flooding can restrict access to those critical facilities.

The city maintains a flood zone map which shows areas that are prone to flooding and their corresponding designations. In addition, regulations governing development and construction of structures in the floodplain are in Article 13 Section 13.200 of the City of Grants Pass Development Code.

National Flood Insurance Program (NFIP)

FEMA's Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs) are effective as of December 3, 2009. Table GPA-6 shows that as of January 2022, the City has 238 National Flood Insurance Program (NFIP) policies in force, representing just under \$62 million in coverage. Of those, 81 are for structures that were constructed before the initial FIRMs. The City's last Community Assistance Visit (CAV) from FEMA was on May 15, 2019. The table shows that most flood insurance policies are for residential structures (97%), primarily single-family homes. Flood insurance covers only the improved land, or the actual building structure. There have been a total of 21 paid claims totaling \$102,477 (most of the claims were for pre-FIRM structures).

The City complies with the NFIP through enforcement of their flood damage prevention ordinance and their floodplain management program.

The NFIP's Community Rating System (CRS) recognizes jurisdictions for participating in floodplain management practices that exceed NFIP minimum requirements. The City participates in the CRS with a current Class Rating of 8 and, therefore, property owners receive discounted flood insurance premiums.

The Community Repetitive Loss record for the City identifies one (1) Repetitive Loss Property¹¹ and no Severe Repetitive Loss Properties¹². The repetitive loss property is located south of the Rogue River, north of Highway 199, and west of Riverside Park.

Table GPA-8 Flood Insurance Detail

	Josephine County	Grants Pass
Effective FIRM and FIS	12/3/2009	12/3/2009
Initial FIRM Date	6/1/1982	4/15/1981
Total Policies	558	238
Pre-FIRM Policies	228	81
Policies by Building Type		
Single Family	521	224
2 to 4 Family	7	6
Other Residential	6	1
Non-Residential	22	6
Minus Rated A Zone	71	36
Insurance in Force	\$142,389,400	\$61,869,400
Total Paid Claims	85	21
Pre-FIRM Claims Paid	53	16
Substantial Damage Claims	3	1
Total Paid Amount	\$589,774	\$102,447
Repetitive Loss Structures	9	1
Severe Repetitive Loss Properties	0	0
CRS Class Rating	-	8
Last Community Assistance Visit	-	5/15/2019

Source: Department of Land Conservation and Development, January 2022.

NA = Not Applicable, NP = Not Participating.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

¹¹ A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

¹² A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP, and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000, and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Landslide

The steering committee determined that the city's probability for landslide is **moderate**, meaning at least one incident may occur within 35 to 75 years, and that its vulnerability to landslide is **low**, meaning that less than 1% of the City's population or property could be affected by a major landslide event. *These ratings have not changed since the previous NHMP.*

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of landslide hazards, as well as the history, location, extent, and probability of a potential event. There has been one landslide off Hilltop Drive caused by heavy rain/melting snow and improperly placed fills ca. 1950.

The severity or extent of landslides is typically a function of geology and the landslide triggering mechanism. Rainfall initiated landslides tend to be smaller and earthquake induced landslides may be very large. Even small slides can cause property damage, result in injuries, or take lives. Grants Pass steering committee members confirmed that landslides in the city are limited due to soil type and topography.

Landslide susceptibility exposure for Grants Pass is shown in Figure GPA-12. Approximately 7% of the City has very high or high, and 20% moderate, landslide susceptibility exposure.¹³ *Note that even if an area has a high percentage of land in a high or very high landslide exposure susceptibility zone, this does not mean there is a high risk (vulnerability), because risk is the intersection of a hazard and assets.*

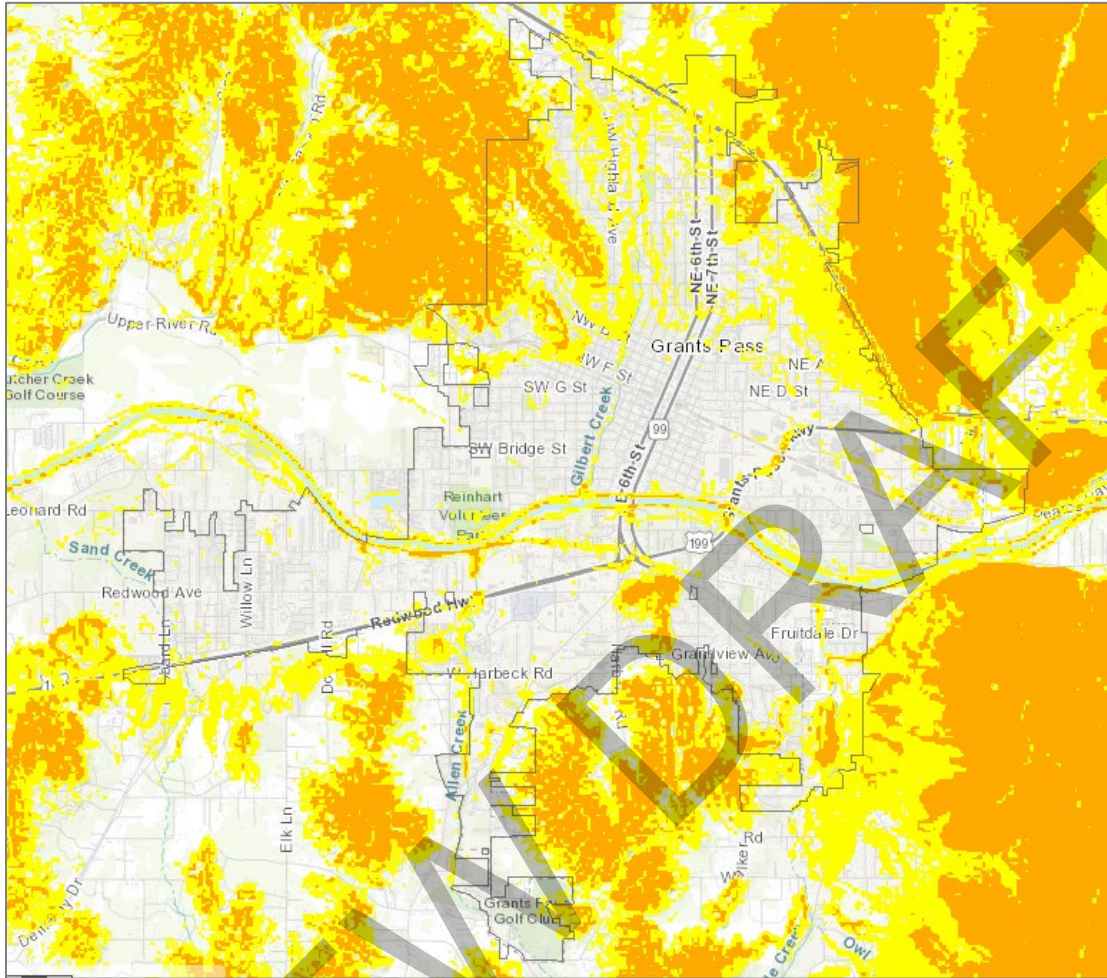
Future Climate Projection:

According to OCCRI report "Fifth Oregon Climate Assessment"¹⁴ the intensity of extreme precipitation is expected to increase as the atmosphere warms. Landslides, triggered by precipitation, are expected to increase with the intensity of extreme precipitation events. Additionally, landslides may increase in wildfire impacted landscapes.

¹³ DOGAMI. [Open-File Report, O-16-02](#), *Landslide Susceptibility Overview Map of Oregon* (2016)

¹⁴ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

Figure GPA-12 Landslide Susceptibility Exposure



Low	Landsliding unlikely. Areas classified as Landslide Density = Low (less than 7%) and areas classified as Slopes Prone to Landsliding = Low.
Moderate	Landsliding possible. Areas classified as Landslide Density = Low to Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = Moderate OR areas classified as Landslide Density = Moderate (7%-17%) and areas classified as Slopes Prone to Landsliding = Low.
High	Landsliding likely. Areas classified as Landslide Density = High (greater than 17%) and areas classified as Slopes Prone to Landsliding = Low and Moderate OR areas classified as Landslide Density = Low and Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = High.
Very High	Existing landslides Landslide Density and Slopes Prone to Landsliding data were not considered in this category. Note: the quality of landslide inventory (existing landslides) mapping varies across the state.

Source: [Oregon Explorer: Map Viewer](#) – To explore and view map detail click hyperlink to left.

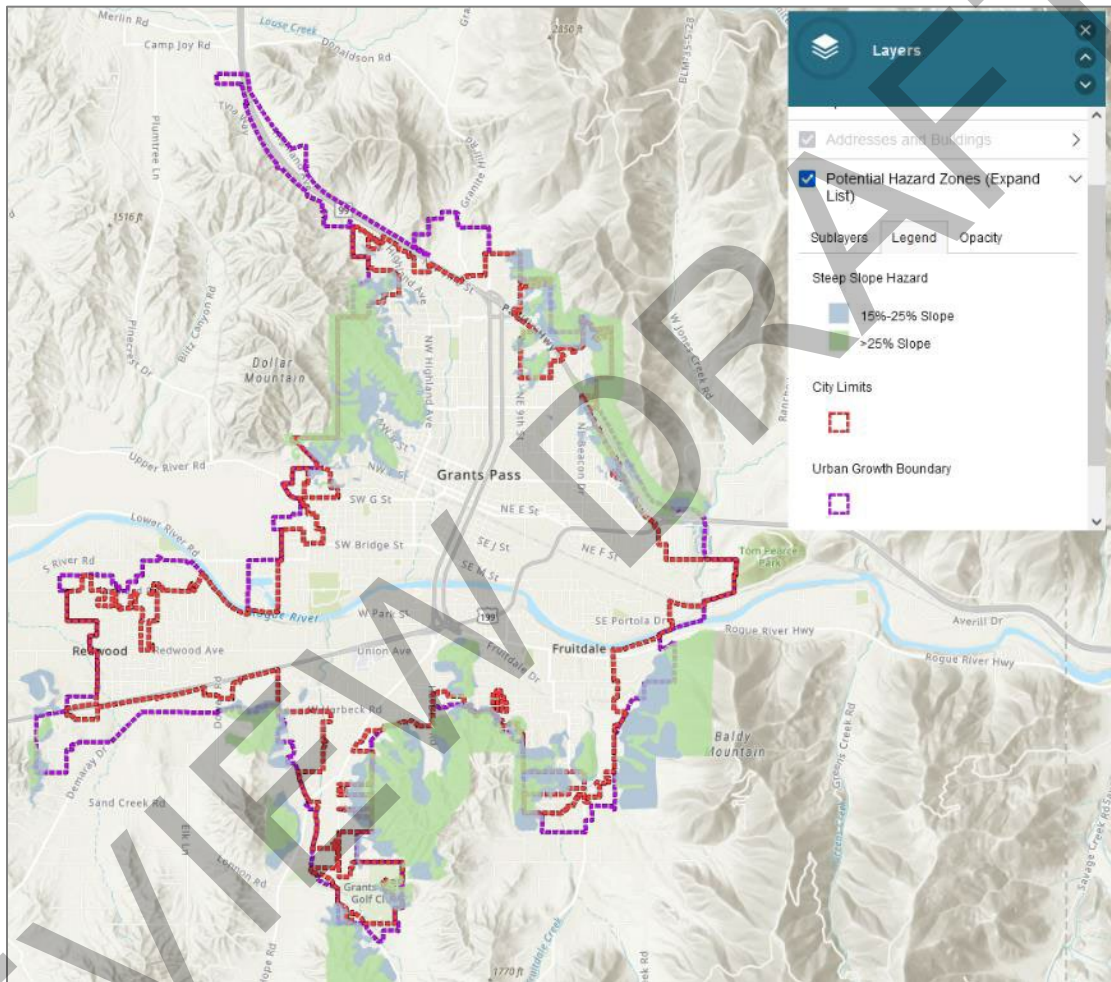
Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Potential landslide-related impacts are adequately described within the county’s plan, and include infrastructure damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. In general, the areas of greater

risk are located adjacent to the city to the north and east (along Interstate-5). There are also areas adjacent to the Rogue River that indicate potential areas of riverine erosion. The City has also identified areas of steep slope hazard (Figure GPA-13).

Rain-induced landslides and debris flows can potentially occur during any winter in Josephine County, and thoroughfares beyond city limits are susceptible to obstruction as well. As such, Grants Pass is vulnerable to isolation for an extended period.

Figure GPA-13 Steep Slope Hazard



Source: [City of Grants Pass GIS](#)

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Severe wind events may occur throughout Oregon during all seasons. Often originating in the Pacific Ocean, westerly winds pummel the coast, slowing as they cross the coastal mountain range and head into the inland valleys. Similarly, severe winter storms consisting of rain, freezing rain, ice, snow, cold temperatures, and wind originate from troughs of low pressure offshore in the Gulf of Alaska or in the central Pacific Ocean that ride along the jet

stream during fall, winter, and early spring months.¹⁵ In summer, the most common wind directions are from the west or northwest; in winter, they are from the south and east. Local topography, however, plays a major role in wind direction.

Future Climate Projections

According to OCCRI report “*Fifth Oregon Climate Assessment*”¹⁶ projected climate variations are expected to increase the frequency and intensity of some weather incidents. Oregon and the Pacific Northwest experience a variety of extreme weather incidents ranging from severe winter storms and floods to drought and dust storms, often resulting in morbidity and mortality among people living in the impacted regions. Hot summer days are expected to increase and overnight lows will continue to be warmer. Additionally, the frequency, intensity, and duration of extreme heat events is also expected to increase.

These variations pose risks for increased injuries, illnesses, and deaths from both direct and indirect effects. Incidents of extreme weather (such as floods, droughts, severe storms, heat waves and fires) can directly affect human health as well as cause serious environmental and economic impacts. Indirect impacts can occur when climate change alters or disrupts natural systems.

Extreme Heat Event

The steering committee determined that the city’s probability for an extreme heat event is **high**, meaning at least one severe incident is likely within the next 35-year period, and that its vulnerability to extreme heat is **moderate**, meaning that between 1% and 10% of the city’s population or property could be affected by an extreme heat event. *These ratings have not changed since the previous plan.*

Josephine County’s NHMP Volume I, Section 2, adequately describes the causes and characteristics of extreme heat, as well as the history, location, extent, and probability of a potential event. Generally, an event that affects the County is likely to affect the City as well. A severe heat episode or “heat wave” occurs about every two to three years, and typically lasting two to three days but can last as many as five days. A severe heat episode can be defined as consecutive days of upper 90s to around 100. Severe heat hazard in Southern Oregon can be described as the average number of days with temperatures greater than or equal to 90-degrees Fahrenheit¹⁷. On average Grants Pass experiences 54.7 days with temperatures above 90-degrees Fahrenheit.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Extreme heat events can and have occurred in the Grants Pass area, and while they typically do not cause loss of life; they are becoming more frequent and have the potential to impact economic activity as well as quality of life.

¹⁵ DLCD. *Oregon State Natural Hazard Mitigation Plan*. 2020.

¹⁶ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

¹⁷ DLCD. *Oregon State Natural Hazard Mitigation Plan*. 2020.

The City of Grants Pass has not experienced any life-threatening consequences from the few historical extreme heat events, although changes in climate indicate that the area should expect to see more extreme heat events.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Windstorm

The steering committee determined that the city's probability for windstorm is **high** meaning at least one severe incident may occur within the next 35-year period, and that its vulnerability to windstorm is **moderate**, meaning that between 1% and 10% of the City's population or property could be affected by a major windstorm event. *The windstorm ratings have not changed since the previous NHMP.*

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of windstorm hazards, as well as the history, location, extent, and probability of a potential event.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. In Grants Pass, power outages are the greatest concern during windstorms. Building codes require new developments to place power lines below ground; currently. Without power, communication is lost, and fuel and food stores shut down.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Winter Storm (Snow/ Ice)

The steering committee determined that the city's probability for winter storm is **high**, meaning at least one severe incident may occur within the next 35-year period, and that its vulnerability to winter storm is **high**, meaning that more than 10% of the city's population or property could be affected by a major winter storm event. *These ratings have not changed since the previous NHMP.*

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of winter storm hazards, as well as the history, location, extent, and probability of a potential event. Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the city typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from October through March.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Major winter storms can and have occurred in the Grants Pass area, and while they typically do not cause significant damage; they are frequent and have the potential to impact economic activity. Road closures on Interstate-5, or Highway 199, due to winter weather are an uncommon

occurrence, but can interrupt commuter and large truck traffic. Power outages are a concern during winter storms (snow/ice can impact electric utilities with the accumulation of snow and ice on power lines and trees that may then disrupt service). Building codes require new developments to place power lines below ground; currently. Without power, communication is lost, and fuel and food stores shut down.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcanic Event

The steering committee determined that the city's probability for volcanic event is **low**, meaning one incident may occur within the next 75 to 100-year period, and that its vulnerability to volcanic event is **low**, meaning that less than 1% of the city's population or property would be affected by a major volcanic event (ash). *These ratings have not changed since the previous NHMP.*

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of volcanic event hazards, as well as the history, location, extent, and probability of a potential event. Generally, an event that affects the county is likely to affect Grants Pass as well.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Grants Pass is unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city received small amounts of ashfall, but not enough to cause significant health and/or economic damages. The Oregon State NHMP 2020 plan states that Josephine County is extremely unlikely to be affected by volcanic activity.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

The steering committee determined that the city's probability for wildfire is **high**, meaning one incident may occur within the next 35-year period, and that its vulnerability to wildfire is **high**, meaning that more than 10% of the City's population or property could be affected by a major wildfire event. *The vulnerability rating increased since the previous NHMP.*

The [Rogue Valley Integrated Community Wildfire Protection Plan](#) (RVICWPP) was completed in 2017 and revised in 2019. The RVICWPP is hereby incorporated into this NHMP addendum by reference, and it will serve to supplement the wildfire section in this addendum. The following presents a summary of key information (and includes content from the Oregon Wildfire Risk Explorer); refer to the full RVICWPP for a complete description and evaluation of the wildfire hazard.

Josephine County's NHMP Volume I, Section 2, adequately describes the causes and characteristics of wildfire hazards, as well as the history, location, extent, and probability of a potential event. The location and extent of a wildfire vary depending on fuel, topography, and weather conditions. Wildfires within the last five years have been particularly devastating in Josephine County, but these wildfires have mostly been in unincorporated

areas of the county. Recent large wildfires near Grants Pass include the Interstate 5 MP 54 wildfire in 2018 (about 46 acres) and the Beacon Hill Wildfire in 2013 (about 124 acres).

Future Climate Projection:

According to OCCRI report “*Fifth Oregon Climate Assessment*”¹⁸ wildfire risk is expected to increase as the frequency of higher fire danger days per year increases under the higher emissions scenario compared with the historical baseline.

Vulnerability Assessment

Due to insufficient data and resources, Grants Pass is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Overall, the city, and its watershed, has low to moderate overall wildfire risk, however, the forested areas have the potential for large wildfires and a wildfire within the watershed could impact the city’s water supply and quality. Grants Pass experiences greater vulnerability to wildfire than the County overall due to the larger population that would be affected. *NOTE: The Oregon Department of Forestry is currently updating the Oregon Wildfire Risk Assessment per SB 762, which should be completed in late 2022. Changes to the risk assessment may be incorporated into the plan during the implementation and maintenance phase.*

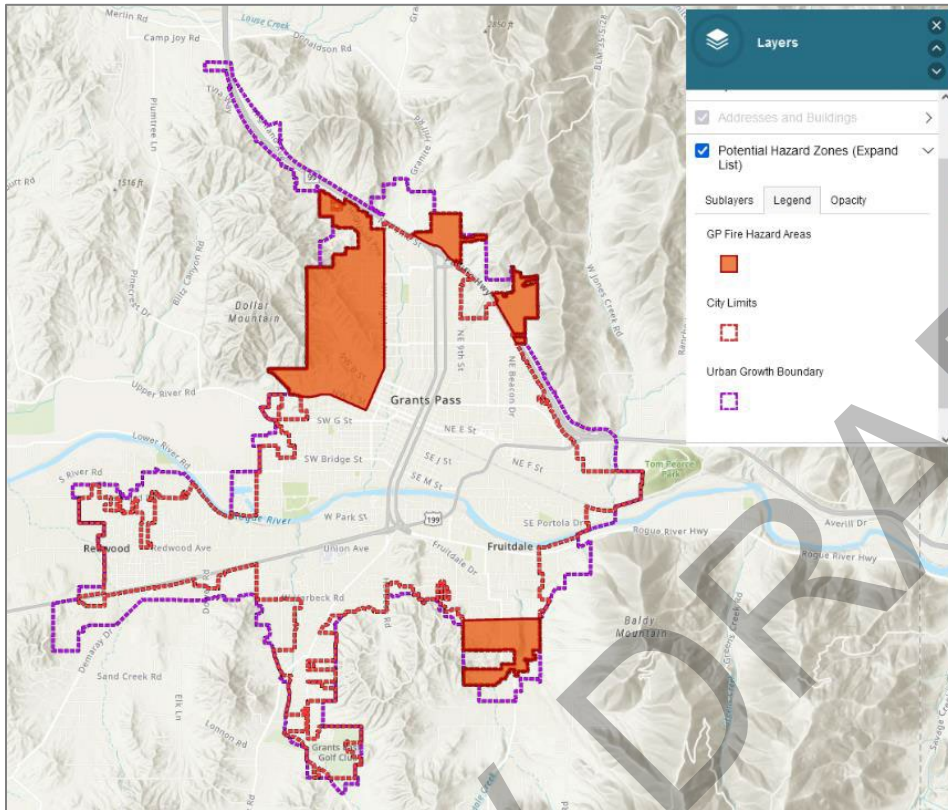
Property can be damaged or destroyed with one fire as structures, vegetation, and other flammables easily merge to become unpredictable, and hard to manage. Other factors that affect ability to effectively respond to a wildfire include access to the location, and to water, response time from the fire station, availability of personnel, and equipment, and weather (e.g., heat, low humidity, high winds, and drought). Grants Pass includes four Firewise USA Communities: Cathedral Hills Estates, Crescent and B Street, Forest Hills, Starlite Place, and Woodson Drive. The City of Grants Pass has conducted wildfire risk mapping and identified wildfire hazard areas (Figure GPA-14). Notably, the City has developed [several ordinances](#) to address the increased fire vulnerability. Ordinances exist that include: grass lot, fireworks, open burnings, and regulated closures. Newer development in the NW B Street subdivision is located within a significant wildfire hazard zone (box canyon).

As shown in Figure GPA-15 the developed parts of the city has lower wildfire risk than the areas on the edge of the city that have high to very high, overall wildfire risk. Areas of concern include the southern side of the city (where forestland borders development), and some of the open spaces within the city’s limits along the river. Due to the prevailing wind patterns (i.e., from the north or south), the city’s steering committee felt that the east and south ends of the city might be the most vulnerable. Power, natural gas, and phone lines run through the forest to the east of the city and would be affected in the event of a wildfire. Likewise, active commercial logging occurs just outside the city, and slash burns are a potential wildfire concern.

See the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

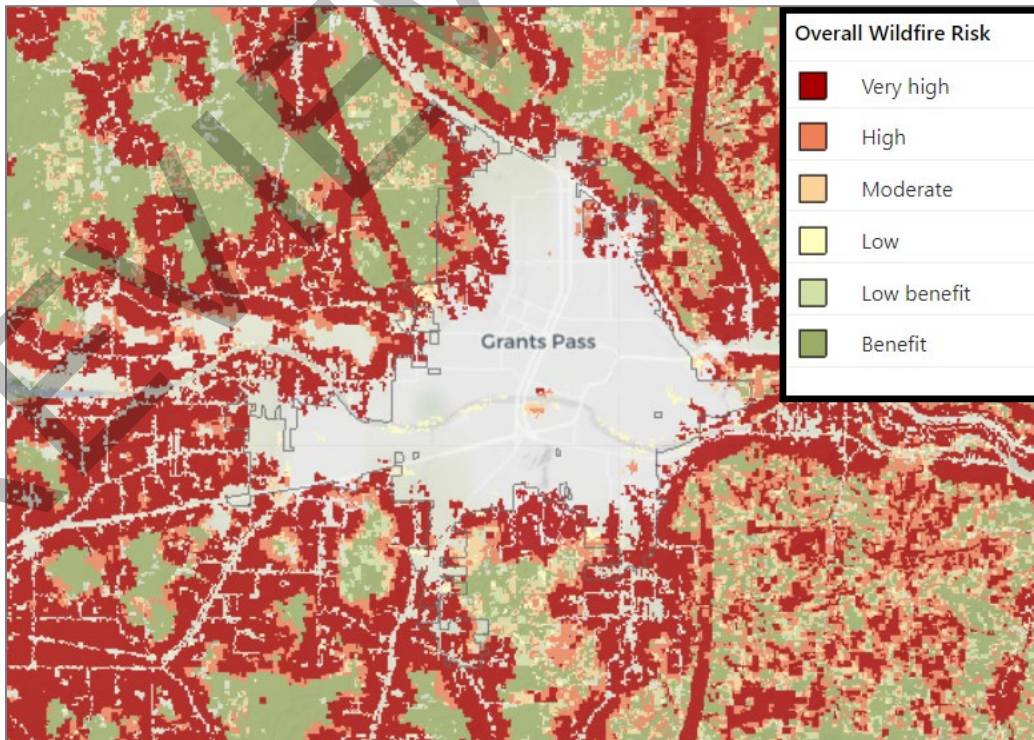
¹⁸ Oregon Climate Change Research Institute, *Fifth Oregon Climate Assessment*. 2021.

Figure GPA-14 Grants Pass Wildfire Hazard Zone



Source: [City of Grants Pass GIS](#) Detailed Map of [North Grants Pass](#) and [South Grants Pass](#)

Figure GPA-15 Overall Wildfire Risk



Source: [Oregon Explorer: Map Viewer](#) – To explore and view map detail click hyperlink to left.

REVIEW DRAFT

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ATTACHMENT A: ACTION ITEM FORMS

Table GPA-1 provides a summary list of actions for the city. Each high priority action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

DESCRIPTION/RATIONALE FOR PROPOSED ACTION ITEM

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from several sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in this addendum and within Volume I, Section 2. The worksheet provides information on the activities that have occurred since the previous plan for each action item.

LEAD (COORDINATING) ENTITY:

The lead entity is the entity with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation.

PARTNERS (INTERNAL AND EXTERNAL):

The partner entities listed in the action item are potential partners recommended by the steering committee but not necessarily contacted during the development of the plan. The coordinating entity should contact the identified partner entities to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action item.

TIMELINE:

All broad scale action items have been determined to be ongoing, as opposed to short (1 to 2 years), medium (3-5 years), or long (more than 5 years). This is because the action items are broad ideas, and although actions may be implemented to address the broad ideas, the efforts should be ongoing.

POTENTIAL FUNDING SOURCE

Where possible potential funding sources have been identified. Example funding sources may include Federal Hazard Mitigation Assistance programs, state funding sources such as the Oregon Seismic Rehabilitation Grant Program, or local funding sources such as capital improvement or general funds. An action item may include several potential funding sources.

ESTIMATED COST

A rough estimate of the cost for implementing each action item is included. Costs are shown in general categories showing low, medium, or high cost. The estimated cost for each category is outlined below:

Low - Less than \$50,000

Medium - \$50,000 – \$100,000

High - More than \$100,000

HIGH PRIORITY ACTIONS

The steering committee will focus their attention and resource availability over the next five-years on high priority actions that are considered achievable, high leverage activities. Although this provides a guide for the steering committee in terms of implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not currently listed as the highest priority.

Each high priority action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The rest of this appendix includes the high priority action item worksheets.

Grants Pass Multi-Hazard Action Item 1.1		<input checked="" type="checkbox"/> High Priority Action	
<input checked="" type="checkbox"/> Drought	<input checked="" type="checkbox"/> Flood	<input checked="" type="checkbox"/> Volcanic Event	<input checked="" type="checkbox"/> Extreme Heat
<input checked="" type="checkbox"/> Earthquake	<input checked="" type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire	<input checked="" type="checkbox"/> Windstorm
<input checked="" type="checkbox"/> Winter Storm			
Description	Continue to improve and sustain City-wide public information and education programs about potential hazards in the county, the need for personal preparedness, and mitigation actions possible.		
Benefits	Increased resilience and confidence at the local level, whenever disasters arise. Improved recovery rates and recovery experiences post-disaster because of personal mitigation and preparedness.		
Lead	Emergency Management		
Partners	Josephine County Emergency Management		
Potential Funding Source	Local government funding resources, private investment, non-profit fundraisers, grants (SHSP, EMPG)		
Estimated Cost		Timing	
<input checked="" type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input checked="" type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)
<input type="checkbox"/> High (\$100,000 or more)		<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)

Grants Pass Earthquake Action Item 3.1		<input checked="" type="checkbox"/> High Priority Action
<input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Volcanic Event <input type="checkbox"/> Extreme Heat <input type="checkbox"/> Windstorm <input checked="" type="checkbox"/> Earthquake <input type="checkbox"/> Landslide <input type="checkbox"/> Wildfire <input type="checkbox"/> Winter Storm		
Description	Complete structural and non-structural retrofit projects on the following critical facilities: City Hall, Department of Public Safety, and City Yard.	
Benefits	Mitigate immediate physical impacts of an earthquake event to reduce loss of life or numbers of significant injuries through identification and trained use of safety zones within a building (when evacuation is not possible or is riskier than a shelter in place option). Mitigate immediate event impacts to local and visiting public to vulnerable historic buildings by doing outreach and education to those building owners on options before and during a local earthquake event.	
Lead	Community Development, Public Works	
Partners	City and County Facilities, USGS DOGAMI, State Office of Emergency Management	
Potential Funding Source	Local funding resources, grants (HMGP, SHSP)	
Estimated Cost		Timing
<input type="checkbox"/> Low (Less than \$50,000) <input type="checkbox"/> Medium (\$50,000 to \$100,000) <input checked="" type="checkbox"/> High (\$100,000 or more)		<input type="checkbox"/> Ongoing <input type="checkbox"/> Medium Term (3 to 5 years) <input type="checkbox"/> Short Term (0 to 2 years) <input checked="" type="checkbox"/> Long Term (More than 5 years)

Grants Pass Earthquake Action Item 3.2		<input checked="" type="checkbox"/> High Priority Action
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event
<input checked="" type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire
<input type="checkbox"/> Extreme Heat	<input type="checkbox"/> Windstorm	<input type="checkbox"/> Winter Storm
Description	Complete structural and non-structural retrofit projects on the water reservoirs and pump stations.	
Benefits	Mitigate immediate physical impacts of an earthquake event to reduce loss of life and loss of service.	
Lead	Public Works	
Partners	Community Development, City and County Facilities, USGS DOGAMI, State Office of Emergency Management	
Potential Funding Source	Local funding resources, grants (HMGP, SHSP)	
Estimated Cost		Timing
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input checked="" type="checkbox"/> Long Term (More than 5 years)
<input checked="" type="checkbox"/> High (\$100,000 or more)		

Grants Pass Wildfire Action Item 7.4		<input checked="" type="checkbox"/> High Priority Action
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input checked="" type="checkbox"/> Wildfire
<input type="checkbox"/> Extreme Heat	<input type="checkbox"/> Windstorm	<input type="checkbox"/> Winter Storm
Description	Reduce the risk of wildfire around the developed areas on/around Dollar Mountain.	
Benefits	This action reduces wildfire risk to residents, the environment, and enhances quality of life within Grants Pass.	
Lead	Grants Pass Public Safety - Fire; Firewise Coordinator	
Partners	Josephine County Emergency Management, OR Department of Forestry, local fire districts	
Potential Funding Source	Title III funds, ODF, HMA (BRIC, HMGP)	
Estimated Cost		Timing
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input checked="" type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)
<input checked="" type="checkbox"/> High (\$100,000 or more)		

ATTACHMENT B: PUBLIC INVOLVEMENT SUMMARY

Members of the steering committee provided edits and updates to the NHMP prior to the public review period as reflected in the final document.

To provide the public information regarding the draft NHMP addendum, and provide an opportunity for comment, an announcement (see text below) was announced on the county's website and reference on the city's social media and feedback form was provided for public comment.

Section to be updated. Public comments are pending.

REVIEW DRAFT

Grants Pass Steering Committee

Steering Committee members possessed familiarity with the Grants Pass community and how it's affected by natural hazard events. The Steering Committee guided the update process through several steps including goal confirmation and prioritization, action item review and development and information sharing to update the NHMP and to make the NHMP as comprehensive as possible. The Steering Committee met formally on the following date:

Meeting #1: Grants Pass Steering Committee, March 3, 2022 (via Zoom)

During this meeting, the Steering Committee reviewed the previous NHMP, and were provided updates on hazard mitigation planning, the NHMP update process, and project timeline. The Steering Committee provided updates on:

- history of hazard events in the city
- reviewed and confirmed the County NHMP's mission and goals
- discussed the NHMP public outreach strategy
- reviewed and provided feedback on the draft risk assessment update including community vulnerabilities and hazard information
- reviewed and updated their existing mitigation strategy (actions)
- reviewed and updated their implementation and maintenance program

Meeting Attendees:

- Convener, Jason Canady, Public Works Director
- Randy DeLonge, Fire Rescue, Deputy Chief
- Wade Elliott, Public Works, Assistant Director
- Rick McClintock, Fire Rescue, Firewise Coordinator
- Donna Rupp, Community Development, Associate Planner



UNIVERSITY OF
OREGON



AGENDA

Meeting: Josephine County NHMP Update: Grants Pass Meeting

Date: March 3, 2022

Time: 8:30am – 9:45am

Location: Zoom:

<https://uoregon.zoom.us/j/99991914739?pwd=dnJ2ZU5UMU9VV1RtOVA5azZCUXBPOT09>

- I. Welcome and Background**
 - a. Introductions
 - b. Project context
- II. Natural Hazard Mitigation Planning**
 - a. Emergency Management Overview
 - b. Natural Hazard Mitigation Plans (NHMP) Overview
- III. NHMP Overview and Review**
 - a. Risk Assessment
 - b. Mitigation Strategies (Actions) – [Link to Worksheet](#) (go to “Actions” tab)
 - c. Implementation and Maintenance
 - d. Public Outreach
- IV. Wrap Up and Next Steps**

ATTACHMENT C: ACTION ITEM FORM TEMPLATE

Grants Pass Action Item		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire	<input type="checkbox"/> Windstorm
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Winter Storm
Description			
Benefits			
Lead			
Partners			
Potential Funding Source			
Estimated Cost	Timing		
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)	
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)	
<input type="checkbox"/> High (\$100,000 or more)			

REVIEW DRAFT

REVIEW DRAFT

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ATTACHMENT D: CRITICAL FACILITIES AND LOSS ESTIMATION

Table GPA-9 Critical Facilities, Community Lifelines, and Loss Estimation

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Asante Physician Partners	520 SW Ramsey Ave, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Bear Valley Medical Clinic	1833 SW Nebraska Ave, Grants Pass													
Boys and Girls Club Grants Pass	203 SE 9th St, Grants Pass		X								500-Year	High		
Brighton Academy	1121 NE 7th St, Grants Pass		X						1900	Not in Soft Soil Hazard	Not in SFHA	Moderate	Not in Lahar Zone	Low
Bureau of Land Management - Grants Pass Interagency Office	2164 NE Spalding Ave, Grants Pass	X							1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Cardiology Consultants	520 SW Ramsey Ave, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Cascade West Primary Care Clinic	201 NE Savage St, Grants Pass													
City Hall, Grants Pass Admin, Police	101 NW A, Grants Pass					X						High		
Community of Christ Church	2033 Harbeck Rd, Grants Pass													
Courthouse with SOCOMM and County Admin	500 NW 6th Street, Grants Pass					X						High		
DaVita Grants Pass li Dialysis	1055 Redwood Ave, Grants Pass			X								Moderate		
DaVita Redwood Dialysis	201 SW L St, Grants Pass			X								High		
Department of Human Services	726 NE 7th Street, Grants Pass	X	X			X			1992	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Edgewater Grants Pass	101 Assembly Cir, Grants Pass		X									Moderate		
Fruitdale Elementary	1560 Bill Baker Way, Grants Pass		X						2003	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Gladiola High	1137 SE Gladiola Dr, Grants Pass													
GP Water Treatment/Filtration Plant	821 SE M Street, Grants Pass		X						1900	Not in Soft Soil Hazard	500-Year	Moderate	Not in Lahar Zone	Low
Grants Pass Adventist School	2250 NW Heidi Ln, Grants Pass		X						1900	Not in Soft Soil Hazard	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Grants Pass Clinic	495 SW Ramsey Ave, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Grants Pass Family Medicine	1690 NE Lynda Ln, Grants Pass													
Grants Pass Fire & Rescue Operations Division Station 2	SE M St, Grants Pass													
Grants Pass Fire and Rescue	615 NW 5th St, Grants Pass													
Grants Pass High School	830 NE 9th St, Grants Pass		X						1997	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Grants Pass Maintenance Station	345 Agness Ave, Grants Pass		X						1996	Not in Soft Soil Hazard	Not in SFHA	Moderate to High	Not in Lahar Zone	Low
Grants Pass Post Office	1636 NW Washington Blvd, Grants Pass													
Grants Pass Post Office	132 NW 6th St, Grants Pass													
Grants Pass VA Clinic	1877 Williams Hwy, Grants Pass													
Grants Pass Wastewater Treatment/Maintenance Station Grounds	1200 SW Greenwood Ave, Grants Pass		X					X	1974	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Highland Elementary School	1845 NW Highland Ave, Grants Pass		X						2006	Not in Soft Soil Hazard	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low
Hillcrest Fire Station	199 NW Hillcrest Dr, Grants Pass	X							1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Jail and Oregon Youth Authority	1901 NE F St, Grants Pass	X	X						1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Circuit Court	500 NW 6th St, Grants Pass	X							0	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Circuit Court - Family Court	301 NW F St, Grants Pass	X							0	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Community Corrections	510 NW 4th St, Grants Pass	X	X						1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Fairgrounds	1451 Fairgrounds Rd, Grants Pass		X									Moderate		
Josephine County Planning Office	700 NW Dimmick St, Grants Pass													
Josephine County Public Works	201 River Heights Way, Grants Pass	X			X		X		1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Sheriff's Office	1901 NE F St, Grants Pass	X			X				1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Kairos - New Beginnings	1750 SW Nebraska Ave, Grants Pass		X						1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Kairos - Three Bridges	711 SW Ramsey Ave, Grants Pass		X						1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Lincoln Elementary School	1132 NE 10th St, Grants Pass		X						1948	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
North Middle School	1725 NW Highland Ave, Grants Pass		X						1967	Not in Soft Soil Hazard	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low
One Peak Medical	1325 NE 7th St, Grants Pass													
Oregon State Police - Grants Pass	1463 NE 7th Street, Grants Pass	X								Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
OYA - Rogue Valley	2001 NE F St, Grants Pass	X							1998-2018	Not in Soft Soil Hazard	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low
Parkside Elementary School	735 SW Wagner Meadows Dr, Grants Pass		X						1997	Not in Soft Soil Hazard	100-Year	Low	Not in Lahar Zone	Low
Parkway Community Church	229 NE Beacon Dr, Grants Pass		X											
Planned Parenthood - Grants Pass Health Center	160 NW Franklin Blvd, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Reaching Our Community Food Pantry	564 SW Foundry St, Grants Pass		X											
Redwood Elementary School	3163 Leonard Rd, Grants Pass		X						1945	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Redwood Grange	1830 Redwood Ave, Grants Pass													
River Valley Church Grants Pass	405 NE 6th Street, Grants Pass		X											
Riverside Elementary School	1200 Se Harvey Dr, Grants Pass		X						1955	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Rogue River-Siskiyou National Forest Law Enforcement - Interagency Office	2164 NE Spalding Ave, Grants Pass	X							1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Rogue Valley Christian School	1515 Redwood Ave, Grants Pass													
Rural Metro Fire Department - Administration	807 NE 6th St, Grants Pass	X							1997	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Rural Metro Fire Department - Station 1	2428 Williams Hwy, Grants Pass	X							1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Saint Luke's Episcopal Church	224 NW D St, Grants Pass													

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Siskiyou Community Health Center	1701 NW Hawthorne Ave, Grants Pass			X					1921	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
South Middle School	350 W Harbeck Rd, Grants Pass		X						1958	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
St Anne Catholic School/Church	1131 NE 10th St, Grants Pass		X						1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
The Church of Jesus Christ of Latter-day Saints	1969 Williams Hwy, Grants Pass		X											
The Salvation Army Grants Pass Corps	2543 Redwood Ave, Grants Pass		X											
Three Rivers Community Hospital - Grants Pass	500 SW Ramsey Ave, Grants Pass		X	X					2001	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Three Rivers Community Hospital - Washington Campus and Urgent Care	537 Union Ave, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Valley Immediate Care – Grants Pass	162 NE Beacon Dr, Grants Pass													
Womens Health Center	700 SW Ramsey Ave #204, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Womens Health Center: Asante Women's Imaging	1075 SW Grandview Ave Suite 200, Grants Pass			X					1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low

Source: Grants Pass NHMP Steering Committee; Department of Land Conservation and Development, Oregon Natural Hazard Mitigation Plan, 2020. 2020 Statewide Loss Estimates (Appendices 9.1.8 and 9.1.9). Loss estimate data aggregated at the facility level by IPRE. Facilities without loss estimation data were not included in the analysis in the OR NHMP (2020).

**Volume III:
Appendices**

REVIEW DRAFT

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REVIEW DRAFT

APPENDIX A: ACTION ITEM FORMS

Volume I, Section 3 provides a summary list of actions for the County. Below is an accounting of the major changes to actions since the previous NHMP.

Renumbered 2017 Actions:

2017 Action Item	2022 Action Item
Multi-Hazard #1	Multi-Hazard 1.1
Multi-Hazard #2	Multi-Hazard 1.2
Multi-Hazard #3	Multi-Hazard 1.3
Earthquake #1	Earthquake 3.1
Earthquake #2	Earthquake 3.2
Flood #1	Flood 4.1
Flood #2	Flood 4.2
Flood #3	Flood 4.3
Wildfire #1	Wildfire 7.1
Wildfire #2	Wildfire 7.2
Wildfire #4	Wildfire 7.3

Previous NHMP Actions Completed:

- (2017) EQ #2 *“Encourage that all new critical facilities be built to highest earthquake building code standards; consider Institute for Business and Home Safety (IBHS) “Fortified for Safer Business” standards.”* was completed. This is part of the building code.
- (2017) FL #2 *“Certify County staff member as County Floodplain Manager”* was completed. The County has a Certified Floodplain Manager.
- (2017) FL #4 *“Update Transportation Systems Plan (TSP) infrastructure needs analysis to included identified or needed culvert upgrades”* was completed. The Transportation System Plan 2020 update includes improvement needs.

Previous NHMP Actions Removed/Deleted:

- (2017) MH #4 *“Continue to Develop Catastrophic Recovery Plan / Framework and complete a related economic development strategy”* was deleted. This is not a high priority for the County. The action may be reviewed in future NHMP updates.
- (2017) DR #1 *“Support the City of Grants Pass’ efforts to address localized drought management strategies”* was deleted. This activity is part of normal operations that support Grants Pass.
- (2017) SW #1 *“Establish designated parking areas within the county proximate to major transportation corridors (I-5, OR-199) for stranded motorists during severe weather events”* was deleted. This activity is considered outside the jurisdiction of the County.
- (2017) WF #3 *“Hazard fuel reduction on county-owned forest land adjacent to communities at risk”* was removed. Parts of this action were included in revised Wildfire Actions 7.3, 7.4, and 7.5.

Previous NHMP Actions Combined:

- (2017) EQ #1 and EQ #4 were combined and renumbered EQ 3.1.
- (2017) MH #1, FL#5, and VE #1 were combined and renumbered MH 1.1.

New NHMP Actions:

The following actions were added to the 2022 NHMP:

- Multi-Hazard 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11
- Drought: 2.1, 2.2
- Earthquake: 3.3, 3.4, 3.5, 3.6
- Landslide: 5.1, 5.2
- Severe Weather: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6
- Wildfire: 7.4, 7.5, 7.6, 7.7

DESCRIPTION/RATIONALE FOR PROPOSED ACTION ITEM

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from several sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in this addendum and within Volume I, Section 2. The worksheet provides information on the activities that have occurred since the previous plan for each action item.

LEAD (COORDINATING) ENTITY:

The lead entity is the entity with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation.

PARTNERS (INTERNAL AND EXTERNAL):

The partner entities listed in the action item are potential partners recommended by the steering committee but not necessarily contacted during the development of the plan. The coordinating entity should contact the identified partner entities to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action item.

TIMELINE:

All broad scale action items have been determined to be ongoing, as opposed to short (1 to 2 years), medium (3-5 years), or long (more than 5 years). This is because the action items are broad ideas, and although actions may be implemented to address the broad ideas, the efforts should be ongoing.

POTENTIAL FUNDING SOURCE

Where possible potential funding sources have been identified. Example funding sources may include Federal Hazard Mitigation Assistance programs, state funding sources such as the Oregon Seismic Rehabilitation Grant Program, or local funding sources such as capital improvement or general funds. An action item may include several potential funding sources.

ESTIMATED COST

A rough estimate of the cost for implementing each action item is included. Costs are shown in general categories showing low, medium, or high cost. The estimated cost for each category is outlined below:

Low - Less than \$50,000

Medium - \$50,000 – \$100,000

High - More than \$100,000

HIGH PRIORITY ACTIONS

The steering committee will focus their attention and resource availability over the next five-years on high priority actions that are considered achievable, high leverage activities. Although this provides a guide for the steering committee in terms of implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not currently listed as the highest priority.

Each high priority action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The rest of this appendix includes the high priority action item worksheets.

Josephine County Multi-Hazard Action Item 1.1		<input checked="" type="checkbox"/> High Priority Action
<input checked="" type="checkbox"/> Drought	<input checked="" type="checkbox"/> Flood	<input checked="" type="checkbox"/> Volcanic Event
<input checked="" type="checkbox"/> Earthquake	<input checked="" type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire
		<input checked="" type="checkbox"/> Extreme Heat
		<input checked="" type="checkbox"/> Windstorm
		<input checked="" type="checkbox"/> Winter Storm
Description	Continue to improve and sustain public information and education programs about potential hazards in the county, the need for personal preparedness, and mitigation actions possible.	
Benefits	Increased resilience and confidence at the local level, whenever disasters arise. Improved recovery rates and recovery experiences post-disaster because of personal mitigation and preparedness.	
Lead	Emergency Management – Get Ready Rogue Campaign	
Partners	Jackson County Emergency Management – Get Ready Rogue Campaign (shared 2 county approach)	
Potential Funding Source	Local government funding resources, private investment, non-profit fundraisers, grants (SHSP, EMPG)	
Estimated Cost	Timing	
<input checked="" type="checkbox"/> Low (Less than \$50,000)	<input checked="" type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)
<input type="checkbox"/> High (\$100,000 or more)		

Josephine County Multi-Hazard Action Item 1.6		<input checked="" type="checkbox"/> High Priority Action
<input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Volcanic Event <input type="checkbox"/> Extreme Heat <input checked="" type="checkbox"/> Windstorm <input checked="" type="checkbox"/> Earthquake <input type="checkbox"/> Landslide <input checked="" type="checkbox"/> Wildfire <input checked="" type="checkbox"/> Winter Storm		
Description	Starting with the critical facilities identified in the “Josephine County Solar + Storage Microgrid Feasibility” project, complete solar + storage microgrid feasibility studies and implement projects with assistance from Energy Trust.	
Benefits	Power outages are possible during hazard events including wildfire, wind, and winter storms (snow/ice). Maintaining continuity of operations for critical facilities and the departments that support them improves mitigation and recovery. Solar battery options will increase local energy resilience during Public Safety Power Shutoff events that are proposed during some fire and other hazard events, and the likelihood of fuel shortages during some disasters which will impact gas/diesel generators as primary backup.	
Lead	Emergency Management	
Partners	County and City Facilities Departments, PacifiCorp, Energy Trust of Oregon, Public Utility Commission, Building owners and managers	
Potential Funding Source	Grants (BRIC, HMGP, SHSP), energy investment incentives, public-private partnership shared investments	
Estimated Cost	Timing	
<input type="checkbox"/> Low (Less than \$50,000) <input type="checkbox"/> Medium (\$50,000 to \$100,000) <input checked="" type="checkbox"/> High (\$100,000 or more)	<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Medium Term (3 to 5 years) <input type="checkbox"/> Short Term (0 to 2 years) <input type="checkbox"/> Long Term (More than 5 years)	

Josephine County Earthquake Action Item 3.4		<input checked="" type="checkbox"/> High Priority Action
<input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Volcanic Event <input type="checkbox"/> Extreme Heat <input type="checkbox"/> Windstorm <input checked="" type="checkbox"/> Earthquake <input type="checkbox"/> Landslide <input type="checkbox"/> Wildfire <input type="checkbox"/> Winter Storm		
Description	Assess vulnerable county and city buildings to identify safety zones and earthquake mitigations for employee offices and high-traffic visitor areas. This includes historic buildings such as the County Courthouse and the unreinforced historic masonry buildings of core downtown business, government, and public use.	
Benefits	Mitigate immediate physical impacts of an earthquake event to reduce loss of life or numbers of significant injuries through identification and trained use of safety zones within a building (when evacuation is not possible or is riskier than a shelter in place option). Mitigate immediate event impacts to local and visiting public to vulnerable historic buildings by doing outreach and education to those building owners on options before and during a local earthquake event.	
Lead	Emergency Management	
Partners	City and County Planning, City and County Facilities, City and County Public Works, USGS DOGAMI, State Office of Emergency Management	
Potential Funding Source	Local funding resources, grants (HMGP, SHSP)	
Estimated Cost		Timing
<input type="checkbox"/> Low (Less than \$50,000) <input checked="" type="checkbox"/> Medium (\$50,000 to \$100,000) <input type="checkbox"/> High (\$100,000 or more)		<input type="checkbox"/> Ongoing <input type="checkbox"/> Medium Term (3 to 5 years) <input checked="" type="checkbox"/> Short Term (0 to 2 years) <input type="checkbox"/> Long Term (More than 5 years)

Josephine County Earthquake Action Item 3.6		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat
<input checked="" type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input type="checkbox"/> Wildfire	<input type="checkbox"/> Windstorm
<input type="checkbox"/> Winter Storm			
Description	Repair the McMullen Dam (Lake Selmac) that is at risk of failure.		
Benefits	Protect roads and neighborhoods from potential flood inundation if the dam is to fail.		
Lead	Emergency Management, County Parks Department		
Partners	Oregon Water Resources Department, County Public Works		
Potential Funding Source	Grants (BRIC, HMGP), Federal Infrastructure Investment and Jobs Act		
Estimated Cost		Timing	
<input type="checkbox"/> Low (Less than \$50,000)	<input type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)	
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input checked="" type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)	
<input checked="" type="checkbox"/> High (\$100,000 or more)			

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Josephine County Severe Weather Action Item 6.1		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Volcanic Event		<input checked="" type="checkbox"/> Extreme Heat <input type="checkbox"/> Windstorm	
<input type="checkbox"/> Earthquake <input type="checkbox"/> Landslide <input checked="" type="checkbox"/> Wildfire		<input checked="" type="checkbox"/> Winter Storm	
Description	Collaborate with local community organizations to develop community sites for use as a warming shelter in the winter, a cooling shelter in the summer, and a clean air refuge site when needed.		
Benefits	Pre-planned community shelter sites (for extreme weather events) with pre-planned agreements of use and operations between community partners may reduce loss of life and injuries due to extreme weather exposures.		
Lead	Emergency Management		
Partners	County Public Health, Oregon Department of Human Services, local faith organizations, local non-profits, local government		
Potential Funding Source	Local funding resources, private investment		
Estimated Cost		Timing	
<input checked="" type="checkbox"/> Low (Less than \$50,000) <input type="checkbox"/> Medium (\$50,000 to \$100,000) <input type="checkbox"/> High (\$100,000 or more)		<input type="checkbox"/> Ongoing <input type="checkbox"/> Medium Term (3 to 5 years) <input checked="" type="checkbox"/> Short Term (0 to 2 years) <input type="checkbox"/> Long Term (More than 5 years)	

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Josephine County Wildfire Action Item 7.1		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input checked="" type="checkbox"/> Wildfire	<input type="checkbox"/> Windstorm
<input type="checkbox"/> Winter Storm			
Description	Continue to support the Firewise Program for communities throughout the county. Utilize Firewise guidance to promote the Firewise Communities/USA" recognition program to promote wildfire resilience.		
Benefits	The Firewise program provides a series of steps that individual residents and their neighbors can take to keep their homes and neighborhoods safer from fire.		
Lead	Emergency Management		
Partners	Communities, Community Fire Plan coordinator, local fire districts, Get Ready Rogue campaign		
Potential Funding Source	Title III funds		
Estimated Cost		Timing	
<input type="checkbox"/> Low (Less than \$50,000)	<input checked="" type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)	
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)	
<input checked="" type="checkbox"/> High (\$100,000 or more)			

REVIEW

Josephine County Wildfire Action Item 7.3		<input checked="" type="checkbox"/> High Priority Action	
<input type="checkbox"/> Drought	<input type="checkbox"/> Flood	<input type="checkbox"/> Volcanic Event	<input type="checkbox"/> Extreme Heat
<input type="checkbox"/> Earthquake	<input type="checkbox"/> Landslide	<input checked="" type="checkbox"/> Wildfire	<input type="checkbox"/> Windstorm
<input type="checkbox"/> Winter Storm			
Description	Implement wildfire mitigation action items listed in the Rogue Valley (Jackson and Josephine counties) Integrated Community Wildfire Protection Plan (RVICWPP) and continue to participate with ongoing maintenance and updates.		
Benefits	The plan reduces wildfire risk to residents, the environment, and enhances quality of life within Josephine County.		
Lead	Emergency management		
Partners	Jackson County Emergency Management, OR Department of Forestry, local fire districts		
Potential Funding Source	Title III funds, ODF, HMA (BRIC, HMGP)		
Estimated Cost		Timing	
<input type="checkbox"/> Low (Less than \$50,000)	<input checked="" type="checkbox"/> Ongoing	<input type="checkbox"/> Medium Term (3 to 5 years)	
<input type="checkbox"/> Medium (\$50,000 to \$100,000)	<input type="checkbox"/> Short Term (0 to 2 years)	<input type="checkbox"/> Long Term (More than 5 years)	
<input checked="" type="checkbox"/> High (\$100,000 or more)			

REVIEW DRAFT

APPENDIX B: PLANNING AND PUBLIC PROCESS

NHMP Update Changes

This memo describes the changes made to the 2022 Josephine County Multi-Jurisdictional Natural Hazard Mitigation Plan (NHMP) during the 2022 NHMP update process.

Project Background

Josephine County, the cities of Cave Junction and Grants Pass partnered with the Oregon Partnership for Disaster Resilience (OPDR) to update the multi-jurisdictional 2017 Josephine County NHMP. The Disaster Mitigation Act of 2000 requires communities to update their NHMPs every five years to remain eligible for Building Resilient Infrastructure and Communities (BRIC), Hazard Grant Mitigation Program (HMGP), and Flood Mitigation Assistance (FMA) funding. A Federal Emergency Management Hazard Mitigation Grant Program funded the work with non-federal match provided by the State of Oregon per HB 5006.

OPDR and the committees made several changes to the previous NHMP to consolidate and streamline the NHMP. The City of Cave Junction addendum was added to this version of the NHMP.

Major changes are documented and summarized in this memo.

2022 NHMP Update Changes

The sections below only discuss *major* changes made to the NHMPs during the 2022 NHMP update process. Major changes include the replacement or deletion of large portions of text, changes to the NHMP's organization, new mitigation action items, and the addition of the Cave Junction addendum to the NHMP. If a section is not addressed in this memo, then it can be assumed that no significant changes occurred.

Table B-1 lists the 2022 Josephine County NHMP section names and the corresponding 2022 section names, as updated (major Volumes are highlighted in blue). This memo will use the 2022 NHMP update section names to reference any changes, additions, or deletions within the NHMP.

Table B-I Changes to Organization

2017 Josephine County MNHMP	2022 Josephine County MNHMP
Acknowledgements	Acknowledgements
Table of Contents	Table of Contents
	Approval Letters and Resolutions
	FEMA Review Tool
Volume I: Basic Plan	Volume I: Basic Plan
Plan Summary	Plan Summary
Section 1: Introduction	Section 1: Introduction
Section 2: Risk Assessment	Section 2: Hazard Identification and Risk Assessment
Section 3: Mitigation Strategy	Section 3: Mitigation Strategy
Section 4: Plan Implementation and Maintenance	Section 4: Plan Implementation and Maintenance
Volume II: Multi-Jurisdictional Addenda	Volume II: Jurisdictional Addenda
Grants Pass Addendum	Cave Junction
	Grants Pass
Volume IV: Mitigation Resources	Volume III: Appendices
Appendix A-1: Priority Action Items	Appendix A: Priority Action Items
Appendix A-2: Action Item Pool	-
Appendix B: Planning and Public Process	Appendix B: Planning and Public Process
Appendix C: Community Profile	Appendix C: Community Profile
Appendix D: Economic Analysis of Natural Hazard Mitigation Projects	Appendix D: Economic Analysis of Natural Hazard Mitigation Projects
Appendix E: Grant Programs and Resources	Appendix E: Grant Programs and Resources
Appendix F: Survey	Appendix F: Community Survey

As the table indicates the structure of the NHMP has changed significantly. Content and changes are described below.

Front Pages

1. The NHMP’s cover has been updated.
2. Acknowledgements have been added to include the 2022 project partners and planning participants.
3. The FEMA approval letter, review tool, and county resolutions of adoption are included.

Volume I: Basic Plan

Volume I provides the overall NHMP framework for the 2022 Multi-jurisdictional NHMP update. Volume I includes the following sections:

Plan Summary

The 2022 NHMP includes an updated NHMP summary that provides information about the purpose of natural hazard mitigation planning and describes how the NHMP will be implemented.

Section I: Introduction

Section 1 introduces the concept of natural hazard mitigation planning and answers the question, “Why develop a mitigation plan?” Additionally, Section 1 summarizes the 2022 NHMP update process and provides an overview of how the NHMP is organized. Major changes to Section 1 include the following:

- Section 1 of the 2022 update, outlines the layout of the NHMP update, which has been revised since the previous version of the plan as described herein.

Section 2: Hazard Identification and Risk Assessment

This section consists of three phases: hazard identification, vulnerability assessment, and risk analysis. Hazard identification involves the identification of hazard geographic extent, its intensity, and probability of occurrence. The second phase attempts to predict how different types of property and population groups will be affected by the hazard. The third phase involves estimating the damage, injuries, and costs likely to be incurred in a geographic area over time. Changes include:

- Hazard identification, characteristics, history, probability, vulnerability, and hazard specific mitigation activities were updated. Outdated and extraneous information was removed and links to technical reports were added as a replacement where applicable. With this update the Oregon NHMP and DOGAMI reports are cited heavily as a reference to the more technical hazard material.
- Links to specific hazard studies and data are embedded directly into the NHMP where relevant and available.
- NFIP information was updated.
- The hazard vulnerability analysis (Risk Assessment) has been updated for the county and cities (see Volume II for more information).

Section 3: Mitigation Strategy

This section provides the basis and justification for the mission, goals, and mitigation actions identified in the NHMP. The 2022 mission and goals were evaluated by the county, city, and special district Steering Committees. Changes were made and new goals were added. Major changes to the mitigation strategies (actions) include the following:

- **Priority actions were evaluated, and new priorities were assigned.** Priority actions are shown in Table 3-1 and within Volume III, Appendix A, and within each city and special district addendum (Volume II).
- **Actions evaluated for status and merit.** The county and city Steering Committees reviewed the previous actions and provided updates and edits to the actions where applicable. Including, the revision of existing actions, lead and partners, timeframe, potential funding sources, and estimated cost. Prioritized actions are those that are achievable, high leverage activities over the next five-years and will receive each jurisdiction's focus based on resource availability. Updates, changes to actions, status (completed, revised, deleted, new) are discussed in Volume III, Appendix A and Attachment A of each city addendum.

Section 4: Plan Implementation and Maintenance

Josephine County Emergency Management will continue to co-convene and coordinate the County Steering committee (Steering Committee). Documentation for the City Steering Committees is contained within each jurisdictional addendum (Volume II).

Volume II: Jurisdictional Addenda

The city of Grants Pass opted to participate and update their 2022 city addenda. The city of Cave Junction developed their first addendum in the 2022 update of the NHMP (they have been an active participant in previous versions of the NHMP).

Where appropriate, information has been consolidated and a reference is provided within each addendum to the appropriate NHMP section. New data and hazard information was included for the participating cities (see Section 2 information above) and actions were reviewed, revised and prioritized as described in each addendum (see also Attachment A of each addendum).

Volume III: Appendices

Below is a summary of the changes to the appendices included in the 2022 NHMP:

Appendix A: Action Item Forms

Priority Action Item forms were updated as noted in the section above discussing Volume I, Section 3 and as shown in the preamble to this Appendix (including completed and deleted actions).

Appendix B: Planning and Public Process

This planning and public process appendix reflects changes made to the Josephine County NHMP and documents the 2022 planning and public process.

Appendix C: Community Profile

The community profile has been updated to conform to the OPDR template and consolidates information for Josephine County and cities. Additional community information is provided in each addendum within Volume II.

Appendix D: Economic Analysis of Natural Hazard Mitigation Projects

This appendix provides an economic analysis of natural hazard mitigation projects and consolidates previous plan information into one appendix.

Appendix E: Grant Programs and Resources

This appendix is new and provides information on grant programs and resources.

Appendix F: Community Survey

This survey was conducted with the 2022 update of the NHMP and was utilized to inform the development of mitigation strategies and identification of community vulnerabilities. It is provided herein as documentation and to serve as a resource for future planning efforts.

Public Participation Process

Josephine County is dedicated to directly involving the public in the review and update of the NHMP. Although members of the Steering committee represent the public to some extent, the residents of Josephine County and participating cities were also given the opportunity to provide feedback about the NHMP. The NHMP will undergo review by the County NHMP Steering Committee on a quarterly basis and by the city Steering Committees on an annual basis.

Josephine County made the NHMP available via the County website:

<https://www.co.josephine.or.us/Page.asp?NavID=1867>. Cities also provided a copy of their addendum on their own websites. The draft NHMP was available for public review and comment through the FEMA review period.

Public Involvement Summary

A survey was provided to the public during the early stages of the update cycle (Volume III, Appendix F). Information from this survey was used by the Steering Committee to help inform their risk assessment and mitigation strategies. Specifically, 2022 Multi-Hazard actions 1.8, 1.9, 1.10 and wildfire action 7.7 were developed directly from public responses in the survey. Additionally, Severe Weather actions 6.4 and 6.5 were reinforced and supported by survey responses.

During the County public review period (see next page) there were xx comments provided. Comments and responses to comments are provided herein. Section to be updated. Public comments are pending.

See jurisdictional addenda (Volume II) for city public involvement information.

Members of the Steering Committee provided edits and updates to the NHMP prior to the public review period as reflected in the final document.

Website Posting

Section to be updated. Website post is pending.

Public Comments and Responses

Listed below is the list of public comments shown in *italic text* followed by the County's response.

REVIEW DRAFT

Josephine County Steering Committee

Steering Committee members possessed familiarity with the Josephine County community and how it's affected by natural hazard events. The Steering Committee guided the update process through several steps including goal confirmation and prioritization, action item review and development and information sharing to update the NHMP and to make the NHMP as comprehensive as possible. The Steering Committee met formally on the following dates:

Meeting #1: Steering Committee Kickoff, November 11, 2021 (via Zoom)

During this meeting, the Steering Committee reviewed the previous NHMP, and were provided updates on hazard mitigation planning, the NHMP update process, and project timeline. They also provided updates on the history of hazard events in the county and cities, reviewed and revised the NHMP's mission and goals. The NHMP public outreach strategy was also discussed.

Meeting #2: Risk Assessment and Actions, January 5, 2022

During this meeting, the Steering Committee reviewed the existing risk assessment including community vulnerabilities and hazard information. Information obtained during this meeting was used to inform the update of the hazard analysis. The Steering Committee also continued their review of their existing mitigation strategy (actions) and provided status updates.

Meeting #5: Actions and Implementation, March 9, 2022

The Steering Committee completed their review of their existing mitigation strategy (actions). The previous NHMP's implementation and maintenance program was reviewed and any changes that were necessary were made as indicated in this appendix and Volume I, Section 4.

Jurisdictional Addenda Meetings:

The participating cities and special district convened their steering committees during the County meeting processes described above. During these meetings, the Steering Committees for each jurisdiction provided comments on draft updates, revised, and prioritized their actions, and reviewed the NHMP implementation and maintenance schedule. Additional meetings were held as described in Volume II for each jurisdiction.

In addition to the meetings listed above, there were numerous informal meetings and email exchanges between Steering Committee members, OPDR, the County, and other state agencies.

The following pages includes copies of meeting agendas and sign-in sheets.

Josephine County NHMP Update Kick-Off



AGENDA

Meeting: Josephine County NHMP Update - Kickoff

Date: November 12, 2021

Time: 1:00pm – 2:00pm

Location: Zoom:

<https://uoregon.zoom.us/j/96463038308?pwd=aXJRWdGVEJwOW45bnYzNmV1QzZvQT09>

Meeting ID: 964 6303 8308 Passcode: 299859

I. Welcome and Background	10 minutes
a. Introductions	
b. Project context	
II. Natural Hazard Mitigation Planning Overview and Review	20 minutes
a. NHMP Overview	
b. Medford (NHMP) Review	
c. Stakeholders	
d. Mitigation Actions Review	
III. Public Outreach Strategy	10 minutes
IV. Hazard History	10 minutes
a. Hazard history since previous plan	
b. What are the critical hazard concerns for your community?	
c. Any changes since the previous plan?	
V. Incorporating Climate Change	5 minutes
VI. Questions and Next Steps	5 minutes

Meeting Attendees:

- *Convener*, Emily Ring, Emergency Manager, Josephine County
- Tyler Averyt, Senior Emergency Management Specialist, PacifiCorp
- Michelle Binker, Interim Coordinator, Josephine County Local Public Safety Coordinating Council
- Scott Clemetson, Emergency Preparedness Coordinator, Asante
- Colby Hawkinson, Park Ranger, Bureau of Land Management
- Joe Hyatt, Fire Marshall, Grants Pass Fire Rescue
- Leah Swanson, Emergency Preparedness Coordinator, Josephine County Public Health
- Sean Taggart, Director of Risk Management Rogue Valley Community College
- Karl Witz, Southwest Protection Supervisor, Oregon Department of Forestry

Josephine County NHMP Update Meeting #2



AGENDA



Meeting: → Josephine County NHMP Update—Meeting #2

Date: → January 5, 2021

Time: → 3:00pm—4:00pm

Location: → Zoom:

<https://uoregon.zoom.us/j/91528335000?pwd=NFILSGV5WkZSkxzYUVlcDNVMC9Rdz09>



I. → Welcome and Status Update	→	10 minutes
a. → Mission and Goals		
b. → Survey		
¶		
II. → Natural Hazards Risk Assessment	→	20 minutes
a. → Context and Update		
¶		
III. → Mitigation Strategy (Action Items)	→	25 minutes
a. → Overview of previous actions		
b. → Identification of new actions		
c. → Financing and Implementation		
¶		
IV. → Questions and Next Steps	→	5 minutes

Meeting Attendees:

- *Convener*, Emily Ring, Emergency Manager, Josephine County
- Tyler Averyt, Senior Emergency Management Specialist, PacifiCorp
- Rob Brandes, Public Works Director, Josephine County
- Jason Canady, Public Works Director, City of Grants Pass
- Scott Cecilliani, Water Master, Oregon Water Resources Department
- Wade Elliott, Assistant Public Works Director, City of Grants Pass
- John Holmes, Fire Chief, Illinois Valley Fire District
- Julie Smithart, Emergency Manager, Cow Creek Band of Umpqua Tribe of Indians

Josephine County NHMP Update Meeting #3



AGENDA

Meeting: Josephine County NHMP Update – Meeting #3

Date: March 9, 2022

Time: 2:30pm – 4:30pm

Location: Zoom:

<https://uoregon.zoom.us/j/92941357023?pwd=cUR3N3hxOFhuQ1IUVUJtxdlZqeGt1Zz09>

- | | |
|---|-------------------|
| I. Welcome and Status Update | 10 minutes |
| a. County and City updates | |
| II. Mitigation Strategy (Action Items) | 45 minutes |
| a. Overview of previous actions | |
| b. Identification of new actions | |
| c. Financing and Implementation | |
| d. Link to actions spreadsheet (click on “actions” tab) | |
| III. Implementation and Maintenance | 30 minutes |
| IV. Questions and Next Steps | 5 minutes |

Meeting Attendees:

- *Convener*, Emily Ring, Emergency Manager, Josephine County
- Tyler Averyt, Senior Emergency Management Specialist, PacifiCorp
- Rob Brandes, Public Works Director, Josephine County
- Randy DeLonge, Deputy Chief, Grants Pass Fire Rescue
- John Holmes, Fire Chief, Illinois Valley Fire District
- Lloyd Lawless, Battalion Chief, Grants Pass Fire Rescue
- Julie Smithart, Emergency Manager, Cow Creek Band of Umpqua Tribe of Indians
- Teresa Vonn, Rogue Valley Integrated Fire Plan Coordinator, Jackson County Emergency Management

APPENDIX C: COMMUNITY PROFILE

The following section describes the county from several perspectives to help define and understand the county’s sensitivity and resilience to natural hazards. Sensitivity and resilience indicators are identified through the examination of community capitals which include natural environment, social/demographic capacity, economic, physical infrastructure, community connectivity, and political capital. These community capitals can be defined as resources or assets that represent all aspects of community life. When paired together, community capitals can influence the decision-making process to ensure that the needs of the community are being met.¹

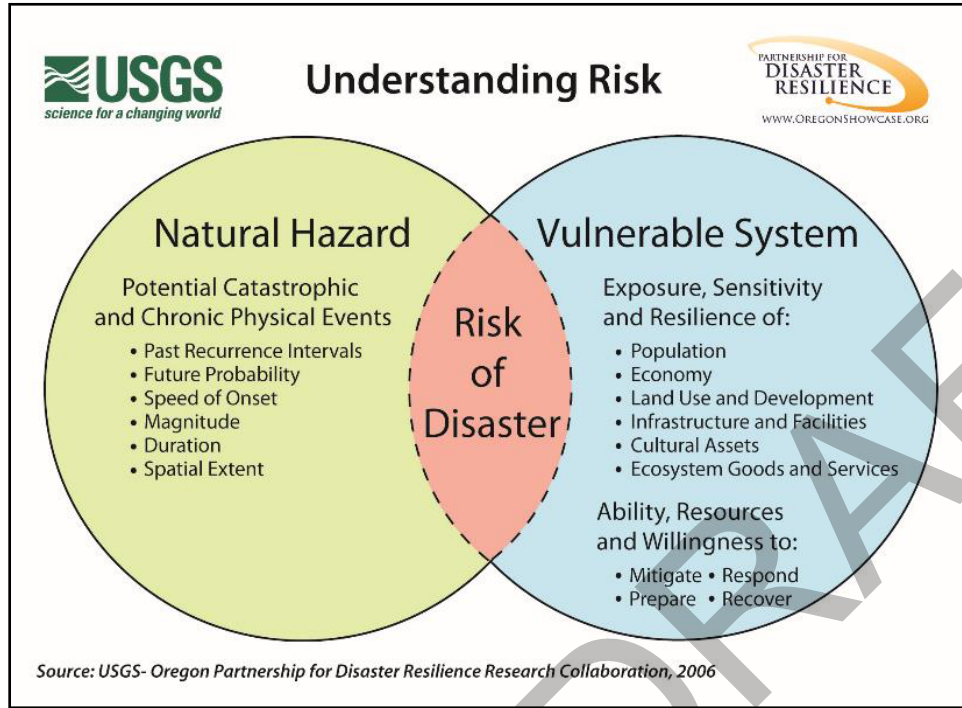
Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community’s ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs).

Political Capacity	3
Natural Environment Capacity	3
Social/Demographic Capacity	13
Economic Capacity	26
Physical Infrastructure Capacity	36
Community Connectivity Capacity	54

The Community Profile describes the sensitivity and resilience to natural hazards of Josephine County, its Census Designated Places (CDPs), and its incorporated cities, as they relate to each capacity. It provides a snapshot in time when the plan was developed and will assist in preparation for a more resilient county. The information in this section, along with the hazard assessments located in Volume I, Section 2 should be used as the local level rationale for the risk reduction actions identified in Volume I, Section 3. The identification of actions that reduce the county’s sensitivity and increase its resiliency assist in reducing overall risk of disaster, the area of overlap in Figure C-1.

¹ Mary Emery and others, “Using Community Capitals to Develop Assets for Positive Community Change,” *CD Practice* 13 (2006): 2

Figure C-1 Understanding Risk



Oregon Partnership for Disaster Resilience

The U.S. Census delineates areas of settled population concentrations that are identifiable by name but are not legally incorporated as Census Designated Places (CDPs). There are eight CDPs in Josephine County as shown in Table C-1. Other unincorporated areas that are not included in the Census data include Dryden, Galice, Golden, Greenback, Holland, Hugo, Leland, Murphy, Placer, Pleasant Valley, Sunny Valley, Waldo, Wilderville, Wolf Creek, and Wonder.

Table C-1 Josephine County, Cities, and Census Designated Places

Incorporated Cities	Unincorporated Census Designated Places	
Grants Pass	Kerby	Redwood
Cave Junction	Merlin	Selma
	New Hope	Takilma
	O'Brien	Williams

Source: Portland State University Population Research Center, U.S. Census Bureau Tiger Lines Files

The remainder of this appendix will provide detailed information for the County, unincorporated communities, and summarized data for the incorporated cities. Detailed information for each incorporated city participating in this NHMP is provided within each city's addendum (Volume II).

Political Capacity

Political capacity is recognized as the government and planning structures established within the community. In terms of hazard resilience, it is essential for political capital to encompass diverse government and non-government entities in collaboration; as disaster losses stem from a predictable result of interactions between the physical environment, social and demographic characteristics and the built environment.² Resilient political capital seeks to involve various stakeholders in hazard planning and works towards integrating the Natural Hazard Mitigation Plan with other community plans, so that all planning approaches are consistent.

Government Structure

Josephine County is governed by a three-member Board of Commissioners. The Commissioners are non-partisan and serve four-year terms. The Board is empowered to adopt ordinances, establish programs, levy taxes, appropriate funds, make appointments, and zone property in the unincorporated area of Josephine County. All the departments within the County governance structure have some degree of responsibility in building overall community resilience. Department with an Obvious role to improve the life safety would be first responders such as Emergency Medical Service and public health, and public works focuses on hardening physical infrastructure. But beyond the obvious responsibility, all the department play a role in ensuring that County functions and normal operations resume after an incident, and the needs of the population are met. County departments and divisions consist of the following:

- **Building Safety:** Assists citizens with permitting and build code applications. This department could collaborate to do outreach to the owners of structures that were not built up to modern, resilient code.
- **Commission for Children and Families:** Plans, advocates, and engages the community around issues on behalf of families and children, often thought of as vulnerable populations due to increased sensitivity to the impacts of hazard incidents. This department also manages state and federal grant funds.
- **Fairgrounds:** Serves as an entertainment venue but can be considered a staging site for response efforts. Mitigation could include specific actions to ensure the facilities could be used during response, such as extra power should it need to be used as a shelter.
- **Forestry:** Manages the County's 30,000 acres of forest land for timber productions, minerals, watershed enhancement and protection, wildlife, and recreation.
- **Geographic Information Systems:** Develops and maintains a Geographic Information System (GIS) for Josephine County. The GIS is composed of computer maps and associated databases. Examples of the maps include soils, flood hazard areas, and streams. In all phases of the disaster cycle, information is key. Building robust data that catalogues not only the County's risk and vulnerability, but also resources and response capability can ensure that efficient and effective mitigation activities.

² Mileti, D. 1999. Disaster by Design: a Reassessment of Natural Hazards in the United States. Washington D.C.: Joseph Henry Press.

- **Information Technology:** focuses on providing the various other County departments with the information systems and telecommunications technology to conduct daily business. Without this critical component, the County could not effectively serve the residents. Mitigation efforts from this department would not likely involve citizens at all but would go a long way to ensuring uninterrupted services during hazard incidents.
- **Planning:** conducts both short- and long-range plans that determine much of the built, physical community. Through the County Comprehensive Plan and subsequent policies, this department guides decisions about growth, development, and conservation of natural resources. The Planning Department can be partners in mitigation by developing, implementing, and monitoring policies that incorporate hazard mitigation principles such as ensuring homes, businesses, and other buildings are built to current seismic code and out of the flood zones.
- **Public Health:** Josephine County Divisions of Health, Environmental Health, and Animal Protection & Regulation provides quality public health services consistent with laws, available resources, and community support through, the prevention of disease, health education and promotion and protection of the community and the environment. As an inherently mitigation focused department, Public Health can be an ally in preparing the community for natural hazards. Public Health likely has a distribution network established for information and supplies and these connections to the community will be to encourage personal preparedness and during incident response.
- **Public Works:** The Public Works Department develops and implements the Josephine County Rural Transportation System Plan that assure the roads, bridges, traffic signs, and rights-of-way are designed, built, and maintained to provide users with the best possible, safest transportation system.
- **Sheriff's Office:** The mission of the Josephine County Sheriff's Office is to provide quality public safety services, in a professional, ethical, and fiscally responsible manner. Life safety is the first goal of mitigation and response. Public Safety interacts with the vulnerable aspects of the community on a day-to-day basis and can help identify areas for focused mitigation.

Existing Plans and Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.²⁴

The Josephine County Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the county's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the county's existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the action items identified in the plan. Implementing the natural hazards mitigation plan's action items through existing plans and policies increases their likelihood of being supported and getting updated and maximizes the county's resources. In addition

to the plans listed below the county and incorporated cities also have zoning ordinances (including floodplain development regulations) and building regulations.

Josephine County Comprehensive Plan

- Date of Last Revision: 2005
- Author/ Owner: Josephine County
- Description: The Comprehensive Plan is the official policy guide for decisions about growth, development, and conservation of natural resources in Josephine County.
- Relationship to Natural Hazard Mitigation Planning: The Goal 7 Policies within Josephine County's Comprehensive Plan provide the framework for evaluating land use actions for their exposure to potential harm from natural hazards. The policies guide the identification of areas subject to natural hazards, regulation of development in those areas, and protection of citizens, property, and the environment from the effects of natural hazards. The protection methods prescribed by these policies include prevention and preparedness, land use regulation, use of natural systems to mitigate hazards, public education, and collaboration with other organizations. These policies also guide development of this natural hazards mitigation plan. Likewise, the risk assessment and mitigation action items identified within this natural hazard mitigation plan should also influence the comprehensive plan's findings and land use policies.

Rogue Valley Integrated Community Wildfire Protection Plan

- Date of Last Revision: 2019
- Author/ Owner: Jackson and Josephine counties
- Description: Reducing the risk of wildfire to life, property, and natural resources in the Rogue Valley by encouraging coordination among public agencies, community organizations, private landowners, and the public to increase their awareness of, and responsibility for, fire issues.
- Relationship to Natural Hazard Mitigation Planning: The Rogue Valley Integrated Community Wildfire Protection Plan is intended to be adopted for incorporation within the Josephine County Natural Hazards Mitigation Plan. The CWPP contains goals and actions that seek to minimize the county's risk to wildfire hazards.

Josephine County Hazard Analysis – Emergency Operations Plan

- Date of Last Revision: 2016
- Author/ Owner: Josephine County
- Description: The Josephine County Emergency Operations Plan (EOP) is based on a thorough analysis of the natural and human-made hazards that could affect the county. This analysis is the first step in planning for mitigation, response, and recovery actions. The method used in this analysis provides a sense of hazard priorities, or relative risk. It does not predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can then be focused where the risk is the greatest.
- Relationship to Natural Hazard Mitigation Planning: the EOP includes information that is relevant to the Josephine County Natural Hazards Mitigation Plan. Hazard rankings from the EOP were informed the Natural Hazard Mitigation Plan's Hazard Chapters. Ideally, the EOP and Natural Hazards Mitigation Plan will eventually share,

and benefit from one risk assessment. As such, information from the NHMP may be integrated into the EOP.

Josephine County Stormwater Master Plan for the Grants Pass Urbanized Area

- Date of Last Revision: 2016
- Author/ Owner: Keller Associates / Josephine County and City of Grants Pass
- Description: Outlines the different components of Josephine County's Stormwater Management Program: (1) Public Education and Outreach; (2) Public Participation/ Involvement; (3) Unlawful Discharge Detection and Elimination (Illicit Discharge); (4) Construction Site Runoff Control; (5) Post-Construction Runoff Control; (6) Pollution Prevention. Stormwater Master Plan provides a clear path for maintaining and improving the function of the Grants Pass stormwater system.
- Relation to Natural Hazard Mitigation Planning: Josephine County's Stormwater Management Program develops and implements education and outreach strategies related to stormwater management. Existing connections with the public can be utilized to disseminate educational materials related to natural hazards mitigation. Additionally, mitigation actions that seek to reduce the hazards associated with urban flooding can be implemented through the county's Stormwater Management Program.

Josephine County Rural Transportation Systems Plan

- Date of Last Revision: 2018
- Author/ Owner: Josephine County
- Description: establishes the county's goals, policies, and action strategies for developing the transportation system outside of the Grants Pass and Cave Junction Urban Areas.
- Relation to Natural Hazard Mitigation Planning: Transportation systems are important in evacuating and responding to natural disasters. Mitigation actions that focus on strengthening the transportation system can be incorporated into the Transportation Systems Plan.

Other plans are available via the [county website](#) or by contacting staff.

Natural Environment Capacity

Natural environment capacity is recognized as the geography, climate, and land cover of the area such as, urban, water and forested lands that maintain clean water, air, and a stable climate.³ Natural resources such as wetlands and forested hill slopes play significant roles in protecting communities and the environment from weather-related hazards, such as flooding and landslides. However, natural systems are often impacted or depleted by human activities adversely affecting community resilience.

Geography

Josephine County is in southwestern Oregon and covers about 1,639 square miles. The geography, topography, climate, and other natural attributes such as vegetation vary significantly with location in Josephine County. The geographic diversity of Josephine County is an important factor to consider in mitigation planning for natural and human-caused hazards.

Josephine County is mountainous and has two major valleys and three rivers: the Rogue, the Applegate, and the Illinois. The topography of the county can range from 7,013 feet above sea level at the summit of Greyback Mountain to roughly 500 feet at Black Bar Falls. The Southern Oregon region boasts more than 210 days of sunshine annually. The rainy season is November to March/April. The information below includes precipitation and temperature information for areas around Josephine County.

Josephine County is located within a 3rd level tier ecoregion described by the (EPA) as the Klamath Mountains. The Klamath Mountains is Josephine County's only ecoregion. This physically and biologically diverse ecoregion covers the highly dissected ridges, foothills, and valleys of the Klamath and Siskiyou mountains. The region has diverse flora and contains a mix of both conifers and hardwoods. The mild, subhumid climate of the Klamath Mountains is characterized by a lengthy summer drought.

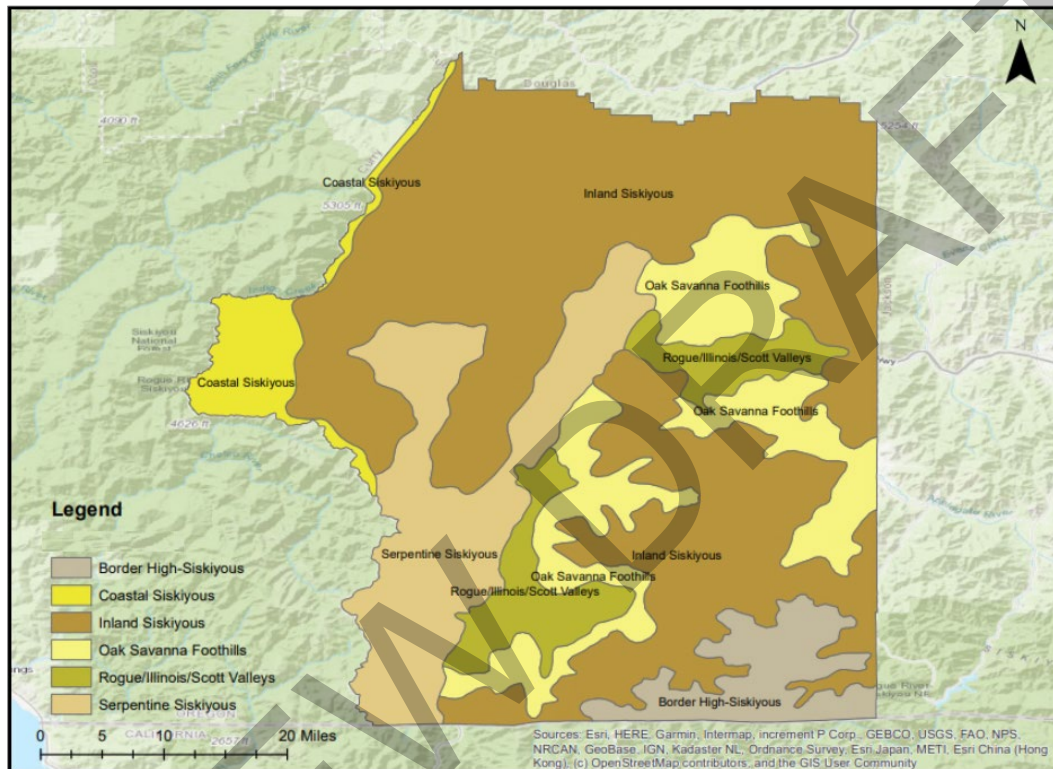
Josephine County contains six level IV Ecoregions⁴ within the Klamath Mountains. **The Rogue/Illinois Valleys** are highly developed valleys with little original vegetation. This land is mostly orchards, cropland, and pastureland. Both Grants Pass and Cave Junction are in this sub eco-region, as well as many other unincorporated areas like Redwood, Selma, Takilma, O'Brien, and Kerby. **The Oak Savanna Foothills** border the Rogue and Illinois river valleys and have similar climate. Josephine County foothills tend to be wetter and less dissected than the eco-region near Medford. Merlin, New Hope, and Williams are in this region. The **Serpentine Siskiyou** are very distinct from the rest of the region. Many plants have difficulty growing in its serpentine soils due to a shortage of calcium and high levels of magnesium, nickel, and chromium. As a result, vegetation is often sparse and composed of specialist species. Historic mines and associated water quality problems have occurred. The **Inland Siskiyou** is very forested and more mountainous than neighboring sub ecoregions. This ecoregion has a higher fire frequency, less annual precipitation, and longer summer droughts than the surrounding regions. The **Coastal Siskiyou** ecoregion makes up a very small part of western Josephine County and has a wetter and milder maritime climate than

³ Mayunga, J. 2007. Understanding and Applying the Concept of Community Disaster Resilience: A capital-based approach. Summer Academy for Social Vulnerability and Resilience Building.

⁴ Environmental Protection Agency, Region 10 Level IV Ecoregions. Link: <https://www.epa.gov/ecoresearch/ecoregion-download-files-state-region-10>

elsewhere in the Klamath Mountains. These are productive forests composed of good logging trees, but broadleaf evergreens, quickly colonize disturbed areas, making it difficult to regenerate conifer forest growth. The **Border High-Siskiyou** ecoregion consists of relatively high elevation mountains along Josephine County's border with California. Elevations range from about 5,000 to greater than 7,000 feet, and soil temperature is unsuitable for farming.⁵

Figure C-2 Level IV Ecoregions of Josephine County



Source: US Environmental Protection Agency, Level IV Ecoregions: <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10>

Potential impacts of Climate Variability

Climate refers to the temperatures, weather patterns, and precipitation in Josephine County. This section covers historic climate information. Estimated future climate conditions and possible impacts are also provided (for a more detailed analysis refer to the State Risk Assessment.) Josephine County receives high levels of precipitation during winter months. It does not receive much snow, except for high peaks, and the temperature is moderate in spring and fall months around the county and can be very hot in the summer months. These climate patterns could see changes in the future due to climate variability, affecting the overall geological and natural processes of the Klamath Mountain ecosystems, topography, and habitats of the Klamath Mountain ecoregion. Future climate projections indicate that the temperature is estimated warm 0.5 degrees Fahrenheit per decade. The Pacific Northwest is projected to have greater warming during summer than in the winter.

⁵ Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Precipitation in the Pacific Northwest is expected to increase but to remain within historical ranges for rainfall. Winter precipitation is projected to increase, while summers will be longer and even drier than at present. Scientific data and research also anticipates an increase in intense precipitation events.⁶ Extensive research shows that Oregon and other Western states already have experienced noticeable variations in climate, and predicts that more variations will occur in the future.⁷

In the Pacific Northwest, the current projected climate variations are likely to (1) increase average annual temperatures, (2) increase the number and duration of heat waves, (3) increase the amount of precipitation falling as rain during the year, (4) increase the intensity of rainfall events, and 5) increase sea level. These changes are also likely to reduce winter snowpack and shift the timing of spring runoff earlier in the year.⁸

These anticipated changes point toward some of the ways that projected climate variability is likely to impact ecological systems and the goods and services they provide. There is considerable uncertainty about how long it would take for some of the impacts to materialize, and the magnitude of the associated economic consequences.

Potential impact on agriculture and forestry

The projected variation in climate may impact Oregon's agriculture through changes in: growing season, temperature ranges, and water availability.⁹ This variation may impact Oregon's forestry through increase in wildfires, decrease in the rate of tree growth, change in mix of tree species, and increases in disease and pests that damage trees.¹⁰

Potential impact on tourism and recreation

Impacts on tourism and recreation may range from: (1) decreases in snow-based recreation if snow-pack in the Cascades decreases, (2) negative impacts to outdoor recreations due to

⁶ Oregon Wetlands Explorer. (2009). Coastal Climate Effects. Retrieved from <http://oregonexplorer.info/wetlands/ClimateChange/CoastalClimateEffects>

⁷ Doppelt, B., R. Hamilton, C. Deacon Williams, et al. 2009. *Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon*. Climate Leadership Initiative, Institute for a Sustainable Environment, University of Oregon. March. Retrieved June 16, 2009, from http://climlead.uoregon.edu/pdfs/willamette_report3.11FINAL.pdf and Doppelt, B., R. Hamilton, C. Deacon Williams, et al. 2009. *Preparing for Climate Change in the Rogue River Basin of Southwest Oregon*. Climate Leadership Initiative, Institute for a Sustainable Environment, University of Oregon. March. Retrieved June 16, 2009 from http://climlead.uoregon.edu/pdfs/ROGUE_percent20WS_FINAL.pdf

⁸ Mote, P., E. Salathe, V. Duliere, and E. Jump. 2008. Scenarios of Future Climate for the Pacific Northwest. Climate Impacts Group, University of Washington. March. Retrieved June 16, 2009, from <http://cses.washington.edu/db/pdf/moteetal2008scenarios628.pdf>; Littell, J.S., M. McGuire Elsner, L.C. Whitely Binder, and A.K. Snover (eds). 2009. "The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate - Executive Summary." In *The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate*, Climate Impacts Group, University of Washington. Retrieved June 16, 2009, from www.cses.washington.edu/db/pdf/wacciaexecsummary638.pdf; Madsen, T. and E. Figdor. 2007. When it Rains, it Pours: Global Warming and the Rising Frequency of Extreme Precipitation in the United States. Environment America Research & Policy Center and Frontier Group.; and Mote, P.W. 2006. "Climate-driven variability and trends in mountain snowpack in western North America." *Journal of Climate* 19(23): 6209-6220.

⁹ "The Economic Impacts of Climate Change in Oregon: A preliminary Assessment," Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon, October 2005.

¹⁰ "Economic Impacts of Climate Change on Forest Resources in Oregon: A Preliminary Analysis," Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon, May 2007.

increased fire risk¹¹, (3) negative impacts on availability of water summer river recreation (e.g., river rafting or sports fishing) as a result of lower summer river flows, and (4) negative impacts on the availability of water for domestic and business uses.

Temperature

Temperatures in Josephine County are generally moderate¹². The temperature in the Rogue/Illinois Valleys during the coldest winter months usually maintains a temperature around 31 to 47 degrees Fahrenheit. The summer months are considerably warmer; in July the temperature in the Rogue/Illinois Valleys ranges between 51- and 89-degrees Fahrenheit. Table C-2 describes the typical average temperatures during winter and summer with a mean annual rainfall amount for each sub-eco-region in Josephine County. Temperatures generally increase inland to the east, and rainfall generally increases towards the coast in the West.¹³

Table C-2 Mean Precipitation and Temperature

Level IV Ecoregion	Mean Annual Rainfall Range (inches)	Mean Temperature Range (°F) January min/max	Mean Temperature Range (°F) July min/max
Rogue/Illinois Valleys	20-60	31°/47°	51°/89°
Oak Savannah Foothills	110-160	28°/45°	50°/87°
Serpentine Siskiyou	70-140	32°/44°	49°/82°
Inland Siskiyou	90-160	29°/44°	50°/86°
Coastal Siskiyou	100-190	38°/50°	50°/76°
Border-High Siskiyou	90-160	24°/42°	49°/88°

Source: US Environmental Protection Agency, Level IV Ecoregions

Precipitation and Snowpack

Josephine County receives relatively high levels of precipitation when compared to Oregon as a whole, Oregon receives a mean annual precipitation amount of 37 to 50 inches, and Josephine County's mean annual precipitation data indicates higher than average precipitation levels. In the lower elevations of the Rogue/Illinois Valleys, the normal annual precipitation is between 20 and 60 inches, while in the Oak Savannah Foothills and Siskiyou Mountain areas precipitation rises precipitation levels are regularly over 70 inches annually (see Table C-2 and Figure C-3). November, December, and January are the rainiest months for which special attention should be paid to flood events during that time. In some locations, flood control dams have greatly reduced the incidence of damaging floods.

Snowpack occurs in the county and the area usually only receives about five inches annually; however, elevations above 3,500 feet are prone to snowfall that occasionally lasts into late spring. Josephine County also has, on average, more than half of its days with frost, meaning

¹¹ "The Economic Impacts of Climate Change in Oregon: A preliminary Assessment," Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon, October 2005.

¹² Economic Development Alliance of Josephine County. (2014). General information on Josephine County. Retrieved from http://www.coastbusiness.info/general_info.htm

¹³ Environmental Protection Agency, Region 10. <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10>

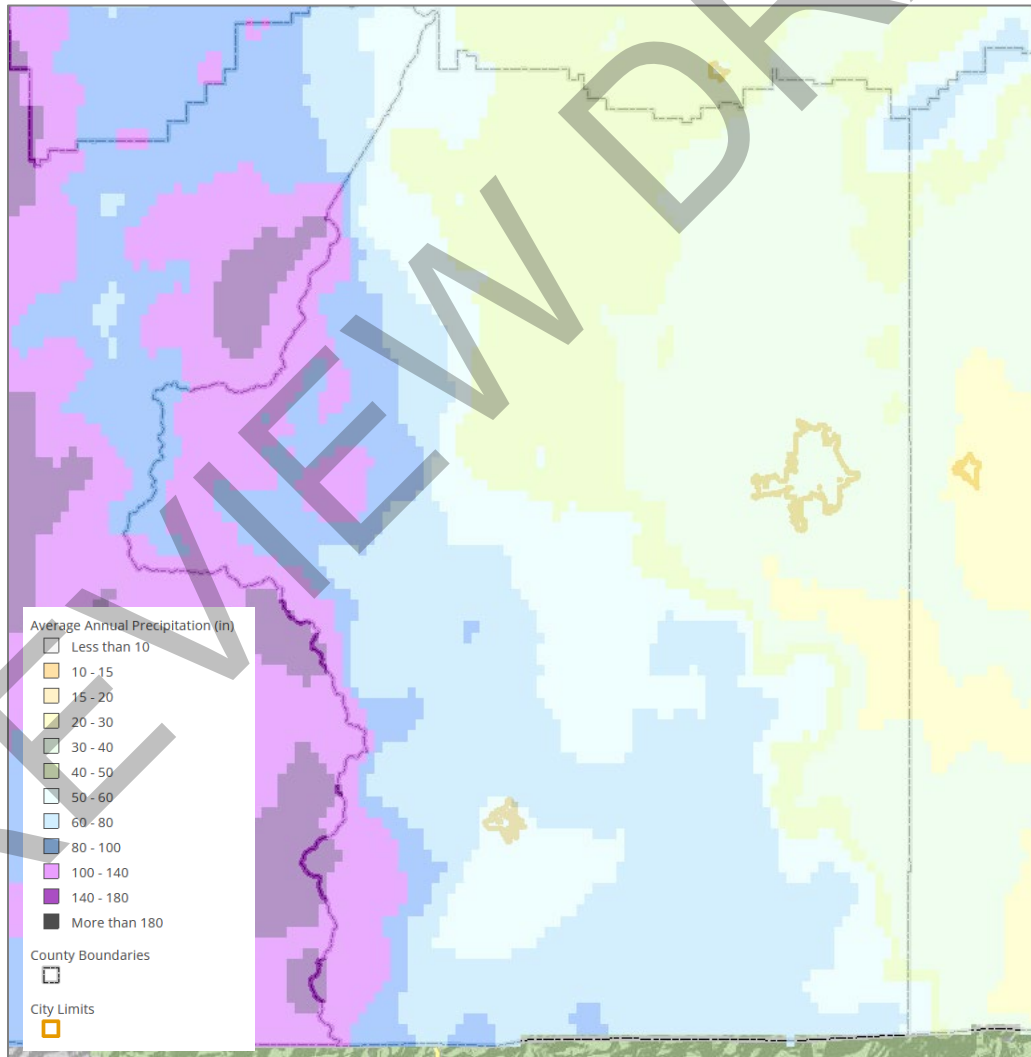
overnight temperatures reach below 41°F. The likelihood of frost increases at higher elevations (see Table C-3).

Table C-3 Mean Annual Days of Frost

Level IV Ecoregion	Mean Annual Days of Frost		
	Days	Min	Max
Rogue/Illinois Valleys	185-245	51%	67%
Oak Savannah Foothills	205-255	56%	70%
Serpentine Siskiyou	245-320	67%	88%
Inland Siskiyou	295-330	81%	90%
Coastal Siskiyou	235-295	64%	81%
Border-High Siskiyou	330-340	90%	93%

Source: US Environmental Protection Agency, Level IV Ecoregions: <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10>

Figure C-3 Josephine County Mean Annual Precipitation 1990-2020



Source: Oregon Department of Transportation (ODOT) TransGIS.

Projected Climate

The impacts of projected climate variations in Oregon are largely driven by temperature and precipitation. Temperatures in the Pacific Northwest increased 1.3° Fahrenheit (F) over the historical period (1895-2011 observed period). Over the last 30 years, temperatures in Oregon have generally been above the 20th century average. The average annual temperatures in all but two years since 1998 have been above the average annual temperatures for the 20th century. Within the same historical period, annual precipitation amounts fall within the normal range of natural annual variability.¹⁴

According to OCCRI report “*Fifth Oregon Climate Assessment*”¹⁵ projected climate variations are expected to increase the frequency and intensity of some weather incidents. Oregon and the Pacific Northwest experience a variety of extreme weather incidents ranging from severe winter storms and floods to drought and dust storms, often resulting in morbidity and mortality among people living in the impacted regions. Hot summer days are expected to increase and night overnight lows will continue to be warmer. Additionally, the frequency, intensity, and duration of extreme heat events is also expected to increase.

Synthesis

The physical geography, weather, climate, and land cover of an area represent various interrelated systems that affect overall risk and exposure to natural hazards.

Above average rainfall (mostly during winter), several major rivers across the county, topography, storm with strong winds, potential climate variation’s impacts, and land uses such as logging and livestock: these factors combined with periods of population growth and development intensification can lead to increasing risk of hazards, threatening loss of life, property, and long-term economic disruption if land management is inadequate.

In broad terms, climate in the Pacific Northwest is characterized by variability, and that variability is largely dominated by the interaction between the atmosphere and ocean in the tropical Pacific Ocean that is responsible for El Niño and La Niña. Human activities are changing the climate, particularly temperature, beyond natural variability. Variations in climate are already affecting Oregon communities and resources and needs to be recognized in various planning efforts as an important stressor that significantly influences the incidence—and in some cases the location—of natural hazards and hazard events. These projected variations are anticipated to affect the frequency and/or magnitude of some kinds of natural hazards in Oregon. In the mountains and valleys, an increase in heat in recent decades has led to higher summer temperatures and more frequent droughts. In Oregon’s forested areas, large areas have been impacted by disturbances that include wildfire in recent years, and climate variations are probably one major factor. Closer to home for some Oregonians, a three-fold increase in heat-related illness has been documented in Oregon with each 10 °F rise in daily maximum temperature.¹⁶

¹⁴ Department of Land Conservation and Development. *Oregon Natural Hazard Mitigation Plan*. 2020.

¹⁵ Oregon Climate Change Research Institute. *Fifth Oregon Climate Assessment*. 2021.

¹⁶ Ibid.

Social/Demographic Capacity

Social/demographic capacity is a significant indicator of community hazard resilience. The characteristics and qualities of the community population such as language, race and ethnicity, age, income, educational attainment, and health are significant factors that can influence the community's ability to cope, adapt to and recover from natural disasters. Population vulnerabilities can be reduced or eliminated with proper outreach and community mitigation planning.

Population

Josephine County is composed of two incorporated municipalities and eight census designated places. A substantial portion of the county's population resides in unincorporated areas administered by Josephine County. Josephine County experienced modest population growth between 2010 and 2019 (Table C-4).

Josephine County accounts for roughly two percent (2%) of Oregon's population. Grants Pass is the county's largest city with an estimated population of 39,479 in 2021. Cave Junction has about a fifteenth of the population of Grants Pass (approximately 2,500). There are eight (8) Census Designated Places (CDP) within the County. The unincorporated area of the county accounts for about 54% of the overall population and is growing slower than the incorporated cities (0.5% AAGR vs 1.6% AAGR). The rural unincorporated area of Josephine County has a dispersed population, with several communities that are about as large as Cave Junction.

Table C-4 Population Estimates and Change (2014, 2019, and 2021)

Jurisdiction	2014		2019		Change (2014-2019)		AAGR	2021
	Number	Percent	Number	Percent	Number	Percent	(2014-2019)	Number
Josephine County	83,105	-	86,750	-	3,645	4%	0.9%	88,728
Incorporated	36,975	44%	40,024	46%	3,049	8%	1.6%	41,628
Cave Junction	1,905	2%	1,975	2%	70	4%	0.7%	2,149
Grants Pass	35,060	42%	37,485	43%	2,425	7%	1.3%	39,479
Unincorporated*	46,140	56%	47,290	55%	1,150	< 1%	0.5%	47,100
Kerby CDP	311	0%	578	1%	267	86%	13.2%	-
Merlin CDP	1,594	2%	1,922	2%	328	21%	3.8%	-
New Hope CDP	1,443	2%	1,593	2%	150	10%	2.0%	-
O'Brien CDP	112	< 1%	636	1%	524	468%	41.5%	-
Redwood CDP	2,661	3%	2,970	3%	309	12%	2.2%	-
Selma CDP	653	1%	591	1%	-62	-9%	-2.0%	-
Takilma CDP	266	< 1%	466	1%	200	75%	11.9%	-
Williams CDP	1,142	1%	1,390	2%	248	22%	4.0%	-
Other Unincorporated	37,958	46%	37,144	43%	764	2%	-0.4%	-

Source: Portland State University, Population Research Center, "Annual Population Estimates" 2020 and 2021;

* - U.S. Census Bureau, American Community Survey, 2010-2014 and 2015-2019 5-Year Estimates, Social Explorer Table SE: A00001 CDP=Census Designated Place

Tourists

Tourists are not counted in population statistics; and are therefore considered separately in this analysis. Table C-5 shows the estimated number of person nights in private homes, hotels and motels, and other types of accommodations. The table shows that, between

2018 and 2019, approximately 58% of all visitors to Josephine County lodged in private homes, with 25% staying in hotels/motels, the remaining visitors stay on other accommodations (vacation homes/campgrounds). Data from 2020 is considerably different than 2018 and 2019 due to COVID-19, but still favor staying in private homes. Tourists' lodging in private homes suggests the prevalence of tourists staying in cabins and in more rural areas without hotels. For hazard preparedness and mitigation purposes, outreach to residents in Josephine County will likely be transferred to these visitors in some capacity. Visitors staying in rural areas are less likely to benefit from local preparedness outreach efforts aimed at full-time residents.

Table C-5 Annual Visitor Estimates in Person Nights

	2018		2019		2020	
	Person-Nights	Percent	Person-Nights	Percent	Person-Nights	Percent
All Overnight	1,889,630	100%	1,971,390	100%	1,250,250	100%
Hotel, Motel, STR	477,150	25%	514,290	26%	476,470	38%
Private Home	1,106,630	59%	1,144,300	58%	581,680	47%
Other	305,850	16%	312,800	16%	192,100	15%

Source: Oregon Tourism Commission, Oregon Travel Impacts: 1991-2020 p, Dean Runyan Associates
 Notes: STR = Short Term Rental

Tourists are specifically vulnerable due to the difficulty of locating or accounting for travelers within the region. Tourists are often at greater risk during a natural disaster because of unfamiliarity with evacuation routes, communication outlets, or even the type of hazard that may occur. Knowing whether the region's visitors are staying in friends/relative's homes in hotels/motels, or elsewhere can be instructive when developing outreach efforts.

Vulnerable Populations

Vulnerable populations include those with access and functional needs and include may include seniors, disabled citizens, women, and children, as well those people living in poverty, often experience the impacts of natural hazards and disasters more acutely. Vulnerability exists for migrant short-term workers for fish processing plants in Josephine County. Hazard mitigation that targets the specific needs of these groups has the potential to greatly reduce their vulnerability. Examining the reach of hazard mitigation policies to special needs populations may assist in increasing access to services and programs. FEMA's Office of Equal Rights addresses this need by suggesting that agencies and organizations planning for natural hazards identify special needs populations, make recovery centers more accessible, and review practices and procedures to remedy any discrimination in relief application or assistance.

Population size itself is not an indicator of vulnerability. More important is the location, composition, and capacity of the population within the community. Research by social scientists demonstrates that human capital indices such as language, race, age, income, education, and health can affect the integrity of a community. Therefore, these human capitals can impact community resilience to natural hazards.

Additional information on vulnerable populations is available via Josephine County Public Health's [webpage](#) and the Community Health Assessment of Jackson and Josephine Counties.

Language Barriers

Special consideration should be given to populations who do not speak English as their primary language. Language barriers can be a challenge when disseminating hazard planning and mitigation resources to the public, and it is less likely they will be prepared if special attention is not given to language and culturally appropriate outreach techniques.

There are various languages spoken across Josephine County; the primary language is English. Approximately 4% of the Josephine County population speaks a language other than English, and about 1% of the population is not proficient in English (Table C-6). Cave Junction (2%) has the highest percentage of residents who have limited or no English language proficiency. Outreach materials used to communicate with, plan for, and respond to non-English speaking populations should take into consideration the language needs of these populations.

Table C-6 Josephine County Language Spoken at Home

Jurisdiction	Population 5 years and over	English Only		Multiple Languages		Limited or No English	
		Number	Percent	Number	Percent	Number	Percent
Josephine County	82,005	78,777	96%	2,029	2%	1,199	1%
Incorporated	37,642	35,968	96%	1,111	3%	563	1%
Cave Junction	2,342	2,250	96%	81	3%	11	< 1%
Grants Pass	35,300	33,718	96%	1,030	3%	552	2%
Unincorporated	44,363	42,809	96%	918	2%	636	1%
Kerby	561	561	100%	0	0%	0	0%
Merlin	1,871	1,855	99%	16	< 1%	0	0%
New Hope	1,579	1,579	100%	0	0%	0	0%
O'Brien	636	636	100%	0	0%	0	0%
Redwood	2,805	2,709	97%	78	3%	18	< 1%
Selma	569	561	99%	8	1%	0	0%
Takilma	466	466	100%	0	0%	0	0%
Williams	1,214	1,206	99%	8	< 1%	0	0%
Other Unincorporated	34,662	33,236	96%	808	2.3%	618	2%

Source: Social Explorer, U.S. Census Bureau, 2015-2019 American Community Survey Estimates, Table 16001.

Race and Ethnicity

The impact in terms of loss and the ability to recover may also vary among minority population groups following a disaster. Studies have shown that racial and ethnic minorities can be more vulnerable to natural disaster events. This is not reflective of individual characteristics; instead, historic patterns of inequality along racial or ethnic divides have often resulted in minority communities that are more likely to have inferior building stock, degraded infrastructure, or less access to public services. Table C-7 displays Josephine County's population by race and Hispanic or Latino/a ethnicity.

Most of the population in Josephine County is racially white (91%). About 7% of the County is Hispanic or Latino/a. Within the unincorporated area of the County, 94% of the population is racially white and six percent (6%) is Hispanic or Latino/a.

Table C-7 Race and Ethnicity (Hispanic or Latino/a)

	Josephine County		Unincorporated		Incorporated	
	Number	Percent	Number	Percent	Number	Percent
Total population	86,251	100%	46,227	100%	40,024	100%
American Indian and Alaska Native	1,014	1%	666	1%	348	1%
Asian	866	1%	369	1%	497	1%
Black or African American	442	1%	106	< 1%	336	1%
Native Hawaiian and Other Pacific Islander	50	< 1%	50	< 1%	0	0%
White	79,658	91%	43,362	94%	36,296	91%
Some Other Race	1,128	2%	307	1%	821	2%
Two or More	3,093	4%	1,367	3%	1,726	4%
Hispanic or Latino/a	6,408	7%	2,790	6%	3,618	9%

Source: Social Explorer, Table T14, U.S. Census Bureau, 2015-2019 American Community Survey Estimates.

It is important to identify specific ways to support all portions of the community through hazard mitigation, preparedness, and response. Culturally appropriate, and effective outreach can include both methods and messaging targeted to diverse audiences. For example, connecting to historically disenfranchised populations through already trusted sources or providing preparedness handouts and presentations in the languages spoken by the population will go a long way to increasing overall community resilience.

Gender

Josephine County has slightly more females than males (Female 51%, Male: 48%). O'Brien (60%) and Cave Junction (54%), have the highest female to male ratios comprising their populations, while Selma (45%) and Kerby (43%) have lower ratios comprising their populations.¹⁷ It is important to recognize that women tend to have more institutionalized obstacles than men during recovery due to sector-specific employment, lower wages, and family care responsibilities.

Age

Of the factors influencing socio demographic capacity, the most significant indicator in Josephine County may be age of the population. As of 2019, 26% of the county population is 65 or older, a percentage that is projected to rise to 30% by 2040 (see Table C-8). The Josephine County age dependency ratio is 76.4 (Kerby has the largest age dependency ratio at 127.8). The age dependency ratio indicates a higher percentage of dependent aged people to that of working age. The age dependency ratio for Josephine County is expected to rise to 81.4 in 2040, largely because of the rise in the older age cohorts (population 65+, 30% in 2040). With a higher age-dependency ratio there will be fewer people of working age who can support mitigation and recovery from a natural disaster (numbers greater than 100 indicate more non-working age population than working age). In addition, as the population

¹⁷ Social Explorer, U.S. Census Bureau, 2015-2019 American Community Survey Estimates Table A02002.

ages, the County may need to consider different mitigation and preparedness actions to address the specific needs of this group.

Table C-8 Population by Vulnerable Age Groups, 2019 and 2040 Forecast

Jurisdiction	Total	< 15 Years Old		65 + Years Old		15 to 64 Years Old	Age Dependency Ratio
		Number	Percent	Number	Percent		
2019							
Josephine County	86,251	13,946	16%	22,145	26%	47,211	76.4
Incorporated	40,024	7,673	19%	7,967	20%	22,830	68.5
Cave Junction	2,479	565	23%	545	22%	1,222	90.8
Grants Pass	37,545	7,108	19%	7,422	20%	21,608	67.2
Unincorporated	46,227	6,273	14%	14,178	31%	24,381	83.9
Kerby	578	64	11%	249	43%	245	127.8
Merlin	1,922	229	12%	386	20%	1,230	50.0
New Hope	1,593	167	10%	459	29%	894	70.0
O'Brien	636	0	0%	309	49%	327	94.5
Redwood	2,970	587	20%	898	30%	1,414	105.0
Selma	591	40	7%	206	35%	315	78.1
Takilma	466	26	6%	72	15%	320	30.6
Williams	1,390	326	23%	403	29%	622	117.2
Other Unincorporated	36,081	4,834	13%	11,196	31%	19,014	84.3
2040							
Oregon	5,100,899	740,779	15%	1,161,035	23%	3,199,085	59.4
Josephine County	97,807	14,194	15%	29,707	30%	53,906	81.4

Source: Social Explorer, U.S. Census Bureau, 2015-2019 American Community Survey Estimates Table A01001. Portland State University, Population Research Center, "Population Forecasts", 2018 (County) and 2020 (Oregon).

The age profile of an area has a direct impact both on what actions are prioritized for mitigation and how response to hazard incidents is carried out. School age children rarely make decisions about emergency management. Therefore, a larger youth population in an area will increase the importance of outreach to schools and parents on effective ways to teach children about fire safety, earthquake response, and evacuation plans. Furthermore, children are more vulnerable to the heat and cold, have few transportation options and require assistance to access medical facilities.

Older populations may also have special needs prior to, during and after a natural disaster. They may require assistance in evacuation due to limited mobility or health issues, especially in harder to access areas. Additionally, older populations may require special medical equipment or medications, and can lack the social and economic resources needed for post-disaster recovery.

Families and Living Arrangements

Two ways the census defines households are by type of living arrangement and family structure. A householder may live in a "family household" (a group related to one another by birth, marriage or adoption living together); in a "nonfamily household" (a group of unrelated people living together); or alone. Table C-9 shows that Josephine County is predominately comprised of family households (65%). Of all households, 35% are one-

person non-family households (householder living alone). Countywide about 15% of householders live alone and are age 65 or older.

Table C-9 Household by Type, Including Living Alone

Jurisdiction	Total Households	Family Households		Householder Living Alone		Householder Living Alone (age 65+)	
	Estimate	Estimate	Percent	Estimate	Percent	Estimate	Percent
Josephine County	36,367	23,666	65%	12,701	35%	5,331	15%
Incorporated	16,807	10,312	61%	6,495	39%	2,497	15%
Cave Junction	1,026	613	60%	413	40%	235	23%
Grants Pass	15,781	9,699	62%	6,082	39%	2,262	14%
Unincorporated	19,560	13,354	68%	6,206	32%	2,834	14%
Kerby	270	154	57%	116	43%	76	28%
Merlin	768	539	70%	229	30%	70	9%
New Hope	682	648	95%	34	5%	16	2%
O'Brien	352	102	29%	250	71%	50	14%
Redwood	1,244	917	74%	327	26%	250	20%
Selma	266	202	76%	64	24%	55	21%
Takilma	165	118	72%	47	29%	47	29%
Williams	526	419	80%	107	20%	51	10%
Other Unincorporated	15,287	10,255	67%	5,032	33%	2,219	15%

Source: Social Explorer, Table 165, U.S. Census Bureau, 2015-2019 American Community Survey Estimates.

Table C-10 shows household structures for families with children. Nearly 30% of all households within the county are married family households that have children. Redwood (32%) and Cave Junction (24%) have the highest percentage of single-parent households. These populations will likely require additional support during a disaster and will inflict strain on the system if improperly managed. It is also worth noting that many of the smaller CPD areas have little information on family estimates, particularly regarding single parents with children.

Table C-10 Married-Couple and Single Parent Families with Children

Jurisdiction	Total Households	Married-Couple with Children		Single Parent with Children	
	Estimate	Estimate	Percent	Estimate	Percent
Josephine County	16,714	11,061	0	3,700	0
Incorporated	9,083	5,550	33%	2,435	14%
Cave Junction	712	290	28%	249	24%
Grants Pass	8,371	5,260	33%	2,186	14%
Unincorporated	7,631	5,511	28%	1,265	6%
Kerby	84	47	17%	-	0%
Merlin	306	306	40%	-	0%
New Hope	240	165	24%	65	10%
O'Brien	-	-	0%	-	0%
Redwood	658	167	13%	402	32%
Selma	66	66	25%	-	0%
Takilma	74	74	45%	-	0%
Williams	365	294	56%	71	13%
Other Unincorporated	5,838	4,392	29%	727	5%

Source: U.S. Census Bureau, 2015-2019 American Community Survey Estimates, Table DP02.

Income

Household income and poverty status are indicators of socio demographic capacity and the stability of the local economy. Household income can be used to compare economic areas but does not reflect how the income is divided among the area residents. Table C-11 shows the distribution of household income for 2014 and 2019.

Countywide, between 2014 and 2019 all income cohorts increased or decreased to differing degrees. The share of households with incomes between \$75,000 and \$99,999 increased the most, followed most by those in the \$60,000 and \$74,999 cohort. The share of households with incomes less than \$45,000 decreased during the period.

Table C-II Household Income

Household Income	2014		2019		Change in Share	
	Households	Percent	Households	Percent	Households	Percent
Less than \$15,000	5,167	15%	5,177	14%	10	-0.9%
\$15,000-\$29,999	7,158	21%	6,371	18%	-787	-3.4%
\$30,000-\$44,999	6,146	18%	6,205	17%	59	-0.9%
\$45,000-\$59,999	4,155	12%	4,655	13%	500	0.6%
\$60,000-\$74,999	3,126	9%	3,967	11%	841	1.8%
\$75,000-\$99,999	3,580	11%	4,670	13%	1,090	2.3%
\$100,000-\$199,999	3,963	12%	4,302	12%	339	0.2%
\$200,000 or more	891	3%	1,020	3%	129	0.2%

Source: Social Explorer, Table 56, U.S. Census Bureau, 2015-2019 American Community Survey and 2010-2014 5-Year Estimates. Note: ^ - 2014 and 2019 dollars adjusted for 2021 via Social Explorer's Inflation Calculator

Table C-12 shows decreases and gains, in real incomes, across Josephine County. The 2019 median household income across Josephine County is \$46,185; this is higher than the inflation adjusted 2014 figure, representing a 13% increase in real incomes. Takilma has the highest median household income while O'Brien has the lowest median household income.

Table C-12 Median Household Income

Jurisdiction	Median Household Income		
	2014 [^]	2019	Percent Change
Josephine County	\$40,984	\$46,185	13%
Incorporated	-	-	-
Cave Junction	\$28,644	\$26,578	-7%
Grants Pass	\$36,380	\$44,737	23%
Unincorporated	-	-	-
Kerby	\$15,070	-	-
Merlin	\$56,422	-	-
New Hope	\$59,957	\$66,181	10%
O'Brien	\$23,856	\$21,446	-10%
Redwood	\$40,769	\$58,555	44%
Selma	\$35,896	\$61,751	72%
Takilma	\$97,270	\$81,304	-16%
Williams	\$38,491	\$67,394	75%

Source: Social Explorer, Table 57, U.S. Census Bureau, 2015-2019 and 2010-2014 American Community Survey 5-Year Estimates.

Note: ^ - 2017 and 2019 dollars adjusted for 2021 via Social Explorer's Inflation Calculator

Table C-13 identifies the percentage of individuals and cohort groups that are below the poverty level in 2019. It is estimated that about 18% of individuals live below the poverty level, 9% of individuals live in deep poverty, and 3% of populations 65 and over live in poverty across the county. O'Brien (44%) and Cave Junction (42%) have the highest total population poverty rates. O'Brien and Cave Junction also have the highest number if

individuals in deep poverty. O’Brien (13%) and Williams (7%) has the highest poverty rate for adults aged 65 and older.

Affluent communities are more likely to have both the collective and individual capacity to rebound from a hazard event more quickly, while impoverished communities and individuals may not have this capacity –leading to increased vulnerability. Wealth can help those affected by hazard incidents to absorb the impacts of a disaster more easily. Conversely, poverty, at both an individual and community level, can drastically alter recovery time and quality.

Table C-13 Poverty Rates

	Total Population in Poverty		Children Under 18 in Poverty		18 to 64 in Poverty		65 or over in Poverty	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Josephine County	15,384	18%	4,102	26%	9,156	20%	2,126	10%
Incorporated	7,363	19%	2148	25%	4574	20%	641	8%
Cave Junction	6,312	17%	437	61%	561	46%	53	10%
Grants Pass	1,051	42%	1711	21%	4013	19%	588	8%
Unincorporated	8,021	18%	1954	27%	4582	19%	1,485	10%
Kerby	149	27%	20	30%	106	43%	23	9%
Merlin	439	23%	51	17%	331	27%	57	15%
New Hope	124	8%	26	11%	54	6%	44	10%
O'Brien	279	44%	0	0%	194	59%	85	28%
Redwood	681	23%	355	54%	206	15%	120	13%
Selma	67	11%	0	0%	31	10%	36	17%
Takilma	93	20%	0	0%	77	24%	16	22%
Williams	214	16%	11	3%	111	18%	92	23%
Other Unincorporated	5,975	17%	1491	27%	3472	18%	1,012	9%

Source: Social Explorer Tables 114, 115, 116, U.S. Census Bureau, 2015-2019 American Community Survey Estimates. Compiled by Headwaters Economics.

Federal assistance programs such as food stamps are another indicator of poverty or lack of resource access. Statewide social assistance programs like the Supplemental Nutritional Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF) aid individuals and families. In Josephine County, TANF reaches approximately 900 families per month and SNAP helps to feed about 8,564 people per month.¹⁸ Those reliant on state and federal assistance are more vulnerable in the wake of disaster because of a lack of personal financial resources and reliance on government support.

Education

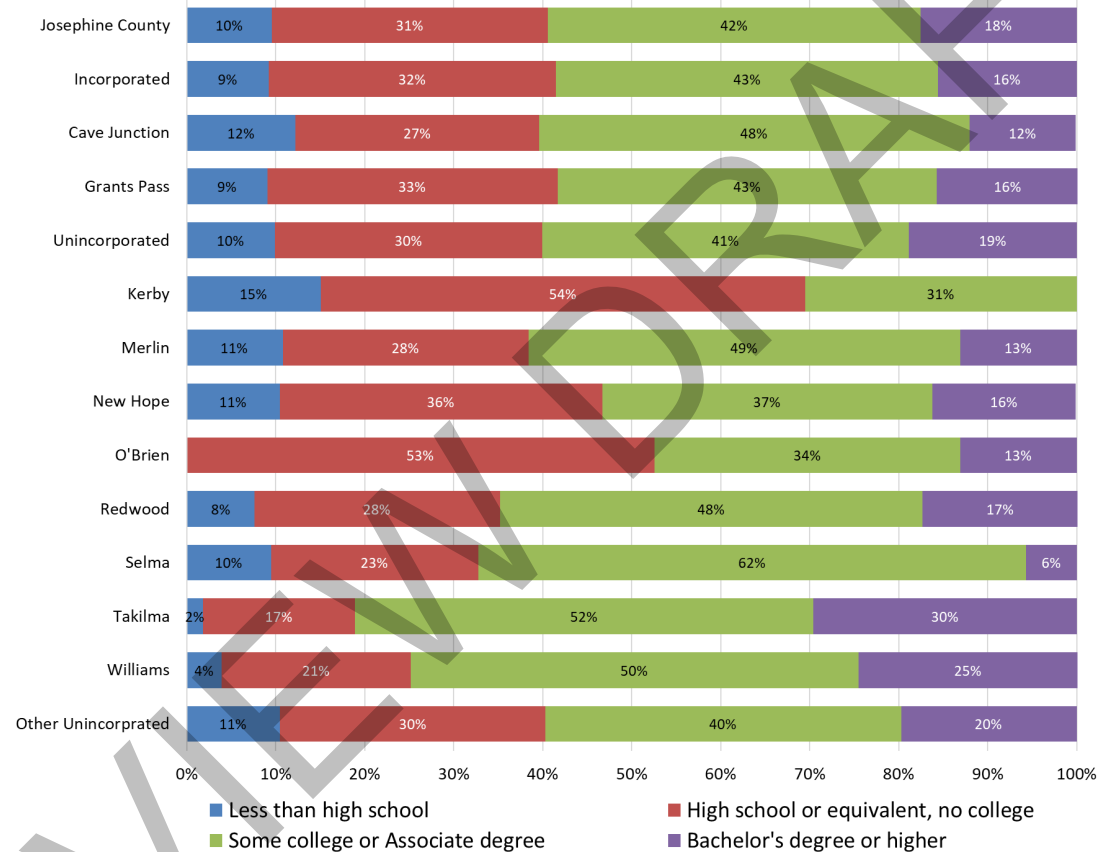
Educational attainment of community residents is also identified as an influencing factor in socio demographic capacity. Educational attainment often reflects higher income and therefore higher self-reliance. Widespread educational attainment is also beneficial for the regional economy and employment sectors as there are potential employees for professional, service, and manual labor workforces. An oversaturation of either highly

¹⁸ Sabatino, J. (2020). Oregon TANF Caseload FLASH, “One and Two Parent Families Combined”, District 8 (Cave Junction and Grants Pass); Septemner 2020 data, and Sabatino, J. (2018). Oregon SNAP Program Activity, “SSP, APD and AAA Combined”, District 8 (Cave Junction and Grants Pass); July 2020 data. Retrieved from State of Oregon Office of Business Intelligence website: <https://www.oregon.gov/dhs/assistance/pages/data.aspx>

educated residents or low educational attainment can have negative effects on the resiliency of the community.

Approximately 10% of the Josephine County population over 25 years does not have a high school degree or equivalent, while 31% have a high school degree or equivalent but do not have college experience. An additional 43% have some college or an Associate degree and 16% have earned a bachelor’s degree or higher (Figure C-4). Kerby and Cave Junction have the lowest percentages of high school graduates. The unincorporated areas have the highest percentages of people with a bachelor’s degree or higher.

Figure C-4 Educational Attainment



Source: Social Explorer, Table 25, U.S. Census Bureau, 2015-2019 American Community Survey Estimates

Health

Individual and community health play an integral role in community resiliency, as indicators such as health insurance, people with disabilities, dependencies, homelessness, and crime rate paint an overall picture of a community’s well-being. These factors translate to a community’s ability to prepare, respond to, and cope with the impacts of a disaster.

The Resilience Capacity Index recognizes those who lack health insurance or are impaired with sensory, mental, or physical disabilities, have higher vulnerability to hazards and will likely require additional community support and resources. Josephine County has 8% of its population without health insurance; Grants Pass and New Hope (9%) have the highest percentages (see Table C-14). The ability to provide services to the uninsured populations

may burden local providers following a natural disaster. Approximately 20% of the Josephine County civilian non-institutionalized population identifies with one or more disabilities. O'Brien and Selma have the highest percentage of their total population with a disability (33% and 30%).

Table C-14 People with Disabilities and without Health Insurance Coverage

Jurisdiction	Total Population	People with a Disability		People without Health Insurance	
		Number	Percent	Number	Percent
Josephine County	86,251	17,036	20%	6,854	8%
Incorporated	40,024	7,530	19%	3,387	8%
Cave Junction	2,479	646	26%	149	6%
Grants Pass	37,545	6,884	19%	3,238	9%
Unincorporated	46,227	9,506	21%	3,467	7%
Kerby	578	129	22%	40	7%
Merlin	1,922	564	29%	103	5%
New Hope	1,593	319	20%	143	9%
O'Brien	636	208	33%	24	4%
Redwood	2,970	842	28%	75	3%
Selma	591	177	30%	29	5%
Takilma	466	50	11%	27	6%
Williams	1,390	233	17%	68	5%
Other Unincorporated	36,081	6,984	19%	2,958	8%

Source: Social Explorer, Table 146, U.S. Census Bureau, 2015-2019 American Community Survey Estimates.

Table C-15 displays disability status of the population by type and age. Older populations tend to have more disabilities than younger populations in Josephine County. Approximately 20% of the population 65 and over has an ambulatory disability, 16% have a hearing disability, and 11% have an independent living disability. Depending on the type of disability outreach, mitigation, and response efforts may need to be adjusted.

Table C-15 Disability Type by Age Group – Josephine County

	Hearing Disability	Vision Disability	Cognitive Disability	Ambulatory Disability	Self-Care Disability	Independent Living Disability
Total Population [^]	6%	3%	8%	10%	4%	7%
Under 18*	2%	2%	8%	1%	2%	-
18 to 64*	3%	2%	8%	8%	2%	6%
65 and over*	16%	6%	9%	20%	7%	11%

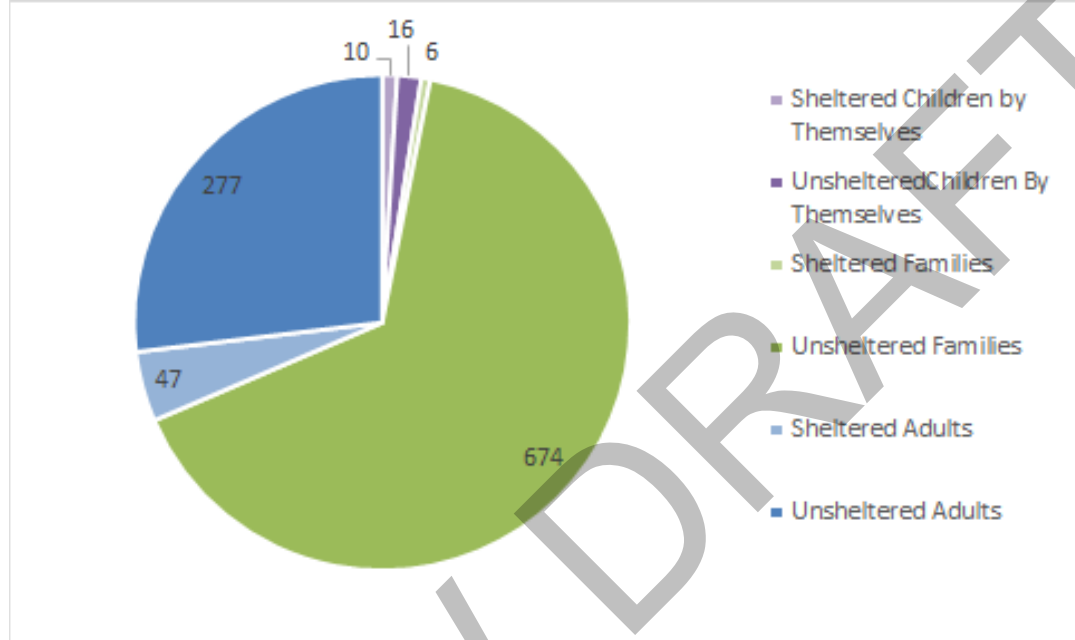
Source: Social Explorer, U.S. Census Bureau, 2015-2019 American Community Survey Estimates, Tables B18102 through B18107.

Notes: [^] non-institutionalized civilian population age 5 years and older, except for Independent Living Disability which is age 18 years and older., * Percent of age group

In 2019, Oregon Housing and Community Services (OHCS) conducted a point-in-time homeless count to identify the number of homeless, their age and their family type. As

Figure C-5 displays, the OHCS study found that 1,030 individuals and persons in families in Josephine County identify as homeless (~2% of total population); only 63 people were sheltered (47 individuals and 16 children or persons in families), and 967 people (94% of the homeless population) were unsheltered (277 individuals, 674 persons in families, and 16 children by themselves).

Figure C-5 Josephine County PIT Homeless Count (2019)



Source: Oregon Housing and Community Services, 2019 Point-in-Time Homeless Count

The homeless have little resources to rely on, especially during an emergency. It will likely be the responsibility of the county, cities, and local non-profit entities to provide services such as shelter, food, and medical assistance. Therefore, it is critical to foster collaborative relationships with agencies that will provide additional relief such as the American Red Cross and homeless shelters. It will also be important to identify how to communicate with these populations, since traditional means of communication may not be appropriate or available.

Household Characteristics – Vehicles Available

Countywide one percent (1%) of all occupied households, and four percent (4%) of renter-occupied households, have no vehicle available (Table C-16). The percentage of all households without a vehicle available is greatest in Grants Pass (3%); for renter occupied households the percentage is also greatest in Grants Pass (11%) Household access to a vehicle is key to evacuating quickly and safely. Households that have no access to a vehicle or limited vehicles available may face delays, or need assistance, to evacuate. Due to the rural nature of the county, households are more likely to have a vehicle.

Table C-16 Vehicles Available (All Households and Renter Occupied)

Jurisdiction	Occupied Housing			Renter Occupied Housing		
	Housing Units	No Vehicle	One Vehicle	Housing Units	No Vehicle	One Vehicle
Josephine County	57,011	1%	14%	28,080	4%	14%
Incorporated	20,024	1%	10%	18,982	10%	23%
Cave Junction	1,198	1%	12%	1,272	8%	22%
Grants Pass	18,826	3%	17%	17,710	11%	23%
Unincorporated	36,987	1%	8%	9,098	0%	3%
Kerby	507	0%	28%	71	0%	6%
Merlin	1,250	0%	13%	672	0%	19%
New Hope	1,206	1%	3%	387	3%	0%
O'Brien	517	0%	42%	119	0%	0%
Redwood	2,276	2%	23%	685	2%	8%
Selma	513	0%	19%	73	0%	6%
Takilma	418	0%	29%	48	0%	0%
Williams	1014	2%	17%	376	0%	0%
Other Unincorporated	29,286	1%	7%	6667	2%	15%

Source: Social Explorer, Tables 182 and 199, U.S. Census Bureau, 2015-2019 American Community Survey Estimates

Synthesis

Socio demographic capacity is a significant indicator of county hazard resiliency. Josephine County is not the largest county in the state of Oregon, in terms of population. With 85,640 residents, resiliency and hazard mitigation efforts can be a lot harder to manage. The characteristics and qualities of the community population such as age, race, education, income, and health and safety are significant factors that can influence the county's ability to cope, adapt to, and recover from natural disasters. The status of socio demographic capacity indicators can have long term impacts on the economy and stability ultimately affecting future resiliency of Josephine County.

One important thing to consider is that there are several residents who are not proficient in English. Language barriers will often make it difficult to reach populations of residents who don't speak English. Resiliency efforts need to focus on targeting these populations as they will be most vulnerable and may have trouble knowing what to do in the event of a disaster. It is also important to think about the county's population in terms of its age groups; it is important to cater information towards each of these populations individually, as it is necessary to be able to reach out to all age groups. In 2019, the percentage of residents aged 65 and older was 26%; by 2040, that percentage is expected to increase to 30%. While disasters don't affect certain age groups more than others, information can be dispersed and catered depending on who may be the most vulnerable.

Josephine County socio-economic factors to consider include:

- The median household income across the county has increased to \$45,616. "Real" median household incomes are decreasing in all unincorporated communities.

- 18% of the population is considered in poverty, and 14% of those in poverty are over 65. Poverty rates are highest in O'Brien and Cave Junction.
- 20% of the population has a disability, much of this population is 65 years or older.
- There are 1,030 people, about 2% of the county population, experiencing homelessness in Josephine County and only 6% of that population is sheltered.

Highlighting the above socio-economic factors and looking at the Socio Demographic Capacity of the county is important as it affects the resiliency of the county and helps determine target areas and potential vulnerable populations for increased notification on mitigation and resiliency efforts.

Economic Capacity

Economic capacity refers to the financial resources present, and revenue generated in the community to achieve a higher quality of life. Income equality, housing affordability, economic diversification, employment, and industry are measures of economic capacity. However, economic resilience to natural disasters is far more complex than merely restoring employment or income in the local community. Building a resilient economy requires an understanding of how the component parts of employment sectors, workforce, resources, and infrastructure are interconnected in the existing economic picture. Once any inherent strengths or systematic vulnerabilities become apparent, both the public and private sectors can act to increase the resilience of the local economy.

Regional Affordability

The evaluation of regional affordability supplements the identification of social/demographic capacity indicators, i.e., median income, and is a critical analysis tool to understanding the economic status of a community. This information can capture the likelihood of individuals' ability to prepare for hazards, through retrofitting homes or purchasing insurance. If the community reflects high-income inequality or housing cost burden, the potential for homeowners and renters to implement mitigation can be drastically reduced. Therefore, regional affordability is a mechanism for generalizing the abilities of community residents to get back on their feet without Federal, State, or local assistance.

Income Equality

Income equality is a measure of the distribution of economic resources, as measured by income, across a population. It is a statistic defining the degree to which all persons have a similar income. The table below illustrates the county and cities level of income inequality. The Gini index is a measure of income inequality. The index varies from zero to one. A value of one indicates perfect inequality (only one household has any income). A value of zero indicates perfect equality (all households have the same income).¹⁹

Table C-17 shows that the countywide income inequality coefficient is 0.45. The areas of greatest income inequality are Kerby (0.58), O'Brien (0.53), and Cave Junction (0.48). The

¹⁹University of California Berkeley. Building Resilient Regions, Resilience Capacity Index. <http://brr.berkeley.edu/rci/>.

areas of greatest income equality are Takilma (0.31), Selma (0.35), and Williams (0.36). Based on social science research, the region’s cohesive response to a hazard event may be affected by the distribution of wealth in communities that have less income equality.²⁰

Table C-17 Regional Income Inequality

Jurisdiction	Income Inequality Coefficient
Josephine County	0.45
Incorporated	
Cave Junction	0.48
Grants Pass	0.44
Unincorporated	
Kerby	0.58
Merlin	0.43
New Hope	0.42
O'Brien	0.53
Redwood	0.41
Selma	0.35
Takilma	0.31
Williams	0.36

Source: Social Explorer, Table 157, U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates

Housing Affordability

Housing affordability is a measure of economic security gauged by the percentage of an area’s households paying less than 30% of their income on housing.²¹ Households spending more than 30% are considered housing cost burdened. Table C-18 displays the percentage of homeowners and renters reflecting housing cost burden across the region.

Countywide roughly 41% of homeowners with a mortgage have a housing cost burden, compared to over 54% of renters. The communities of Williams (92%), O’Brien (69%), Redwood (48%), and Cave Junction (48%) have the highest rates of owners with a mortgage with a housing cost burden. Amongst renters, Grants Pass, Cave Junction, Kerby and O’Brien have more than 50% with a housing cost burden. In general, the population that spends more of their income on housing has proportionally fewer resources and less flexibility for alternative investments in times of crisis.²² This disparity imposes challenges for a community recovering from a disaster as housing costs may exceed the ability of residents to repair or move to a new location. These populations may live paycheck to paycheck and are extremely dependent on their employer, in the event their employer is also impacted it will further the detriment experienced by these individuals and families.

²⁰ Susan Cutter, Christopher G. Burton, and Christopher T. Emrich. 2010. “Disaster Resilience Indicators for Benchmarking Baseline Conditions,” *Journal of Homeland Security and Emergency Management* 7, no.1: 1-22

²¹ University of California Berkeley. Building Resilient Regions, Resilience Capacity Index. <http://brr.berkeley.edu/rci/>.

²² Ibid.

Table C-18 Households Spending > 30% of Income on Housing

Jurisdiction	Owners		Renters
	With Mortgage	Without Mortgage	
Josephine County	41%	12%	54%
Incorporated	38%	11%	57%
Cave Junction	38%	30%	69%
Grants Pass	38%	10%	56%
Unincorporated	43%	12%	48%
Kerby	65%	7%	100%
Merlin	22%	23%	36%
New Hope	51%	0%	14%
O'Brien	54%	0%	100%
Redwood	48%	15%	80%
Selma	59%	7%	0%
Takilma	19%	0%	0%
Williams	68%	12%	8%
Other Unincorporated	42%	13%	49%

Source: Social Explorer, Tables 103 and 109, U.S. Census Bureau, 2015-2019 American Community Survey Estimates.

Economic Diversity

Economic diversity is a general indicator of an area's fitness for weathering difficult financial times. One method for measuring economic diversity is through use of the Herfindahl Index, a formula that compares the composition of county and regional economies with those of states or the nation. Using the Herfindahl Index, a diversity ranking of 1 indicates the county with the most diverse economic activity compared to the state, while a ranking of 36 corresponds with the least diverse county economy. The table below describes the Herfindahl Index Scores for counties in the region.

Table C-19 shows that Josephine County has an economic diversity rank of 16 as of 2019, this is on a scale between all 36 counties in the state where 1 is the most diverse economic county in Oregon and 36 is the least diverse. The county's ranking has declined from a rank of 9 in 2016.

Table C-19 Regional Herfindahl Index Scores

County	2016			2019		
	Employment	Number of Industries	State Rank	Employment	Number of Industries	State Rank
Josephine	22,300	199	9	25,336	202	16
Curry	5,241	135	25	5,455	136	28
Douglas	29,674	207	10	31,445	210	8
Jackson	73,845	243	8	79,755	242	7

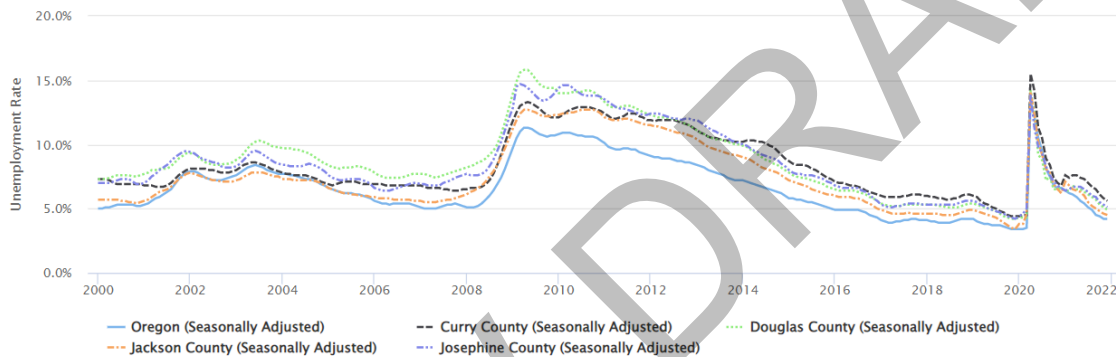
Source: Oregon Employment Department

While illustrative, economic diversity is not a guarantor of economic vitality or resilience. Josephine County, as of March 2021, is listed as an economically distressed community as prescribed by Oregon Law. The economic distress measure is based on indicators of decreasing new jobs, average wages, and income, and is associated with an increase of unemployment.²³

Employment and Wages

According to the Oregon Employment Department (Figure C-6), unemployment in Josephine County has declined since 2009 (13.9%) but as of 2021 remains slightly higher (6.2%) than the State of Oregon (5.2%) and other counties in the region. Note: there has been a spike in unemployment related to the COVID-19 pandemic.

Figure C-6 Unemployment Rate



Source: Oregon Employment Department, “Local Area Employment Statistics”, [Qualityinfo.org](https://qualityinfo.org).

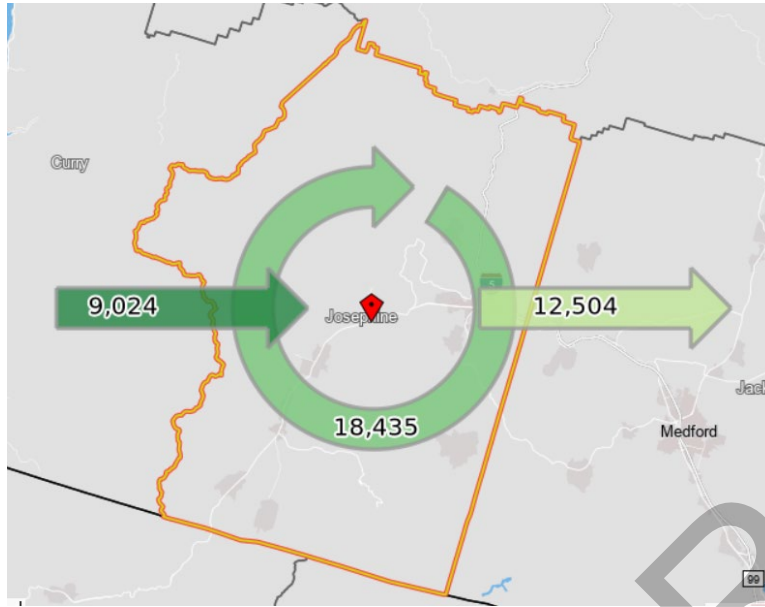
Labor and Commute Shed

Most hazards can happen at any time during the day or night. It may be possible to give advance warning to residents and first responders who can take immediate preparedness and protection measures, but the variability of hazards is one part of why they can have such varied impact. A snowstorm during the workday will have different impacts than one that comes during the night. During the day, a hazard has the potential to segregate the population by age or type of employment (e.g., school children at school, office workers in downtown areas). This may complicate some aspects of initial response such as transportation or the identification of wounded or missing. Conversely, a hazard at midnight may occur when most people are asleep and unable to receive an advance warning through typical communication channels. The following labor shed, and commute shed analysis is intended to document where county residents work and where people who work in Josephine County reside.

Josephine County employers draw in more than 9,024 workers from outside the county. The Josephine County economy is a cornerstone of regional economic vitality. Figure C-7 shows the county’s laborshed; the map shows that about 67% (18,435) of workers (all jobs) live and work in the county (, 33% (9,024) of workers come from outside the county), and about 46% (12,504) of residents work outside of the county

²³ Business Oregon – Oregon Economic Data “Distressed Communities List”, <https://www.oregon.gov/biz/reports/Pages/DistressedAreas.aspx>

Figure C-7 Josephine County Laborshed



Source: U.S. Bureau of the Census, [On The Map](#).

Table C-20 shows where workers commute to, who reside in Josephine County Figure C-19 shows the location of those employment areas in Josephine County (and Medford area). Of 18,435 jobs, approximately two-thirds of Josephine County employed residents work inside of the County; 17% work in Jackson County (of which, 31%, 5% of total) work in the city of Medford, , and 3% work in Coos or Curry County.

Table C-20 Commute Shed (Where Workers are Employed who Live in Josephine County), 2019

Jurisdiction	Number of Jobs	Share
All Counties	30,939	100%
Josephine County, OR	18,435	59.6%
Jackson County, OR	6091	19.7%
Douglas County, OR	1114	3.6%
Lane County, OR	740	2.4%
Multnomah County, OR	716	2.3%
Marion County, OR	534	1.7%
Coos County, OR	465	1.5%
Washington County, OR	444	1.4%
Deschutes County, OR	270	0.9%
Clackamas County, OR	255	0.8%
All Other Locations	1,875	6.1%

Source: U.S. Bureau of the Census, On The Map.

Table C-21 shows where workers live who work in Josephine County. Approximately 60% of Josephine County workers live inside of the County; 20% live in Jackson County, 4% in Douglas County, and 2% live in Coos County.

Table C-21 Labor Shed (Where Workers Live who are Employed in Josephine County), 2019

Jurisdiction	Number of Jobs	Share
All Counties	27,459	100%
Josephine County, OR	18,435	67.1%
Jackson County, OR	4735	17.2%
Douglas County, OR	969	3.5%
Coos County, OR	466	1.7%
Lane County, OR	294	1.1%
Curry County, OR	213	0.8%
Multnomah County, OR	197	0.7%
Marion County, OR	170	0.6%
Deschutes County, OR	165	0.6%
Washington County, OR	155	0.6%
All Other Locations	1,660	6.0%

Source: U.S. Bureau of the Census, [On The Map](#).

Workers can be impacted during a disaster to varying levels based upon their means of transportation to work. Commuters who use motorized vehicles and public transportation that rely upon maintained roads, bridges, and other infrastructure may be delayed or unable to travel if infrastructure is impacted during an event (for example, earthquakes or heavy winter storms). Table C-22 shows that 88% of Josephine County commuters utilized motorized vehicles (cars, trucks, vans, or motorcycles) and less than one percent (1%) use public transportation. Five Percent (5%) of commuters bike or walk to work, and six percent (6%) work from home. Kerby (24%), Williams (16%), Redwood (13%), and Cave Junction (10%) have the highest percentage of workers who work from home.

Mitigation activities are needed at the business level to ensure the health and safety of workers and limit damage to industrial infrastructure. Employees are highly mobile, commuting from all over the surrounding area to industrial and business centers. As daily transit rises, there is an increased risk that a natural hazard event will disrupt the travel plans of residents across the region and seriously hinder the ability of the economy to meet the needs of Josephine County residents and businesses.

Table C-22 Means of Transportation to Work

Jurisdiction	Workers (16 and older)	Motorized Vehicle [^] (Percent)	Public Transportation (Percent)	Bike/ Walked (Percent)	Other (Percent)	Worked at Home (Percent)
Josephine County	31,519	88%	1%	5%	1%	6%
Incorporated	16,244	90%	1%	5%	1%	4%
Cave Junction	556	79%	0%	11%	0%	10%
Grants Pass	15,688	91%	1%	5%	1%	3%
Unincorporated	15,275					
Kerby	68	76%	0%	0%	0%	24%
Merlin	716	91%	0%	0%	6%	2%
New Hope	670	90%	0%	5%	1%	3%
O'Brien	207	100%	0%	0%	0%	0%
Redwood	1,013	85%	2%	0%	0%	13%
Selma	137	100%	0%	0%	0%	0%
Takilma	241	93%	0%	0%	0%	7%
Williams	496	59%	0%	25%	0%	16%
Other Unincorporated	11,727	85%	1%	5%	1%	8%

Source: Social Explorer, Table 128, U.S. Census Bureau, 2015-2019 American Community Survey Estimates

Notes: ^ - includes car, truck, van, or motorcycle

Industry

Key industries are those that represent major employers and are significant revenue generators. Different industries face distinct vulnerabilities to natural hazards, as illustrated by the industry specific discussions below. Identifying key industries in the region enables communities to target mitigation activities towards those industries' specific sensitivities. It is important to recognize that the impact that a natural hazard event has on one industry can reverberate throughout the regional economy.

This is of specific concern when the businesses belong to the basic sector industry. Basic sector industries are those that are dependent on sales outside of the local community; they bring money into a local community via employment. The farm and ranch, information, and wholesale trade industries are all examples of basic industries. Non-basic sector industries are those that are dependent on local sales for their business, such as retail trade, construction, and health services.

Employment by Industry

Economic resilience to natural disasters is particularly important for the major employment industries in the region. If these industries are negatively impacted by a natural hazard, such that employment is affected, the impact will be felt throughout the regional economy. Thus, understanding and addressing the sensitivities of these industries is a strategic way to increase the resiliency of the entire regional economy.

Table C-23 identifies Employment by industry. The industry sectors in Josephine County with the highest percentage of the workforce are Education and Health Services (24%), Trade, Transportation & Utilities (19%), Retail Trade (15%), Leisure and Hospitality, (11%) and Manufacturing (11%).

Table C-23 Total Non-Farm Employment by Industry 2020, Expected Growth 2030

Employment Sector	2020				Percent Change in Employment (2015-2020)	Employment Forecast* (2020-2030)
	Firms	Employees	Percent Workforce	Average Wage		
Total Payroll Employment	2,640	27,909	100%	\$ 41,609	11.7%	14%
Total Private	2,552	24,714	89%	\$ 40,188	14.9%	16%
Natural Resources and Mining	112	907	3%	\$ 37,704	94.6%	19%
Construction	262	1,178	4%	\$ 44,820	44.4%	14%
Manufacturing	110	2,948	11%	\$ 46,671	0.7%	10%
Trade, Transportation & Utilities	434	5,350	19%	\$ 35,974	5.3%	10%
Wholesale Trade	94	732	3%	\$ 49,839	-15.7%	7%
Retail Trade	294	4,159	15%	\$ 32,309	9.0%	10%
Information	45	458	2%	\$ 47,175	15.1%	3%
Financial Activities	50	258	1%	\$ 53,993	2.0%	15%
Professional and Business Services	224	1,387	5%	\$ 62,234	27.6%	16%
Education and Health Services	324	2,066	7%	\$ 43,811	3.0%	17%
Leisure and Hospitality	546	6,572	24%	\$ 45,044	40.6%	31%
Other Services	240	3,118	11%	\$ 19,824	5.3%	12%
Private Non-Classified	214	904	3%	\$ 29,125	-26.6%	-
Unclassified	35	27	0%	\$ 45,831	-	-
Government	88	3,195	11%	\$ 52,599	-8.4%	6%
Federal	18	278	1%	\$ 69,591	2.6%	-2%
State	13	437	2%	\$ 54,808	-47.8%	10%
Local	57	2,480	9%	\$ 50,305	4.3%	7%

Source: Oregon Employment Department, "2015 and 2020 Covered Employment and Wages Summary Reports" and "Regional Employment Projections by Industry & Occupation 2020-2030"²⁴. <http://www.qualityinfo.org>.

Basic industries encourage growth in non-basic industries and bring wealth into communities from outside markets. However, a high dependence on basic industries can lead to severe difficulties when recovering from a natural disaster if vital infrastructure or primary resource concentrations have been greatly damaged. While Josephine County has some basic industries, such as Trade and Leisure Hospitality and manufacturing, four out of the six largest industrial sectors are of the non-basic nature and thus they rely on local sales and services. Trending towards basic industries can lead to higher community resilience.

Future Employment in Industry

Table C-23 shows that between 2015 and 2020, the sectors that experienced the largest percent growth were Natural Resources and Mining (95%), Construction (44%), Education and Health Services (41%), and Financial Activities (28%). Some of these sectors often require more training and education, while others require less education and have lower wages.

Sectors that are anticipated to be major employers in the future also warrant special attention in the hazard mitigation planning process. Table C-23 shows that, between 2020

²⁴ Tauer, Guy. (2021) " 'Industry Employment Projections, 2020-2030, Jackson and Josephine Counties.' Oregon Employment Department, Workforce and Economic Research Division, 11 Nov. 2021.

and 2030, the largest employment growth in the region is anticipated within Leisure and Hospitality (31%), Education and Health Services (17%), Professional and Business Services (16%), and Natural Resources and Mining (16%). Mitigation activities that respond to the needs of these sectors may help to ensure the resilience of the economy and help the community stay open for business following a disaster.

High Revenue Sectors

Table C-24 shows the revenue generated by each reported economic sector (not all sectors are reported). In 2017, the three sectors with the highest revenue, were Retail Trade, Manufacturing, and Health Care and Social Assistance. All the reported sectors combined generated more than \$3.1 billion in revenue for the county in 2017, with the top three sectors comprising 74% (\$2.3 Billion) of total revenue

Table C-24 Revenue of Top Sectors in Josephine County 2012 and 2017

Sector Meaning (NAICS code)	Firms		Sector Revenue		Percent Change in Revenue (2012 to 2017)
	2012	2017	2012 [^] (\$1,000)	2017 (\$1,000)	
Utilities	5	-	Q	Q	-
Manufacturing	106	109	\$466,868	\$561,205	20.2%
Wholesale trade	49	56	D	\$294,534	-
Retail trade	312	323	\$1,060,675	\$1,208,103	13.9%
Transportation and warehousing	45	40	\$29,932	\$37,588	25.6%
Information	32	38	N	N	-
Finance and insurance	123	107	N	N	-
Real estate and rental and leasing	106	107	\$48,101	\$63,947	32.9%
Professional, scientific, and technical services	140	128	\$43,548	\$74,894	72.0%
Administrative and support and waste management and remediation services	97	101	\$93,743	\$104,537	11.5%
Educational services	6	10	\$1,796	\$3,158	75.8%
Health care and social assistance	269	298	\$449,318	\$525,495	17.0%
Arts, entertainment, and recreation	34	32	\$16,121	\$17,632	9.4%
Accommodation and food services	199	208	\$133,640	\$169,844	27.1%
Other services (except public administration)	103	107	D	\$40,676	-
Total	1,626	1,664	\$2,343,742	\$3,101,613	32.3%

Source: U.S. Census Bureau, 2014 and 2019 Economic Census, Table EC1200A1 (2012) and EC1700BASIC (2017).
[^] 2012 dollars are adjusted for 2017 using the Social Explorer Inflation Calculator.

Josephine County relies on both basic and non-basic sector industries, and it is important to consider the effects each may have on the economy following a disaster. Basic sector businesses have a multiplier effect on a local economy that can spur the creation of new jobs, some of which may be non-basic. The presence of basic sector jobs can help speed the local recovery; however, if basic sector production is hampered by a natural hazard event, the multiplier effect could be experienced in reverse. In this case, a decrease in basic sector purchasing power results in lower profits and potential job losses for the non-basic businesses that are dependent on them.

If any of these primary sectors are impacted by a disaster, Josephine County may experience a significant disruption of economic productivity.

Synthesis

Regional economic capacity refers to the present financial resources and revenue generated in the community to achieve a higher quality of life. Forms of economic capital include income equality, housing affordability, economic diversifications, employment, and industry. The current and anticipated financial conditions of a community are strong determinants of community resilience, as a strong and diverse economic base increases the ability of individuals, families, and the county to absorb disaster impacts for a quick recovery.

The current and anticipated financial conditions of a community are strong determinants of community resilience, as a strong and diverse economic base increases the ability of individuals, families, and the community to absorb disaster impacts for a quick recovery. The county's economy is expected to grow by 2030. It is important to consider what might happen to the county economy if the largest revenue generators and employers are impacted by a disaster. Strategies and actions to reduce vulnerability from an economic focus are imperative and should focus on risk management for the county's dominant industries.

Several industries, including Natural Resources and Mining, Construction, and Education and Health Services saw significant increases in employment from 2015 to 2020. While relying heavily on its top revenue-producing industries - Retail Trade, Health Care and Social Assistance, and Manufacturing- it is important for the county to consider the economic impacts that affect its residents in the event of a disaster. Strategies and actions to reduce vulnerability from an economic focus are imperative and should focus on risk management for the county's dominant industries.

Physical Infrastructure Capacity

Physical infrastructure capacity refers to the built environment and infrastructure that supports the community. The various forms, quantity, and quality of built capital mentioned above contribute significantly to community resilience. Physical infrastructures, including utility and transportation lifelines, are critical during a disaster and are essential for proper functioning and response. The lack or poor condition of infrastructure can negatively affect a community's ability to cope, respond and recover from a natural disaster.

Land Use and Development Patterns

Historically, the County, region and state economy are based on timber, tourism, and agriculture. This, along with the large portions of the county that are public lands, impacted the land use and development patterns in the county.

The Board of County Commissioners began adopting land use regulations in 1956. Then, in 1973, the Oregon Legislature adopted mandatory requirement for local jurisdictions commonly referred to as Oregon's 19 Statewide Planning Goals. The Goals express the state's policies on land use and related topics, such as citizen involvement, housing, and natural resources. Local jurisdictions including Counties and incorporated cities must prepare and adopt comprehensive plans, zoning regulations, land use permitting regulations. As part of the 19 Goals, Urban Growth Boundaries (UGBs) were established to separate areas planned for urban use as opposed to rural uses. Urban Growth boundaries are not necessarily city boundaries and, unlike a city boundary, must contain land enough land to meet estimated 20-year employment and population growth. Additionally, the UGB must be regularly periodically to assess the land capacity.

Much of Josephine County is publicly owned including the Rogue River National Forest, the Grants Pass District State Forest, and the Wolf Creek County Park. Josephine County has two incorporated cities, Cave Junction and Grants Pass. The Urban Growth Boundaries (UGBs) were established around Grants Pass and Cave Junction in 1979. In the early 1980's the City of Grants Pass and the County established a joint Urban Area Planning Commission to review and approve land use decisions and an Intergovernmental Agreement for joint management of the Grants Pass UGB. Refer to the Grants Pass addendum for additional information.

Josephine County is experiencing significant changes in development patterns resulting from the legalization of marijuana. Land use and building permit applications related to marijuana greenhouse and processing facilities have increased significantly in recent years. Issues associated with water quality and quantity are being reported. Additionally, concerns related to wildfire, landslide, and flood vulnerabilities were raised by members of the steering committee. In short, Josephine County is experiencing change in development patterns countywide.

Regulatory Context

Oregon land use laws require land outside Urban Growth Boundaries (UGBs) to be protected for farm, forest, and aggregate resource values. For the most part, this law limits the amount of development in the rural areas. However, the land use designation can change from resource protection in one of two ways:

- The requested change could qualify as an exception to Statewide Planning Goals, in which case the city must demonstrate to the State that the change meets requirements for an exception. These lands, known as exception lands, are predominantly designated for residential use.
- Resource land can also be converted to non-resource use when it can be demonstrated to Grants Pass that the land is no longer suitable for farm or forest production.

Local and state policies currently direct growth away from rural lands into UGBs, and, to a lesser extent, into rural communities. If development follows historical development trends, urban areas will expand their UGBs, rural unincorporated communities will continue to grow, and overall rural residential density will increase slightly with the bulk of rural lands kept in farm and forest use. The existing pattern of development in the rural areas, which is radiating out from the urban areas along rivers and streams, is likely to continue. Most of the “easy to develop” land is already developed, in general leaving more constrained land such as land in the floodplains or on steep slopes to be developed in the future, perhaps increasing the rate at which development occurs in natural hazard areas.

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of 19 statewide planning goals that express the state's policies on land use and on related topics, such as citizen involvement, land use planning, and natural resources.

Most of the goals are accompanied by "guidelines," which are suggestions about how a goal may be applied. Oregon's statewide goals are achieved through local comprehensive planning. State law requires each county and city to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect. The local comprehensive plans must be consistent with the statewide planning goals. Plans are reviewed for such consistency by the state's Land Conservation and Development Commission (LCDC). When LCDC officially approves a local government's plan, the plan is said to be "acknowledged." It then becomes the controlling document for land use in the area covered by that plan.

Goal 7

Goal 7: Areas Subject to Natural Disasters and Hazards has the overriding purpose to “protect people and property from natural hazards”. Goal 7 requires local governments to adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards. Natural hazards include floods, landslides, earthquakes, tsunamis, coastal erosion, and wildfires.

To comply with Goal 7, local governments are required to respond to new hazard inventory information from federal or state agencies. The local government must evaluate the hazard risk and assess the:

- a) frequency, severity, and location of the hazard;
- b) effects of the hazard on existing and future development;
- c) potential for development in the hazard area to increase the frequency and severity of the hazard; and
- d) types and intensities of land uses to be allowed in the hazard area.

Local governments must adopt or amend comprehensive plan policies and implementing measures to avoid development in hazard areas where the risk cannot be mitigated. In addition, the siting of essential facilities, major structures, hazardous facilities, and special occupancy structures should be prohibited in hazard areas where the risk to public safety cannot be mitigated. The state recognizes compliance with Goal 7 for coastal and riverine flood hazards by adopting and implementing local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements.

In adopting plan policies and implementing measures for protection from natural hazards local governments should consider:

- a) the benefits of maintaining natural hazard areas as open space, recreation, and other low density uses;
- b) the beneficial effects that natural hazards can have on natural resources and the environment; and
- c) the effects of development and mitigation measures in identified hazard areas on the management of natural resources.

Local governments should coordinate their land use plans and decisions with emergency prevention, protection, mitigation, response, and recovery programs. Given the numerous waterways and forested lands throughout much of Josephine County, special attention should be given to problems associated with riverbank erosion and potential for wildland/urban interface fires.

Goal 7 guides local governments to give special attention to emergency access when considering development in identified hazard areas, including:

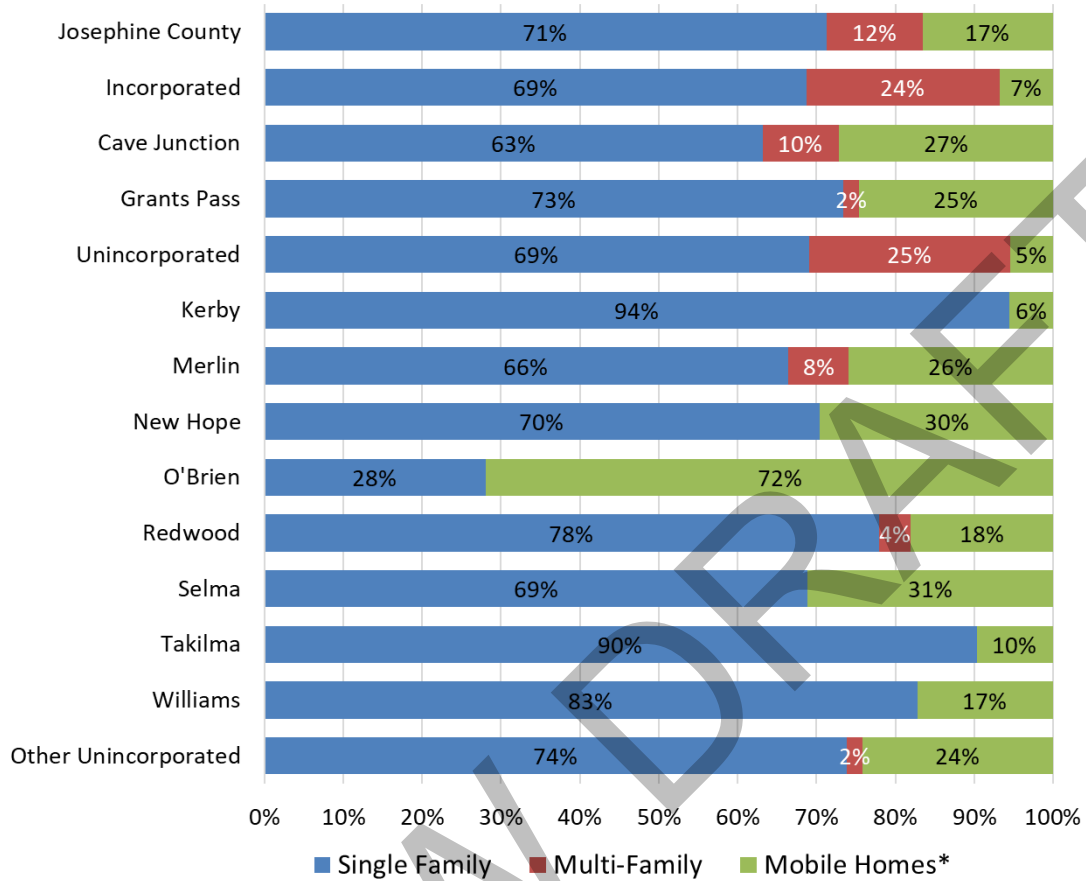
- a) Consider programs to manage stormwater runoff as a means to address flood and landslide hazards;
- b) Consider non-regulatory approaches to help implement the goal;
- c) When reviewing development requests in high hazard areas, require site specific reports, appropriate for the level and type of hazards. Site specific reports should evaluate the risk to the site, as well as the risk the proposed development may pose to other properties; and
- d) Consider measures exceeding the National Flood Insurance Program.

Housing

The Figure C-8 identifies the types of housing most common throughout the county. Of interest are mobile homes, which account for about 17% of the housing countywide; and about 72% in O'Brien.

Mobile homes are particularly vulnerable to certain natural hazards, such as windstorms, and special attention should be given to securing the structures, because they are more prone to wind damage than wood-frame construction. In other natural hazard events, such as earthquakes and floods, moveable structures like mobile homes are more likely to shift on their foundations and create hazardous conditions for occupants.

Figure C-8 Housing Profile



Source: Social Explorer, Table 97, U.S. Census Bureau, 2015-2019 American Community Survey

Aside from location and type of housing, the year structures were built has implications. In the 1970's, FEMA began assisting communities with floodplain mapping as a response to administer the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Upon receipt of floodplain maps, communities started to develop floodplain management ordinances to protect people and property from flood loss and damage. Housing within the floodplain is generally less vulnerable to flood if it was built after the implementation of floodplain development ordinances.

The National Flood Insurance Program's (NFIP's) Flood Insurance Rate Maps (FIRMs) delineate flood-prone areas. They are used to assess flood insurance premiums and to regulate construction so that in the event of a flood, damage minimized. For more information about the flood hazard, NFIP, and FIRMs, please refer to Flood Hazard section of the Risk Assessment.

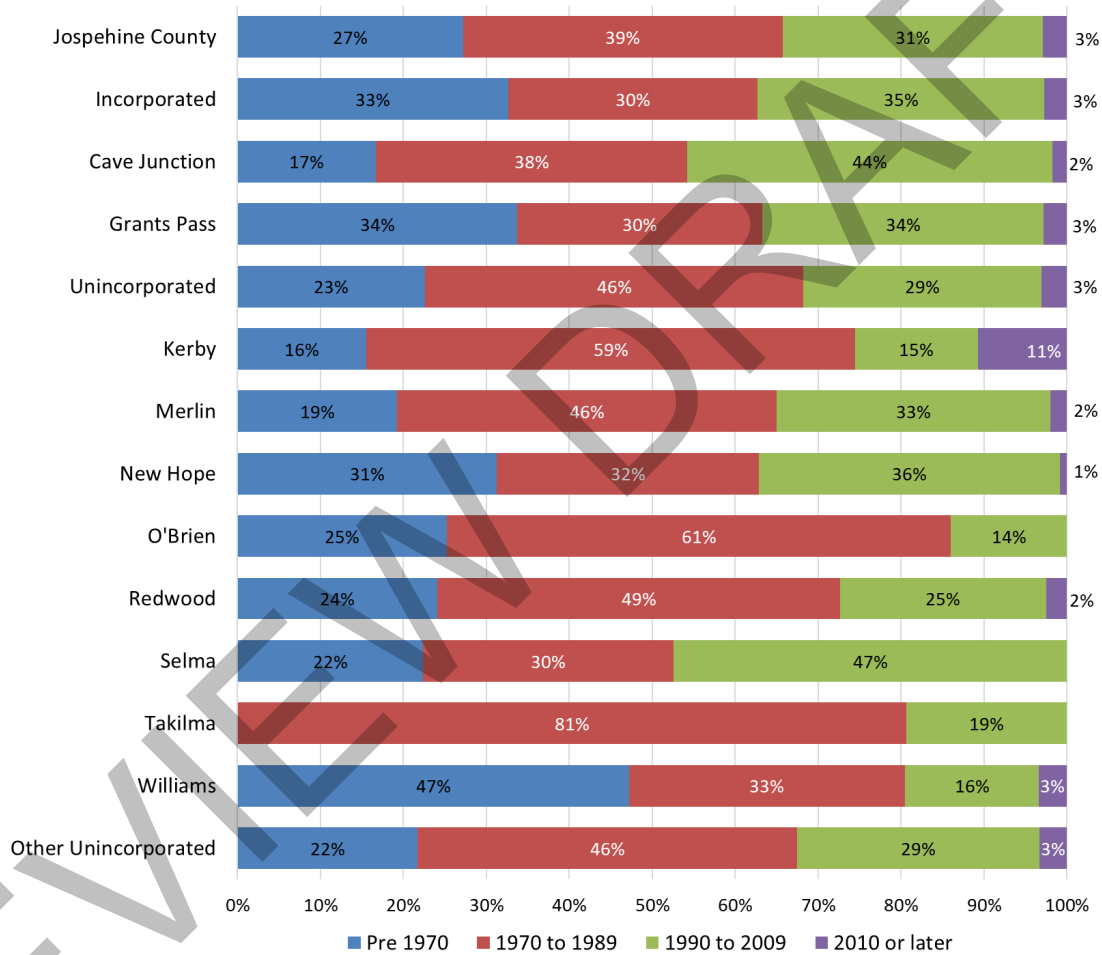
Seismic building standards were codified in Oregon building code starting in 1974; more rigorous building code standards were passed in 1993 that accounted for the Cascadia

earthquake fault.²⁵ Therefore, homes built before 1993 are more vulnerable to seismic events.

Figure C-9 shows that, countywide, 27% of the housing stock was built prior to 1970, before the implementation of floodplain management ordinances; Williams has almost one-half of its housing units built prior to 1970.

Countywide, 66% of the housing stock was built before 1990 and the codification of stricter seismic building standards (Table C-25).

Figure C-9 Year Structure Built



Source: U.S. Census Bureau, 2015-2019 American Community Survey Estimates, Table B25034

DOGAMI's interpretation of state building code histories and evolution as described by Judson (2012), Oregon Building Codes Division (2002, 2010) and Business Oregon (2015) is shown in Table C-25.

²⁵ State of Oregon Building Codes Division. *Earthquake Design History: A summary of Requirements in the State of Oregon*, February 7, 2012. http://www.oregon.gov/OMD/OEM/osspace/docs/history_seismic_codes_or.pdf

Table C-25 Oregon’s Seismic Design Level Benchmark Years

Building Type	Year Built	Design Level	Basis
Single Family Dwelling (including Duplexes)	prior to 1976	Pre Code	Interpretation of Judson (2012)
	1976-1991	Low Code	
	1992-2003	Moderate Code	
	2004-present	High Code	
Manufactured Housing	prior to 2003	Pre Code	Interpretation of Oregon Manufactured Dwelling Special Codes (Oregon Building Codes Division, 2002)
	2003-2010	Low Code	
	2011-present	Moderate Code	
All other buildings	prior to 1976	Pre Code	Interpretation of Oregon Benefit-Costs Analysis Tool (Business Oregon, 2015, p. 24)
	1976-190	Low Code	
	1991-present	Moderate Code	

Source: DOGAMI

Infrastructure Profile

Physical infrastructure such as dams, roads, bridges, railways, and airports support Josephine County communities and economies. Critical facilities are those facilities that are vital in government response and recovery activities and are important to consider as there can be serious secondary impacts to such facilities when disrupted. Critical facilities and infrastructure can be a wide range of things depending on the social, environmental, economic, and physical makeup of the area under consideration. Such facilities can include emergency services, communication services, transportation systems, government facilities, healthcare and public health facilities, information technology, water services, and energy generation and transmission. Due to the fundamental role that infrastructure plays both pre- and post-disaster, special attention in the context of creating more resilient communities is important. The information provided in this section will outline important infrastructures throughout the county which will help provide a basis for informed decisions about how to reduce the county’s infrastructural vulnerabilities to natural hazards.

Utility Lifelines

Utility lifelines are the resources the public relies on daily, (i.e., electricity, fuel, and communication lines). If these lines fail or are disrupted, the essential functions of the community can become severely impaired. Utility lifelines are closely related to physical infrastructure, (i.e., dams and power plants) as they transmit the power generated from these facilities.

Josephine County receives oil and gas through the natural gas utility providers Avista Utilities, and Williams. Most of the natural gas Oregon uses originates in Alberta, Canada. The network of transmission lines running through the county may be vulnerable to severe, but infrequent natural hazards, such as windstorm, winter storms, and earthquakes.

Seismic lifeline routes help maintain transportation facilities for public safety and resilience in the case of natural disasters. Following a major earthquake, it is important for response and recovery agencies to know which roadways are most prepared for a major seismic event. The Oregon Department of Transportation has identified lifeline routes to provide a

secure lifeline network of streets, highways, and bridges to facilitate emergency services response after a disaster.²⁰

Potable Water

Water treatment plants are often located in flood prone areas and are subject to inundation when raw water enters the filters, sedimentation, or flocculation basins, resulting in loss of capability to treat incoming raw water properly. Water system control buildings and pump stations may also be subject to flood damages. Public or private water systems with wells as the water source are subject to outages when flood waters contaminate well heads; this is a common problem for smaller water systems.

Water transmission or distribution pipes are rarely damaged by flood waters, unless there are soil settlements or major erosion, because the lines are sufficiently pressurized (for water quality) to prevent intrusion of flood waters. Water transmission or distribution pipes are, however, subject to breakage when they cross landslide areas or in earthquakes. Water treatment plants are also subject to earthquake damages to the building and to process and control equipment.

Water systems, including Grants Pass' water systems, are also highly vulnerable to electric power outages. Many water systems include pumped storage systems where water is pumped to storage tanks which are typically located 60 to 200 feet above the elevation of water system customers. Such tanks generally contain no more than 1 or 2 days of storage beyond typical daily usage (for reasons of water quality). Thus, electric power outages of more than 1 or 2 days may result in loss of potable water due to the inability of pumping plants to pump water. The most logical mitigation projects to minimize such outages are to provide back-up generators at key pumping plants or to provide quick connects so that portable generators (if available) can be quickly installed. Water treatment plants are also subject to outages due to loss of electric power.

Wastewater Systems

Wastewater systems are often highly vulnerable to flood impacts. Rising water may cause collection pipes to backup and overflow. Intrusion of storm water into collection systems may result in flows that exceed treatment plant capacities, resulting in release of untreated or only partially treated flows. Treatment plants are often located in floodplains, at low elevations, to facilitate gravity flow. However, such locations also facilitate flood damages.

Lift stations and treatment plants are also subject to loss of function due to electric power outages, with resulting overflows or releases. Collection pipes are also subject to breakage due to landslides. However, such impacts are not particularly common since most wastewater collection systems are in more urbanized areas with only selected areas subject to slides. Wastewater pipes are, however, subject to breakage in earthquakes. Wastewater treatment plants are also subject to earthquake damages to the building and to process and control equipment.

Natural Gas Systems

Josephine County's primary natural gas provider is investor owned Avista Utilities. Natural gas transmission and distribution pipes are not usually affected by flooding, because the

pipes are pressurized. However, compressor stations may be subject to inundation damage or loss of electrical power to run electrical and mechanical equipment.

Transmission and distribution pipes are also subject to rupture in slide areas and in earthquakes. Buried utility pipes are very subject to failure in small ground movements. Movements as small as an inch or two are often sufficient to break the pipes, especially for older cast-iron pipe which is more brittle than welded steel or polyethylene pipe. Possible mitigation actions include pipe upgrades for a few critical locations and nonstructural seismic mitigation for control equipment.

Telecommunications Systems

Telephone (land lines and cellular) systems, broadcast radio and TV systems, and cable TV systems may all be vulnerable to damages and services outages from hazards. However, in general, such systems have proved to be somewhat less vulnerable to service outages than other utility systems. System nodes (broadcast studios, switching offices and such) are subject to flooding if located in flood-prone areas. However, because of the importance of such facilities, few are in highly flood-prone sites.

Similarly, few such facilities are likely to be in landslide prone areas. Cellular towers in hilly areas, however, may be more subject to landslide hazards.

Buried communications (copper and fiber optic) and cable television cables are usually flexible enough to accommodate several feet of ground movement before failure. While major landslides may rupture such cables, minor settlements or small slides are not nearly as likely to impact such cables as they are to break buried gas or water pipes. Such lines typically perform relatively well in earthquakes.

Above ground communications and cable television cables are subject to wind- induced failures from tree falls and pole failures. However, such failures are a less common than failures of electric power lines. The better performance of communications cables arises in part because the electrical cables are always highest on the poles, thus a falling branch is usually first resisted by the power cables. Also, because the voltage levels in communications cables are much lower than those in power cables, the communication cables are not subject to “burn down” or shorting if wind-swayed cables touch each other or get too close.

Some telecommunications facilities are subject to failure because of loss of electric power. However, key facilities almost always have backup battery power and/ or generators. Therefore, telecommunications facilities are generally much less vulnerable to outages from loss of electric power than are water or wastewater systems.

Electric Power Systems

The county is served by several investor-owned, public, and cooperative and municipal utilities. Pacific Power and Light (Pacific Power) is the primary investor-owned utility company serving Josephine County.

The electric power system is central to community function. The impacts of loss of electric power are large: residential, commercial, and public customers are all heavily dependent on electric power for normal functioning. Furthermore, other utility systems, especially water

and wastewater systems, are heavily dependent on electric power for normal operations. Loss of electric power, therefore, may have large impacts on affected communities, especially if outages are prolonged. Grants Pass currently has an emergency power generator in the Water Treatment Plant, installed in November 2014.

Mitigation Successes

Josephine County, working with the Energy Trust of Oregon, recently explored the feasibility of solar + storage microgrid installation on critical facilities. Rather than assessing feasibility solely on the structural capacity of a building to host a solar + storage microgrid, this project sought to incorporate other factors as well. They considered the location and ownership of critical facilities, as well as the location of vulnerable populations in Josephine County. By taking all these factors into account, the results and recommendations from the project can more holistically support clean energy goals, mitigate risks to critical community lifelines and the communities who depend on those lifelines, and lead to increased energy independence.

Facilities that were recommended to prioritize include: Cave Junction Wastewater Plant, County EOC and SAR, Fires Station 4 Holland, Fire Station 1 Cave Junction, Fire Station 3 O'Brien, Grants Pass Wastewater Treatment Plant, Grants Pass Airport, Illinois Valley Airport, Josephine County Food Bank, Josephine County Public Works (Kerby), Kerby Belt Building (Illinois Valley Learning Center), and North Valley High School.

Dams

Dams are manmade structures built to impound water. Dams are built for many purposes including water storage for potable water supply, livestock water supply, irrigation, or fire suppression. Other dams are built for flood control, recreation, navigation, hydroelectric power or to contain mine tailings. Dams may also be multifunction, serving two or more of these purposes.

The National Inventory of Dams (Figure C-10 and Table C-26), NID, which is maintained by the United States Army Corps of Engineers, is a database of approximately 76,000 dams in the United States. The NID does not include all dams in the United States. Rather, the NID includes dams that are deemed to have a high or significant hazard potential and dams deemed to pose a low hazard if they meet inclusion criteria based on dam height and storage volume. Low hazard potential dams are included only if they meet either of the following selection criteria:

- exceed 25 feet in height and 15 acre-feet of storage, or
- exceed 6 feet in height and 50-acre feet of storage.

There are many thousands of dams too small to meet the NID selection criteria. However, these small dams are generally too small to have significant impacts if they fail and thus are generally not considered for purposes of risk assessment or mitigation planning.

This NID potential hazard classification is solely a measure of the probable impacts if a dam fails. Thus, a dam classified as High Potential Hazard does not mean that the dam is unsafe or likely to fail. The level of risk (probability of failure) of a given dam is not even considered in this classification scheme. Rather, the High Potential Hazard classification simply means that there are people at risk downstream from the dam in the inundation area if the dam were to fail.

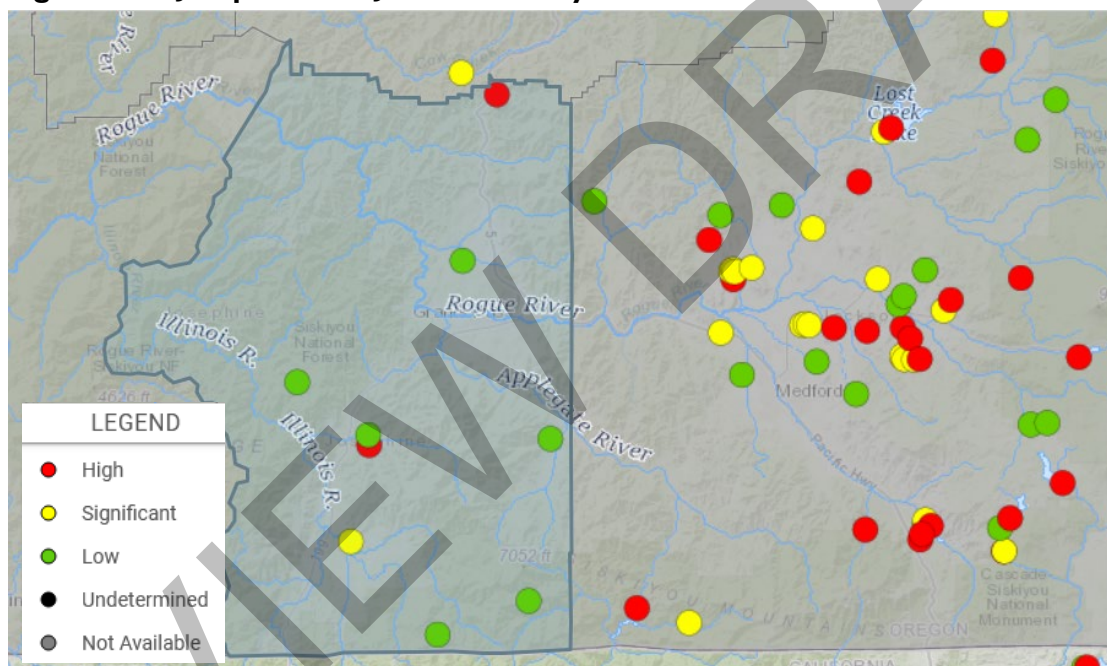
Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/ or environmental losses. Losses are principally limited to the dam owner's property.

Dams assigned to the significant hazard potential classification are those where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities. Significant hazard potential dams are often located in predominantly rural or agricultural areas.

Dams assigned to the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life. Failure of dams in the high classification will generally also result in economic, environmental or lifeline losses, but the classification is based solely on probable loss of life.

The locations of the dams in Josephine County can be found in Figure C-10.

Figure C-10 Josephine and Jackson County Dams and Hazard Threat



Source: National Inventory of Dams.

Dam failures can occur at any time in a dam's life; however, failures are most common when water storage for the dam is at or near design capacity. At high water levels, the water force on the dam is higher and several of the most common failure modes are more likely to occur. Correspondingly, for any dam, the probability of failure is much lower when water levels are substantially below the design capacity for the reservoir.

For embankment dams, the most common failure mode is erosion of the dam during prolonged periods of rainfall and flooding. When dams are full and water inflow rates exceed the capacity of the controlled release mechanisms (spillways and outlet pipes), overtopping may occur. When overtopping occurs, scour and erosion of either the dam itself and/ or of the abutments may lead to partial or complete failure of the dam. Especially for embankment dams, internal erosion, piping or seepage through the dam, foundation, or

abutments can also lead to failure. For smaller dams, erosion and weakening of dam structures by growth of vegetation and burrowing animals is a common cause of failure.

For embankment dams, earthquake ground motions may cause dams to settle or spread laterally. Such settlement does not generally lead, by itself, to immediate failure. However, if the dam is full, relatively minor amounts of settling may cause overtopping to occur, with resulting scour and erosion that may progress to failure. For any dam, improper design, construction, or inadequate preparation of foundations and abutments can also cause failures. Improper operation of a dam, such as failure to open gates or valves during high flow periods can also trigger dam failure. For any dam, unusual hydrodynamic (water) forces can also initiate failure. Landslides into the reservoir, which may occur on their own or be triggered by earthquakes, may lead to surge waves which overtop dams or hydrodynamic forces which cause dams to fail under the unexpected load. Earthquakes can also cause seiches (waves) in reservoirs that may overtop or overload dam structures. In rare cases, high winds may also cause waves that overtop or overload dam structures.

Concrete dams are also subject to failure due to seepage of water through foundations or abutments. Dams of any construction type are also subject to deliberate damage via sabotage or terrorism. For waterways with a series of dams, downstream dams are also subject to failure induced by the failure of an upstream dam. If an upstream dam fails, then downstream dams also fail due to overtopping or due to hydrodynamic forces.

Dam failures can occur rapidly and with little warning. Fortunately, most failures result in minor damage and pose little or no risk to life safety. However, the potential for severe damage still exists. The Oregon Water and Resources Department has inventoried all dams located in Oregon and Josephine County. There are two dams categorized as high hazard; Strong Reservoir located on Sour Dough Gulch (near Glendale in Wolf Creek Park) and McMullen Creek Dam (near Selma). There is also one dam categorized as a significant hazard: Sowell Dam Southeast of Cave Junction.

Table C-26 Josephine County Dam Inventory

Threat Potential	Number of Dams	Dam Name
High	1	<i>Strong, McMullen Creek</i>
Significant	2	Sowell Dam
Low	12	Upper Lippert, Tall Timber Lake, Big Miller Lake, Upper Werner, Circle W, Hartley, Holzouser, Indian, Lower Lippert, Lower Werner, Madams Creek, Singer Lake
Total	15	-

Source: National Inventory of Dams. See also, Oregon water Resources Department, "Dam Inventory Query"

Transportation

Transportation networks, systems for power transmission, and critical facilities such as hospitals and law enforcement stations are all vital to the functioning of the region. Due to the fundamental role that infrastructure plays both pre-and post-disaster, it deserves special attention in the context of creating more resilient communities. The information documented in this section of the profile can provide the basis for informed decisions about how to reduce the vulnerability of Josephine County's infrastructure to natural hazards.

An Overview of transportation systems in Josephine County can be seen on Figure C-11. Communities in Josephine County are linked by Interstate Highway 5, U.S. Route 199, Oregon Route 260, Oregon Route 238, and a network of rural highways and county roads. Rail service within Josephine County is provided freight rail by the Central Oregon & Pacific Railroad (COPR) and can be found in the northeastern section of the county nearby the I-5 corridor. Airports are found mostly along Highway 199. Public transportation is provided primarily by Josephine Community Transit.

Figure C-11 Josephine County Transportation Network



Source: Oregon Department of Transportation, [TransGIS](#), accessed March 6, 2022.

Railroads

Railroads are major providers of regional and national cargo trade flows. The Central Oregon & Pacific Railroad (CORP) is a subsidiary rail line of Genesee & Wyoming. It is designated as a class II railway with approximately 17,000 carloads and a revenue stream of over 11 million dollars.²⁶ The rail line is used mostly for timber products.²⁷

Figure C-11 shows the Rail Network in Josephine County. Most of the line located within Josephine County runs through the Northeast corner of the state, connecting Douglas and Jackson Counties through Grants Pass.

Rails are sensitive to icing from winter storms that can occur in the Southeast Oregon region. For industries in the region that utilize rail transport, these disruptions in service can result in economic losses. The potential for rail accidents caused by natural hazards can also have serious implications for the local communities if hazardous materials are involved.

Airports

Josephine County has two public airports, three private heliports, and three private airports²⁸. Southern Oregon General Hospital also maintains a heliport for emergency airlifting of critically injured patients. Both Grants Pass and Cave Junction operate airports owned by the county. (Grants Pass and Illinois Valley, respectively). Two of the three private airports are on ranches in Selma, and the third operates near Wilderville, and Wonder. There is no commercial service airport in the County. Access to these facilities could become closed in the event of natural hazards. Another important consideration in identifying area air resources is the type and condition of runway surfaces at these various facilities, as they will impact the ability to utilize the airport.

Public Transportation

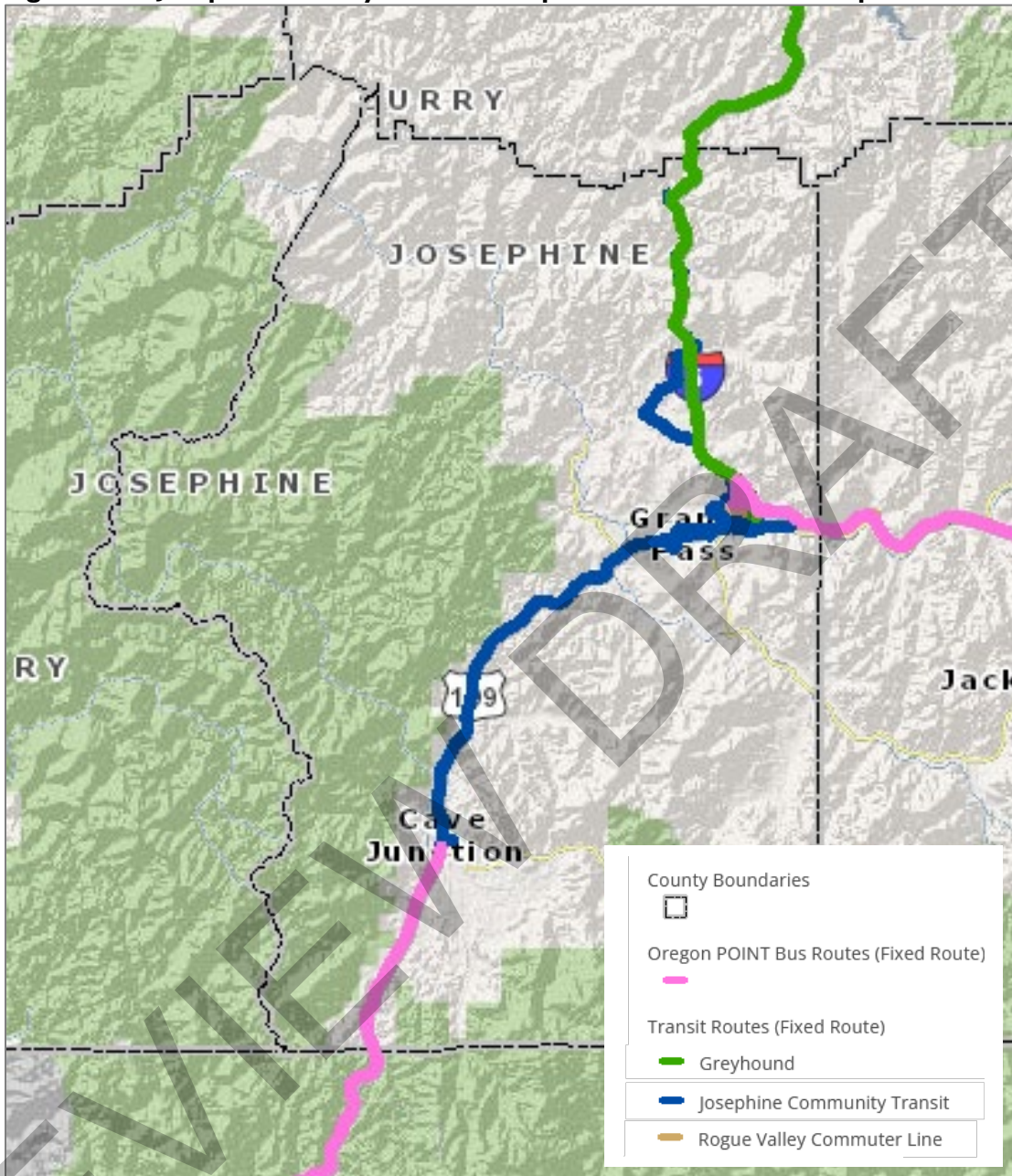
Figure C-12 shows the available public transit routes and stops in Josephine County. Public transportation is provided primarily by Josephine Community Transit, particularly along the I-5 Corridor and Highway 199. Oregon's POINT Bus System connects Grants Pass to Medford, Central Point, Ashland, and Klamath Falls, as well as the Illinois Valley to Northern California (Crescent City) and back to Brookings, Oregon. The Greyhound Line goes through Grants Pass and can connect directly to Roseburg and Medford.

²⁶ "Central Oregon & Pacific Railroad Inc" (2022). D&B Business Directory.

²⁷ Central Oregon & Pacific Railroad (CORP), Genesee & Wyoming Inc., retrieved September 1, 2014

²⁸ Josephine County Public and Private Airports, Oregon. Toll Free Airlines. Accessed 7 Jan. 2022.

Figure C-12 Josephine County Public Transportation Routes and Stops

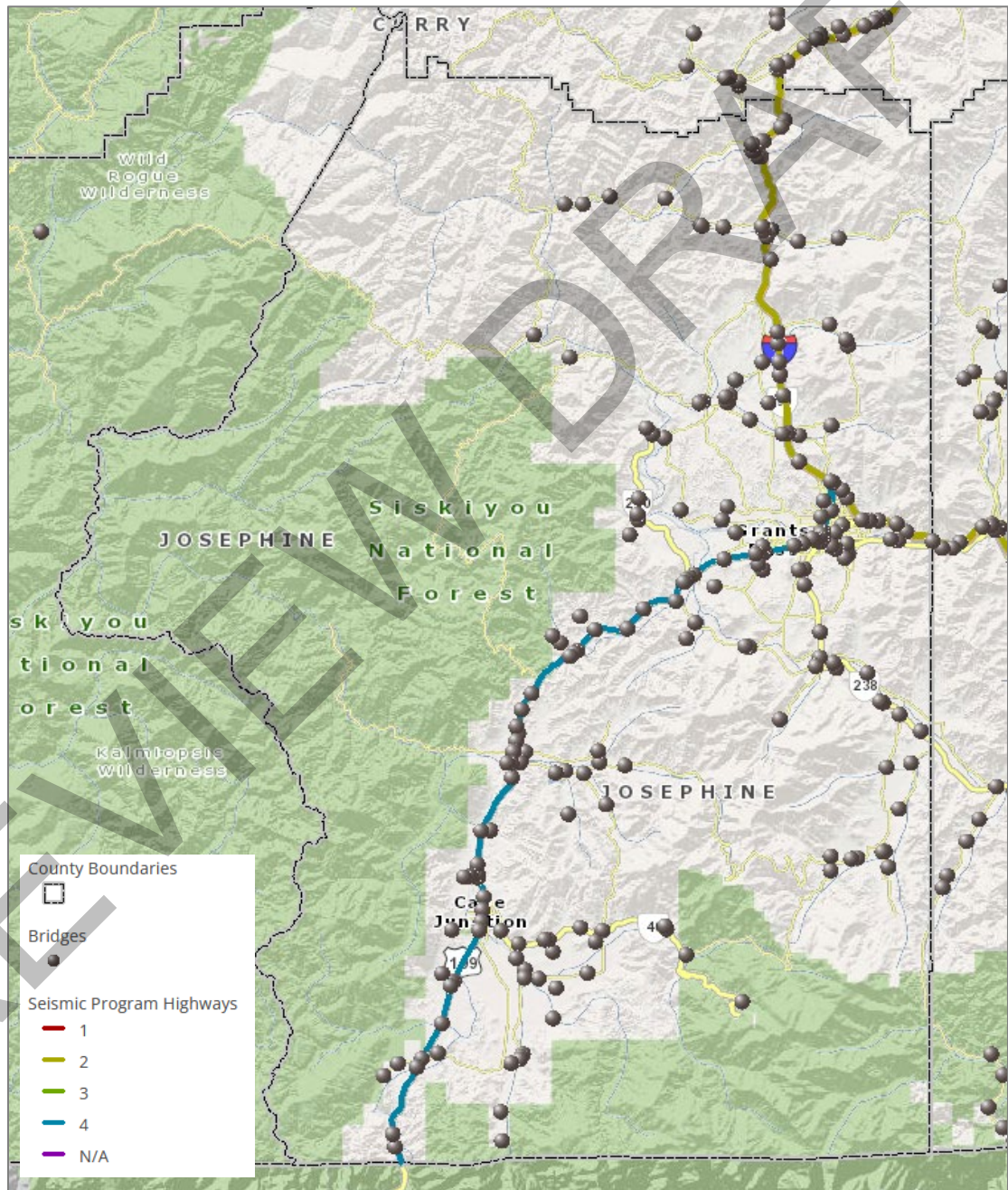


Source: Oregon Department of Transportation, ODOT TransGIS

Bridges

Because of earthquake risk, the seismic vulnerability of the county's bridges is an important issue. Non-functional bridges can disrupt emergency operations, sever lifelines, and disrupt local and freight traffic. These disruptions may exacerbate local economic losses if industries are unable to transport goods. The county's bridges are part of the state and interstate highway system that is maintained by the Oregon Department of Transportation (ODOT) or that are part of regional and local systems that are maintained by the region's counties and cities. Figure C-13 shows the locations of bridges in Josephine County.

Figure C-13 Josephine County Bridges



Source: Oregon Department of Transportation, ODOT TransGIS

Table C-27 shows the structural condition of bridges in the region. A distressed bridge is a condition rating used by the Oregon Department of Transportation (ODOT) indicating that a bridge has been identified as having a structural or other deficiency, while a deficient bridge is a federal performance measure used for non-ODOT bridges; the ratings do not imply that a bridge is unsafe. The table shows that overall, 20% of the county owned bridges are distressed, compared to 20% of State Owned (ODOT) bridges. There are five historic bridges in the County:

- Deer Creek, Hogue Drive (Bridge # 509005, ca 1921)
- Grave Creek Covered Bridge (Bridge # 141005, ca 1920)
- Williams Creek, Hwy 272 (Pedestrian, Bridge # 02379, ca 1917)
- Pacific Highway Bridges:
 - Wolfcreek, Edgewood Rd (Bridge # 114005, ca. 1921-1931)
 - Caveman Bridge (Bridge # 01418, ca 1921-1931)

Table C-27 Bridge Inventory

Bridge Owner	Number	Distressed	Percent Distressed	Historic
State	60	12	20%	5
County	104	21	20%	0
City	1	0	0%	N/A
Total	165	33	20%	5

Source: Oregon Department of Transportation, 2014; Oregon Department of Transportation (2013); Oregon’s Historic Bridge Field Guide
 Note: ODOT bridge classifications overlap, and sum-total is not used to calculate percent distressed, calculation for ODOT distressed bridges accounts for this overlap.

The bridges in Josephine County require ongoing management and maintenance due to the age and types of bridges. Modern bridges, which require minimum maintenance and are designed to withstand earthquakes, consist of pre-stressed reinforced concrete structures set on deep steel piling foundations.

Critical Facilities

Critical facilities are those facilities that are essential to government response and recovery activities (e.g., polices and fire stations, public hospitals, public schools). It is important that these facilities are the most resilient to natural hazards as interruption or destruction of these facilities could restrict response efforts and time needed to assist those in danger. Critical facilities in Josephine County are identified below and within the City Addenda of Volume II. Table C-32 at the end of this appendix provides a full list of the identified critical facilities and other community lifelines. Included in the table is loss estimation from the Oregon NHMP.

Hospitals and Clinics

There are two main hospitals in Josephine County. Asante Three Rivers Medical Center in Grants Pass (125 beds), and Three Rivers Community Hospital in Grants Pass. In addition, there are two Siskyou Community Health Centers, one in Grants Pass and one in Cave Junction. Ambulance services are provided by Rural/Metro private provider of emergency and non-emergency ambulance services

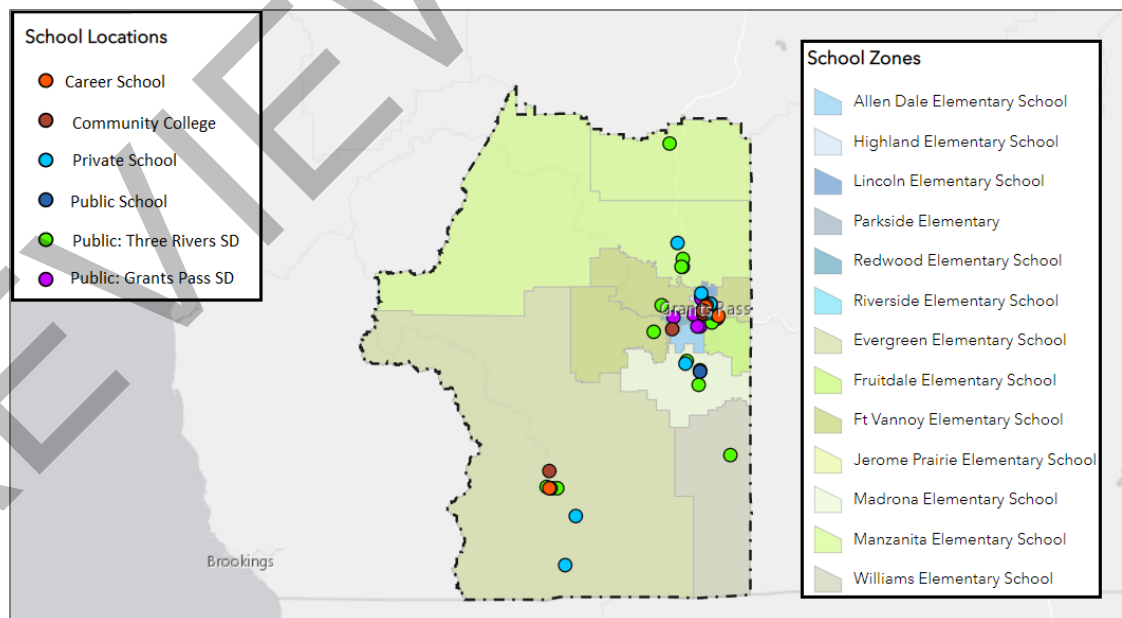
Law Enforcement and Fire Districts

Josephine County is served by the Josephine County Sheriff’s office, as well as Grants Pass Police Department and Oregon State Patrol. The County Sheriff’s Office has locations in both Grants Pass and Cave Junction and provides services to unincorporated parts of the county. There are six (6) fire districts in Josephine County. Aside from just extinguishing fires, each fire district and department provides essential public services in the communities they serve, including emergency medical services, search and rescue, and fire prevention education. The Rural Metro Fire Department has seven (7) stations and services most of the Northern end of the county. The Illinois Valley Rural Fire Protection District has 6 stations and services the Southern end. In addition, there are fire districts in Grants Pass Area (Grants Pass Fire/Rescue with locations in Hillcrest, Redwood, and Parkway Public Safety Centers), County Fire Department (Merlin), Williams Rural Fire Protection District (Williams), and Wolf Creek Rural Fire Protection District (2 stations in the Wolf Creek area).

Schools

Figure C-14 shows the schools and their designated zones in Josephine County. There are 43 schools that service Josephine County, with 42 being in the county and one (Applegate School) in Jackson County. There are two main school districts, Grants Pass School District 7 (9 Schools) and Josephine County, or Three Rivers, School District 11 (15 Schools). There are nine (9) private schools, and high school serving the correctional facility (New Bridge High School). For higher education, there are five (5) career schools in Josephine County (4 in Grants Pass and 1 in Cave Junction) as well as Rogue Community College – Redwood Campus. For more information on the seismic collapse potential of schools see Section 2, Risk Assessment. For more information on the seismic collapse potential of schools see Section 2, Risk Assessment, and city addenda.

Figure C-14 Josephine County Schools and School Districts



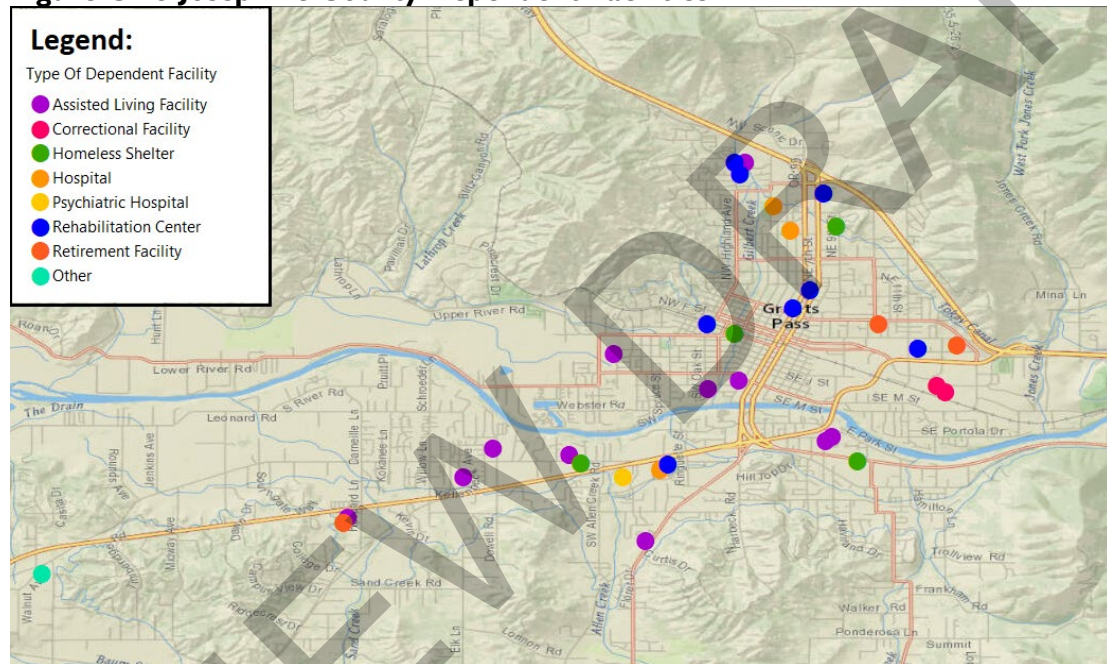
Source: Josephine County GIS Department.

Dependent Facilities

Facilities which have patients that are dependent on continued support and care include long term care (skilled, assistive), senior residential facilities, residential mental health facilities, and psychiatric hospitals. In the event of a disaster, these facilities may also act as secondary medical facilities as they are equipped with nurses, medical supplies, and beds.

Dependent Facilities can be seen in Figure C-15. All but one of the dependent facilities are in Grants Pass (the only other one is Siskiyou Community Health Center in Cave Junction, as referred to in the Hospitals and Clinics section). Most facilities are off major arterials and highways, which could be a potential problem in the advent of emergency evacuation or using the dependent facilities as secondary medical services.

Figure C-15 Josephine County Dependent Facilities



Source: Institute for Policy Research and Engagement (IPRE), University of Oregon, 2021.

Correctional Facilities

Correctional facilities are incorporated into physical infrastructure as they play an important role in everyday society by maintaining safe separation from the public. There are two correctional facilities located in Josephine County. The Josephine County Jail and the Rogue Valley Community Correctional Facility are both located in Grants Pass. While correctional facilities are built to code to resist structural failure, they typically have backup power to sustain regulation of inmates following the immediate event of an emergency. It is when the impacts of the event continue over a long duration, that logistical planning of these facilities becomes a challenge.

Synthesis

Built capacity refers to the built environment and infrastructure that support a community. The various forms of built capital mentioned above will play significant roles in the event of a disaster. Physical infrastructures, along with utility and transportation lifelines are critical

during a disaster and are essential for proper functioning and response. Community resilience is directly affected by the quality and quantity of built capital and lack of, or poor condition of, infrastructure can negatively affect a community's ability to cope, respond, and recover from a natural disaster. Initially following a disaster, communities may experience isolation from surrounding cities and counties due to infrastructure failure. These conditions will force communities to rely on local and immediate resources, so it is important to identify critical infrastructures throughout the county as they may play crucial roles in the mitigation and recovery stages of a disaster.

It is important for the county to consider these numbers when producing mitigation and educational outreach materials as it is important to reach all populations, especially the ones who face a higher risk of damage. There are two (2) dams throughout the county classified with a high threat potential. There are a variety of critical facilities located throughout county limits that in the event of a disaster can make communication efforts challenging. Several major highways run throughout the county, giving residents several alternative routes that may provide service access, or serve as evacuation routes, yet if these roads are destroyed it can isolate communities and make rescue efforts more challenging.

Community Connectivity Capacity

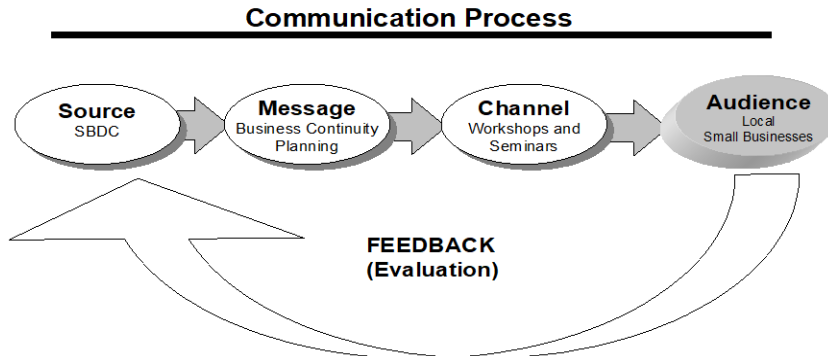
Community connectivity capacity places strong emphasis on social structure, trust, norms, and cultural resources within a community. In terms of community resilience, these emerging elements of social and cultural capital will be drawn upon to stabilize the recovery of the community. Social and cultural capitals are present in all communities; however, it may be dramatically different from one city to the next as these capitals reflect the specific needs and composition of the community residents.

Social Systems and Service Providers

Social systems include community organizations and programs that provide social and community-based services, such as employment, health, senior and disabled services, professional associations, and veterans' affairs for the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g., elderly, children, low income, etc.). The county can use existing social systems as resources for implementing such communication-related activities because these service providers already work directly with the public on several issues, one of which could be natural hazard preparedness and mitigation. The presence of these services is more predominantly located in urbanized areas of the county, this is synonymous with the general urbanizing trend of residents.

Figure C-16 displays the NHMP's communication process. It is followed by a brief explanation of how the communication process works and how the community's existing social service providers could be used to provide natural hazard related messages to their clients.

Figure C-16 Communication Process



Source: Adapted from the U.S. Environmental Protection Agency Radon Division's outreach program

- There are five essential elements for communicating effectively to a target audience:
- The source of the message must be credible,
- The message must be appropriately designed,
- The channel for communicating the message must be carefully selected,
- The audience must be clearly defined, and
- The recommended action must be clearly stated, and a feedback channel established for questions, comments, and suggestions.

The following list highlights organizations that are active within the community and may be potential partners for implementing mitigation actions. The three involvement methods are defined below.

Education and outreach – organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.

Information dissemination – organization could partner with the community to provide hazard-related information to target audiences.

Plan/project implementation – organization may have plans and/or policies that may be used to implement mitigation activities, or the organization could serve as the coordinating or partner organization to implement mitigation actions.

Civic Engagement

Civic engagement and involvement in local, state, and national politics are important indicators of community connectivity. Those who are more invested in their community may have a higher tendency to vote in political elections. The 2020 Presidential General Election resulted in 76% voter turnout in the county.²⁹ These results are relatively equal to voter participation reported across the State (78.5%).³⁰ Other indicators such as volunteerism,

²⁹ Josephine County Statement of Votes Cast, 2020.

<http://www.co.josephine.or.us/SIB/files/Clerk/Certified%20Summary%20of%20Results%2011-3-2020.pdf>

³⁰ Oregon Voter Turnout History for General Elections, 2021.

https://sos.oregon.gov/elections/Documents/Voter_Turnout_History_General_Election.pdf

participation in formal community networks and community charitable contributions are examples of other civic engagement that may increase community connectivity.

Cultural Resources

Libraries and Museums

Libraries and museums develop cultural capacity and community connectivity as they are places of knowledge and recognition, they are common spaces for the community to gather, and can serve critical functions in maintaining the sense of community during a disaster. They are recognized as safe places and reflect normalcy in times of distress. There are currently four community libraries in Josephine County located in Grants Pass, Williams, Wolf Creek, and the Illinois Valley (Cave Junction). There are five museums in Josephine County, including an art museum, a museum on Josephine County's Smokejumpers, and other local histories.

Cultural Events

Other such institutions that can strengthen community connectivity are the presence of festivals and organizations that engage diverse cultural interests. Examples of events and institutions include the BearFest, Summer Concerts in the Park series, Grants Pass's Art Along the Rogue and Cave Junction's Labor Day Festival. Not only do these events bring revenue into the community, but they also have potential to improve cultural competence and enhance the sense of place. Cultural connectivity is important to community resilience, as people may be more inclined to remain in the community because they feel part of the community and culture.

Historic Places

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources for tourism revenue. Protecting these resources from the impact of disasters is important because they have an important role in defining and supporting the community. According to the National Register Bulletin, "a contributing resource is a building, site, structure, or object adds to the historic associations, historic architectural qualities, or archeological values for which a property is significant because it was present during the period of significance, related to the documented significance of the property, and possesses historical integrity or is capable of yielding important information about the period; or it independently meets the National Register criteria."³¹ If a structure does not meet these criteria, it is considered to be non-contributing.

Table C-28 identifies the number of eligible/significant (ES), eligible/contributing (EC) historical sites, and non-eligible historic sites in Josephine County. The table also shows how many ES and EC sites are listed on the National Register and are located and in incorporated cities, and how many contributing and non-contributing resources are located at ES and EC sites. Overall, there are a total of 90 nationally registered historic places in Josephine

³¹ U.S. Department of the Interior, National Park Service, Cultural Resources, National Register Bulletin 16A: "How to Complete the National Register Registration Form".

County, 39 are within the unincorporated area of the County. The other 51 sites are within Grants Pass. See the City addenda for more information on the City sites.

Table C-28 Josephine County Historic Places

Eligible Sites	Total Sites	County		Cave Junction		Grants Pass	
Eligible Significant	68	36	53%	0	0%	32	47%
Eligible Contributing	274	199	73%	1	0%	74	27%
Not Eligible / Contributing	52	31	60%	0	0%	21	40%
Not Eligible / Out of Period	8	0	0%	0	0%	8	100%
Undetermined	15	8	53%	0	0%	7	47%
	417	274	66%	1	0%	142	34%

Nationally Registered Sites							
Individually	57	33	58%	0	0%	24	42%
Within an Historic District	32	6	19%	0	0%	26	81%
Individually & in a Historic District	1	0	0%	0	0%	1	100%
	90	39	43%	0	0%	51	57%

Source: Oregon Historic Sites Database

Table C-29 displays the nationally registered historic places in Josephine County.

Table C-29 Josephine County Nationally Registered Historic Places

Property Name	Year Built	Eligibility	Status	Historic District
Allen Gulch Townsite	1852	eligible/significant	Individually Listed	
Cameron Mine		eligible/significant	Individually Listed	
Cedar Guard Station #1019	1933	eligible/significant	Individually Listed	
Deep Gravel Mine		eligible/significant	Individually Listed	
Esterly Pit #2, Llano De Oro Mine		eligible/significant	Individually Listed	
Fry Gulch Mine		eligible/significant	Individually Listed	
Golden Church	1890	eligible/contributing	Listed in Historic District	Golden Historic District
Golden Historic District	1881	eligible/significant	Individually Listed	Golden Historic District
Golden School	c.1895	eligible/contributing	Listed in Historic District	Golden Historic District
Golden Store and Post Office	1895	eligible/contributing	Listed in Historic District	Golden Historic District
Grave Creek Bridge	1920	eligible/significant	Individually Listed	
High Gravel Mine		eligible/significant	Individually Listed	
Hugo Community Baptist Church (Pref, Not Historic)	1910	eligible/significant	Individually Listed	
Lippincott, William J & Sarah Wagner, House	c.1951	eligible/significant	Individually Listed	
Logan Cut	1886	eligible/significant	Individually Listed	
Logan Wash Ditch	c.1900	eligible/significant	Individually Listed	
Middle Ditch		eligible/significant	Individually Listed	
Naucke, William & Nannie, House	1883	eligible/significant	Individually Listed	
Old Placer Mine		eligible/significant	Individually Listed	
Oregon Caves Historic District	1922	eligible/significant	Individually Listed	Oregon Caves Historic District
Oregon Caves Historic District (Boundary Increase)	c.1945	eligible/contributing	Listed in Historic District	Oregon Caves Historic District
Osgood Ditch	1900	eligible/significant	Individually Listed	
Rand Ranger Station	1933	eligible/significant	Individually Listed	
Ranger Residence	c.1935	eligible/contributing	Listed in Historic District	Oregon Caves Historic District
Reed-Cobb-Bowser House	c.1910	eligible/significant	Individually Listed	
Rogue River Valley Grange #469	1916	eligible/significant	Individually Listed	
Ruble, W N, House	1894	eligible/contributing	Listed in Historic District	Golden Historic District
Siskiyou Smokejumper Base	1945	eligible/significant	Individually Listed	
Siskiyou Smokejumper Base (Boundary Increase)	1944	eligible/significant	Individually Listed	
Speed's Place On The Rogue	1900	eligible/significant	Individually Listed	
St Patricks Roman Catholic Cemetery		eligible/significant	Individually Listed	
Store Gulch Guard Station #1020	1933	eligible/significant	Individually Listed	
Upper Ditch		eligible/significant	Individually Listed	
Waldo Cemetery		eligible/significant	Individually Listed	
Waldo Chinese Cemetery		eligible/significant	Individually Listed	
Waldo Mine		eligible/significant	Individually Listed	
Whisky Creek Cabin	c.1880	eligible/significant	Individually Listed	
Wimer Ditch		eligible/significant	Individually Listed	
Wolf Creek Tavern	1883	eligible/significant	Individually Listed	

Source: Oregon Historic Sites Database

Community Stability

Community stability is a measure of rootedness in place. It is hypothesized that resilience to a disaster stem in part from familiarity with place, not only for navigating the community during a crisis, but also accessing services and other supports for economic or social challenges.³²

Residential Geographic Stability

Table C-30 estimates residential stability across the region. It is calculated by the number of people who have lived in the same house and those who have moved within the same county a year ago, compared to the percentage of people who have migrated into the region. Josephine County overall has a geographic stability rating of about 94% (i.e., 94% of the population lived in the same house or moved within the county). Takilma has the highest geographic stability (100%) while O'Brien has the lowest (85%).

Table C-30 Regional Residential Stability

Jurisdiction	Population	Geographic Stability	Same House	Moved Within Same County
Josephine County	85,281	94%	85%	8%
Incorporated	39,569	94%	81%	13%
Cave Junction	2,458	95%	80%	15%
Grants Pass	37,111	94%	81%	13%
Unincorporated	45,712	93%	89%	4%
Kerby	578	94%	87%	7%
Merlin	1,922	95%	84%	11%
New Hope	1,579	98%	96%	2%
O'Brien	636	93%	85%	8%
Redwood	2,932	91%	89%	3%
Selma	569	95%	95%	0%
Takilma	466	100%	100%	0%
Williams	1,293	98%	98%	0%
Other Unincorporated	35,737	93%	89%	4%

Source: Social Explorer, Table 130, U.S. Census Bureau, 2015-2019 American Community Survey Estimates

Homeownership

Housing tenure describes whether residents rent or own the housing units they occupy. Homeowners are typically more financially stable but are at risk of greater property loss in a post-disaster situation. People may rent because they choose not to own, they do not have the financial resources for home ownership, or they are transient.

Collectively, about 62% of the occupied housing units in Josephine County are owner-occupied and 31% are renter occupied (Table C-31). Unincorporated areas have higher rates

³² Cutter, Susan, Christopher Burton, Christopher Emrich. "Disaster Resilience Indicators for Benchmarking Baseline Conditions". Journal of Homeland Security and Emergency Management.

of owner-occupied units (about 73%) than the incorporated areas (about 48%). Conversely, the incorporated cities have higher percentages of renter occupied housing units. Approximately 2% of the county’s housing stock is considered “seasonal” housing, these are homes that are either occupied by the owner part of the year or are used as vacation rentals.³³

Table C-31 Housing Tenure and Vacancy

Jurisdiction	Housing Units	Owner-occupied		Renter-occupied		Seasonal [^]		Vacant ^{^^}	
		Estimate	Percent	Estimate	Percent	Estimate	Percent	Estimate	Percent
Josephine County	39,103	24,116	62%	12,251	31%	656	2%	2,080	5%
Incorporated	17,728	8,444	48%	8,363	47%	171	1%	750	4%
Cave Junction	1,099	545	50%	481	44%	25	2%	48	4%
Grants Pass	16,629	7,899	48%	7,882	47%	146	1%	702	4%
Unincorporated	21,375	15,672	73%	3,888	18%	485	2%	1,330	6%
Kerby	270	215	80%	55	20%	0	0%	0	0%
Merlin	768	516	67%	252	33%	0	0%	0	0%
New Hope	717	493	69%	189	26%	0	0%	35	5%
O'Brien	428	278	65%	74	17%	0	0%	76	18%
Redwood	1,286	1,024	80%	220	17%	0	0%	42	3%
Selma	331	217	66%	49	15%	0	0%	65	20%
Takilma	165	150	91%	15	9%	0	0%	0	0%
Williams	593	423	71%	103	17%	0	0%	67	11%
Other Unincorporated	16,817	12,356	73%	2,931	17%	485	3%	1,045	6%

Source: Social Explorer, Tables 94, and 95, U.S. Census Bureau, 2015-2019 American Community Survey Estimates, Table B25004

[^] = Seasonal, recreational, or occasional housing units. ^{^^} = Functional vacant units, computed after removing seasonal, recreational, or occasional housing units from vacant housing units.

According to Cutter, wealth increases resiliency and recovery from disasters. Renters often do not have personal financial resources or insurance to assist them post-disaster. On the other hand, renters tend to be more mobile and have fewer assets at risk of natural hazards.³⁴ In the most extreme cases, renters lack enough shelter options when lodging becomes uninhabitable or unaffordable post-disaster.

Synthesis

Josephine County has distinct social and cultural resources that work in favor to increase community connectivity and resilience. Sustaining social and cultural resources, such as social services and cultural events, may be essential to preserving community cohesion and a sense of place. The presence of larger communities makes additional resources and services available for the public. However, it is important to consider that these amenities may not be equally distributed to the rural portions of the county and may produce implications for recovery in the event of a disaster.

In the long-term, it may be of specific interest to the county to evaluate community stability. A community experiencing instability and low homeownership may hinder the effectiveness of social and cultural resources, distressing community coping and response mechanisms.

³³ U.S. Census Bureau, 2015-2019 American Community Survey Estimates, Table B25004.

³⁴ Cutter, S. L. (2003). Social Vulnerability to Environmental Hazards. *Social Science Quarterly*.

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Table C-32 Critical Facilities, Community Lifelines, and Loss Estimation

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Josephine County Circuit Court	500 NW 6th St, Grants Pass	X							0	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Circuit Court - Family Court	301 NW F St, Grants Pass	X							0	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Community Corrections	510 NW 4th St, Grants Pass	X	X						1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Fairgrounds	1451 Fairgrounds Rd, Grants Pass		X									Moderate		
Josephine County Planning Office	700 NW Dimmick St, Grants Pass													
Josephine County Public Works	201 River Heights Way, Grants Pass	X			X		X		1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Sheriff's Office	1901 NE F St, Grants Pass	X			X				1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Administration and Human Resources Building	500 NW 6th Street, Grants Pass					X			1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Allen Dale Elementary School	2320 Williams Highway, Grants Pass		X						1961	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Applegate Valley RFPD 9 - Station 4	12100 Williams Hwy, Grants Pass	X							2002	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Applegate Valley RFPD 9 - Station 6	1076 Kubli Rd, Grants Pass	X							2002	Moderate	Not in SFHA	Moderate	Not in Lahar Zone	High
B Bar Ranch Airport	1100 McMullen Creek Rd, Selma						X		1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Backachers Ranch Airport	4 miles E of Selma						X		1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Colvin Oil	2520 Foothill Blvd, Grants Pass				X		X	X				High		
Fiddler Mountain M/W Building			X						0	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Fleming Middle School	6001 Monument Dr, Grants Pass		X						1962	Low	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low to High
Fort Vannoy Elementary	5250 Upper River Rd, Grants Pass		X						1967	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Grants Pass Airport	1441 Brookside Blvd, Grants Pass						X		1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Grants Pass Armory	666 Brookside Blvd, Grants Pass	X		X					1987	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Grants Pass Department of Public Safety	724 NE 7th Street, Grants Pass	X							1900	Not in Soft Soil Hazard	500-Year	Low	Not in Lahar Zone	Low
Grants Pass Public Safety Center/Parkway Fire Station	800 E Park St, Grants Pass	X				X			1900	Not in Soft Soil Hazard	500-Year	Low	Not in Lahar Zone	Low
Grants Pass Unit Headquarters	5375 Monument Dr, Grants Pass		X						1979	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Hidden Valley High School	651 Murphy Creek Rd, Grants Pass		X						1976	Low	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low to High
Hugo Interchange Deicer Pump House	I-5		X						2010	Moderate	Not in SFHA	Moderate	Not in Lahar Zone	High
Illinois Valley Airport	30904 Redwood Hwy, Cave Junction						X		1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	Low
Illinois Valley RFPD - Station 2	18505 Redwood Hwy, Selma	X							1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Illinois Valley RFPD - Station 3 (O'Brien)	10 Lone Mountain Rd, O'Brien	X							1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	Low
Illinois Valley RFPD - Station 4 (Holland)	5645 Holland Loop Rd, Cave Junction	X							1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Illinois Valley RFPD - Station 6	8450 Takilma Rd, Cave Junction	X							1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Jerome Prairie Elementary School	2555 Walnut Ave, Grants Pass		X						1938	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Josephine County Food Bank	3658 Upper River Rd Grants Pass		X											
Josephine County Public Works Kerby	24253 Redwood Hwy, Kerby						X							
Josephine Emergency Operations Center and SAR	250 Tech Way, Grants Pass	X				X			1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Kerby Belt Building (Illinois Valley Learning Center)	24353 Redwood Highway Kerby, OR 97531		X											
Lincoln Savage Middle School	8551 New Hope Rd, Grants Pass		X						1962	Moderate	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low to High

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Lookout Manzanita Mountain	100 Bull Creek Rd, Grants Pass					X			1961	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	High
Lookout Sexton Mountain	2205 Shorthorn Gulch Rd, Grants Pass					X			2007	Not in Soft Soil Hazard	Not in SFHA	Moderate	Not in Lahar Zone	High
Lookout Tower Little Grayback Mountain	BLM Rd 39-7-12					X			1980	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	High
Madrona Elementary	520 Detrick Dr, Grants Pass		X						1967	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Madrona SDA School	520 Detrick Dr, Grants Pass		X						1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Manzanita Elementary School	310 San Francisco St, Grants Pass		X						1967	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Manzanita Rest Area	I-5		X						2001	Low	Not in SFHA	Low	Not in Lahar Zone	Low to High
New Hope Christian Schools	5961 New Hope Rd, Grants Pass		X						1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
North Valley High School	6741 Monument Dr, Grants Pass		X						1976	Low	Not in SFHA	Low	Not in Lahar Zone	Low to High
Rural Metro Fire Department - Station 2	Monument Drive, Grants Pass	X							1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Rural Metro Fire Department - Station 3	Old Stage Road, Wolf Creek	X							1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Rural Metro Fire Department - Station 5	5206 Azalea Dr, Grants Pass	X							1900	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Rural Metro Fire Department - Station 6	Upper River Rd, Grants Pass	X							1900	Not in Soft Soil Hazard	500-Year	Low	Not in Lahar Zone	Low
Rural Metro Fire Department - Station 7	Southside Rd, Grants Pass	X							1900	Low	Not in SFHA	Low	Not in Lahar Zone	High
Selma Community Center	18255 Redwood Hwy, Selma		X											
Sexton Mountain M/W Building	No Address		X						0	Not in Soft Soil Hazard	Not in SFHA	Moderate	Not in Lahar Zone	High
Siskiyou Community Health Center	Wolf Creek			X					1921	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low

Facility Name	Address	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Material	Year Built	Earthquake Hazard	Flood Hazard	Landslide Hazard	Volcanic Hazard	Wildfire Hazard
Site Systems - Fiddler Mountain M/W Grounds	No Address		X					X	0	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Site Systems - Hugo Interchange Stockpile Grounds	I-5		X					X	0	Moderate	Not in SFHA	Moderate	Not in Lahar Zone	High
Site Systems - Sexton M/W Operating Grounds	No Address		X						0	Not in Soft Soil Hazard	Not in SFHA	Moderate	Not in Lahar Zone	High
Site Systems - Wolf Creek Stockpile Grounds	191 Coyote Creek Rd, Wolf Creek		X						1992	Not in Soft Soil Hazard	Not in SFHA	Moderate	Not in Lahar Zone	Low
Sunny Wolf Charter School	100 Ruth Ave, Wolf Creek		X						1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	Low
The Dome School	9367 Takilma Rd, Cave Junction		X						1900	Moderate	Not in SFHA	Low	Not in Lahar Zone	High
Three Rivers Community Hospital - Grants Pass	500 SW Ramsey Ave, Grants Pass		X						2001	Not in Soft Soil Hazard	Not in SFHA	Low	Not in Lahar Zone	Low
Vineyard Christian School	275 Potts Way, Grants Pass		X						1900	Moderate	Not in SFHA	Low to Moderate	Not in Lahar Zone	Low
Williams (Library) Community center	20695 Williams Hwy, Williams		X											
Williams Elementary School	20691 Williams Hwy, Williams		X						1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Williams Fire and Rescue	211 E Fork Rd, Williams	X							1900	Low	Not in SFHA	Low	Not in Lahar Zone	Low
Wolf Creek Community Center	100 Railroad Ave, Wolf Creek		X											
Wolf Creek RFPD	1 Old State Hwy 99 S, Wolf Creek		X						1978	Moderate	Not in SFHA	Low	Not in Lahar Zone	Low
Wolf Creek Stockpile Pole Storage	191 Coyote Creek Rd, Wolf Creek		X						1992	Not in Soft Soil Hazard	Not in SFHA	Moderate	Not in Lahar Zone	Low
Woodland Charter School	301 Murphy Creek Rd, Grants Pass		X						1900	Low	Not in SFHA	Moderate	Not in Lahar Zone	High

Source: Cave Junction NHMP Steering Committee; Department of Land Conservation and Development, Oregon Natural Hazard Mitigation Plan. 2020. 2020 Statewide Loss Estimates (Appendices 9.1.8 and 9.1.9). Loss estimate data aggregated at the facility level by IPRE. Facilities without loss estimation data were not included in the analysis in the OR NHMP (2020). For facilities located in the cities of Cave Junction and Grants Pass see the applicable table in each city addendum.

Appendix D: Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon's Institute for Policy Research and Engagement (IPRE). It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon Military Department – Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigation*. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how an economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, law enforcement, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce “ripple-effects” throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value from a public policy perspective, in assessing the positive and negative impacts from mitigation activities and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

Mitigation Strategy Economic Analyses Approaches

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the three methods is outlined below:

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the state Oregon Office of Emergency Management (OEM), the Federal Emergency Management Agency (FEMA), and other state and federal agencies in evaluating hazard mitigation projects and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding. Unless an alternate approach is approved by FEMA, jurisdictions must use the latest available approved FEMA benefit/cost analysis (BCA) toolkit. Alternate approaches should be used with consultation from the State Hazard Mitigation Officer. See <https://www.fema.gov/benefit-cost-analysis> for more information.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in Public Sector Mitigation Activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in Private Sector Mitigation Activities

Private sector mitigation projects may occur based on one or two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or

landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost-effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchases. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Considering detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of those methods is the STAPLE/E approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a synthetic fashion. This set of criteria requires the Steering Committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process."

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff and building department staff can help answer these questions.

- Will the proposed action work?

- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action considering other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or city board of commissioners, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private?)
- How will this action affect the fiscal capability of the community?
- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?

- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

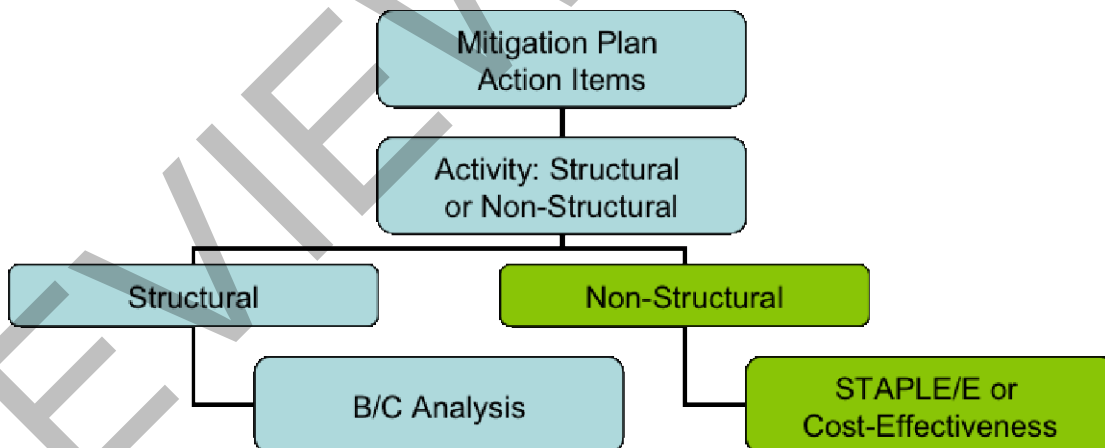
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed benefit/cost analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure D-I Economic Analysis Flowchart



Source: Oregon Partnership for Disaster Resilience. 2005.

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether to implement a mitigation activity. A framework for evaluating

mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation projects can assist in minimizing risk to natural hazards but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- **Determine the project cost.** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- **Estimate the benefits.** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- **Consider costs and benefits to society and the environment.** These are not easily measured but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- **Determine the correct discount rate.** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the best activities given varying costs and benefits include net present value and internal rate of return.

- **Net present value.** Net present value is the value of the expected future returns of an investment minus the value of the expected future cost expressed in today's dollars. If the net present value is greater than the projected costs, the project may be determined feasible for implementation. Selecting the discount rate and

identifying the present and future costs and benefits of the project calculates the net present value of projects.

- **Internal rate of return.** Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked based on economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners because of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change because of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports

- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, small business development, critical infrastructure, and transportation projects among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies for Evaluating the Socio-Economic Consequences of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eiding, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates, Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics, Inc., 1996

Federal Emergency Management Agency, [Report on the Costs and Benefits of Natural Hazard Mitigation](#). Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in the City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects Volume V, Earthquakes*, Prepared for FEMA's Hazard Mitigation Branch, October 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olsen Associates, Prepared for Oregon Military Department – Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000.)

Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

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APPENDIX E: GRANT PROGRAMS AND RESOURCES

Introduction

There are numerous local, state and federal funding sources available to support natural hazard mitigation projects and planning. The following section includes an abbreviated list of the most common funding sources utilized by local jurisdictions in Oregon. Because grant programs often change, it is important to periodically review available funding sources for current guidelines and program descriptions.

Post-Disaster Federal Programs

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The HMGP involves a paper application which is first offered to the counties with declared disasters within the past year, then becomes available statewide if funding is still available.

<http://www.fema.gov/hazard-mitigation-grant-program>

Physical Disaster Loan Program

When physical disaster loans are made to homeowners and businesses following disaster declarations by the U.S. Small Business Administration (SBA), up to 20% of the loan amount can go towards specific measures taken to protect against recurring damage in similar future disasters. <http://www.sba.gov/category/navigation-structure/loans-grants/small-business-loans/disaster-loans>

Pre-Disaster Federal Programs

Building Resilient Infrastructure and Communities Grant Program

The Building Resilient Infrastructure and Communities (BRIC) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. BRIC grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. The BRIC grant program is offered annually; applications are submitted online. Applicants need a user profile approved by the State Hazard Mitigation Officer, which should be garnered well before the application period opens. <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>

Flood Mitigation Assistance Program

The overall goal of the Flood Mitigation Assistance (FMA) Program is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other National Flood Insurance Program (NFIP) insurable structures. This specifically includes:

- Reducing the number of repetitively or substantially damaged structures and the associated flood insurance claims;
- Encouraging long-term, comprehensive hazard mitigation planning;
- Responding to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development activities; and
- Complementing other federal and state mitigation programs with similar, long-term mitigation goals.

<http://www.fema.gov/flood-mitigation-assistance-program>

Detailed program and application information for federal post-disaster and pre-disaster programs can be found in the FY15 Hazard Mitigation Assistance Unified Guidance, available at: <https://www.fema.gov/media-library/assets/documents/103279>. Note that guidance regularly changes. Verify that you have the most recent edition. Flood mitigation assistance is usually offered annually; applications are submitted online. Applicants need a user profile approved by the State Hazard Mitigation Officer, which should be garnered well before the application period opens.

For Oregon Office of Emergency Management (OEM) grant guidance on Federal Hazard Mitigation Assistance, visit:

<https://www.oregon.gov/OEM/emresources/Grants/Pages/HMA.aspx>

Contact: shmo@mil.state.or.us

State Programs

Special Public Works Fund

The Special Public Works Fund (SPWF) provides funds for publicly owned facilities that support economic and community development in Oregon. Funds are available to public entities for: planning, designing, purchasing, improving and constructing publicly owned facilities, replacing publicly owned essential community facilities, and emergency projects as a result of a disaster. Public agencies that are eligible to apply include: cities, counties, county service districts, (organized under ORS Chapter 451), tribal councils, ports, districts as defined in ORS 198.010, and airport districts (ORS 838). Facilities and infrastructure projects that are eligible for funding are: airport facilities, buildings and associated equipment, levee accreditation, certification, and repair, restoration of environmental conditions on publicly-owned industrial lands, port facilities, wharves, and docks, the purchase of land, rights of way and easements necessary for a public facility, telecommunications facilities, railroads, roadways and bridges, solid waste disposal sites, storm drainage systems, wastewater systems, and water systems. <https://www.orinfrastructure.org/Infrastructure-Programs/SPWF/>

Seismic Rehabilitation Grant Program

The Seismic Rehabilitation Grant Program (SRGP) provides state funds to strengthen public schools and emergency services buildings so they will be less damaged during an earthquake. Reducing property damage, injuries, and casualties caused by earthquakes is the goal of the SRGP. <http://www.orinfrastructure.org/Infrastructure-Programs/Seismic-Rehab/>

Community Development Block Grant Program

The Community Development Block Grant Program promotes viable communities by providing: 1) decent housing; 2) quality living environments; and 3) economic opportunities, especially for low- and moderate-income persons. Eligible activities most relevant to natural hazards mitigation include: acquisition of property for public purposes; construction/reconstruction of public infrastructure; community planning activities. Under special circumstances, CDBG funds also can be used to meet urgent community development needs arising in the last 18 months which pose immediate threats to health and welfare.

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Oregon Watershed Enhancement Board

While OWEB's primary responsibilities are implementing projects addressing coastal salmon restoration and improving water quality statewide, these projects can sometimes also benefit efforts to reduce flood and landslide hazards. In addition, OWEB conducts watershed workshops for landowners, watershed councils, educators, and others, and conducts a biennial conference highlighting watershed efforts statewide. Funding for OWEB programs comes from the general fund, state lottery, timber tax revenues, license plate revenues, angling license fees, and other sources. OWEB awards approximately \$20 million in funding annually. More information at: <http://www.oregon.gov/OWEB/Pages/index.aspx>

Federal Mitigation Programs, Activities & Initiatives

Basic & Applied Research/Development

National Earthquake Hazard Reduction Program (NEHRP), National Science Foundation.

Through broad based participation, the NEHRP attempts to mitigate the effects of earthquakes. Member agencies in NEHRP are the US Geological Survey (USGS), the National Science Foundation (NSF), the Federal Emergency Management Agency (FEMA), and the National Institute for Standards and Technology (NIST). The agencies focus on research and development in areas such as the science of earthquakes, earthquake performance of buildings and other structures, societal impacts, and emergency response and recovery.

<http://www.nehrp.gov/>

Decision, Risk, and Management Science Program, National Science Foundation.

Supports scientific research directed at increasing the understanding and effectiveness of decision making by individuals, groups, organizations, and society. Disciplinary and interdisciplinary research, doctoral dissertation research, and workshops are funded in the areas of judgment and decision making; decision analysis and decision aids; risk analysis,

perception, and communication; societal and public policy decision making; management science and organizational design. The program also supports small grants for exploratory research of a time-critical or high-risk, potentially transformative nature.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423

Hazard ID and Mapping

National Flood Insurance Program: Flood Mapping; FEMA

Flood insurance rate maps and flood plain management maps for all NFIP communities.

<http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

National Map: Orthoimagery, DOI – USGS

Develops topographic quadrangles for use in mapping of flood and other hazards.

<https://nationalmap.gov/ortho.html>

Mapping Standards Support, DOI-USGS

Expertise in mapping and digital data standards to support the National Flood Insurance Program. <http://ncgmp.usgs.gov/standards.html>

Soil Survey, USDA-NRCS

Maintains soil surveys of counties or other areas to assist with farming, conservation, mitigation or related purposes. http://soils.usda.gov/survey/printed_surveys/

Project Support

Coastal Zone Management Program, NOAA

Provides grants for planning and implementation of non-structural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration.

<http://coastalmanagement.noaa.gov/>

Community Development Block Grant Entitlement Communities Program, US Department of Housing and Urban Development

Provides grants to entitled cities and urban counties to develop viable communities (e.g., decent housing, a suitable living environment, expanded economic opportunities), principally for low- and moderate- income persons.

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/entitlement

National Fire Plan (DOI – USDA)

The NFP provides technical, financial, and resource guidance and support for wildland fire management across the United States. This plan addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability.

<http://www.forestsandrangelands.gov/>

Assistance to Firefighters Grant Program, FEMA

FEMA AFGM grants are awarded to fire departments to enhance their ability to protect the public and fire service personnel from fire and related hazards. Three types of grants are available: Assistance to Firefighters Grant (AFG), Fire Prevention and Safety (FP&S), and Staffing for Adequate Fire and Emergency Response (SAFER).

<http://www.fema.gov/welcome-assistance-firefighters-grant-program>

Emergency Watershed Protection Program, USDA-NRCS

Provides technical and financial assistance for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas damaged by severe natural hazard events.

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp>

Rural Development Assistance – Utilities, USDA

Direct and guaranteed rural economic loans and business enterprise grants to address utility issues and development needs.

http://www.rurdev.usda.gov/Utilities_Programs_Grants.html

Rural Development Assistance – Housing, USDA

The RDA program provides grants, loans, and technical assistance in addressing rehabilitation, health and safety needs in primarily low-income rural areas. Declaration of major disaster necessary. <http://www.rurdev.usda.gov/HAD-HCFPGGrants.html>

Public Assistance Grant Program, FEMA

The objective of FEMA Public Assistance (PA) Grant Program is to aid State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. <http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit>

National Flood Insurance Program, FEMA

The NFIP makes available flood insurance to residents of communities that adopt and enforce minimum floodplain management requirements. <http://www.fema.gov/national-flood-insurance-program>

HOME Investments Partnerships Program, HUD

The HOME IPP provides grants to states, local government and consortia for permanent and transitional housing (including support for property acquisition and rehabilitation) for low-income persons. <http://www.hud.gov/offices/cpd/affordablehousing/programs/home/>

Disaster Recovery Initiative, HUD

The DRI provides grants to fund gaps in available recovery assistance after disasters (including mitigation).

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/dri

Emergency Management Performance Grants, FEMA

EMPG grants help state and local governments to sustain and enhance their all-hazards emergency management programs. <http://www.fema.gov/fy-2012-emergency-management-performance-grants-program>

Partners for Fish and Wildlife, DOI – FWS

The PFW program provides financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats. <http://www.fws.gov/partners/>

North American Wetland Conservation Fund, DOI-FWS

NAWC fund provides cost-share grants to stimulate public/private partnerships for the protection, restoration, and management of wetland habitats. <http://www.fws.gov/birdhabitat/Grants/index.shtm>

Federal Land Transfer / Federal Land to Parks Program, DOI-NPS

Identifies, assesses, and transfers available federal real property for acquisition for State and local parks and recreation, such as open space. <http://www.nps.gov/ncrc/programs/flp/index.htm>

Wetlands Reserve program, USDA-NCRS

The WR program provides financial and technical assistance to protect and restore wetlands through easements and restoration agreements. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands>

Secure Rural Schools and Community Self-Determination Act of 2000, US Forest Service

Reauthorized for FY2012, it was originally enacted in 2000 to provide five years of transitional assistance to rural counties affected by the decline in revenue from timber harvests on federal lands. Funds have been used for improvements to public schools, roads, and stewardship projects. Money is also available for maintaining infrastructure, improving the health of watersheds and ecosystems, protecting communities, and strengthening local economies. <http://www.fs.usda.gov/pts/>

APPENDIX F: COMMUNITY SURVEY

Survey Purpose and Use

The purpose of this survey was to gauge the overall perception of natural disasters, determine a baseline level of loss reduction activity for residents in the community and assess resident support for different types of individual and community risk reduction activities.

Data from this survey directly informs the natural hazards mitigation planning process. Josephine County can use this survey data to enhance action item rationale and ideas for implementation. Other community organizations can also use survey results to inform their own outreach efforts. Data from the survey provides the County, and participating cities, with a better understanding of desired outreach strategies (sources and formats) and a baseline understanding of community perceptions of natural hazards and resilience.

Key Takeaways

In general, the survey responses reinforced information collected by the plan update team (steering committee and consultant).

- Survey respondents desired more information on community meetings, natural disasters and emergency preparedness, CPR training, and how to prepare a "Disaster Supply Kit".
- Survey respondents ranked wildfire as the hazard of most concern. Earthquake events and winter storms were other hazards rated with high concern.
- Infrastructure (damage or loss of bridges, utilities, schools, etc.), human (loss of life and/or injuries), and economic (business closures and/or job losses) assets were rated as the most vulnerable to natural hazards faced by the county.
- Survey respondents generally believe that their family is more prepared than their local community.
- Most survey respondents believe that their local communities are not well prepared in the advent of a natural hazard.
- Survey respondents install smoke detectors, create disaster plans with their families, and maintain a "defensible space" clear of vegetation and flammable materials, when possible, but are less likely to cover vents and nooks on the exterior of their homes.
- Business owner respondents were most concerned about loss of infrastructure and water, and least concerned about loss of inventory.
- Survey respondents expressed concern regarding maintaining heavily wooded areas near their homes, not being able to get rid of fire hazards, not knowing how to evacuate, not being prepared enough for long disaster, and not knowing what to do to keep themselves safe.

- Survey respondents expressed interest in community preparedness groups, receiving more education and information on natural hazards from local government, and participating in natural hazard drills.

Background

Resident involvement is a key component in the NHMP planning process. Residents should have the opportunity to voice their ideas, interests, and concerns about the impact of natural disasters on their communities.

According to Bierle¹, the benefits of resident involvement include the following: (1) educate and inform public; (2) incorporate public values into decision making; (3) substantially improve the quality of decisions; (4) increase trust in institutions; (5) reduce conflict; and (6) ensure cost effectiveness.

The NHMP planning process provided opportunities for the public to engage through an on-line survey disseminated by Josephine County.

Methodology

In the Winter of 2021-2022, the Oregon Partnership for Disaster Resilience (OPDR) administered the survey via the on-line tool (Qualtrics). The survey was distributed via city and county social media and websites in Josephine County. Survey responses were received from a total of 165 respondents (116 responses were complete, and 49 responses were partially complete).

The survey consisted of 22 questions. Josephine County designed the survey to determine public perceptions and opinions regarding natural hazards and mitigation priorities.

The intent of this survey was not to be statistically valid but instead to gain the perspective and opinions of residents regarding natural hazards in the region. Our assessment is that the results reflect a range attitudes and opinions of residents throughout the county. Results are provided below for the County; specific results are provided for each city as applicable.

Survey Results

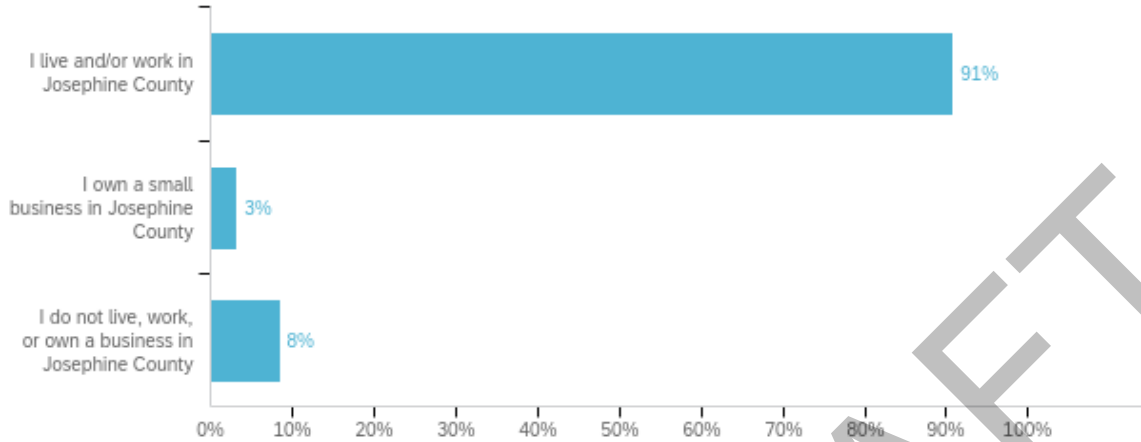
This section presents the compiled data and analysis for the 2022 Josephine County NHMP Community Survey.

Respondent Characteristics

Most respondents Live and/or work in Josephine County, but do not own a small business (140), with a small number not living, working, or owning a business in Josephine County (13) and a very small number of survey takers (5) own a small business in Josephine County.

¹ Bierle, T. 1999. Using social goals to evaluate public participation in environmental decisions. *Policy Studies Review*. 16(3/4), 75-103.

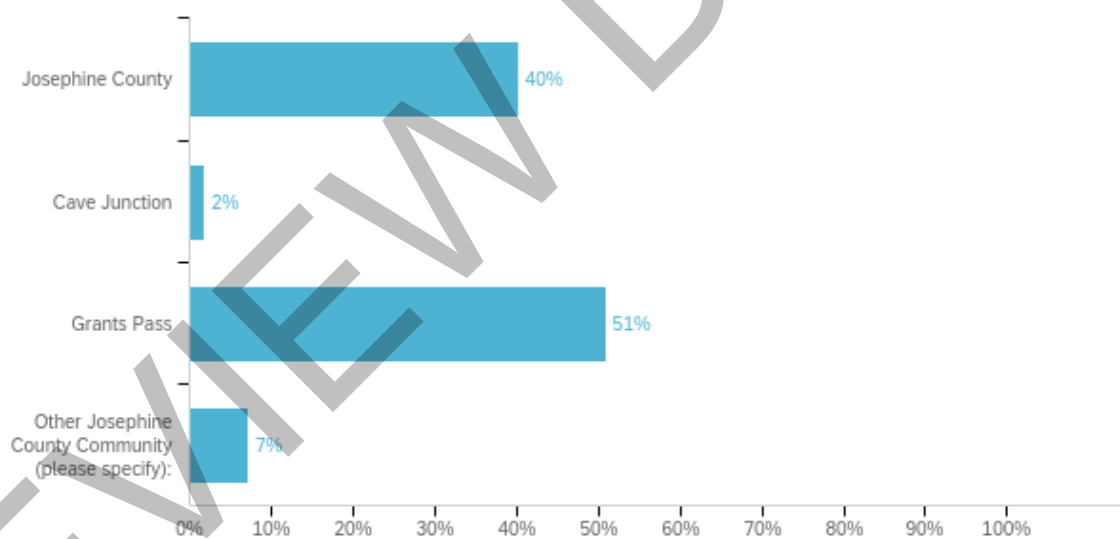
Figure F-1 Self-Identification of Survey Takers (n=158)



Source: 2022 NHMP Community Survey, analysis by OPDR; Q1 - Please tell us about yourself (select all that apply).

About half (53%) of the respondents lived in the incorporated areas of Grants Pass (51%) and Cave Junction (2%). The remaining percent live in the county (40%) and “other Josephine County Communities” including Williams, O’Brien, and Murphy.

Figure F-2 Respondent Place of Residence



Source: 2022 NHMP Community Survey, analysis by OPDR; Q1 - Please tell us about yourself (select all that apply).

Survey Respondents were also asked to provide their ZIP Code. Of the 100 Responses, 86% were from Zip Codes 97526 and 97527, both of which include Grants Pass, Redwood, New Hope, and Murphy. Five percent (5%) of those surveyed lived in the Illinois Valley (ZIP Codes 97523, 97534, and 97538), and include the towns of Cave Junction, Kerby, Takilma, and O’Brien.

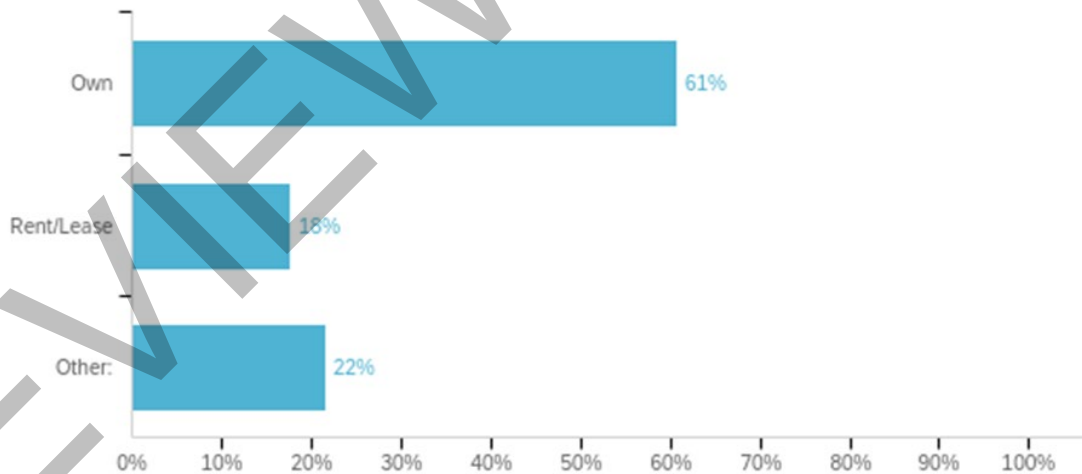
Figure F-3 Zip Code of Respondent.



Source: 2022 NHMP Community Survey, analysis by OPDR; Q18 - Please provide your 5-digit ZIP code.

About 61% of the surveyed residents owned their own home, 18% rented, and 22% responded with “other” For those that chose “other”, living at home with their parents was the most stated response (19 or 80%) said that they lived with family. Note: the survey was distributed to Grants Pass High School students (58 respondents).

Figure F-4 Housing Type of Survey Taker (n=130)



Source: 2022 NHMP Community Survey, analysis by OPDR; Q3 What City or Community do you live in?

Natural Hazard Information

This section reports the experiences of survey respondents involving natural hazards and their exposure to preparedness information.

The survey asked respondents to indicate their interest about natural hazards that impact Josephine County. Table F-1 shows that respondents were “most interested about wildfire

(73% of respondents being “very” or “extremely” interested) and interested in low air quality (59%) and earthquakes (49%). Respondents were least concerned about volcanic events, windstorms, and landslides.

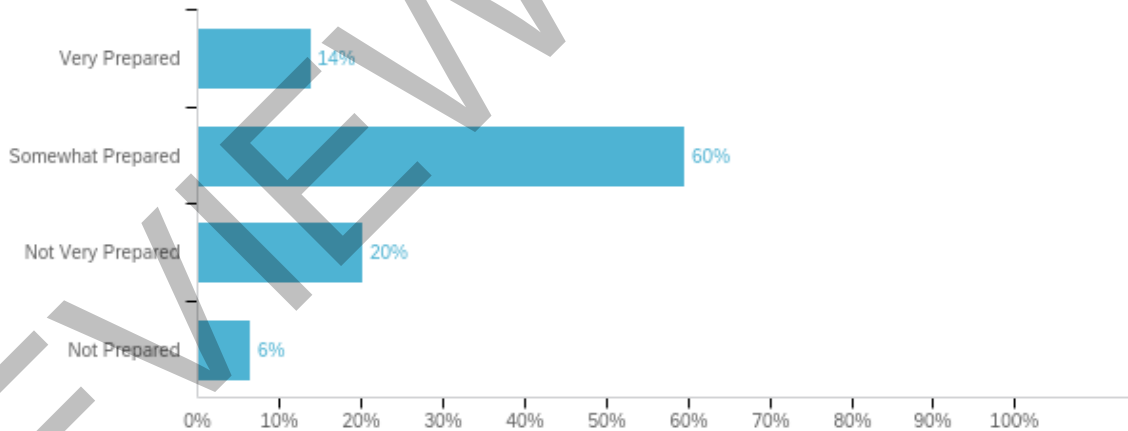
Table F-1 Hazards that Respondents are Most Interested In

Hazard	(A Big Deal to me)				(Not a Big Deal to me)	Total
	Extremely Interested	Very Interested	Somewhat Interested	Slightly Interested	Not at All Interested	
Wildfire	47%	26%	16%	6%	5%	136
Low Air Quality (smoke related)	29%	30%	18%	13%	10%	135
Drought	16%	25%	29%	15%	15%	135
Earthquake	16%	33%	32%	13%	6%	136
Extreme Heat or Cold	14%	22%	32%	18%	14%	136
Winter Storm (snow/ice)	13%	27%	24%	21%	14%	135
Flood	12%	21%	33%	17%	17%	132
Volcanic Event	12%	18%	23%	24%	24%	135
Landslide	7%	17%	35%	20%	21%	136
Windstorm	7%	20%	32%	17%	24%	135

Source: 2022 NHMP Community Survey and Readiness Fair Survey, analysis by OPDR; Q2 - How interested are you about the following natural disasters that may affect you and/or your family?

The survey also asked the level of preparedness of their homes in the advent of a disaster. Only 14% of respondents felt that they were “very prepared” in the advent of a natural disaster. The majority (60%) of residents felt that their household was “somewhat prepared”, and only about 6% felt “not prepared.”

Table F-2 Individual/Family Preparedness for Natural Hazards (n=109)



Source: 2022 NHMP Community Survey, analysis by OPDR; Q6 - How prepared are you and/or your family to respond to, or mitigate, natural hazard risks for you and/or your family?

The survey respondents were also asked their opinions on how to best reduce risk from natural hazards that may impact them or their family and were asked to briefly describe anything that they needed to feel more prepared. Here are the answers to that question:

- I’m not sure
- Earthquake
- We can prepare an emergency packs.
- Water lawns and maintain area.

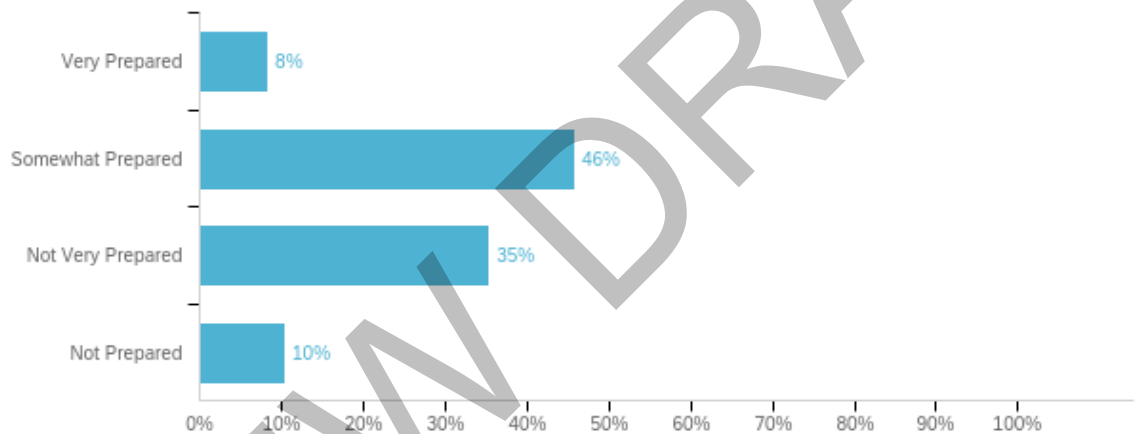
- Bring back the funding for landowners to help cover the high costs of reducing fuel levels by brushing and controlled burns along with proper spacing on trees and shrubs. Stop displacing blame of water issues on legal hemp and agricultural farms when the fact is we have notably increased our housing developments and population densities that have larger household misuse and over consumption of water that is astronomically higher overall zero return water waste.!
- I think it would be nice to be made aware of what more to do in the case of different natural hazards. What local resources are available and what are some things I can do to be more prepared.
- I have no idea how my high schooler would get across the river home if there was an earthquake and the bridges failed.
- Extensive tree trimming. Trees overhang house.
- More bags and A LOT of food and water
- Food water and a safe place to stay.
- We have not really sat down and had a conversation about what we would do if a natural disaster happened. I think if we talked about it and prepared more, we would be a lot safer.
- If we could do things to reduce wildfires, it would really help our family. We live on a hill leading into a mountain, so we are surrounded by vegetation. We have a large pond, so we have access to water for filtering and putting out flames to an extent.
- More water bottles and food to store up.
- Get CPR and First aid certification, make to go pack, and have a plan
- An emergency kit and a plan to get out of the house.
- Minding your own business
- Clean up trash on the roads.
- Make sure you have stuff in a bucket like food water and things like that
- No be stupid
- Nothing
- Nothing [expletive] FEMA I know my [expletive]
- Nah
- A ps5
- More dry-nonperishable foods, and a new house :b
- We need a neighborhood plan/ system
- guns, lots of guns
- Being prepared
- A light saber a backpack and Donald Trump
- We don't exactly have a good plan for something crazy but we should.
- I would a gun for monsters air pods so I can listen to musics i would bring Scottie so I could beat him up and Selena Smith to re impregnate
- be ready
- If I had more knowledge about this topic it would make me feel a lot better
- community connection and work together to plan/prepare/implement measures for everyone's safety - people and animals utility shut-off assistance/information escape routes how to increase drainage and water flow away from property better information system/network, alert system/network
- My opinion would be to pray!

- Training related to injury or illness during a natural disaster when resources/supplies are limited.
- The response of authorities/responders to the natural hazards.
- Be smart
- Grants Pass Public Safety...Pacific Power. How emergency prepared are they? Some years ago during winter, the whole city of Grants Pass and surrounding areas completely lost all electricity for hours (with the exception of Winco and Walmart!!) Concerned that will happen again! Have not heard of any emergency preparedness upgrades in Josephine County (Grants Pass). Where is the accountability?
- Better education and access to resources. Preparedness resources can be very costly, as can be specialized property maintenance (such as falling hazardous trees, removing invasive underbrush, etc.) and in this area especially that can be a death sentence. Wildfires move fast and having a neighborhood on the same page as to how to evacuate, where to meet, who will need help leaving, can save lives and property. We need cohesive plans that translate directly into action when the time calls. Every resident should be educated and have the resources available to give them the best possible chances to survive a natural disaster here.
- What to do if we can not evacuate...we live two miles in on a dead end road.
- Best way to evacuate city in the event of wildfire or other natural hazard.
- Maybe send out a check list of how to prep or prevent
- City's inability to maintain creeks/run-off areas
- Cheap service to help protect your house/property if unaffordable.
- I think it would be helpful to have something sent out via mail or email that would provide a checklist of what an average family should do to prepare for any natural disaster.
- We need early strike force to stop forest fires immediately. Elders need inexpensive or no cost help preparing home and land for fire.
- I need more information on how to be better prepared for flooding
- We need to have a solid plan in place and have emergency preparedness kits set up. We are somewhat prepared, but we need to improve our plan and our level of preparedness.
- I would like to attend my local CERT training this spring.
- We don't qualify for a grant, and we have a lot of trees around property. It's expensive to clear so we haven't done this
- Management of BLM lands to prevent wildfires from spreading quickly.
- Putting together a kit & having all the information in one place
- Get neighbors to clear dangerous nonnative brush.
- Don't know where to store gas and propane and other flammables. Advice about replacing and adding to smoke detectors. Advice about AEDs at our church, testing and training. And CPR classes.
- I really need to complete my binder with all the insurance info and the financial info to have ready to go. I have emergency equipment and go bag in my vehicle, but probably need to check for out dates and replace my water
- With less precipitation I am curious about options if our well goes dry.
- We have the knowledge and the resources to complete what we've started. We just need the time to do it. We're on our way!! Thanks to prepping classes and community resources.

- Need assistance cleaning up property, maybe grants or other funding to be available to homeowners.
- Funds to pay someone to help
- none
- We will NOT be irrigating the lawn because of extreme water scarcity.
- My area is so heavily forested. And a lot of people just don't have the means to clear their property of dead debris which makes it a major fire hazard. Awareness of Community Preparedness for Natural Hazards -

Figure F-5 shows Josephine County residents' opinions on their community's preparedness for natural hazards. Not many respondents (8%) rated their community as very prepared, but over half of respondents said that they believe their community were somewhat prepared (40%). About half of the respondents noted that they believe their community is not very prepared (35%) or not prepared (10%).

Figure F-5 Community Preparedness for Natural Hazards (n=96)



Source: 2022 NHMP Community Survey, analysis by OPDR; Q7 - *In your opinion how prepared is your community to respond to, or mitigate, natural hazard risks?*

The survey respondents were also asked their opinions on how to best reduce risk from natural hazards that may impact their community and were asked to briefly describe any projects that they thought could protect their community from natural hazard risks. Here are the responses to that question:

- They can help make things flood proof and stuff like that
- Projects that give the opportunity to learn or take interactive classes about these safety measures
- People don't take it seriously and/or lack the skills and resources to make proper progress and decisions in terms of natural disaster prevention, mitigation, and planning.
- I think fires with smoke are the biggest threat to our community. The biggest problem I think is overgrown brush that can be taken care of by lumber mills cost and in turn the forestry service can mark trees they would like taken down that are either dead or too densely populated that will benefit sourcing locally and keeping our forests thriving. It's just like a small garden, you have to prune and take care of your plants spacing for healthy growth.

- Education in schools. Tv ads? Preparedness fair with demonstrations, free 72-hour kit assessments, scenarios, info on more classes. Incentivize people to come offering raffle for free products. There are incredible teachers in our area- Mike and Jennifer Swartz are the best
- Free help for elderly and infirm people to reduce landscape hazards.
- If nobody was in a rush because more people die or get hurt by being in a rush
- I think we should build a safe house for people invade anything happens.
- Most of our community isn't prepared to leave their houses in case of emergency. With all the vegetation around us, fires are a big deal.
- I'm not very sure
- I'm not entirely sure.
- Make evacuation plans
- Bring more attention
- None your business
- There is lots of negligence but that is their nature. Not much further can be done other than learning the hard way.
- Terrible
- Nothing [expletive] fema I know my [expletive] and I would prefer the government stay out of my business I don't need help from you.
- Nah
- Inform the people here more on how to prepare
- Having community practices, and repairing our roads and bridges
- Make a community center for being prepared
- City meeting
- Secure and fasten together any buildings in case of earthquake just as an example
- I would bring a hazard suit
- idk
- I feel im pretty prepared
- like neighborhood watches create neighborhood preparedness groups - accessible to all including those whose main language may not be English, who may not have access to internet, who may be lower income or differently abled and so forth. better alert and information systems escape routes utility shut-offs how to prepare information risk assessments for each neighborhood - likely scenarios community trainings
- Our community wouldn't listen unless they hear sirens.
- I think the speaker that came and talked to hidden valley really helped me to think about what I need and need to prepare for.
- get a better governor
- Is Josephine County prepared? Doesn't seem like it. They can't even cut hazardous trees, limbs, and branches that are towering and hanging over very busy public streets and roadways, maintain potholes, update striping, and red zones. Provide better lighting in very dark areas in and just outside of city limits. Provide additional, lighted pedestrian zones (people jaywalking all the time.) More street signs informing people on what "not to do" while driving (people are turning left on red lights throughout the city.) More "wrong way" signs with arrows. Example: Just recently at the intersection of Hillcrest and 9th Street (under I-5 overpass) a person died! from driving straight into the hillside. Due to lack of lighting (so dark you can hardly see the stop sign), no yellow sign with dark black left and right arrows

showing that you cannot go straight. Josephine County is not using public safety/maintenance funds to make the county safer. Don't know exactly what they are spending money to be used for that on?

- As previously stated, educating the larger community, and offering the resources needed would be hugely beneficial. Having county-wide drills and far-reaching alert systems to folks out in the mountains is massively important. Not having cell reception or internet simply cannot be a hurdle residents have to jump just to know that a disaster is happening. Having a county-wide plan for several kinds of natural disasters would only be beneficial. We have 82,000 people in this county and if we have to evacuate how can we do that safely? If certain parts of the city are inaccessible where would emergency services set up? There's only one hospital in the county and a river splits the city. We need to be aware of the dangers present and have an adaptable plan that allows us to best respond to the situation. That would include a massive education and outreach to the residents of the county and would absolutely rely on their voluntary participation. But we've got to make it as easy as possible for them, as easy as possible to remember and to do when there is an emergency happening.
- Local disaster preparedness event. Classes. Authorities to stop illegal Marijuana grows to future reduce drought.
- I think we all feel safe other than floods or fire so we might need to look into being more prepared
- Free or low cost service to prep property and surroundings.
- I think the county making sure that trees are trimmed near wires & keeping power lines maintained is good. Also, community virtual webinars talking about home safety - top things to look for that increase risks for disaster, might be helpful. I'm wondering if it would help to have volunteer opportunities for the community to participate in that would help decrease the chance of natural disasters. Also, maybe putting together a webinar that talks about what to do in different situations that makes sense for our community. I think anything that keeps people from panicking would be helpful.
- More information regarding resources.
- Online information on the city website
- Have a supply of emergency food/water available; have vehicles that can respond out in the community; have the ability to set up emergency shelter; have an organized network of community volunteers who are willing and able to help out around the community in different areas if needed.
- Emergency preparedness week. Information sessions in schools, at the senior center, and virtual workshops.
- Remove homeless encampments from wooded areas along railroad tracks, I-5 corridor, behind rest areas. These are potential areas for wildfires from homeless encampment fires.
- practice drills
- County should require removal of dangerous brush from roadsides.
- Holding Prep U courses in town in community centers like the Grange and/or Churches meeting halls to shorten driving distances and nighttime hours. That might bring more people in. But, with COVID it's not practical now, and not practical in any case due to cost and manpower I would think.
- Have more public info about classes for preparedness

- Increased Forest management.
- Community classes to explain risks and prepare us for the hazards.
- Forest management
- none
- Logging!
- Fund neighborhood-based preparedness initiatives

Table F-3 shows activities that respondents take to improve the safety of themselves and families in the event of a disaster. The tasks most completed include installing smoke detectors (77%), completing the survey (54%), and talking with household members about what to do in the case of an emergency (54%). The tasks that people need the most help with include attending meetings and receiving information on natural disasters and emergency preparedness (17%), learning CPR (14%), preparing a disaster supply kit (13%), and creating a household emergency plan (10%). About one-quarter (28%) of respondents have no interest in attending meetings or receiving information on natural disasters and emergency preparedness.

Table F-3 Steps taken to reduce individual/family risk from disaster event

Question	Completed	Thinking about doing	Started but not done yet	Unable to Do/Need help to do	Will not do/Not of need or interest	Total
Prepared your home by having smoke detectors on each level of the house	77%	6%	5%	4%	8%	126
Completed this survey! Helps my community's preparedness work.	54%	11%	28%	3%	5%	123
Talked with members in your household about what to do in case of a natural disaster or emergency?	54%	13%	13%	9%	12%	127
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	45%	17%	5%	14%	20%	123
Practiced utility (water/power) shutoff how-tos in the event of a natural disaster?	42%	26%	10%	9%	13%	125
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	39%	22%	17%	10%	11%	126
Prepared a "Disaster Supply Kit" (Stored extra food, water, batteries, or other emergency supplies)?	33%	19%	22%	13%	13%	127
Attended meetings or received written information on natural disasters or emergency preparedness?	26%	23%	6%	17%	28%	127

Source: 2022 NHMP Community Survey and Readiness Fair Survey, analysis by OPDR; Q4 - In the following list, please check those activities that you have completed, thinking about doing, started but have not done yet, are unable to do or will need help with, or will not do/not of need or interest. (Please check one answer for each preparedness activity)

Table F-4 shows defensible space techniques that respondents practice at their homes. Most respondents practice defensible space techniques regarding their lawn and removing dead vegetation surrounding their home. Respondents are less likely to do practices that involve cost like screening and boxing in decks and patios, covering attic vents, and enclosing under-eave vents. Respondents are also likely to have flammable materials within 30 feet of their home or outbuilding, but this is likely influenced by the 53% of respondents who live inside city limits.

Table F-4 Defensible space techniques practiced at home

Answer	Percent	Count
Clear leaves and other debris from gutters, eaves, porches, and decks.	14%	88
Remove dead vegetation from under deck and/ or from within 10 feet of house.	10%	64
Remove flammable items from under decks or porches.	10%	59
Screen or box-in areas below patios and decks metal with wire mesh to prevent debris and combustible materials from	6%	36
Remove flammable materials (firewood stacks, propane tanks, dry vegetation) from within 30 feet of your home and	6%	39
Prune trees so lowest branches are 6 to 10 feet from the ground.	9%	54
Keep lawn hydrated and maintained (mowed).	13%	79
Dispose of lawn clippings and other vegetated debris from lawns and planting areas.	13%	77
Inspect shingles and roof tiles and replace/ repair those that are loose or missing.	8%	49
Cover exterior attic vents with metal wire mesh to prevent sparks from entering home.	5%	33
Enclose under-eave and soffit vents or screen with metal wire mesh to prevent ember entry.	6%	36

Source: 2022 NHMP Community Survey, analysis by OPDR; Q5 - Cleaning your property of debris and maintaining your landscaping are important first steps to minimize damage and loss due to wildfire. Have you practiced defensible space techniques at your home? (Please check all that apply.)

Business Owners

There were five (5) business owners that responded to the survey. As such, the sample of businesses was not representative. Of the five business owner respondents, three (3) identified as a small business with under 20 employees, one as a large business with 20 or more employees, and one as “other” and specified that they were a “business+nonprofit+homeowner.”

Of the five respondents, four (80%) of the business owners owned the property that their business is on. Three (60%) of the businesses have been impacted from natural disasters. The two comments regarding these incidents are as follows:

- Storms interrupted services to my business
- The Slater Fire closed our residential plumbing business for eight weeks. The union would not insure us to work in an evac zone (smart,) and we took a huge financial loss.

Table F-5 shows the disasters that the business owners believe that would most impact their business. Most respondents stated that a wildfire, earthquake, or a volcanic event would affect their business to a high or very high degree. By contrast, a landslide or drought event would be least likely to affect their business.

Table F-5 Percieved Impact of Natural Hazards on Business

Question	To a very high degree (weeks to months)	To a high degree (days to weeks)	To a moderate degree (1+ days)	To a low degree (hours)	To a very low degree (minimal to none)	Total
Earthquake	60%	0%	20%	20%	0%	5
Wildfire	60%	20%	0%	20%	0%	5
Volcanic Event	40%	20%	0%	40%	0%	5
Flood	20%	20%	40%	20%	0%	5
Low Air Quality (smoke related)	20%	20%	60%	0%	0%	5
Winter Storm (snow/ice)	20%	20%	60%	0%	0%	5
Drought	0%	20%	20%	40%	20%	5
Landslide	0%	20%	0%	40%	40%	5
Extreme Heat or Cold	0%	20%	60%	20%	0%	5
Windstorm	0%	40%	20%	40%	0%	5

Source: 2022 NHMP Community Survey, analysis by OPDR; Q11 - To what extent do you think your business would be impacted by the following natural disasters?

Table F-6 shows the concerns business owners have over the effects of natural hazards. Most business owners (80%) stated that damage to the local infrastructure and the loss of water were the most concerning, and customer loss, loss of power, and loss of communication systems were also concerning (at 60% for very and extremely concerned). Business owners were divided on employee loss/unavailability and supply chain. Respondents were least concerned about loss of inventory.

Table F-6 Natural Hazard Impact Concerns on Local Businesses

	Extremely Concerned	Very Concerned	Somewhat Concerned	Slightly Concerned	Not at all Concerned	Total
Customer loss	60%	0%	20%	20%	0%	5
Loss of power (electricity, gas)	40%	20%	40%	0%	0%	5
Loss of communication systems (phone, internet, etc.)	40%	20%	40%	0%	0%	5
Loss of supply chain	40%	0%	40%	20%	0%	5
Physical damage to business	20%	20%	60%	0%	0%	5
Damage to local/regional infrastructure (roads, bridges)	20%	60%	0%	20%	0%	5
Loss of water	20%	60%	20%	0%	0%	5
Loss of inventory	20%	20%	20%	40%	0%	5
Employee loss/unavailability	0%	60%	0%	20%	20%	5
Other (please specify):	0%	0%	0%	0%	100%	2

Source: 2022 NHMP Community Survey, analysis by OPDR; Q12 - What level of concern do you have about the following potential natural hazard impacts to your business?

In the advent of a natural disaster, 40% of respondents were confident that their business would be adequately insured and 60% did not. The survey also asked if the respondents knew of government programs (e.g., grants, loans) to help them recover from losses due to a natural disaster that may not be covered by insurance. One (20%) said yes, three (60%) said no, and one (20%) was unsure. When asked if the business owners knew what was needed to mitigate their business against risks posed by natural hazards, two (40%) said yes and three (60%) said no.

The business owner respondents were also asked their opinion on how to best reduce risk from natural hazards that may impact their business. They were to briefly describe anything

that their business needs to be more prepared for a natural hazard. These were the responses:

- We are more than a dollar above the national average for fuel costs... we have adapted a horrible forest management program that equates total loss and massive wildfires year after year and even further blocks any attempt to recover the loss that is viable.
- Better community-wide communications, and attention to safe ingress/egress.

Demographics of survey respondent

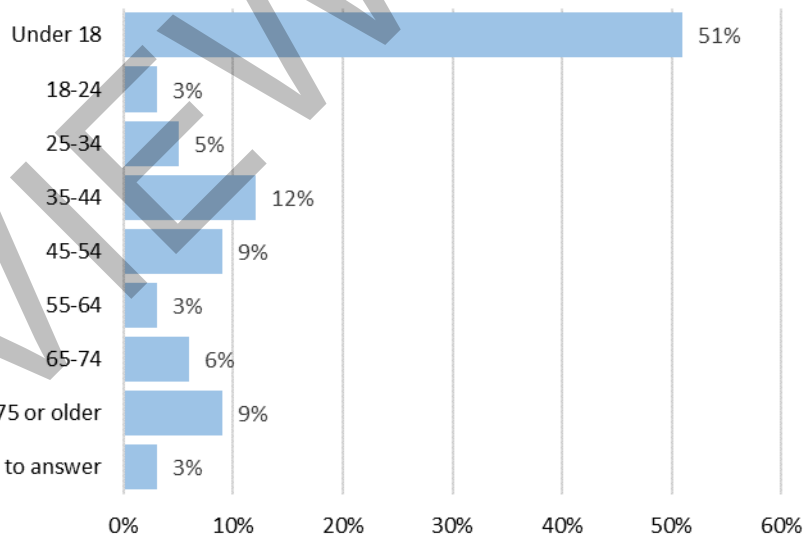
Gender

Just over 34% of survey respondents reported their gender as male, 55% female, 5% as other, which included gender-fluid and nonbinary, and 5% chose not to provide an answer. The 2015-2019 American Community Survey 5-Year Estimates (2019 ACS 5-Year Estimates) reports the gender mix as 49% male and 51% female. The sampling for this survey was weighted towards females.

Age

Figure F-6 shows that the largest respondent group was in the under 18 age group (51%). The survey respondents overrepresented under 18 age cohorts compared to the population estimated age cohort provided by the American Community Survey (20%) and underrepresented all other age cohorts.

Figure F-6 Respondent Age Groups (n=114)

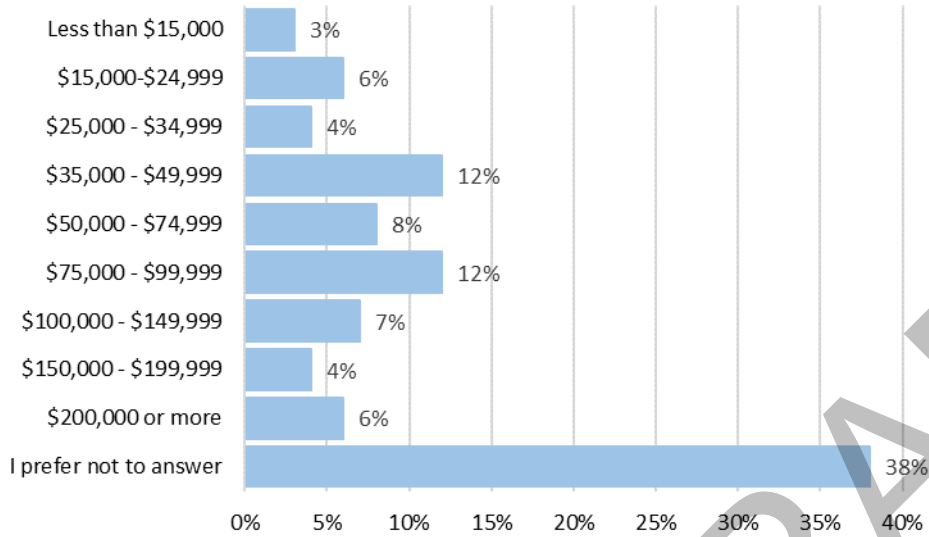


Source: 2022 NHMP Community Survey, analysis by OPDR, Q28 - What best describes your age group?

Income

Figure F-7 shows the income groups for respondents. About 17% of respondents had household incomes of \$100,000 or more and almost 40% prefer not to provide an answer. About 13% of respondents had household incomes below \$30,000.

Figure F-7 Household Income (n=108)

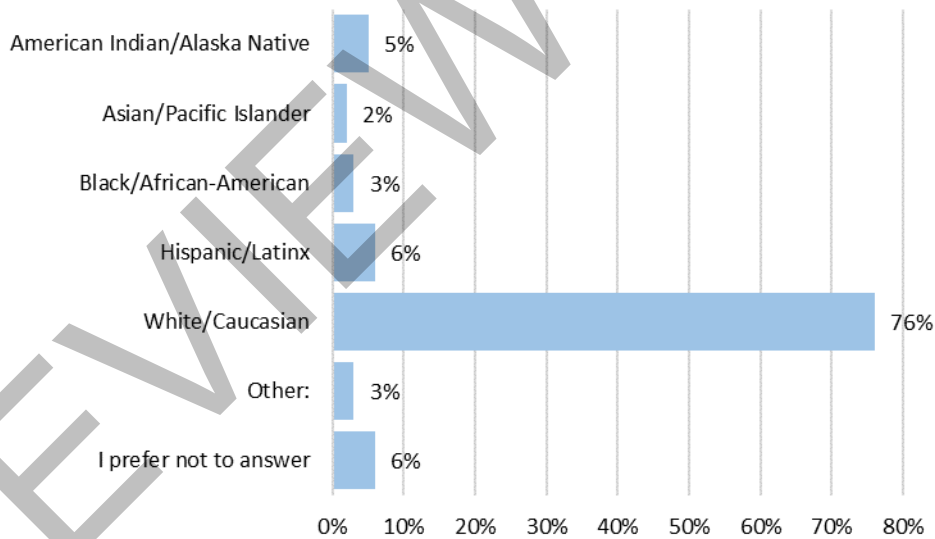


Source: 2022 NHMP Community Survey, analysis by OPDR, Q21 - Which best describes the combined annual income of all members of your household?

Race and Ethnicity (Hispanic or Latinx)

Almost 85% of respondents reported that they were white (Figure F-8).

Figure F-8 Race and Hispanic or Latinx background (n=125)



Source: 20122 NHMP Community Survey, analysis by OPDR; Q30 - Which best describes your race or ethnic background? Select all that apply

Six percent (6%) of respondents did not provide an answer. The survey sample, when compared to ACS 5-Year Estimates, overrepresents all minority populations except Hispanic/Latinx (who is only underrepresented by about 1.5% or two other people taking the survey). Those who reported “other” included mostly White/Caucasian as well as mixed raced.

Other comments:

Respondents were provided an opportunity to provide additional comments. Listed below are their responses:

- There are obvious and simple step we can take to improve if people who control the legal aspects of our state could just step aside from the emotional gaslighting of misguided issues and practices and use some basic common sense.
- I think more public cameras are a great thing in reducing crime and spotting natural hazards like fires more quickly to help first responders react more efficiently.
- Thank you for doing this to help our community.
- We feel comfortable with our preparedness
- i dont know
- i don't have any
- Nope
- Lol
- Nah
- I'm not very informed on any of this so answering these questions is somewhat confusing.
- None
- i hate tsunamis
- Nah
- Important to have generator (dual power source), water source, heat, food, medications and avenue of escape when needed. Backups if avenue of escape is blocked. Defensible and defendable space in that case.
- thank you
- Homeless problem is "out of control."
- We live in an area that is at EXTREME risk of wildfires and to be honest I don't have a lick of faith that we are anywhere near prepared for the sort of thing that happened during the Alameda Fire. 2500 homes gone in a matter of hours. Josephine county has quite a few rural communities that are very vulnerable and can be rather isolated, with only one way in or out of a neighborhood. Where I live there is one road in and that road turns into BLM roads and splits 10 ways from Sunday out into the mountains. If I wasn't able to evacuate on the main road out, the chances of getting lost in the mountains during a wildfire are incredibly high. There is only one road that leads out of the mountains. It is not clearly marked nor maintained. These are things that MUST be addressed moving forward. If we want to continue living in this area without huge sections of it being devastated every other year, we must start aggressively maintaining and caring for our forests and making sure our people are as safe as they reasonably can be.
- I believe there should be a great disaster preparedness presence and support in my area.
- I think there should be information on how to protect and prepare for pets as well
- Thank you for reaching out to the community!!!!
- With the demands of Covid on our health care system, I feel it is more important than ever to get First Aid and CPR and more training out to the general public for them to know what they can do When Help is NOT coming. We are sometimes up against Ambulances that are NOT available (how should you transport and injured

person). And hospitals full or Urgent Care shut down. Offer Advanced Trauma training in case of a severe disaster to more people in neighborhoods. Offer FIRST AID etc. in schools for extra credit or some incentive. Give out Stop the Bleed Kits and splinting supplies. Our problem is that it's hard to congregate with the Virus spreading so rampantly now.

- I feel we should all be educated by our City or County Government in preparation for any emergency that may occur.
- none

Wildfires are the biggest risk facing our community. If we don't take some kind of proactive action, i.e. thinning, controlled burns, logging etc. we are headed for disaster. There are not enough escape routes for the people of rural Josephine County to get out of the path of a major firestorm either.

REVIEW DRAFT