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**Siskiyou County, California
Local Hazard Mitigation Plan**



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List of Commonly Used Acronyms

Acronym	Meaning
BRIC	Building Resilient Infrastructure and Communities
Cal OES	California Governor’s Office of Emergency Services
EAL	Expected Annual Loss
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
GIS	Geographic Information System
HMGP	Hazard Mitigation Grant Program
LHMP	Hazard Mitigation Plan
IBC	International Building Code
NCEI	National Centers for Environmental Information
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRI	National Risk Index
NWS	National Weather Service
RAPT	Resilience Analysis and Planning Tool
MPC	Mitigation Planning Committee
SCOES	Siskiyou County Office of Emergency Services
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	United States Geologic Survey
WUI	Wildland/Urban Interface

Section 1 – Introduction, Assurances, Incorporation, and Adoption

1.1 Introduction

Hazard mitigation is commonly defined as sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects. Hazard mitigation planning provides communities with a roadmap to aid in the creation and revision of policies and procedures, and the use of available resources, to provide long-term, tangible benefits to the community. A well-designed hazard mitigation plan provides communities with realistic actions that can be taken to reduce potential vulnerability and exposure to identified hazards.

This multi-jurisdictional Local Hazard Mitigation Plan (LHMP) was prepared to provide sustained actions to eliminate or reduce risk to people and property from the effects of natural and man-made hazards. This plan documents Siskiyou County and its participating jurisdictions planning process and identifies applicable hazards, vulnerabilities, and hazard mitigation strategies. This plan will serve to direct available community and regional resources towards creating policies and actions that provide long-term benefits to the community. Local and regional officials can refer to the plan when making decisions regarding regulations and ordinances, granting permits, and funding capital improvements and other community initiatives.

Specifically, this hazard mitigation plan was developed to:

- Update the August 2018 LHMP
- Build for a safer future for all citizens
- Foster cooperation for planning and resiliency
- Identify, prioritize, and mitigate against hazards
- Assist with sensible and effective planning and budgeting
- Educate citizens about hazards, mitigation, and preparedness
- Comply with relevant federal requirements
- Address future climate change considerations

This plan has been designed to be a living document, a document that will evolve to reflect changes, correct any omissions, and constantly strive to ensure the safety of all citizens.

1.2 Assurances

In an effort to reduce natural disaster losses, the United States Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in order to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act). DMA 2000 amended the Stafford Act by repealing the previous Mitigation Planning section (409) and replacing it with a new Mitigation Planning section (322). Section 322 of the DMA makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for Federal mitigation grant funds. This SLHMP was prepared to meet the requirements of the DMA 2000, as defined in regulations set forth by the Interim Final Rule (44 Code of Federal Regulations (CFR) Part 201.6).

All adopting jurisdictions certify that they will comply with all applicable Federal statutes and regulations during the periods for which they receive grant funding, in compliance with 44 CFR 13.11(c), and will amend this plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

This LHMP was prepared to comply with all relevant requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, as amended by the Disaster Mitigation Act of 2000. This plan complies with all the relevant requirements of:

- Code of Federal Regulations (44 CFR) pertaining to hazard mitigation planning
- Federal Emergency Management Agency (FEMA) planning directives and guidelines
- Interim final, and final rules pertaining to hazard mitigation planning and grant funding
- Relevant presidential directives

- Office of Management and Budget circulars
- Any additional and relevant federal government documents, guidelines, and rules.

Additionally, this LHMP has been completed to address all State of California recommendations and requirements concerning hazard mitigation planning and the requirements of FEMA’s Local Mitigation Planning Policy Guide that went into effect April 19, 2023.

1.3 Authorities

The LHMP relies on the authorities given to participating jurisdictions by its citizens and encoded in local and state law. This plan is intended to be consistent with all policies and procedures that govern activities related to the mitigation programming and planning. In all cases of primacy, State of California and local laws, statutes, and policies will supersede the provisions of the plan.

1.4 Hazard Mitigation Plan Incorporation and Integration

This hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various county and local codes, plans, reports, and studies. The integration of these can provide the following community benefits:

- Align community goals, objectives, and prime concerns
- Avoid lost opportunities
- Eliminate duplication of effort

Siskiyou County and participating jurisdictions will continue to actively work on incorporating elements of this hazard mitigation plan into any relevant plan, code or ordinance revision or creation. Whenever possible, Siskiyou County and participating jurisdiction will use existing plans, policies, procedures, and programs to aid in the implementation of identified hazard mitigation actions.

On a local level, hazard mitigation plans can be integrated into various planning documents and initiatives to ensure a comprehensive and coordinated approach to reducing the impact of hazards. Local level plans where hazard mitigation strategies can be integrated include:

- **General Plans:** Helps guide long term community development to ensure future resilience against identified hazards.
- **Threat and Hazard Identification and Risk Assessment:** Utilizes information from the LHMP to understand the specific threats and hazards that may impact the community. This informs the development of strategies and resource allocation for emergency management capabilities, ensuring that the community is well-prepared to respond effectively.
- **Comprehensive Land-Use Plans:** Helps guide the development and zoning decisions in a way that minimizes vulnerability to hazards. This includes avoiding construction in high-risk areas and encouraging resilient building practices.
- **Emergency Operations Plans:** Contributes to detailing specific actions to be taken before, during, and after disasters to reduce vulnerability and enhance community resilience.
- **Climate Action Plans:** Can help address both short-term hazards and long-term climate-related risks. This includes considerations for extreme temperatures and changes in precipitation patterns.
- **Transportation Plans:** Helps ensure the resilience of transportation infrastructure to hazards such as floods, and earthquakes. This may involve designing infrastructure to withstand extreme weather events.
- **Infrastructure Master Plans:** Contributes to the design, construction, and maintenance of critical infrastructure, such as water supply systems, roads, bridges, and utility networks.
- **Community Development Plans:** Helps ensure that new development projects align with hazard resilience goals. This may involve establishing building codes that prioritize hazard-resistant construction.
- **Open Space and Recreation Plans:** Provides for the consideration of green infrastructure and open spaces for flood control, wildfire buffers, and other hazard mitigation purposes.

- **School Emergency Plans:** Enhances the safety and resilience of educational facilities. This may involve retrofitting buildings, establishing evacuation routes, and conducting regular drills.
- **Public Health Preparedness Plans:** Addresses potential health risks associated with hazards. This includes planning for medical surge capacity, disease prevention, and healthcare facility resilience.

As a best practice, Siskiyou County and all participating jurisdictions will ensure that both this LHMP and their general plans will meet the following:

- **California Assembly Bill (AB) 2140:** Encourages, but does not legally require, local governments to adopt their LHMP into the safety element of their general plan. If this adoption is completed, the eligible jurisdiction may be considered for part of all its local-share costs on eligible Public Assistance funding to be provided by the State through the California Disaster Assistance Act for federal-grant-funded post-disaster projects.
- **Senate Bill (SB) 379 (2015):** Requires general plans and LHMPs to include climate adaptation and resiliency strategies. The climate adaptation language needs to include goals, policies, and objectives based on a vulnerability assessment, as well as implementation measures.

Integration of hazard mitigation into these various plans ensures that resilience efforts are embedded in the broader fabric of community development. Coordination and collaboration among different sectors and stakeholders are essential for the successful implementation of hazard mitigation strategies on the local level. Plan incorporation and integration is crucial for creating a cohesive and coordinated approach to address various aspects of hazard mitigation. All participating jurisdictions utilize similar internal procedures for plan incorporation and integration. The following represent commonly utilized methods:

- **Cross-Referencing:** Identify and cross-reference relevant sections of different plans and policies. This involves explicitly noting connections between the goals, strategies, and actions outlined in one plan with those in others.
- **Consistency Checks:** Conduct consistency checks to ensure that the language, objectives, and strategies in different plans and policies align with each other.
- **Joint Planning Committees:** Establish joint planning committees or task forces that involve representatives from different departments or agencies responsible for various plans (for example, the MPC). These committees facilitate communication, collaboration, and the coordination of planning efforts across sectors.
- **Collaborative Workshops and Meetings:** Organize collaborative workshops and meetings to bring together stakeholders involved in different planning processes (as seen in the planning meetings for the LHMP). These forums provide an opportunity for stakeholders to share information and discuss common goals.
- **Alignment with State and Regional Plans:** Ensure that local plans align with broader regional and state plans. This involves considering regional and state priorities and incorporating them into local planning efforts to create a harmonized approach to development.
- **Data Sharing and Analysis:** Share relevant data among planning efforts and conduct joint data analysis. This helps in creating a common understanding of the challenges and opportunities, facilitating evidence-based decision-making across different plans.
- **Unified Implementation Strategies:** This involves identifying common actions and initiatives that contribute to the achievement of multiple goals outlined in various plans.

1.5 Adopting Jurisdictions and Participating Stakeholder Communities

In order to have an approved hazard mitigation plan, DMA 2000 requires that each jurisdiction participate in the planning process. Each jurisdiction choosing to participate in the development of the plan was required to meet detailed participation requirements, which included the following:

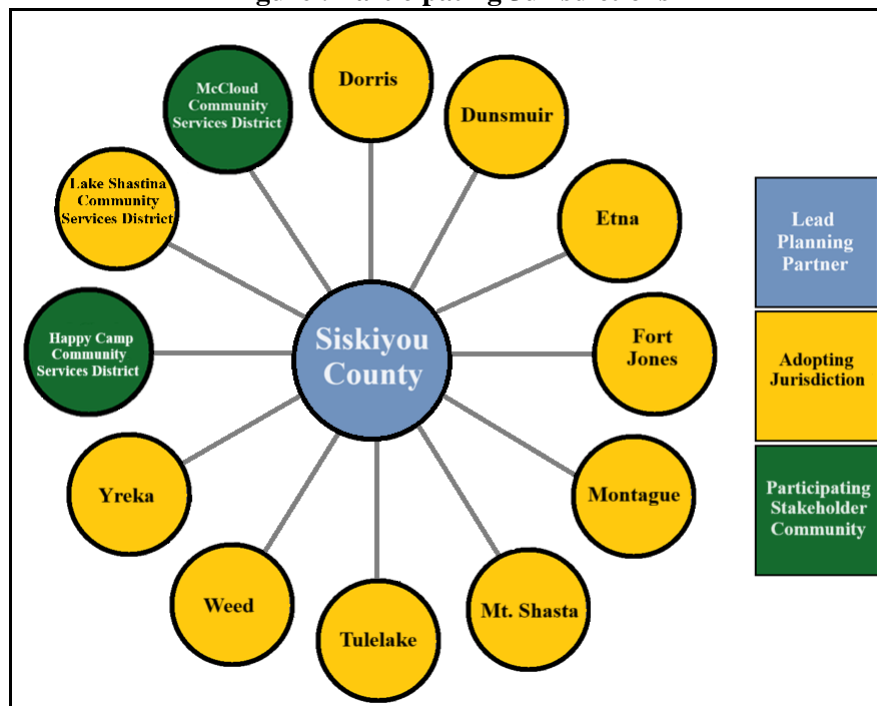
- Participation in planning meetings
- Provision of information to support the plan development

- Identification of relevant mitigation actions
- Review and comment on plan drafts
- Fostering the public input process
- Adopt the LHMP

Two Community Services Districts, Happy Camp Community Services District (CSD) and McCloud CSD have elected to be considered participating stakeholder communities. Under this designation, these communities will be covered under plan adoption by Siskiyou County and will propose hazard mitigation actions under the county. Should any of these community services districts elect to adopt this LHMP at any future date, all adoption requirements will be met.

Based on the above criteria, the following jurisdictions participated in the planning process:

Figure : Participating Jurisdictions



1.6 Plan Adoption

As per the California Governor’s Office of Emergency Services (Cal OES) recommendations, this plan was submitted to Cal OES and FEMA Region IX prior to adoption (approval pending adoption protocol). This methodology allows for a single plan adoption by participating jurisdictions in the event of plan revisions during the review and approval process. Upon review and approved pending adoption status by FEMA Region IX, adoption resolutions will be signed by the participating jurisdictions. FEMA approval documentation and jurisdictional adoption resolutions may be found in Appendix A.

Administration and oversight of the hazard mitigation program is the responsibility of the Siskiyou County Office of Emergency Services (SCOES). The plan will be reviewed annually and will be updated every five years, or as required by changing hazard mitigation regulations or guidelines.

Section 2 – Documentation of the Planning Process

2.1 Guiding Principle

The guiding principle for the creation and utilization of this LHMP is as follows:

- Through partnerships among local jurisdictions, identify and reduce the vulnerability to natural hazards to protect the health, safety, quality of life, environment and economy of the diverse communities within Siskiyou County.

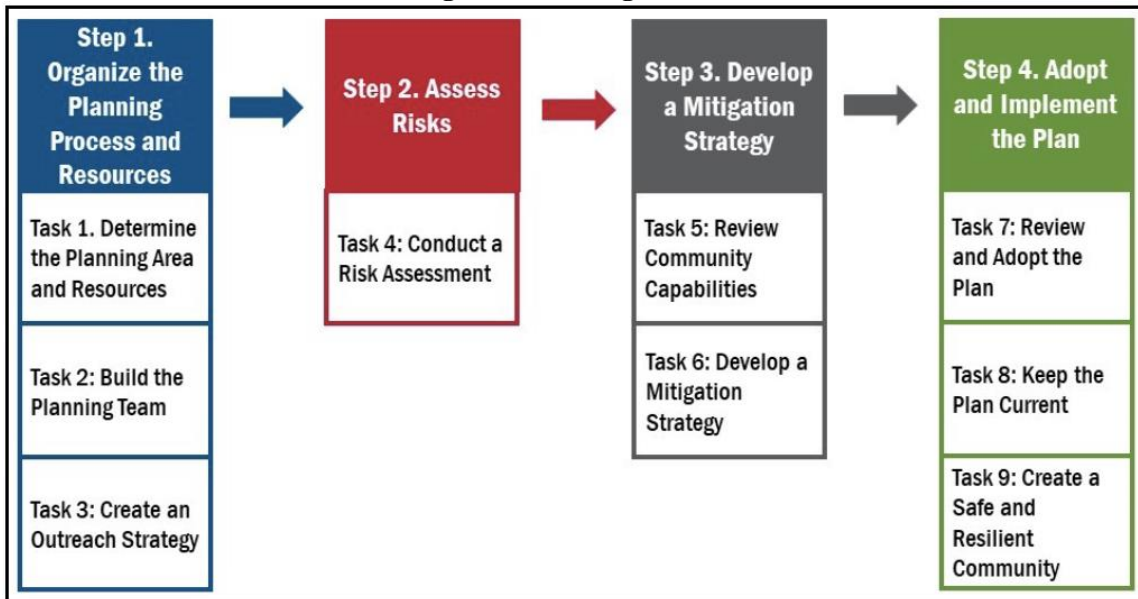
2.2 Planning Process

The process established for this planning effort is based on the Disaster Mitigation Act of 2000 planning and update requirements and the FEMA associated guidance for local hazard mitigation plans (Local Mitigation Planning Policy Guide (FP 206-21-0002), effective April 19, 2023). To accomplish this, the following planning process methodology was followed:

- Inform, invite, and involve other mitigation plan stakeholders throughout the state, including federal agencies, state agencies, regional groups, businesses, non-profits, underserved communities, and local emergency management organizations.
- Creation of a Mitigation Planning Committee (MPC) to codify and guide the planning process.
- Develop the planning and project management process, including methodology, review procedures, details about plan development changes, interagency coordination, planning integration, and the organization and contribution of stakeholders.
- Creation of a multi-pronged outreach strategy to engage stakeholders.
- Conduct a thorough review of all relevant current and historic planning efforts.
- Conduct a review of all related and relevant state and local plans for integration and incorporation.
- Collect data on all related state plans and initiatives, local plans' hazard risk, local plans' mitigation strategies and actions, critical facilities and community lifelines, flood plains, Repetitive Loss/Severe Repetitive Loss properties, hazard events, on-going and completed mitigation actions, and mitigation program changes since the development of the previous plan.
- Complete a risk and vulnerability assessment using data from the FEMA and other federal and state agency resources. Analyses were conducted at the state level, county by county, of state-owned facilities, and county by county drawing on local assessments.
- Develop and update the capability assessment of Siskiyou County and all participating jurisdictions.
- Develop a comprehensive mitigation strategy effectively addressing Siskiyou County's hazards and mitigation program objectives. This included reviewing pre and post disaster policies and programs, identifying objectives and goals, identifying mitigation actions and projects, and assessing mitigation actions and projects.
- Determination and implementation of a plan maintenance cycle, including a timeline for plan upgrades and improvements.

The following figure summarizes these steps:

Figure : Planning Process



Source: FEMA

Additionally, this LHMP utilized Appendix M. Basics of Local Mitigation Planning of the 2023 California State Hazard Mitigation Plan Volume 2 for planning guidance. Appendix M includes a catalog of best practices and resources that that can be leveraged during plan development and helps ensure that the required elements in the Federal Emergency Management Agency (FEMA) Region 9 Local Hazard Mitigation Plan Review Tool are met.

2.3 Project Timeline

The Siskiyou County LHMP review and revision process began in May 2024, with the first public meeting held in June 2024. The following chart indicates the planning stages completed as part of this process:

Chart 1: Project Planning Stages



2.4 2024 Plan Organization

This LHMP is both a reference document and an action plan. It has information and resources to educate readers and decision-makers about hazard events and related issues and a comprehensive strategy that participating jurisdictions, stakeholders, and community members can follow to improve resilience. This LHMP is composed of the following sections:

- **Section 1 - Introduction, Assurances, Incorporation, and Adoption:** Details the regulatory framework for plan development, participating jurisdictions, how the plan will be incorporated into other planning mechanisms, and adoption requirements.
- **Section 2 – Planning Process:** Outlines the steps taken to complete this LHMP, consideration of planning equity, the people involved in its creation, strategies to invite public participation, and technical and planning resources utilized in completing this plan.
- **Section 3 - Regional Profile and Development Trends:** Details demographic information, vulnerable populations, critical facility and community lifeline information, agricultural data, and a discussion of climate change parameters.
- **Section 4 – Capability Assessment:** Provides a comprehensive evaluation of existing abilities to effectively mitigate hazards and manage disaster risks. This assessment involves analyzing the community's current resources, policies, programs, and systems to determine how well it can implement mitigation strategies.
- **Section 5 - Hazard Identification and Risk Assessment:** Describes the hazards that can impact the planning area, including extent, previous occurrences, changing conditions, and vulnerabilities.
- **Section 6 - Mitigation Strategy:** Outlines the specific actions, policies, and projects designed to reduce or eliminate the risks and impacts of hazards on a community. These strategies are developed based on the findings from the hazard identification and risk assessment phases and are tailored to address the unique vulnerabilities and capabilities of the community.
- **Chapter 7 - Plan Maintenance:** Summarizes plan maintenance responsibilities, monitoring and update requirements, and opportunities for continued public involvement.
- **Appendices:** Provides supplementary detailed information and supporting documents. The appendices serve to enhance the main content by offering further clarification, data, and documentation that support the planning process and implementation.

2.5 2024 Plan Update

In undertaking this planning effort, Siskiyou County determined that wide variances in planning format and data do not allow for effective continuous planning. To provide planning continuity every effort was made during this plan update to adhere as closely as possible to elements of the previous LHMP. As such, the level of analysis and detail included in this risk assessment is cumulative, allowing participating jurisdictions to have a robust base to further mold and improve their mitigation strategies over the next five years.

As part of this planning effort, each section of the previous mitigation plan was reviewed based on current and available data. The plan was reviewed against the following elements:

- Compliance with the current regulatory environment
- Completeness of data
- Correctness of data
- Capability differentials
- Current regional environment

Based on the above criteria, each section of the previous LHMP was revised as required. In addition to data revisions, the format and sequencing of the previous plan was updated for ease of use and plan clarity. Key updated elements from the previous LHMP include:

- Integration of the 2024 Siskiyou County General Plan.
- Expanded definition and discussion of underserved communities and vulnerable populations.
- Updated goals and objectives, including a new goal and objectives.
- Updated critical facilities and community lifelines list.
- Expanded detailing of historic hazard occurrences.
- Updated mapping using newly available data.

- Updated county and jurisdictional capabilities assessment.
- Updated mitigation actions, including progress on previous actions.

2.6 Hazard Mitigation Planning Equity

Planning equity refers to the principle of fairness and justice in planning and development processes. It emphasizes the equitable distribution of resources, opportunities, and benefits among all members of a community, particularly those who have historically been marginalized or disadvantaged. The concept of planning equity recognizes that planning decisions can have significant impacts on different groups of people and aims to ensure that these decisions promote social justice and inclusiveness. It involves addressing spatial inequalities, such as disparities in access to housing, transportation, public services, green spaces, and employment opportunities.



Planning equity entails involving diverse stakeholders in decision-making processes, including community members, advocacy groups, and underrepresented populations. It seeks to empower marginalized communities by giving them a voice in shaping the development and planning policies that directly affect their lives.

Planning equity and hazard mitigation planning are closely related, as both aim to create more resilient and inclusive communities. As part of this planning effort, the following intersections were considered between planning equity and hazard mitigation planning:

- **Vulnerability Assessment:** Planning equity recognizes that certain communities, particularly marginalized and disadvantaged populations, may be more vulnerable to hazards due to social, economic, and environmental factors. When conducting a vulnerability assessment as part of hazard mitigation planning, it is important to consider equity issues and identify areas or groups that may experience disproportionate impacts.
- **Engaging Marginalized Communities:** Planning equity emphasizes the inclusion and participation of diverse stakeholders, including marginalized communities, in decision-making processes. In hazard mitigation planning it is crucial to engage these communities to understand their unique needs, concerns, and perspectives regarding hazards.
- **Addressing Social Disparities:** Hazard mitigation planning can help address social disparities by considering the unequal distribution of resources and opportunities in the context of hazards. This can involve implementing mitigation measures that specifically target vulnerable populations, such as affordable housing in safer areas or improved access to emergency services and transportation for underserved communities.
- **Equitable Distribution of Resources:** Planning equity promotes the equitable distribution of resources, and this principle can be applied to hazard mitigation planning. It involves ensuring that mitigation measures and investments are allocated fairly, with consideration given to communities that have historically received less attention or investment. This can help reduce existing disparities and enhance the resilience of marginalized communities.

By integrating planning equity into hazard mitigation planning, it becomes possible to develop strategies and actions that not only reduce the risks associated with hazards but also promote social justice, inclusivity, and resilience for all members of the community.

As part of this planning process, planners considered potential inequities and encouraged the participation of potentially vulnerable citizens and communities. This process began with recognizing that disparities exist within the region, including health outcomes and living conditions for people of color, people with disabilities, and historically disadvantaged communities. It was recognized that these populations may be at greater risk to the hazards identified in this plan and may be limited in their ability to adapt, respond, and recover if an event were to occur.

As recommended in FEMA’s “Guide to Expanding Mitigation,” Siskiyou County took a whole community approach to this planning effort, including:

- Inviting historically underserved populations to participate in the planning and decision-making processes
- Inviting faith based and community organizations, nonprofit groups, schools, and academia to be plan stakeholders

These equity partners were contacted directly by SCOES via phone and email during the entirety of the planning process and were a consistent presence at planning meetings. The following table identifies our equity partners who actively engaged in the LHMP planning effort:

Table : Equity Partners

Equity Partner	Representative and Title	Description
Siskiyou County Health and Human Services Agency	Sarah Collard, Ph.D., Agency Director	Provides a wide range of social services, mental health services, alcohol and drug treatment services, public health services, emergency preparedness and income assistance.
Siskiyou County Social Services Division	Sarah Collard, Ph.D., Agency Director	Administers all of the basic public assistance programs which include Medi-Cal, CalFresh, CalWORKs, and General Assistance. We also administer the Child Protective Services program, In-Home Supportive Services program, the Adult Protective Services program, and the Public Guardian/Public Conservator program. We believe in collaboration and in working with our county-wide network of Family Resource Centers. Our connection with the FRCs increases our ability to reach out to our community and more effectively connect in the large rural area that Siskiyou County encompasses.
Siskiyou Community Resource Collaborative	Ken Palfini, President	Provides a collaborative network of services and support that strengthen the ability of children, youth, adults and families to live healthy and productive lives, which builds their capacity to contribute to the well-being of themselves, their families and communities. This work is led by a network of family/community resource centers, which serve as hubs of intergenerational activity and support, coordinating and integrating supportive services between a range of organizations including churches, county agencies, healthcare providers, schools, service clubs, nonprofit organizations and governments
NorCal Homeless Continuum of Care	Maddelyn Bryan	A consortium of individuals and organizations with the common purpose of planning a housing and services system for people who are homeless.
Disability Action Center	Wendy Longwell, Voice Options Member	A private, non-profit corporation founded in 1980 to meet specific needs of people with disabilities living in northern California. DAC assists people with disabilities to achieve and/or maintain their independence.
Community Organized Relief Effort	Joshua Bien, Program Manager	A humanitarian organization that brings immediate relief and recovery to underserved communities across the globe.
Karuk Tribe	Jeanna Grant-Frost, Operations Manager and Darrell Frost, Emergency Manager	The mission of the Karuk Tribe is to promote the general welfare of all Karuk people, to establish equality and justice for our tribe, to restore and preserve Tribal traditions, customs, language and ancestral rights, and to secure to ourselves and our descendants the power to exercise the inherent rights of self-governance.

These equity partners were leveraged to reach our underserved and isolated communities by providing them with the LHMP and all surveys relating to this plan. All feedback comments, both written and verbal, were incorporated into the fabric of this plan as appropriate.

2.7 Mitigation Planning Committee

Project initiation began with the selection of a Mitigation Planning Committee (MPC), consisting of the Siskiyou County emergency manager and representative staff from both Siskiyou County and participating jurisdictions. From project inception to completion, the MPC was notified at each major plan development milestone through a combination of meetings and electronic communication.

In general, all MPC members were asked to participate in the following ways:

- Attend and participate in meetings
- Help establish project operating procedures and timelines
- Review planning elements and drafts
- Sheppard the plan adoption process

Members of the MPC were also asked to assist with the following:

- **Providing Localized Risk Assessment Data:** Contribute specific data and information about local hazards, vulnerabilities, and risks that are unique to their jurisdiction.
- **Identifying Mitigation Actions:** Help identify and prioritize mitigation actions that are most relevant to their jurisdiction.
- **Coordinating with Stakeholders:** Act as liaisons between the MPC and their respective stakeholders, including community members, local businesses, and other governmental agencies. This ensures that the plan reflects the concerns and needs of all relevant parties.
- **Ensuring Compliance and Integration:** Ensure that the mitigation strategies and actions proposed in the LHMP align with existing local plans, ordinances, and regulations. This integration helps to streamline implementation and ensures that the LHMP supports broader community goals.
- **Securing Resources and Funding:** Help identify potential resources, including funding opportunities, that can support the implementation of mitigation actions.
- **Reviewing and Updating the Plan:** After the initial development of the LHMP, MPC members are typically involved in regular reviews and updates of the plan. This includes monitoring progress on mitigation actions, evaluating the effectiveness of strategies, and making necessary adjustments based on new data or changing conditions.
- **Public Engagement and Education:** Play a crucial role in engaging the public and educating community members about the LHMP and its importance.

By fulfilling these roles, MPC members help ensure that the LHMP is well-rounded, locally relevant, and effectively implemented across the entire planning area. Their involvement is key to the plan's success in reducing risks and enhancing community resilience to hazards. The following table represents members of the MPC:

Table : MPC Members

Jurisdiction	Department	Name	Title	Adopting Jurisdiction
Siskiyou County	Office of Emergency Services	Bryan Schenone	Emergency Manager	Yes
Siskiyou County	Office of Emergency Services	Owen Cabo Dal Molin	Disaster Services Coordinator	Yes
Siskiyou County	Office of Emergency Services	Adam Heilman	OES Support	Yes

Table : MPC Members

Jurisdiction	Department	Name	Title	Adopting Jurisdiction
Dorris	City Clerk	Joanna Wymant	Deputy City Clerk	Yes
Dorris	City of Dorris Planning	Richard Tinsman	Contract City Planner	Yes
Dunsmuir	City of Dunsmuir	Stephen Decatur	Resilience Specialist	Yes
Etna	City of Etna	Cliff Munson	Mayor	Yes
Etna	City of Etna Planning	Richard Tinsman	Contract City Planner	Yes
Fort Jones	Fire Department	Joseph Hess	Fire Chief	Yes
Happy Camp CSD	Happy Camp Community Action	Jasmine Borgatti	Chief Resiliency Officer	No
Lake Shastina CSD	Lake Shastina Community Services District Police	Will Bullington	Chief of Police	Yes
McCloud CSD	McCloud Community Services District	Amos McAbier	General Manager	No
Montague	City Clerk	David Dunn	City Administrator	Yes
Montague	City of Montague Planning	Richard Tinsman	Contract City Planner	Yes
Mt. Shasta	Planning Department	Jeff Mitchem	Planning Director	Yes
Tulelake	Police Department	Jose Fiscal	Chief Resiliency Officer	Yes
Tulelake	City of Tulelake Planning	Richard Tinsman	Contract City Planner	Yes
Weed	City Manager	Steven Baker	Interim City Manager	Yes
Yreka	Planning	Sarah Chaffee	Resilience Planner	Yes
Yreka	Planning	Juliana Lucchesi	Community Development Director	Yes

2.8 Participating Stakeholders

Siskiyou County acknowledges that effective hazard mitigation planning should involve a diverse group of stakeholders, including government agencies, private sector entities, private non-profit organizations, quasi-governmental authorities, and special districts. The coordination and cooperation of these stakeholders assists with all aspects of plan development, including:

- Data collection
- Hazard and risk analysis
- Capability assessment
- Mitigation action review, revision, and development
- Plan implementation

These participating stakeholders were contacted directly by SCOES via phone and email during the entirety of the planning process concerning plan progress and meeting information (including remote meeting login information and in person meeting address and time when applicable). Many of these stakeholders were a consistent presence at planning meetings. The following table details our participating stakeholders:

Table : Participating Stakeholders

Name	Title	Jurisdiction or Agency	Meeting Attendance
Joshua Bien	Program Manager	Community Organized Relief Effort	Yes
Wendy Longwell	Voice Options Member	Disability Action Center	Yes
Scott Porter	Hazard Mitigation Planner	California Department of Transportation	Yes
Julie Titus	Member	Dunsmuir Fire Safe Council	Yes
Mark Dibelka	Missioner for Disaster Resilience	Episcopal Diocese of Northern California	Yes
Josh Short	Police Chief	City of Etna	Yes
Clint Whitchurch	Fire Chief	City of Etna	Yes
Pam Eastlick	City Clerk	City of Etna	Yes

Table : Participating Stakeholders

Name	Title	Jurisdiction or Agency	Meeting Attendance
Mike Baker	Facilities Director	Fairchild Medical Center	Yes
Ann-Marie Moser	EMS Coordinator	Fairchild Medical Center	Yes
Jeanna Grant-Frost	Operations Manager	Karuk Tribe	Yes
Darrell Frost	Emergency Manager	Karuk Tribe	Yes
Rico Tinsman	Consultant	Land Use Consultant	Yes
Takeshi Murakami	Assistant Fire Chief	City of Montague	Yes
Jessie Monday	City Clerk	City of Montague	Yes
Bianca Garza	Member and Author	Mount Shasta Bioregional Ecology Center	Yes
Jeff Mitchem	Planning Director	Mt. Shasta	Yes
Steven Bryan	Program Director & Regional Director	Mt. Shasta Community Resource Center	Yes
George Jennings	Executive Director	Ore-Cal Resource Conservation and Development Area Council	Yes
Kelsey Younker	Member of the public	Public	Yes
John Golay	Executive Director	Rescue Ranch Yreka	Yes
Trenton Quirk	Paramedic	Sierra-Sacramento Valley EMS Agency	Yes
Ali Kutzer	Public Information Officer	Siskiyou County	Yes
Dawn Caveye	Social Worker Supervisor	Siskiyou County Adult Service	Yes
Glenn Shockency	Deputy Director	Siskiyou County Building Department	Yes
Jodi Aceves	Senior Deputy Ag Commissioner	Siskiyou County Department of Agriculture	Yes
Cynthia Billingsley	Victim Services Coordinator	Siskiyou County District Attorney	Yes
Hailey Lang	Planning Director	Siskiyou County Planning	Yes
Aaron Stutz	Public Health Officer	Siskiyou County Public Health	Yes
Sage M. Milestone	Public Information Specialist	Siskiyou County Sheriff Department	Yes
Cliff Munson	CEO	Siskiyou Golden Fair	Yes
Michael Yates	Sergeant	Siskiyou County Sheriff's Office	Yes
Gary Pannell	Lieutenant	Siskiyou County Sheriff's Office	Yes
Tom Hoy	Police Chief	City of Tulelake	Yes
Jenny Coelho	City Hall Administrator	City of Tulelake	Yes
Alia Lezra	Planning Manager	Yreka Planning	Yes
Jay Perkins	Council Member	Yreka Fire Safe Council	Yes
Alex Carter	Council Member	Yreka Fire Safe Council	Yes

Emphasis was placed on inviting local building departments, who played a critical role in creating and reviewing this LHMP. Their expertise was used to help identify local vulnerabilities and develop building-related mitigation measures. Additionally, jurisdictional NFIP coordinators played a key role in mitigation planning at the community level. These coordinators were actively engaged and for their expertise on flood risk, mitigation strategies, and NFIP compliance.

2.9 Coordinating Stakeholders

Coordinating stakeholders have information and resources that are important to the planning process, but do not participate fully in the planning process. While not all of these organizations attended meetings, each was actively courted to provide information, data, and feedback as necessary and as related to their areas of expertise. The following provides a list of all coordinating stakeholders involved in the development of this LHMP:

- California Department of Forestry and Fire Protection (CAL FIRE)
- California Department of Transportation

- California Department of Water Resources
- Karuk Tribal Emergency Management Office
- Sierra-Sacramento Medical Services Agency
- McConnel Foundation
- The Episcopal Diocese of Northern California
- Fairchild Medical Center
- Ore-Cal Resource Conservation and Development Area Council
- College of the Siskiyou
- Siskiyou County Flood Control and Water Conservation District
- Del Norte County Emergency Services
- Humboldt County Emergency Services
- Modoc County Office of Emergency Services
- Shasta County Office of Emergency Services
- Siskiyou County Fire Safe Council
- Trinity County Office of Emergency Services
- Klamath County, Oregon Office of Emergency Management
- Lake County, Office of Oregon Emergency Management
- Yreka Water Department
- Montague Water Conservation District

A special thank you goes out to the following participatory stakeholders who aided in the development of this plan through the sharing of resources and through the provision of expert commentary during planning meetings:

- Phillip Anzo, Siskiyou Unit Chief, California Department of Forestry and Fire Protection
- Greg Roath, Staff, California Department of Forestry and Fire Protection
- Suzanne Brady, Public Information Officer, California Department of Forestry and Fire Protection
- Ronna Bowers, Regional Coordinator, California Department of Water Resources
- Alyse Briody, Staff, California Department of Water Resources
- William Ehorn, Staff, California Department of Water Resources
- Scott Porter, District 2 Maintenance Manager I, California Department of Transportation
- Roger Lucas, District 2 Maintenance Manager II, California Department of Transportation
- Roger Matthews, Maintenance Lead Worker, California Department of Transportation
- James Phelps, Cal OES Support, Cal OES

2.10 Community Outreach

As part of the overall planning process, the public (defined as any person(s) living or working within Siskiyou County and/or any person with a vested interest in the long-term resilience of the county) was provided with numerous opportunities to contribute and comment on the creation and adoption of the plan. These opportunities included:


- A standalone webpage concerning all hazard mitigation activities, survey links, and meeting information.
- Advertised meeting invitations.
- Online surveys
- Comment period upon completion of draft plan

Experience has indicated that public meetings, no matter how well advertised, generally do not generate either participation or interest in the planning process. Even so, open meetings were held at easily accessible community locations.

Along with public meetings, and to help generate community interest and participation, a parallel online outreach strategy was undertaken. This allowed remote and underserved communities to participate fully in the process without having to travel long distances. Information concerning the hazard mitigation planning process, along with links to public surveys, links to meeting presentations, and recorded copies of meetings were provided. Both www.co.siskiyou.ca.us/emergencyservices/page/local-hazard-mitigation-plan and www.readysiskiyou.gov provided this information.

Figure : Siskiyou County Hazard Mitigation Webpage

EMERGENCY SERVICES



Access & Functional Needs Form
Incidents
Local Hazard Mitigation Plan
ReadySiskiyou

Local Hazard Mitigation Plan

Siskiyou County Office of Emergency Services and its partners are working on a plan to better handle future emergencies and disasters. This updated plan called the Local Hazard Mitigation Plan (LHMP), will help us deal with things like fires, floods, and other hazards that might come our way. To make sure this plan is as effective as possible, we need your input.

If you have any questions, comments, concerns, or feedback, please email us at LHMP@Readysiskiyou.gov.

2024 Siskiyou County Hazard Mitigation Plan Update Survey

The hazards survey has now closed. Thank you to everyone who participated.

Timeline of events

June 18, 2024: LHMP Update Kickoff meeting ([Kickoff Meeting Recording](#))

August 6, 2024: Planning Committee Meeting 1 ([Planning Committee Meeting #1 Recording](#))

September 18, 2024: Planning Committee Meeting 2 ([Planning Committee Meeting #2 Recording](#))

October 25, 2024 - 2:00pm to 3:30pm: Planning Committee Meeting 3 (Virtual Meeting Link Below) (Please see Agenda under 'Supporting Documents')

- **Join the meeting now** (Microsoft Teams)
- Meeting ID: 238 895 444 993
- Passcode: cv9Sde

November 4, 2024 - 12:00pm - 1:00pm: Siskiyou County Hazard Mitigation Plan Public Meeting - Afternoon Option

Location: Kahtishraam Wellness Center
1403 Kahtishraam, Yreka, CA 96097

November 4, 2024 - 5:00pm - 6:00pm: Siskiyou County Hazard Mitigation Plan Public Meeting - Evening Option

Location: City Council Chambers
5902 Dunsmuir Ave, Dunsmuir, CA 96025 (the Fire Hall Building)

2024 Siskiyou County Hazard Mitigation Planning Committee

Siskiyou County - Bryan Schenone - OES1@ReadySiskiyou.gov
Siskiyou County - Adam Heilman - OES2@ReadySiskiyou.gov
Siskiyou County - Owen Cabo Dal Molin - OES3@ReadySiskiyou.gov
Dunsmuir - Steven Decatur - hazmit@ci.dunsmuir.ca.us
Yreka - Sarah Chaffee - schaffee@yrekaca.gov
Yreka - Juliana Lucchesi - jucchesi@yrekaca.gov
Tulelake - Jenny Coelho - Jenny.Coelho@cityoftulelake.com
Etna - Cliff Munson - C.Munson@etnaca.com
Dorris - Joanna Wymant - cityadmin@cot.net
Montague - David Dunn - publicworks@cityofmontagueca.com
Mt. Shasta - Jeff Mitchem - planningcommission@mtshastaca.gov
Weed - Sandra Duchi - sandra.duchi@ci.weed.ca.us
McCloud CSD - Amos McAbier - amos@ci.mccloudcsd.ca.us
Happy Camp - Jasmine Borgatti - jborgatti@happycampcc.org
Lake Shastina CSD - Will Bullington - wbullington@lakeshastina.com
Karuk Tribe - Darrell Frost - darrellfrost@sbcglobal.net
Fort Jones - Joseph Hess - fjfire@sisqtel.net

Supporting Documents

[October 25, 2024 LHMP Planning Committee Meeting 3 Agenda \(41 KB\)](#)




Figure : Siskiyou County Hazard Mitigation Webpage

Multi-Agency Local Hazard Mitigation Plan Update

Siskiyou County Office of Emergency Services, in collaboration with Preparis, the planning contractor, is committed to engaging with the community to update the Siskiyou County Local Hazard Mitigation Plan.

Correspondence

For agencies, partners, and members of the public who wish to correspond directly with the Siskiyou County Office of Emergency Services and Preparis regarding the LHMP update, please use the following email address:

Email: LHMP@ReadySiskiyou.gov

We appreciate your participation and feedback as we work together to enhance our community's resilience against natural disasters and other hazards.

LHMP Hazards Survey

The hazards survey has now closed. Thank you to everyone who participated.

Timeline of events

June 18, 2024: LHMP Update Kickoff meeting

- Slides can be downloaded here: [LHMP Meeting Slides](#)

The SCOES YouTube channel was used to provide access to all meetings to those unable to attend or those who could not take time from work or childcare to watch live.

Figure : Siskiyou County YouTube Channel

YouTube
<https://www.youtube.com/watch?v=U-9c68xJF5M>

Siskiyou County Multi-Agency Hazard Mitigation Plan Update ...

WEB Jun 19, 2024 · **Siskiyou County Multi-Agency Hazard Mitigation Plan Update Kickoff Meeting.** For more information on the LHMP update please visit: ...

Additionally, throughout the planning process numerous public surveys were released to allow community members to provide feedback and input on the LHMP update using a series of guided questions and open comment fields. The surveys used Google's auto translate feature to provide a host of languages to complete the forms.

Figure : Siskiyou County Hazard Mitigation Plan Kickoff Survey

The screenshot shows a web-based survey form titled "Siskiyou County Hazard Mitigation Kickoff Survey". The form contains the following elements:

- A header with the title and a text input field containing "Hazard Mitigation Survey".
- A text input field with the question: "What city do you live in (or nearest city)?".
- A multiple-choice question: "Have you read, reviewed, or used the previous (2018) Hazard Mitigation Plan". The options are "1. Yes" and "2. No".
- A multiple-choice question: "Should dam failure continue to be included in the Hazard Mitigation Plan:". The options are "1. Yes" and "2. No".
- A translation menu on the right side of the form, titled "Translated page". It shows "Translate to" set to "Spanish" and a list of other languages including Albanian, Amharic, Arabic, Armenian, Azerbaijani, Bangla, Bosnian (Latin), Bulgarian, Burmese, Catalan, Chinese (Simplified), and Chinese (Traditional). Buttons for "Done" and "Show original" are also visible.

Input from the general public provided the MPC with a clearer understanding of local concerns, helped confirm identified hazards, helped shape proposed mitigation actions, and provided elected officials with a guide and tool to set local, regional, and ordinances and regulations. This public outreach effort was also an opportunity for adjacent jurisdictions and entities to be involved in the planning process. Additionally, as citizens were made more aware of potential hazards and the local process to mitigate against their impacts, it was believed that they would take a stronger role in making their homes, neighborhoods, schools, and businesses safer from the potential effects of natural hazards.

All comments and feedback from the surveys are both incorporated in this LHMP and are included in Appendix B.

2.11 Planning Meetings

Numerous in-person meetings were conducted for the 2024 LHMP update. All of the meetings were held in a publicly accessible location and advertised as open to the public through posts on the above-mentioned websites and social media platforms. These meeting were conducted to discuss the mitigation planning process as well as gain public support and input for the plan update. The following is a brief synopsis of those meetings.

- **LHMP Update Kick-Off and Public Information Meeting – June 18, 2024:** Siskiyou County hosted a kick-off meeting for the MPC, stakeholders, and the public. The meeting was used to present the general structure and timeline for the LHMP process, discuss jurisdictional participation requirements, present data concerning changing demographics and development, review and discuss identified hazards that could impact the region, and present next steps. During the meeting, MPC members, plan stakeholders, and the public were invited to voice any concerns, ask questions, and provide input on the mitigation plan update. Additionally, MPC members were tasked with collecting contact information and advised of future data collection requirements such as hazard history, facility information, and other pertinent information from participating jurisdictions.
- **LHMP Goals and Objectives Review Meeting – August 6, 2024:** Siskiyou County had an open to the public virtual planning meeting to discuss the revision of goals and objectives for the 2024 LHMP.
- **CAL OES Planning Meeting – August 23, 2024:** An online meeting with Cal OES Victoria LaMar-Haas with Cal OES to discuss revised FEMA review requirements, the shape of the LHMP, and best practices for planning.
- **LHMP Plan, Capability, Hazard, and Mitigation Strategy Review Meeting – September 18, 2024:** Siskiyou County had a virtual planning meeting for MPC members. Attendees engaged in a discussion

concerning the status of the LHMP, plan formatting changes, identified hazards, and a discussion of the review, revision, and creation of hazard mitigation action items.

- **LHMP MPC Meeting – October 25, 2024:** Siskiyou County held a virtual planning meeting for MPC members to review the draft final hazard mitigation plan, including hazards, mitigation actions, and jurisdictional capabilities. Attendees also discussed the format and parameters of the public meeting to be conducted on November 4, 2024.
- **LHMP Public Review Meeting – November 4, 2024:** Siskiyou County hosted two open public final plan review meetings for the all stakeholders and the public. At the meeting, MPC members, jurisdictional representatives, plan stakeholders, and the public were invited to voice any concerns, ask questions, and provide input on the mitigation plan update. Additionally, members of the public were invited to review a draft copy of the LHMP update posted to jurisdictional and county websites for two weeks prior to the final meeting, and prior to its submission to FEMA Region IX.

2.12 Planning Document Resources

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various other jurisdictional plans. In creating this plan, all the planning documents identified below were consulted and reviewed, often extensively. In turn, when each of these other plans is updated, they will be measured against the contents of the hazard mitigation plan.

Below is a list of the various planning efforts, sole or jointly administered programs, and documents reviewed and included in this hazard mitigation plan. While each plan can stand alone, their review and functional understanding was pivotal in the development of this plan and further strengthens and improves a jurisdiction's resilience to disasters.

- **August 2018 Siskiyou County Hazard Mitigation Plan:** The previous LHMP has been reviewed and is incorporated throughout this plan per FEMA requirements.
- **2023 California State Hazard Mitigation Plan:** Completed by the California Governor's Office of Emergency Services (Cal OES), this plan was utilized to provide the framework for hazard mitigation. This plan set a baseline for standards and practices for hazard mitigation planning and was used as a resource for information and data.
- **2023 California State Hazard Mitigation Plan Appendix M: Basics of Local Mitigation Planning:** This appendix was referenced as it included a catalog of best practices and resources that Siskiyou County leveraged in the development of this LHMP.
- **2024 Siskiyou County General Plan and Jurisdictional General and Comprehensive Plans:** Every city and county in California is required by law to adopt and maintain a general plan, which is the local government's long-term framework for future growth and development. All specific plans, subdivisions, public works projects, and zoning decisions must be consistent with the general plan. The Siskiyou County General Plan includes the goals and policies upon which the Board of Supervisors and Planning Commission base their land use decisions. The general plan provided background information on the county, information on risk and vulnerabilities, and a review of existing policies related to hazards and mitigation.
- **2023 Community Wildfire Protection Plan - Siskiyou County Addendum:** Created in collaboration with local governments, fire departments, and relevant stakeholders to address the risk of wildfire in the county. The primary goals are to enhance wildfire preparedness, reduce the risk of wildfire to life, property, and critical infrastructure, and improve community resilience.
- **2022 Siskiyou Unit Strategic Fire Plan:** This plan reflects California Department of Forestry and Fire Protection (CAL FIRE) Siskiyou Unit's focus on fire prevention and suppression activities to protect lives, property, and natural resources. Please note that Siskiyou County is in a Cooperative Fire Protection Agreement with the CAL FIRE for the provision of fire protection services
- **2011 Siskiyou County Land Development Manual Update, Second Edition:** A strategic framework used to guide the growth and development of land within the county. This plan outlines how land should be used and developed to achieve various goals such as economic growth, environmental sustainability, and quality of life improvements for residents.

- **Jurisdictional Groundwater Sustainability Plan:** There are four medium priority basins in Siskiyou County; Butte, Scott, Shasta and Tulelake. These plans are used to help achieve sustainable management of the State’s groundwater basins.
- **2023 Siskiyou County Emergency Operations Plans:** This plan is used to develop procedures for the protection of personnel, equipment, and critical records to help determine existing established policies that ensure the continuity of government and essential services during and after disasters.
- **Planning and Zoning Documents and Ordinances:** Planning and zoning ordinances are tools used by local governments to regulate land use and development within their jurisdictions. These ordinances are essential for implementing a community’s land development plan and ensuring orderly growth and development. These documents were reviewed, assessed, and cataloged to compile each participating jurisdiction’s capabilities.

2.13 Technical Resources

A variety of technical resources during plan development. These technical resources were instrumental in completing an accurate vulnerability and risk assessment, and include:

- **FEMA Digital Flood Insurance Rate Maps:** FEMA’s National Flood Hazard Layer data was instrumental in mapping floodplain locations and estimating potential flood impacts and loss estimates.
- **FEMA National Risk Index (NRI):** An online mapping application that identifies communities most at risk to natural hazards. The mapping service visualizes natural hazard risk metrics and includes data about expected annual losses from natural hazards, social vulnerability, and community resilience. The NRI’s interactive web maps are at the county and Census tract level and are made available via GIS services for custom analyses.
- **FEMA Resilience Analysis and Planning Tool (RAPT):** FEMA and Argonne National Laboratory created RAPT to support state, local, tribal, territorial analysis in identifying focus areas for building resilience, response, and recovery capabilities. RAPT is a geographic information system web map tool with clickable layers of community resilience indicators, infrastructure locations, and hazard data.
- **Homeland Infrastructure Foundation-Level Data (HIFLD):** A program managed by the U.S. Department of Homeland Security that provides authoritative geospatial data.
- **National Oceanic and Atmospheric Administration (NOAA)/National Centers for Environmental Information (NCEI):** Provided weather data and historical events occurrence data.
- **U.S. Army Corps of Engineers (USACE):** Provided dam and flood control data.
- **U.S. Department of Agriculture (USDA):** Provided drought and agricultural data.
- **U.S. Geological Survey:** Provided geologic hazard occurrence and probability data.
- **National Weather Service (NWS):** Provided meteorological and storm event occurrence and probability data.
- **Cal-Adapt:** Provides essential data and tools for climate adaptation planning, building resiliency, and fostering community engagement.
- **U.S. Drought Monitor:** Provided drought occurrence and intensity data.
- **California Geological Society:** Provided data about Siskiyou County’s geology and seismology.
- **FEMA Map Service Center:** The official public source for flood hazard information produced in support of the National Flood Insurance Program (NFIP).
- **United States Census Bureau:** Data concerning populations, socially vulnerable populations, and housing.
- **Cal OES:** LHMP planning guidance and technical support.
- **California State Geportal:** Geospatial information used for hazard mapping and data analysis.

As needed, additional technical resources are noted in the relevant hazard section.

Section 3 – Regional Profile and Development Trends

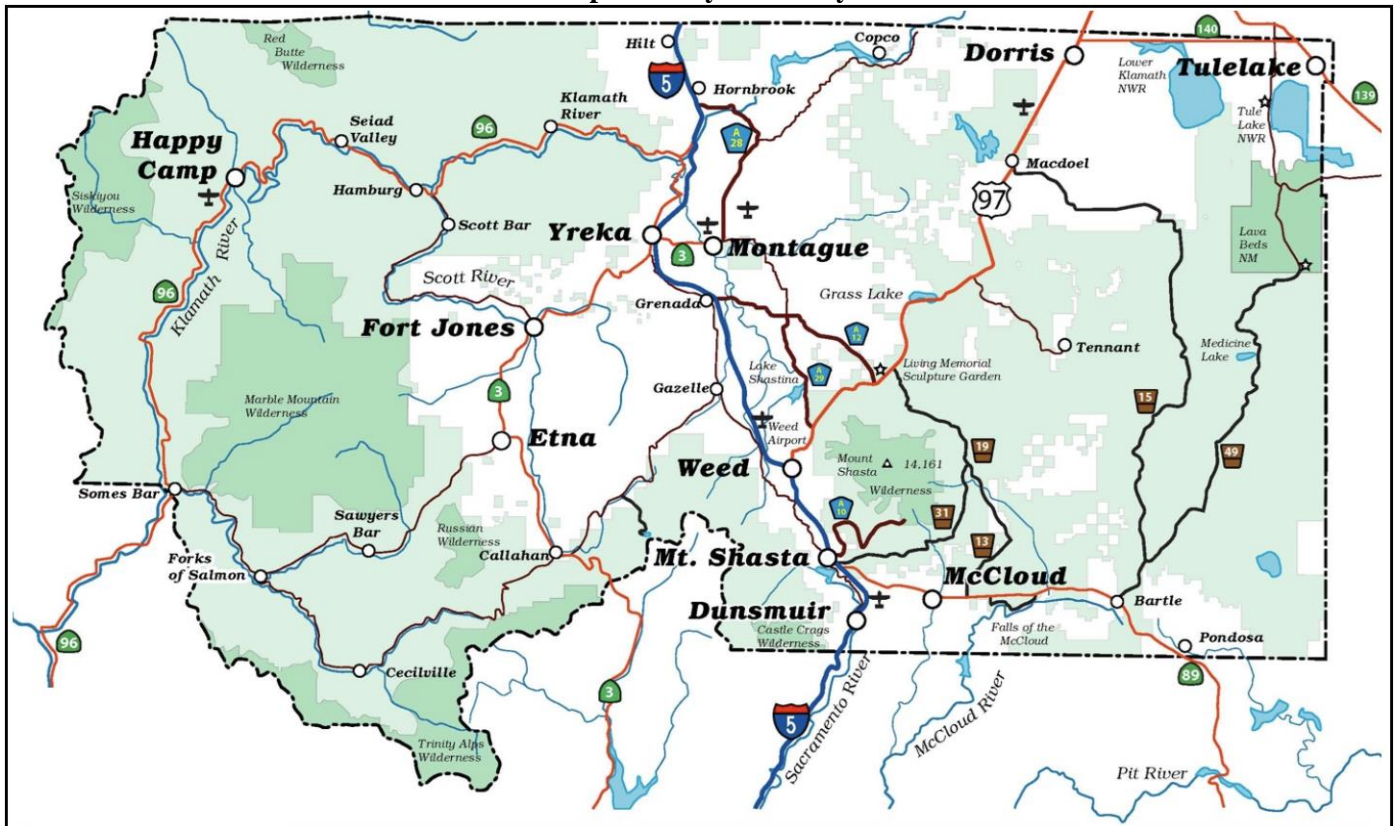
3.1 Introduction

Data concerning development trends and conditions is of great importance in determining regional and local risk and vulnerability to identified hazards, especially in locations which are susceptible to identified hazards. In general, any increase in population or development in hazard susceptible areas tends to increase both the risk and the vulnerability to that hazard. As such, the information presented in this chapter details relevant population and building statistics for Siskiyou County and participating jurisdictions. This data will then be used to determine and refine potential hazard vulnerability in succeeding sections.

3.2 County Map

The following map details the locations of Siskiyou County and participating jurisdictions:

Map 1: Siskiyou County



3.3 Population Data

The following table, and associated charts, present population data for Siskiyou County and participating jurisdictions:

Table : Siskiyou County Population Data

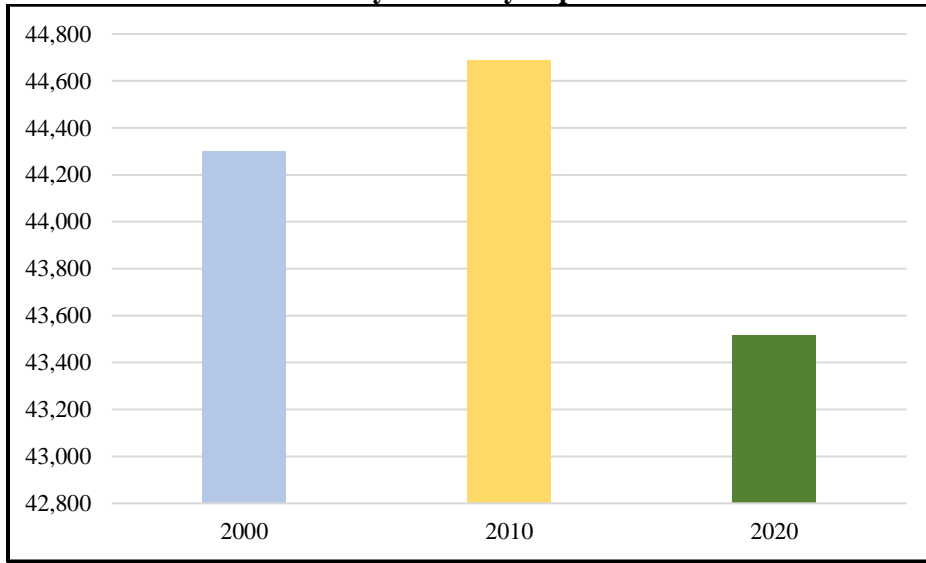
Jurisdiction	Population			Percentage Population Change 2000-2020	Total Land Area (Sq. Mi.)	Population Density
	2000	2010	2020			
Siskiyou County	44,301	44,690	43,516	-1.8%	6,347	7
Dorris	902	920	860	-4.7%	0.7	1,194
Dunsmuir	1,915	1,729	1,870	-2.3%	1.7	1,075
Etna	800	748	755	-5.6%	0.8	944
Fort Jones	660	520	578	-12.4%	0.6	963
Happy Camp CSD	-	-	1,879		12.3	153

Table : Siskiyou County Population Data

Jurisdiction	Population			Percentage Population Change 2000-2020	Total Land Area (Sq. Mi.)	Population Density
	2000	2010	2020			
Lake Shastina CSD	-	-	2,401	-	5.0	480
McCloud CSD	-	-	1,279	-	2.5	512
Montague	1,525	1,472	1,484	-2.7%	1.8	829
Mt. Shasta	3,566	3,480	3,250	-8.9%	3.8	862
Tulelake	1,009	1,005	839	-16.8%	0.4	2,208
Weed	2,970	2,981	2,662	-10.4%	4.8	556
Yreka	7,442	7,542	7,589	2.0%	10.1	751

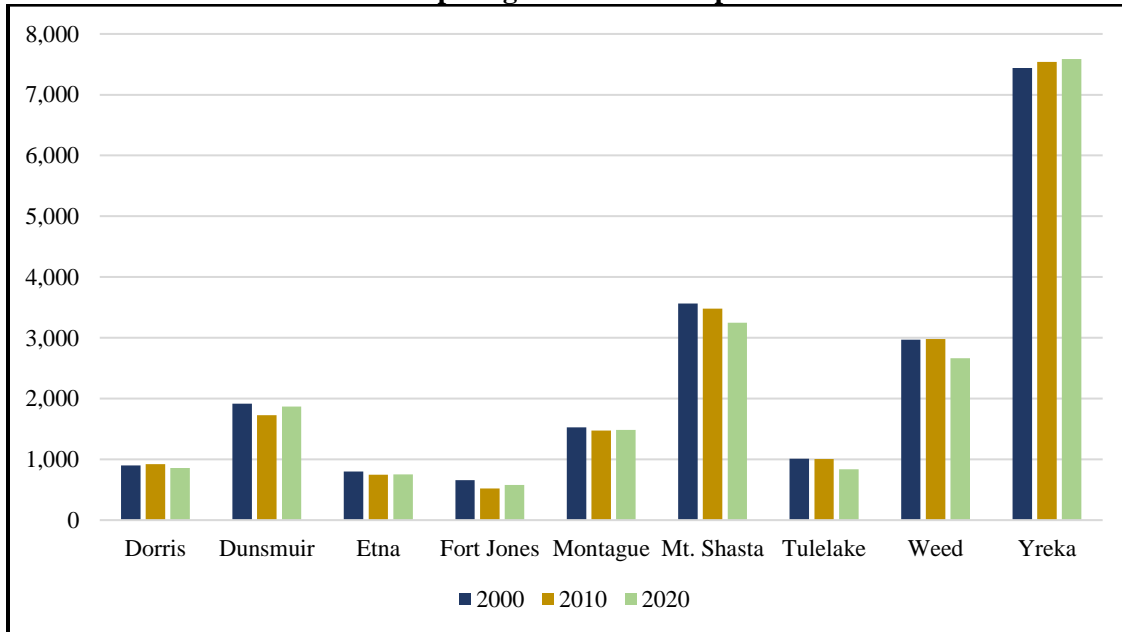
Source: US Census Bureau
 -: Data unavailable

Chart : Siskiyou County Population Data



Source: US Census Bureau

Chart : Participating Jurisdiction Population Data



Source: US Census Bureau

3.4 Socially Vulnerable and At-Risk Populations

As a subset of the population data, Siskiyou County has socially vulnerable and at-risk populations, populations that may have difficulty with medical issues, poverty, extremes in age, and communications due to language barriers. Several principles may be considered when discussing potentially at-risk populations, including:

- Not all people who are considered at risk are at risk
- Outward appearance does not necessarily mark a person as at risk
- The hazard event will, in many cases, affect at risk populations in differing ways

The National Response Framework defines at risk populations as "populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to maintaining independence, communication, transportation, supervision, and medical care." The following table presents information on potential at risk populations within Siskiyou County using 2020 census data:

Table: Siskiyou County Socially Vulnerable and At-Risk Population Data

Jurisdiction	Population Age Five and Under	Population Age 75+	Population Speaking Language Other Than English	Population Living Below Poverty Level	Persons with a Disability, Under the Age of 65
Siskiyou County	2,232	10,983	4,134	7,354	4,226
Dorris	71	60	281	176	61
Dunsmuir	294	107	112	301	161
Etna	101	60	0	118	47
Fort Jones	25	40	21	135	26
Happy Camp CSD	63	201	218	395	417
Lake Shastina CSD	289	332	167	190	377
McCloud CSD	0	196	35	170	376
Montague	93	61	132	255	187
Mt. Shasta	78	426	130	598	206
Tulelake	123	66	450	351	40
Weed	80	282	256	870	451
Yreka	486	584	736	1,715	773

Source: US Census Bureau

-: Data unavailable

Table: Siskiyou County Socially Vulnerable and At-Risk Populations as Percentage of Total Population

Jurisdiction	Percentage of Population Age Five and Under	Percentage of Population Age 75+	Percentage of Population Speaking Language Other Than English	Percentage of Population Living Below Poverty Level	Percentage of Persons with a Disability, Under the Age of 65
Siskiyou County	5.1%	9.5%	9.5%	16.9%	9.7%
Dorris	8.3%	7.0%	32.7%	20.5%	7.1%
Dunsmuir	15.7%	5.7%	6.0%	16.1%	8.6%
Etna	13.4%	7.9%	0.0%	15.6%	6.2%
Fort Jones	4.3%	6.9%	3.6%	23.4%	4.5%
Happy Camp CSD	3.4%	10.7%	11.6%	21.0%	22.2%
Lake Shastina CSD	12.0%	13.8% -	6.9%	7.9%	15.7%
McCloud CSD	0.0%	15.3%	2.7%	13.3%	29.4%
Montague	6.3%	4.1%	8.9%	17.2%	12.6%
Mt. Shasta	2.4%	13.1%	4.0%	18.4%	6.3%
Tulelake	14.7%	7.9%	53.6%	41.8%	4.8%

Table: Siskiyou County Socially Vulnerable and At-Risk Populations as Percentage of Total Population

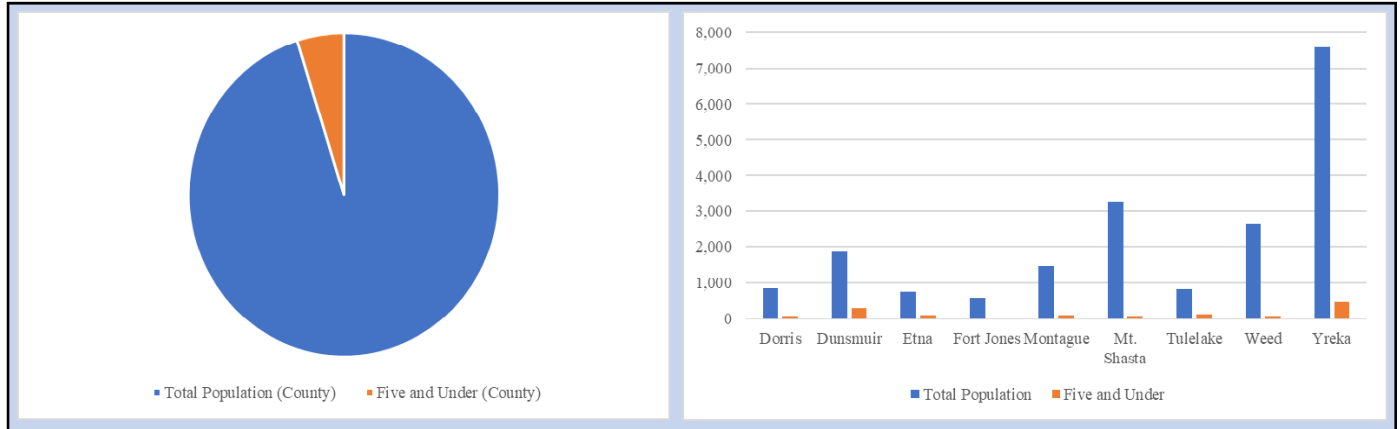
Jurisdiction	Percentage of Population Age Five and Under	Percentage of Population Age 75+	Percentage of Population Speaking Language Other Than English	Percentage of Population Living Below Poverty Level	Percentage of Persons with a Disability, Under the Age of 65
Weed	3.0%	10.6%	9.6%	32.7%	16.9%
Yreka	6.4%	7.7%	9.7%	22.6%	10.2%

Source: US Census Bureau

-: Data unavailable

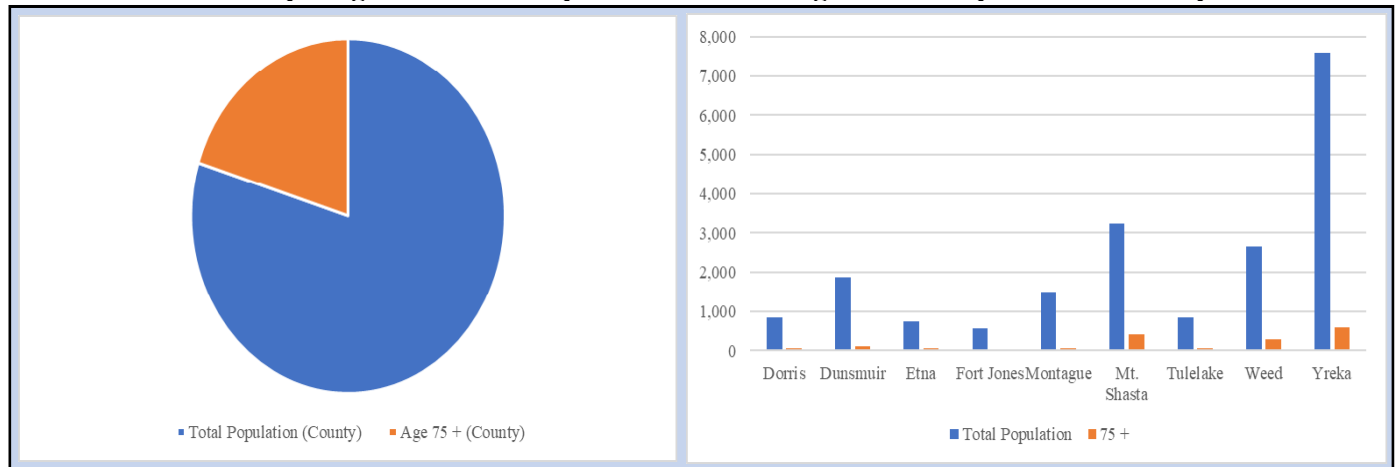
The following charts, developed using Census data, illustrate potentially at-risk populations within Siskiyou County.

Chart : Participating Jurisdiction Population Under the Age of Five Compared to Total Population



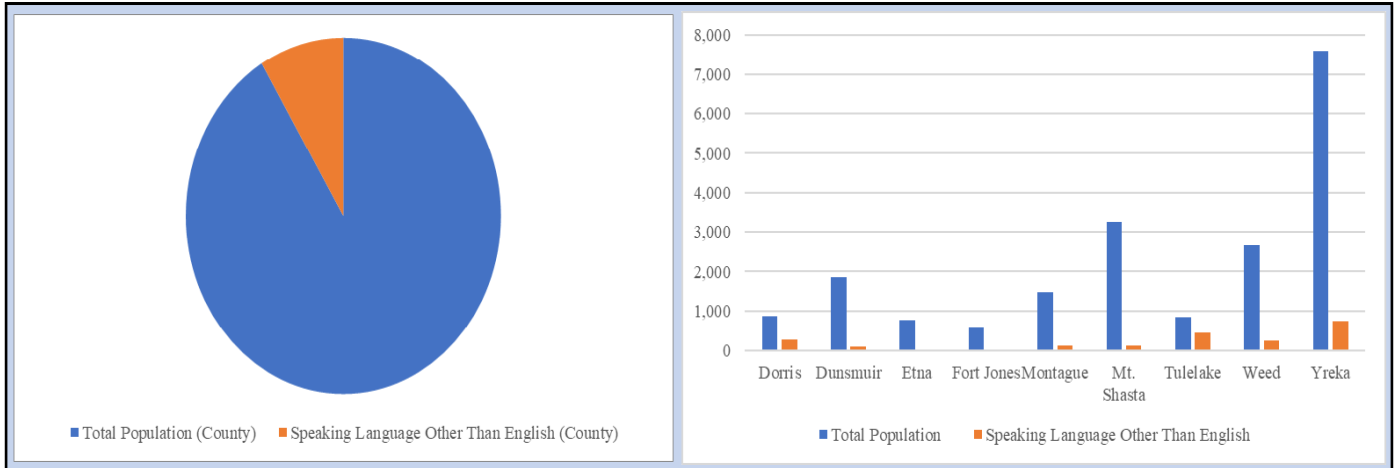
Source: U.S. Census Bureau

Chart : Participating Jurisdiction Population Over the Age of 75 Compared to Total Population



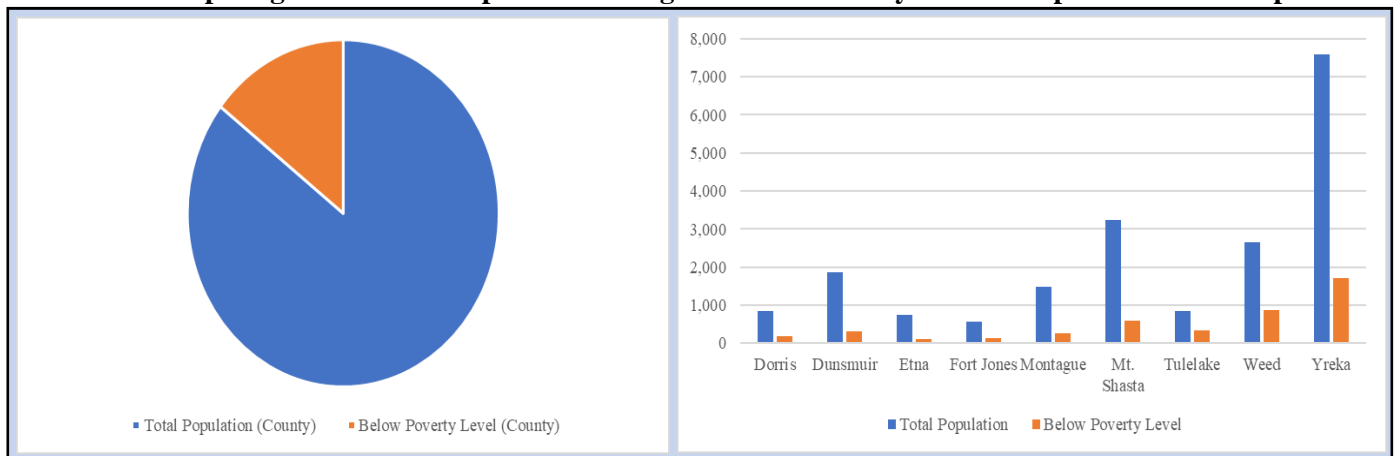
Source: U.S. Census Bureau

Chart : Participating Jurisdiction Population Speaking Language Other than English Compared to Total Population



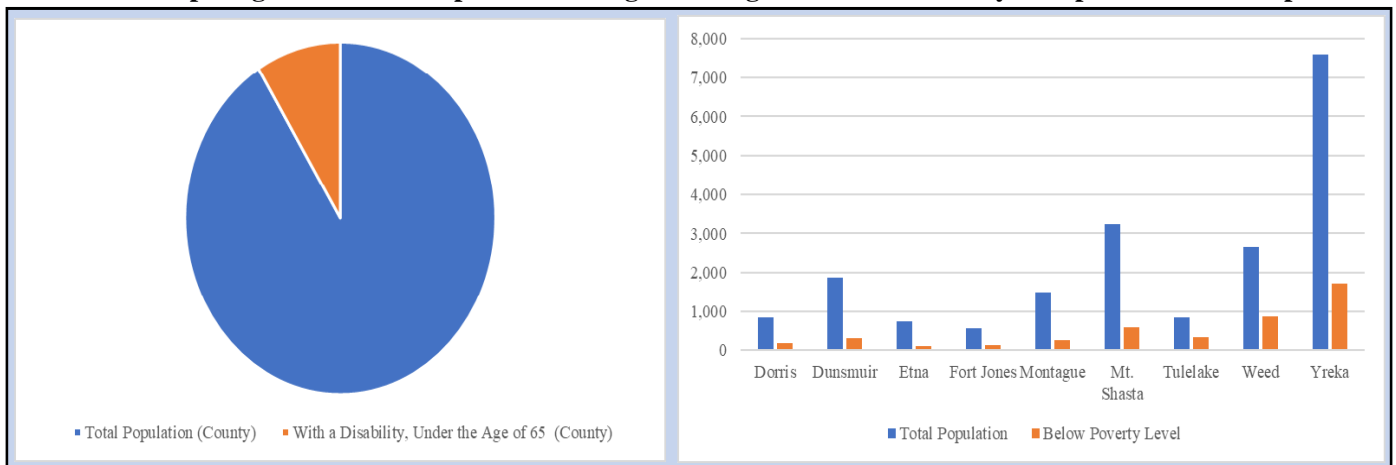
Source: U.S. Census Bureau

Chart : Participating Jurisdiction Population Living Below the Poverty Level Compared to Total Population



Source: U.S. Census Bureau

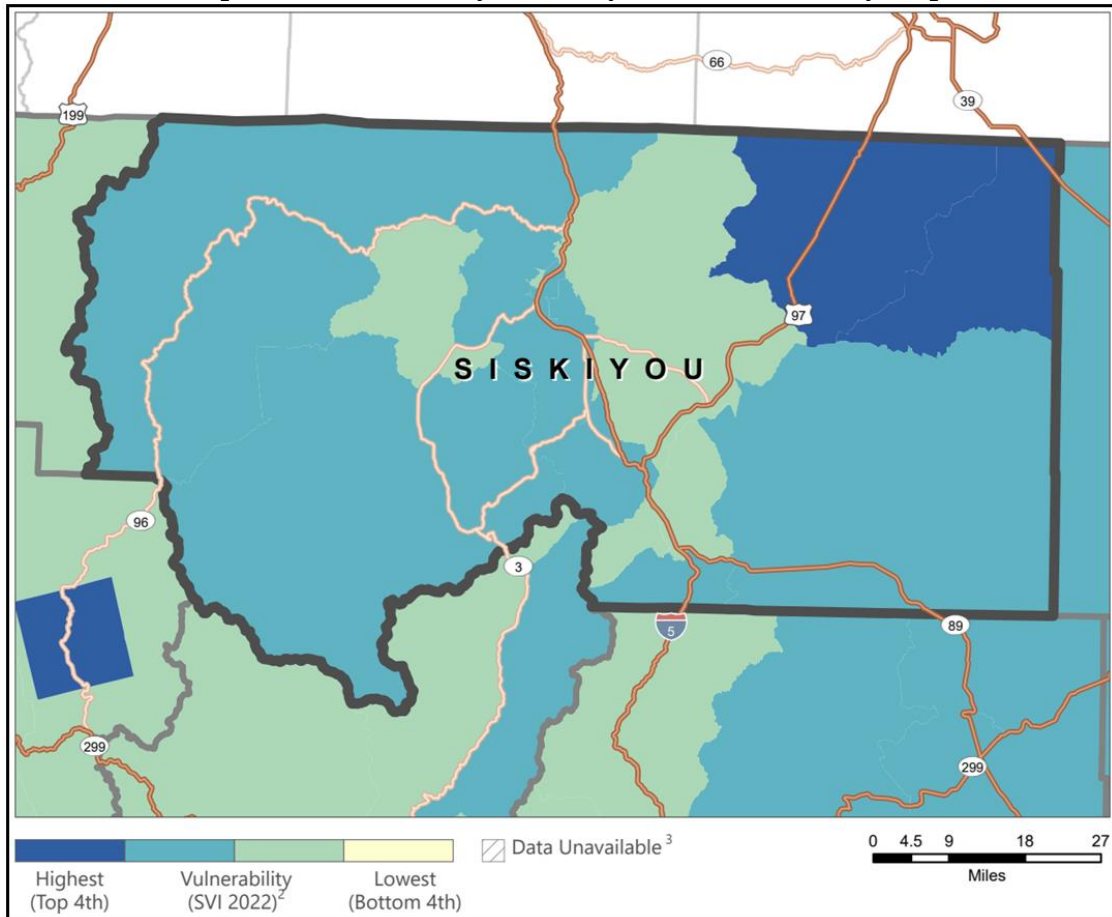
Chart : Participating Jurisdiction Population Living Below Age 65 with a Disability Compared to Total Population



Source: U.S. Census Bureau

Additionally, the Centers for Disease Control/Agency for Toxic Substances and Disease Registry Social Vulnerability Index County Map depicts the social vulnerability of communities, at census tract level, within Siskiyou County:

Map : FEMA NRI Siskiyou County Social Vulnerability Map



Source: CDC

A Community Disaster Resilience Zone is a designated area that has been identified as particularly vulnerable to natural disasters and other hazards. The goal of establishing such zones is to focus resources, planning efforts, and mitigation strategies on areas that need the most support to improve their resilience to disasters. These zones are typically selected based on factors such as the frequency and severity of past disasters, the level of community vulnerability, and the potential impact of future events. Communities designated as Community Disaster Resilience Zone can receive increased financial and technical assistance to plan and implement resilience projects. For example, they are eligible for Building Resilient Infrastructure and Communities grant funds at an increased federal cost share of up to 90%, relative to the baseline of up to 75%. As of this plan, no communities within Siskiyou County have received this designation.

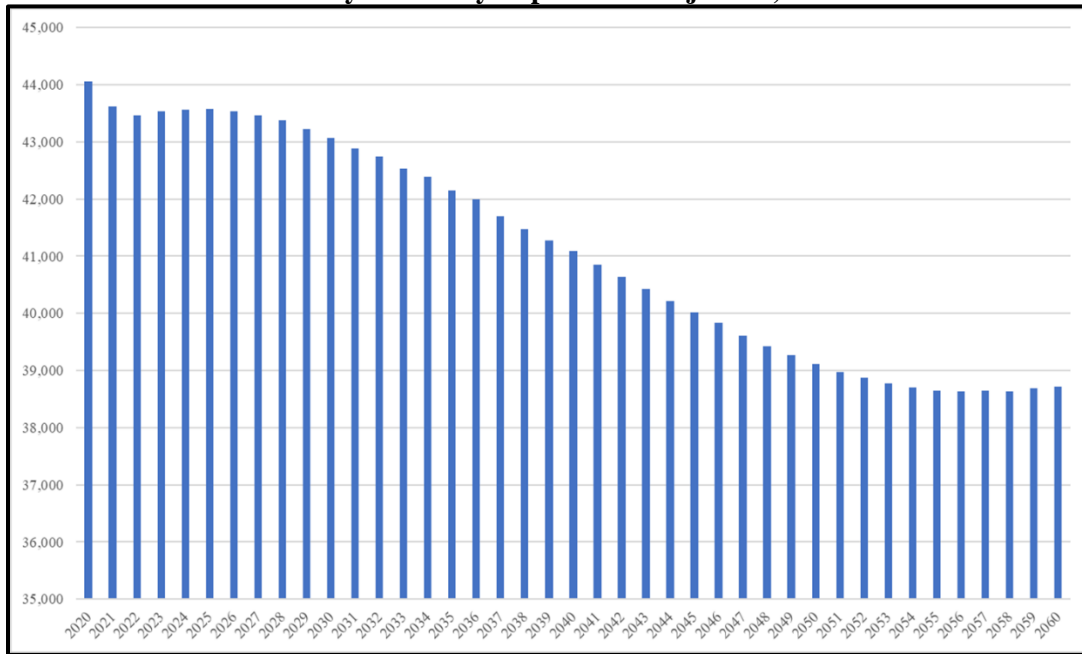
3.5 Regional Population Migration

Siskiyou County is experiencing consistent population decline as people increasingly migrate from rural areas to urban centers. This transformation reflects broader demographic trends witnessed across the United States. Demographic research indicates that this migration is occurring due to the following factors:

- **Economic Opportunity:** A primary driver of the population movement from rural to urban areas is the quest for better economic prospects. Urban centers such as Sacramento, the largest city in the region, offer a diverse range of employment opportunities in sectors like manufacturing, healthcare, finance, and technology. These opportunities often come with higher wages and better access to educational and healthcare facilities compared to rural areas.
- **Access to Education and Training:** Urban centers are often home to educational institutions, including colleges, universities, and vocational schools. Young people from rural areas often migrate to these urban settings to pursue higher education and vocational training. This educational mobility is a key factor in the rural-to-urban population shift.

The rural-to-urban population movement has significant implications for Siskiyou County. Communities may experience declining populations, school closures, and reduced economic activity. The following chart, using data from the State of California Department of Finance Population Projects (2019) publication, indicates -decreasing population for Siskiyou County through 2060.

Chart : Siskiyou County Population Projection, 2014-2064



Source: State of California Department of Finance

3.6 Housing Data

Closely tracking population data, but tending to lag population changes, housing data is a good indicator of changing demographics and growth. The following table and associated chart, using data from the U.S. Census, present occupied housing unit information for Siskiyou County.

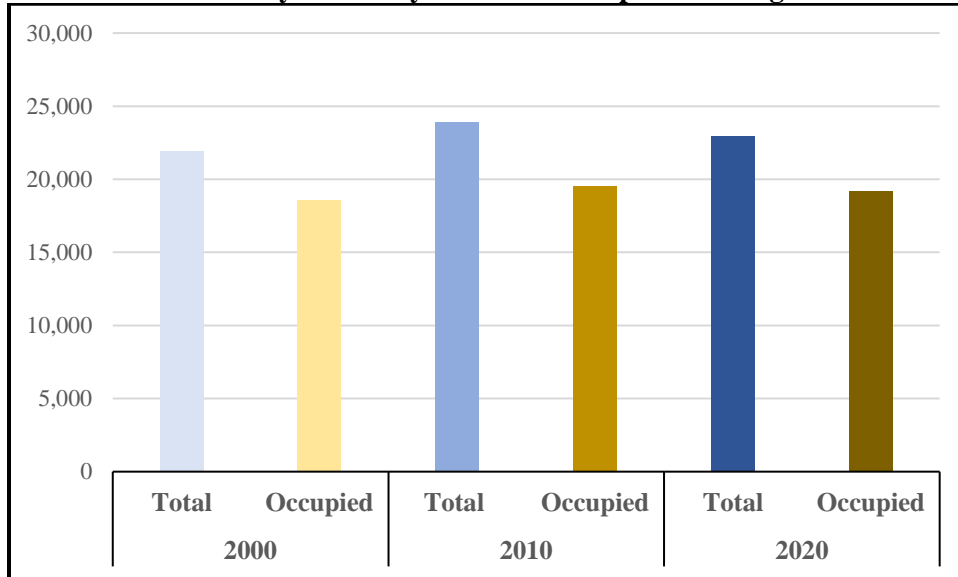
Table : Siskiyou County Housing Data

Jurisdiction	2000		2010		2020		2000 - 2020	
	Total	Occupied	Total	Occupied	Total	Occupied	Numeric Change, Total Units	Percent Change, Total Units
Siskiyou County	21,947	18,556	23,910	19,505	22,929	19,219	982	4.5%
Dorris	411	355	414	364	365	318	-46	-11.2%
Dunsmuir	1,168	856	1,110	763	1,091	798	-77	-6.6%
Etna	367	337	359	323	355	315	-12	-3.3%
Fort Jones	338	318	344	304	330	302	-8	-2.4%
Happy Camp CSD	-	-	-	-	1,083	830	-	-
Lake Shastina CSD	-	-	-	-	1,264	1,063	-	-
McCloud CSD	-	-	-	-	1,103	667	-	-
Montague	613	575	633	576	569	518	-44	-7.2%
Mt. Shasta	1,827	1,672	1,895	1,664	1,906	1,662	79	4.3%
Tulelake	453	352	437	347	361	283	-92	-20.3%
Weed	1,283	1,172	1,299	1,273	1,281	1,131	-2	-0.2%
Yreka	3,321	3,113	3,675	3,394	3,668	3,368	347	10.4%

Source: US Census Bureau

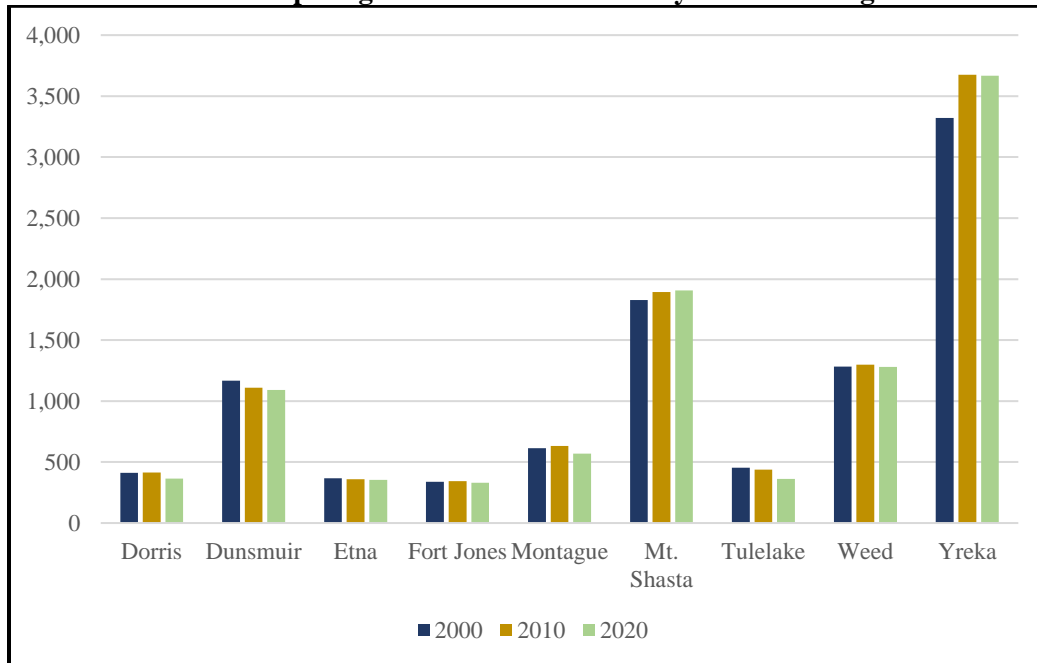
-: Data unavailable

Chart : Siskiyou County Total Vs. Occupied Housing Units



Source: US Census Bureau

Chart : Participating Stakeholder Community Total Housing Units



Source: US Census Bureau

Of particular concern when considering housing data is mobile home residences. Data from the NOAA National Severe Storms Laboratory reports that people living in mobile homes are especially at risk for injury and death as even anchored mobile homes can be seriously damaged when winds gust over 80 miles per hour. Additionally, study data from Michigan State University reported that the two biggest factors related to wind event fatalities were housing quality (measured by mobile homes as a proportion of housing units) and income level. When a tornadic wind strikes, a county with double the number of mobile homes as a proportion of all homes will experience 62% more fatalities than a county with fewer mobile homes, according to the study data. The following indicates the percentage of mobile homes for each Siskiyou County:

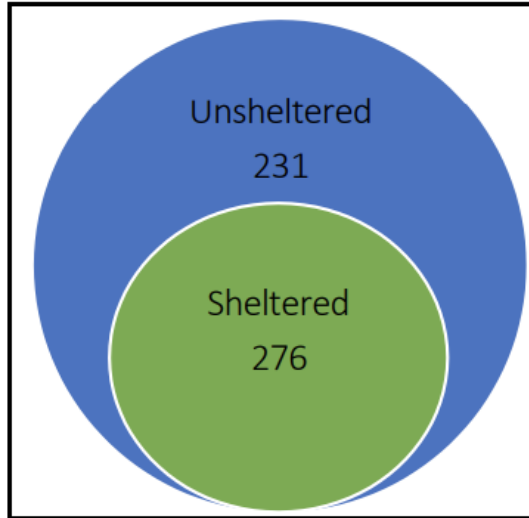
Table : Siskiyou County Mobile Home Data

Jurisdiction	2000		2010		2020		2000 - 2020	
	Total	Percentage of Total Housing Units	Total	Percentage of Total Housing Units	Total	Percentage of Total Housing Units	Numeric Change	Percentage of Housing Unit Change
Siskiyou County	2,892	13.2%	3,443	14.4%	2,218	9.7%	-674	-3.9%
Dorris	52	12.7%	99	24.0%	39	10.7%	-13	-2.0%
Dunsmuir	24	2.1%	18	1.6%	8	0.7%	-16	-1.4%
Etna	37	10.1%	36	10.1%	24	6.8%	-13	-3.3%
Fort Jones	48	14.2%	52	15.0%	46	13.9%	-2	-0.3%
Happy Camp CSD	-	-	-	-	-	-	-	-
Lake Shastina CSD	-	-	-	-	-	-	-	-
McCloud CSD	-	-	-	-	-	-	-	-
Montague	77	12.6%	77	12.1%	38	6.7%	-39	-5.9%
Mt. Shasta	39	2.1%	34	1.8%	12	0.6%	-27	-1.5%
Tulelake	50	11.0%	21	4.9%	9	2.5%	-41	-8.5%
Weed	49	3.8%	40	3.1%	44	3.4%	-5	-0.4%
Yreka	211	6.4%	125	3.4%	188	5.1%	-23	-0.7%

Source: US Census Bureau
 -: Data unavailable

The 2023 NorCal Continuum of Care Siskiyou County, Homelessness, Point-in-Time Count indicates that Siskiyou County has 507 homeless people:

Chart : 2023 Siskiyou County Homeless Population



Source: 2023 NorCal Continuum of Care point in Time Report

As indicated by the following table, the number of homeless people in the county has increased by 112% from 2019 to 2023:

Table : Siskiyou County Homeless Population, 2019 - 2023

Sheltering Status	2019	2023	Change, 2019 – 2023
Sheltered	47	231	392%
Unsheltered	192	276	44%
Total	239	507	112%

Source: NorCal Continuum of Care, Point-in Time Reports, 2022

3.7 Valuation Data

FEMA’s Hazus is a nationally standardized risk modeling methodology that uses GIS-based data to identify areas with high risk for natural hazards. Hazus also details the valuation of all buildings within a county. Hazus estimates that:

- There are 25,608 building in the county
- These building have an aggregate total replacement value of \$11,613,000,000
- 59.0% of these building are residential in nature
- 17.1% of these buildings are commercial in nature
- 13.2% of these buildings are industrial in nature

The Siskiyou County Assessor’s Office was contacted to determine if a valuation of properties was available for participating jurisdictions. It was determined that, due to the reporting format of available data, determining valuations for each jurisdiction was not feasible.

3.8 School District Data

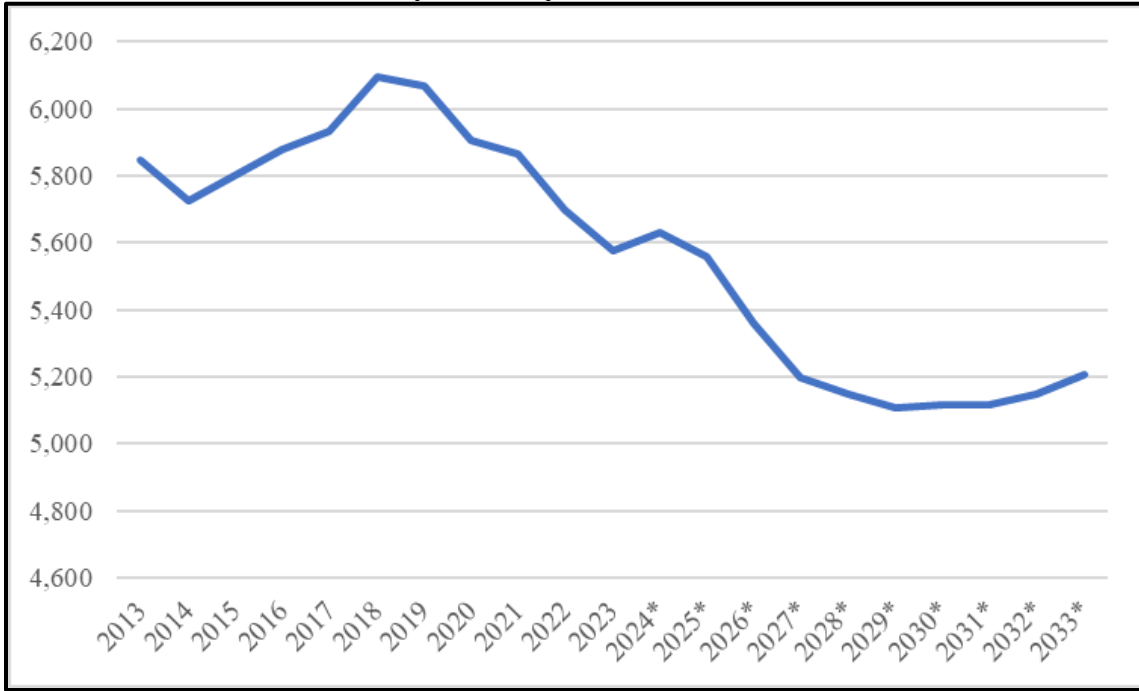
The following table presents school enrollment information from the California Department of Finance for school years 2013 through 2033:

Table 8: Siskiyou County School Enrollment Information

Year	Enrollment
2013	5,847
2014	5,727
2015	5,804
2016	5,879
2017	5,933
2018	6,096
2019	6,066
2020	5,905
2021	5,865
2022	5,697
2023	5,578
2024 (projected)	5,630
2025 (projected)	5,556
2026 (projected)	5,358
2027 (projected)	5,198
2028 (projected)	5,148
2029 (projected)	5,109
2030 (projected)	5,115
2031 (projected)	5,114
2032 (projected)	5,146
2033 (projected)	5,204

Source: California Department of Finance

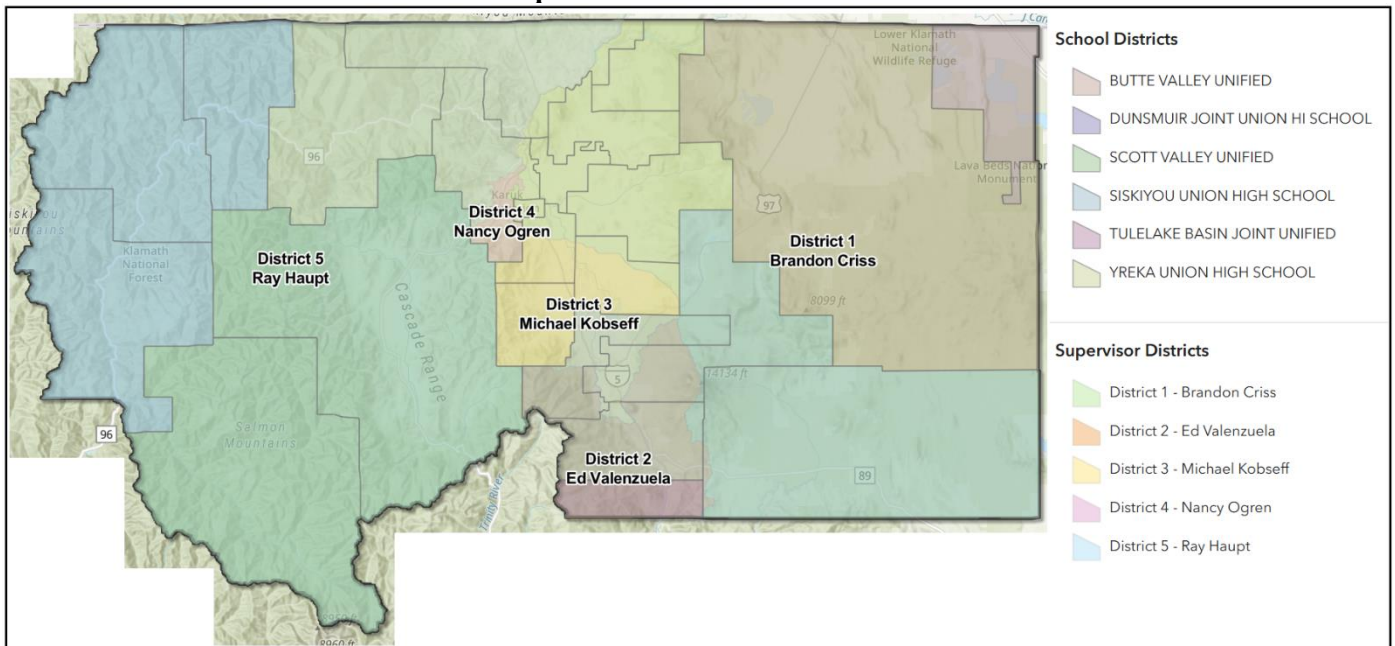
Chart : Siskiyou County School Enrollment Trends



Source: California Department of Finance
 Note: * indicates projected data

The following map details school district boundaries within Siskiyou County:

Map: School District Boundaries



Source: Siskiyou County GIS

3.9 Community Lifelines and Critical Infrastructure

Certain community lifelines have a net positive value on the community as they contribute to the public good by facilitating the basic functions of society. These locations help maintain order, public health, education, and help the economy function. Additionally, components are integral to disaster response and recovery operations. The following is a list of considered community lifelines:

- Communication facilities
- Fire facilities
- Food distribution facilities (groceries)
- Government facilities
- Law enforcement facilities
- Medical facilities

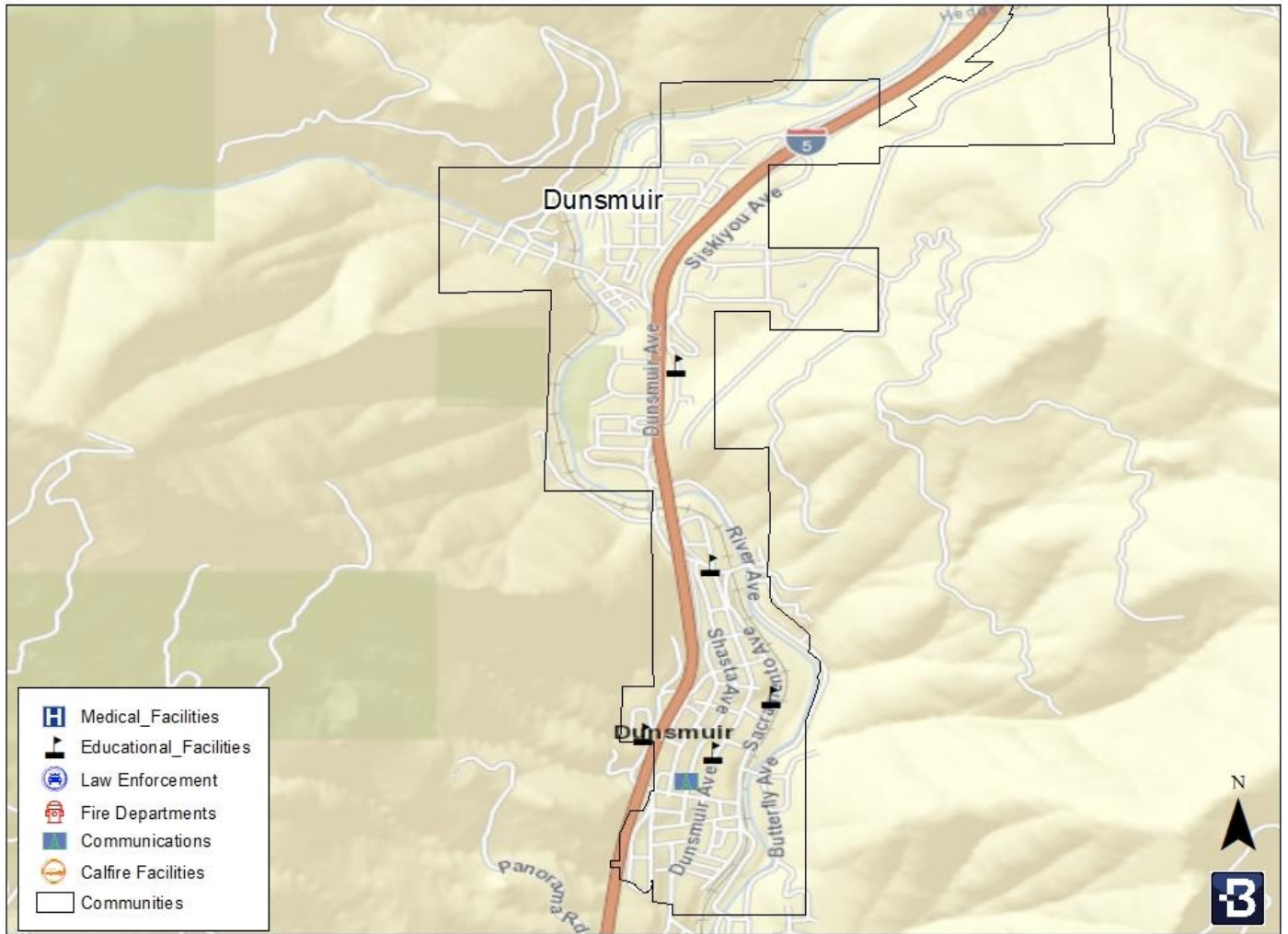
The following maps break down community lifeline locations by jurisdiction:

Map : Dorris Community Lifelines and Critical Facilities



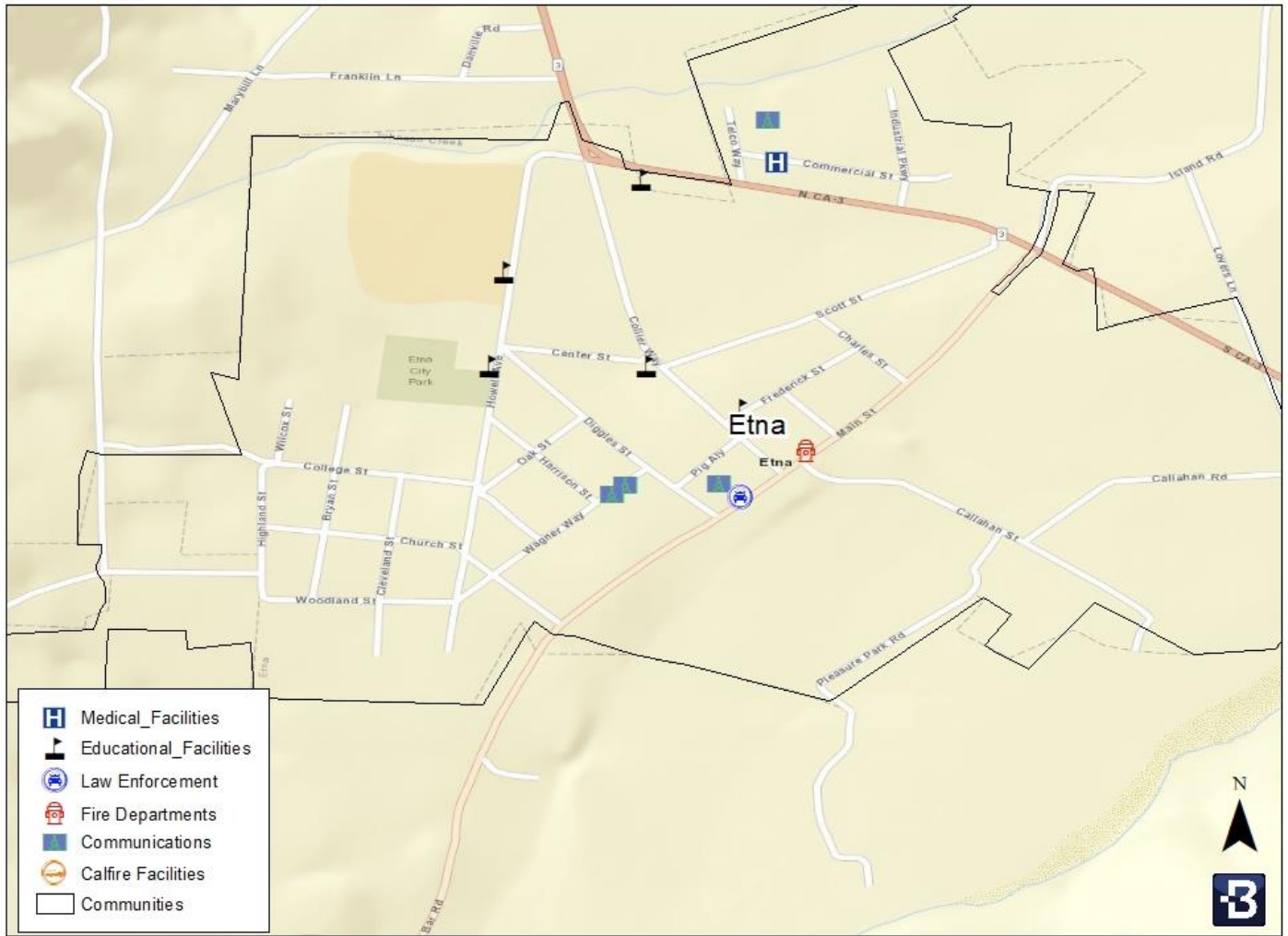
Source: Siskiyou County and BOLDplanning

Map : Dunsmuir Community Lifelines and Critical Facilities



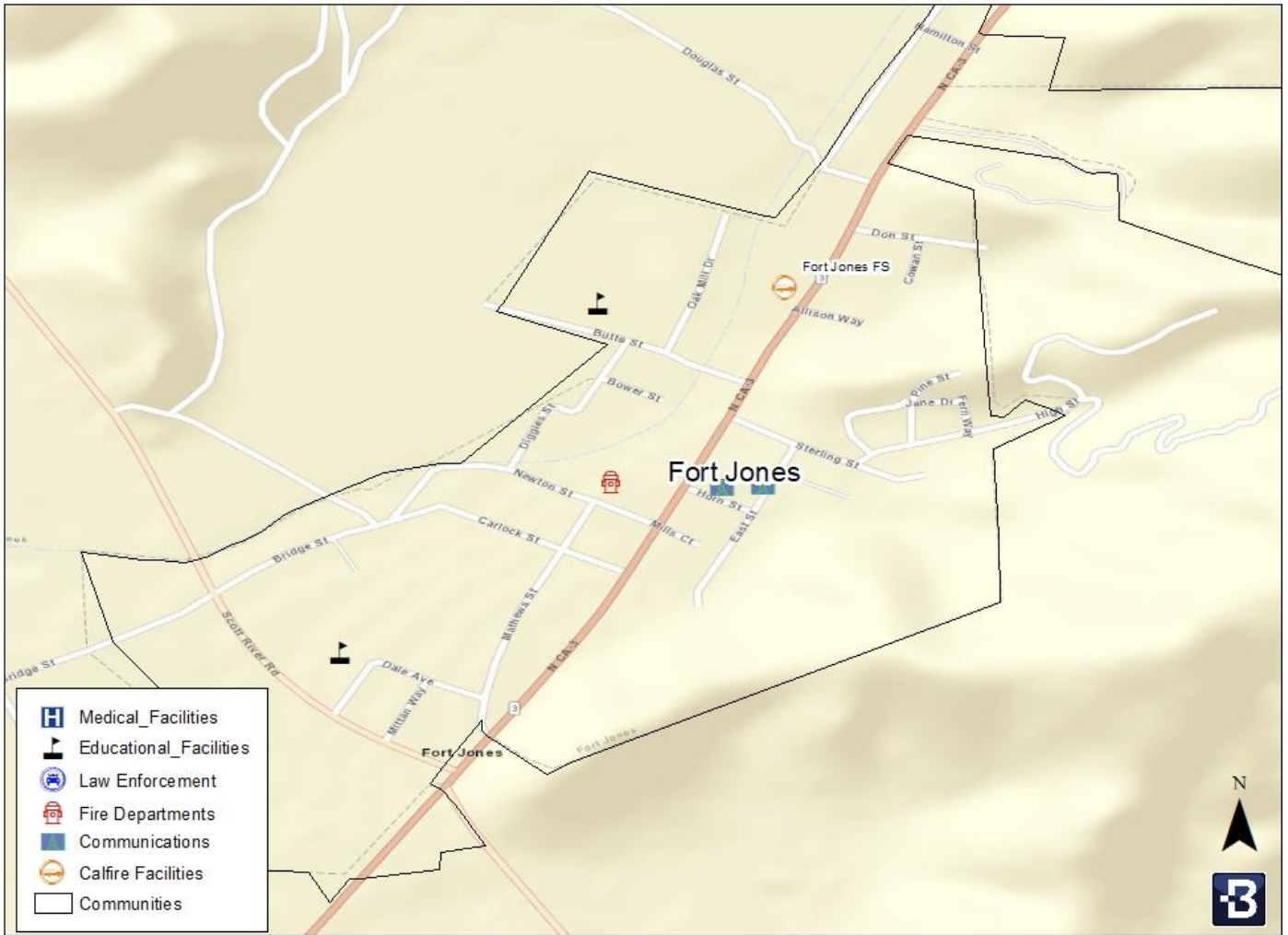
Source: Siskiyou County and BOLDplanning

Map : Etna Community Lifelines and Critical Facilities



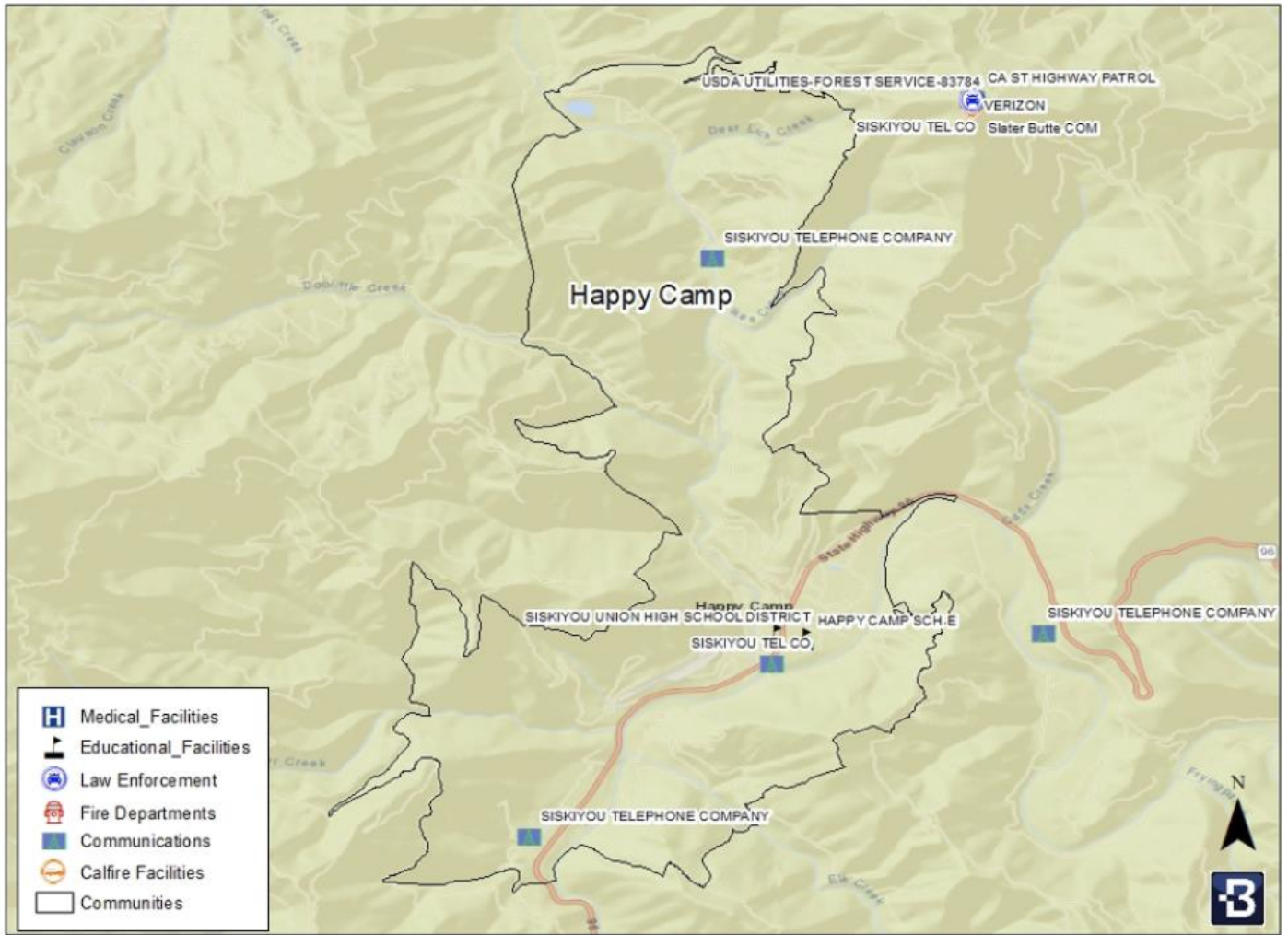
Source: Siskiyou County and BOLDplanning

Map : Fort Jones Community Lifelines and Critical Facilities



Source: Siskiyou County and BOLDplanning

Map : Happy Camp CSD Community Lifelines and Critical Facilities



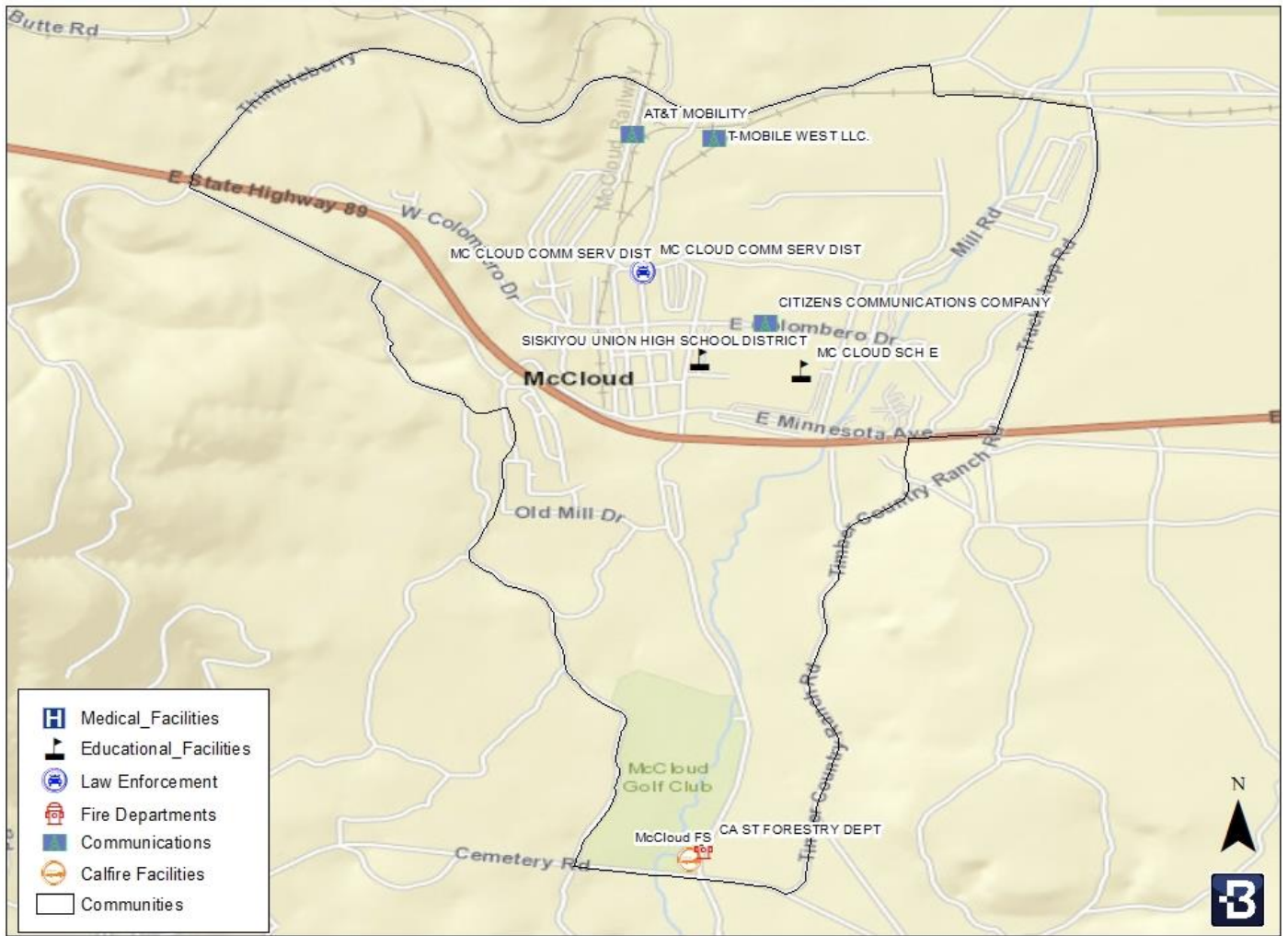
Source: Siskiyou County and BOLDplanning

Map : Lake Shastina CSD Community Lifelines and Critical Facilities



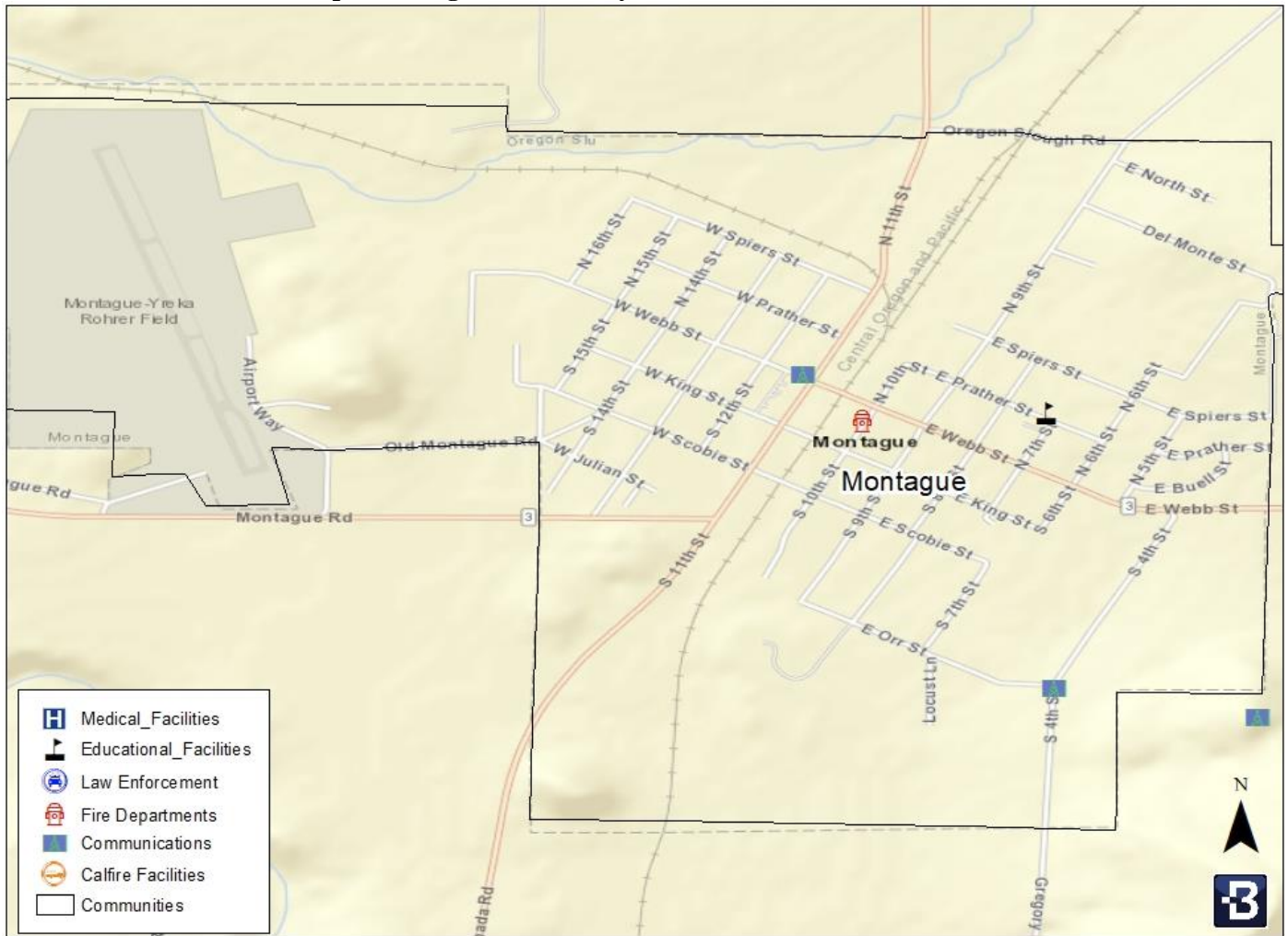
Source: Siskiyou County and BOLDplanning

Map : McCloud CSD Community Lifelines and Critical Facilities



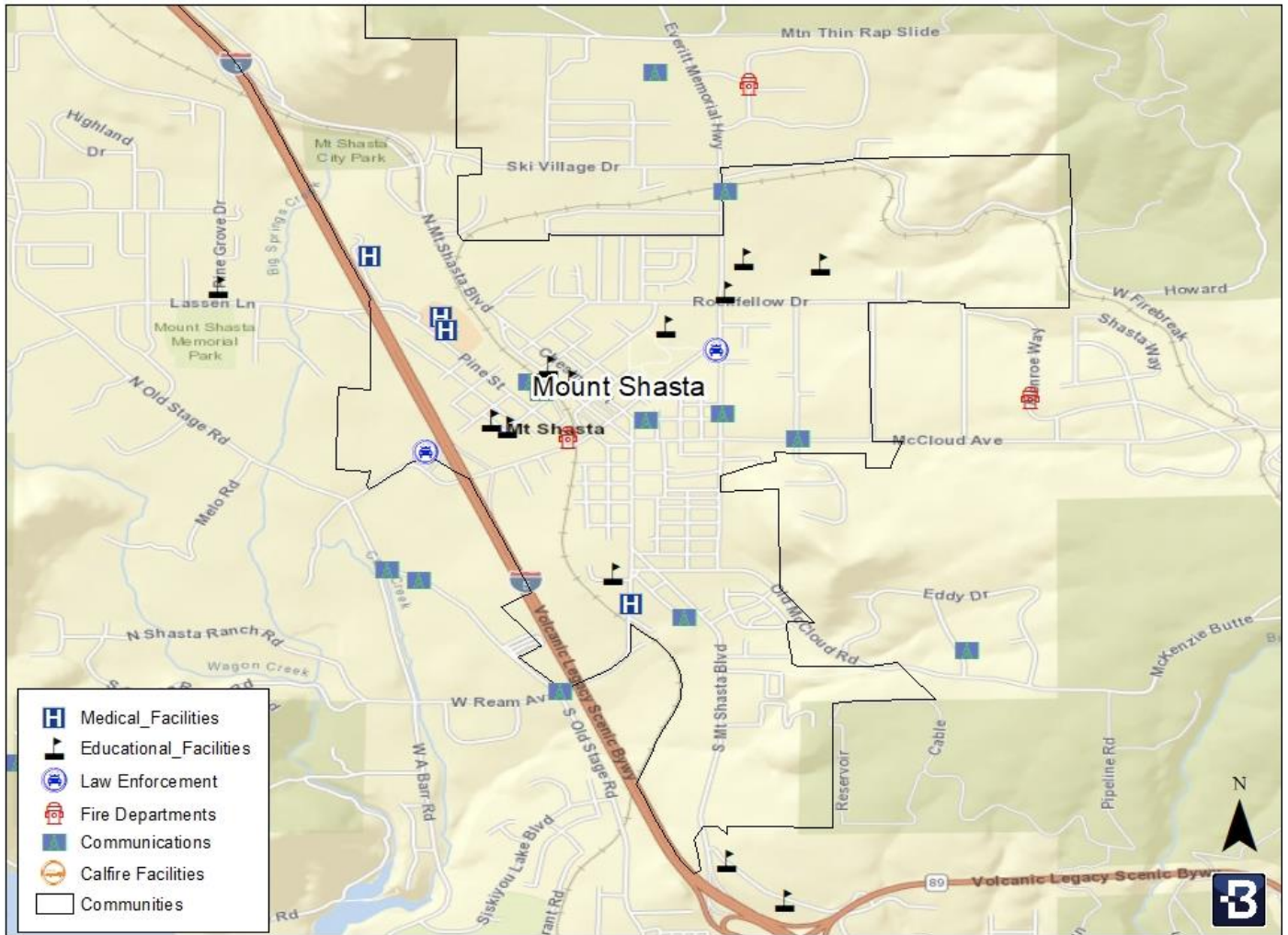
Source: Siskiyou County and BOLDplanning

Map : Montague Community Lifelines and Critical Facilities



Source: Siskiyou County and BOLDplanning

Map :Mount Shasta Community Lifelines and Critical Facilities



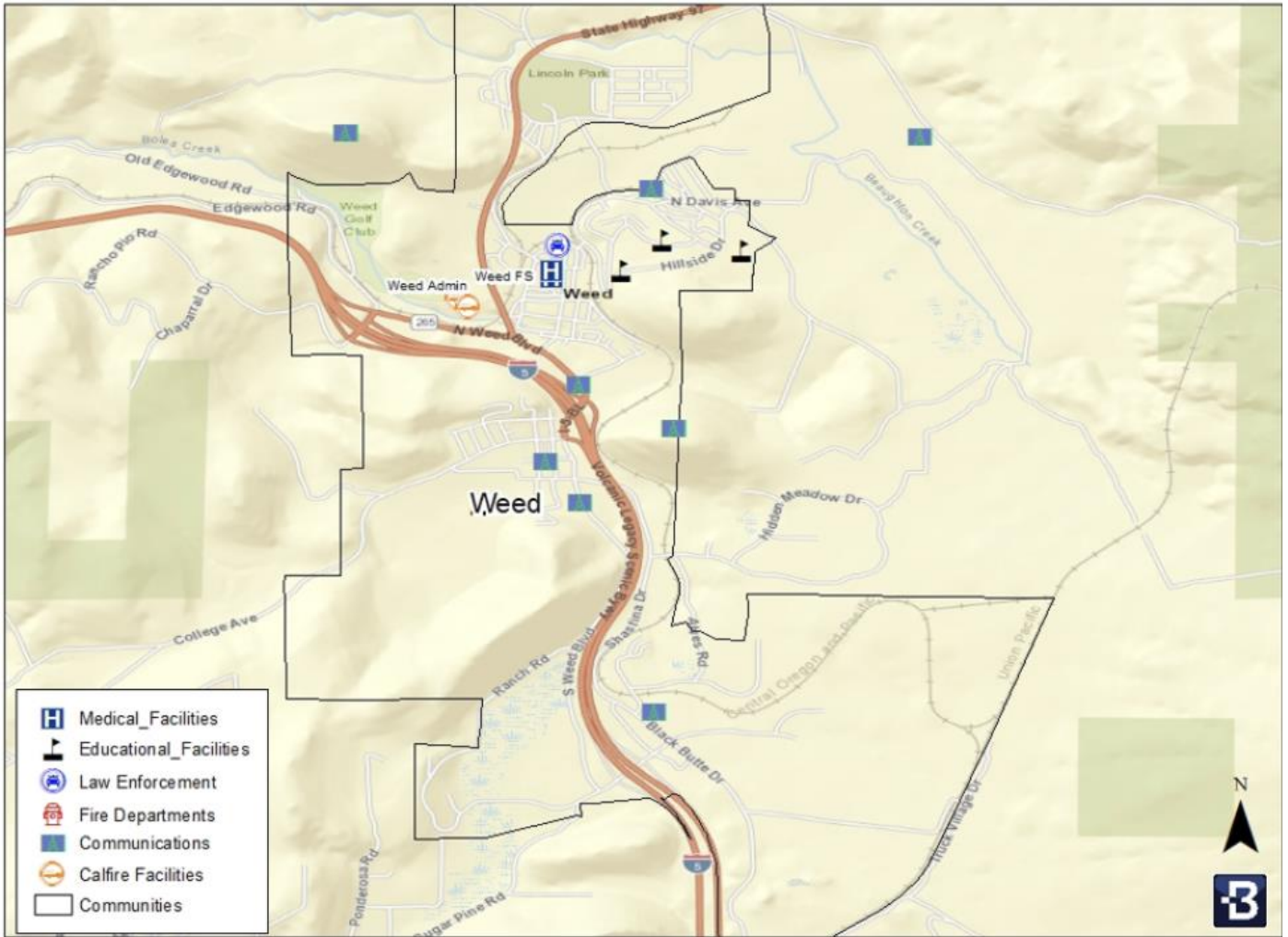
Source: Siskiyou County and BOLDplanning

Map : Tulelake Community Lifelines and Critical Facilities



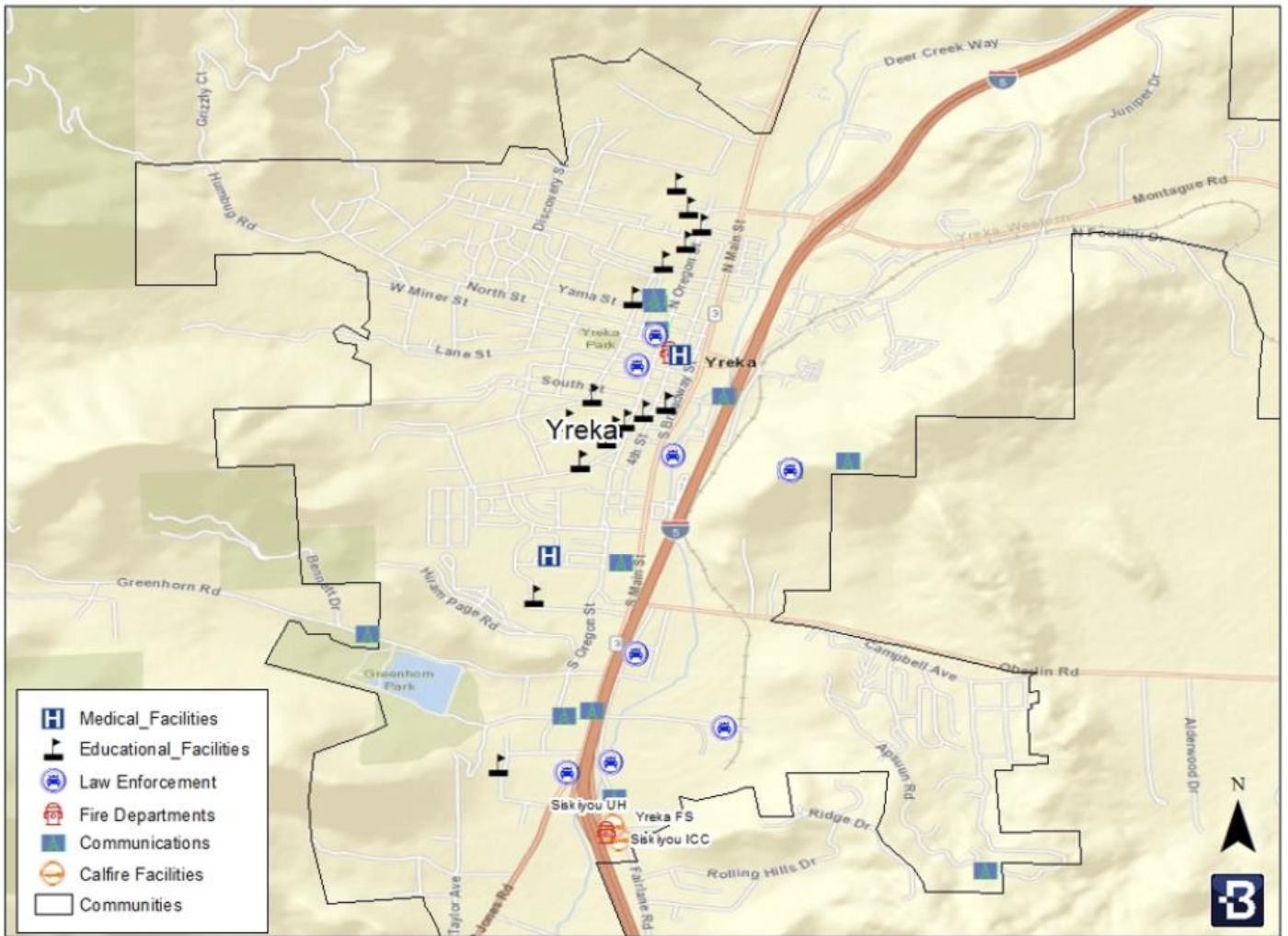
Source: Siskiyou County and BOLDplanning

Map : Weed Community Lifelines and Critical Facilities



Source: Siskiyou County and BOLDplanning

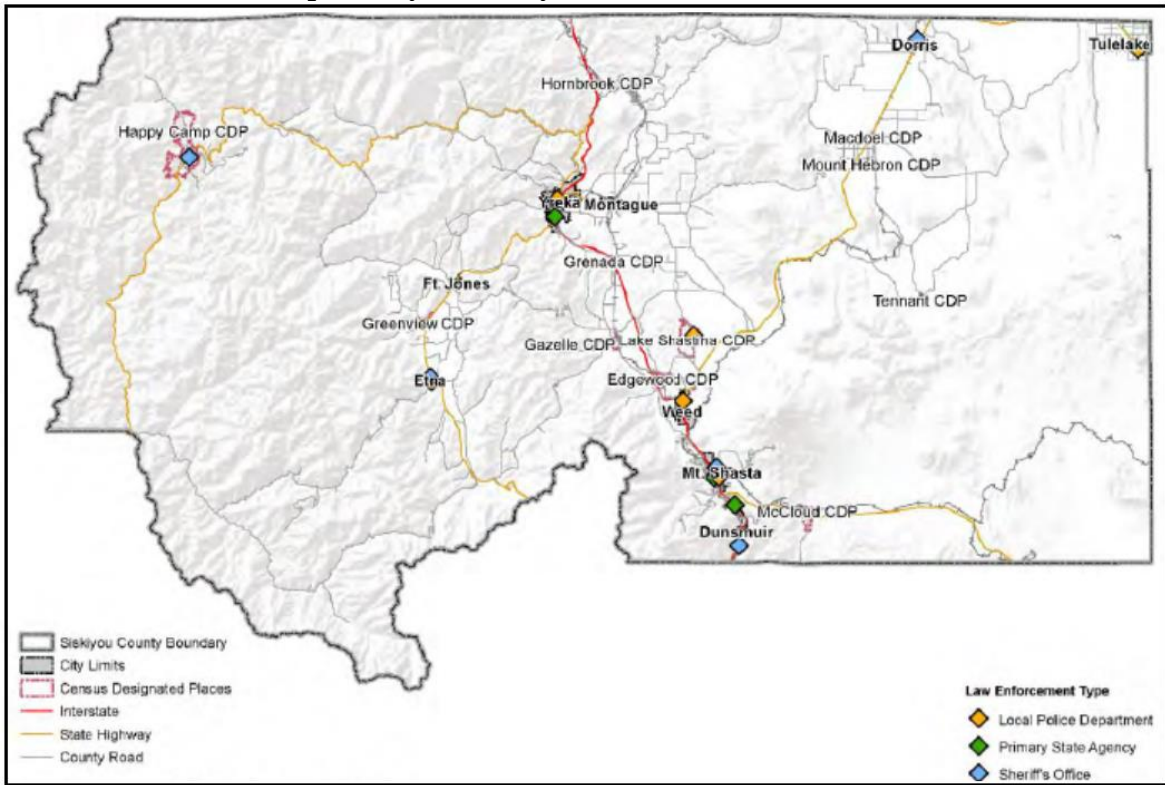
Map : Yreka Community Lifelines and Critical Facilities



Source: Siskiyou County and BOLDplanning

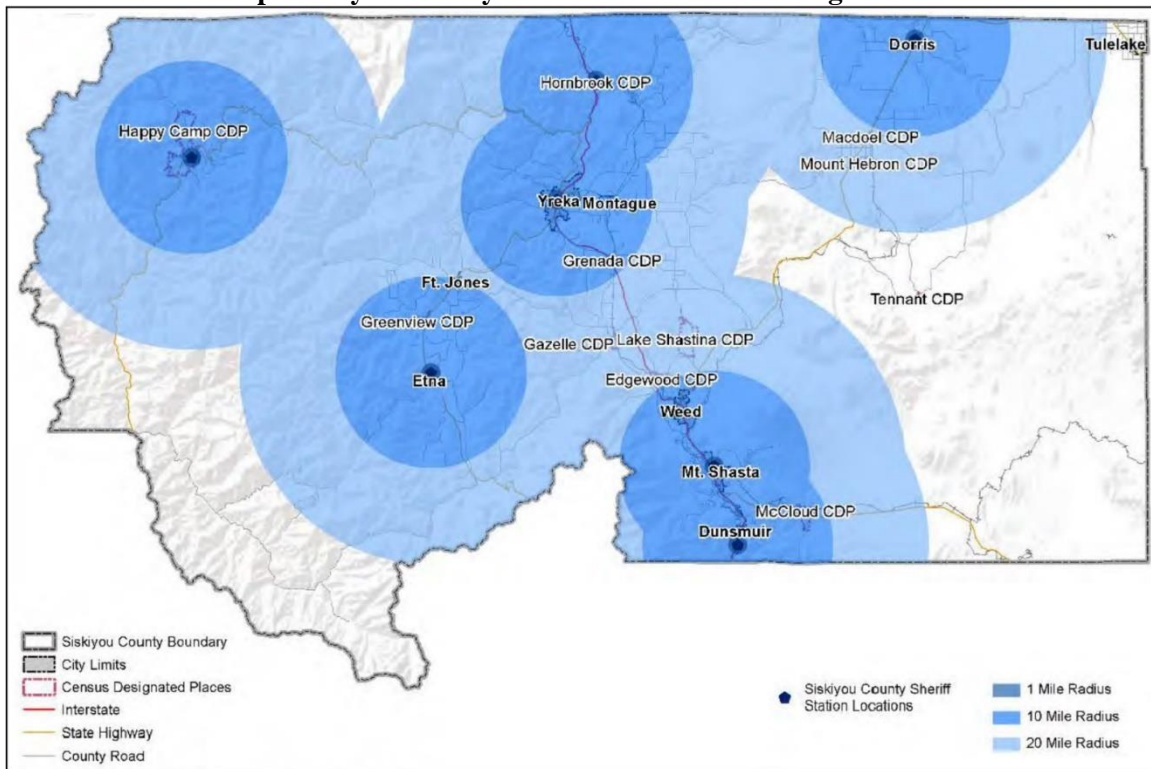
Along with local police stations in Mt. Shasta, Tulelake, Weed, and Yreka, the Siskiyou County Sheriff's Department has five patrol stations throughout the county. The following maps detail the locations of the facilities, and the radius of coverage:

Map : Siskiyou County Law Enforcement Facilities



Source: Siskiyou County General Plan

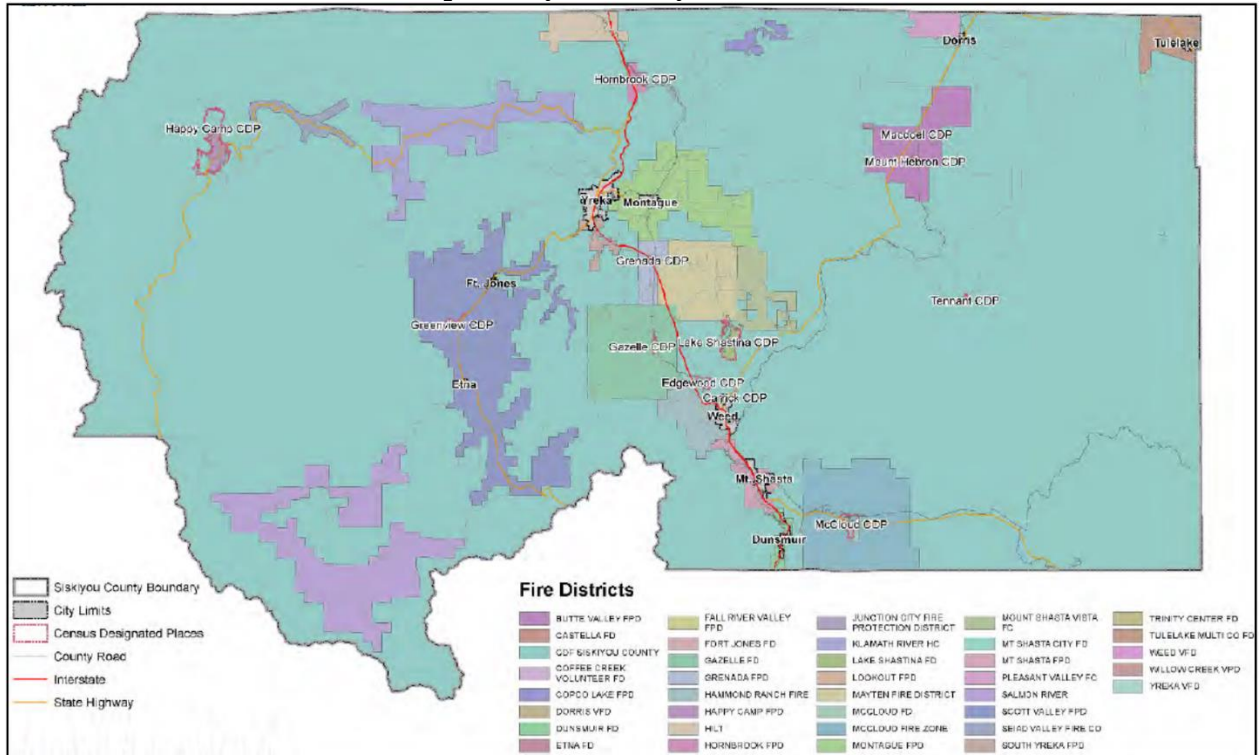
Map: Siskiyou County Law Enforcement Coverage Radius



Source: Siskiyou County General Plan

Given the rural and sparsely inhabited nature of large portions of Siskiyou County, many of the fire departments and fire districts are operated by volunteer firefighting teams and funded through community fundraising. The following map details the location of Fire Districts within Siskiyou County:

Map : Siskiyou County Fire Districts



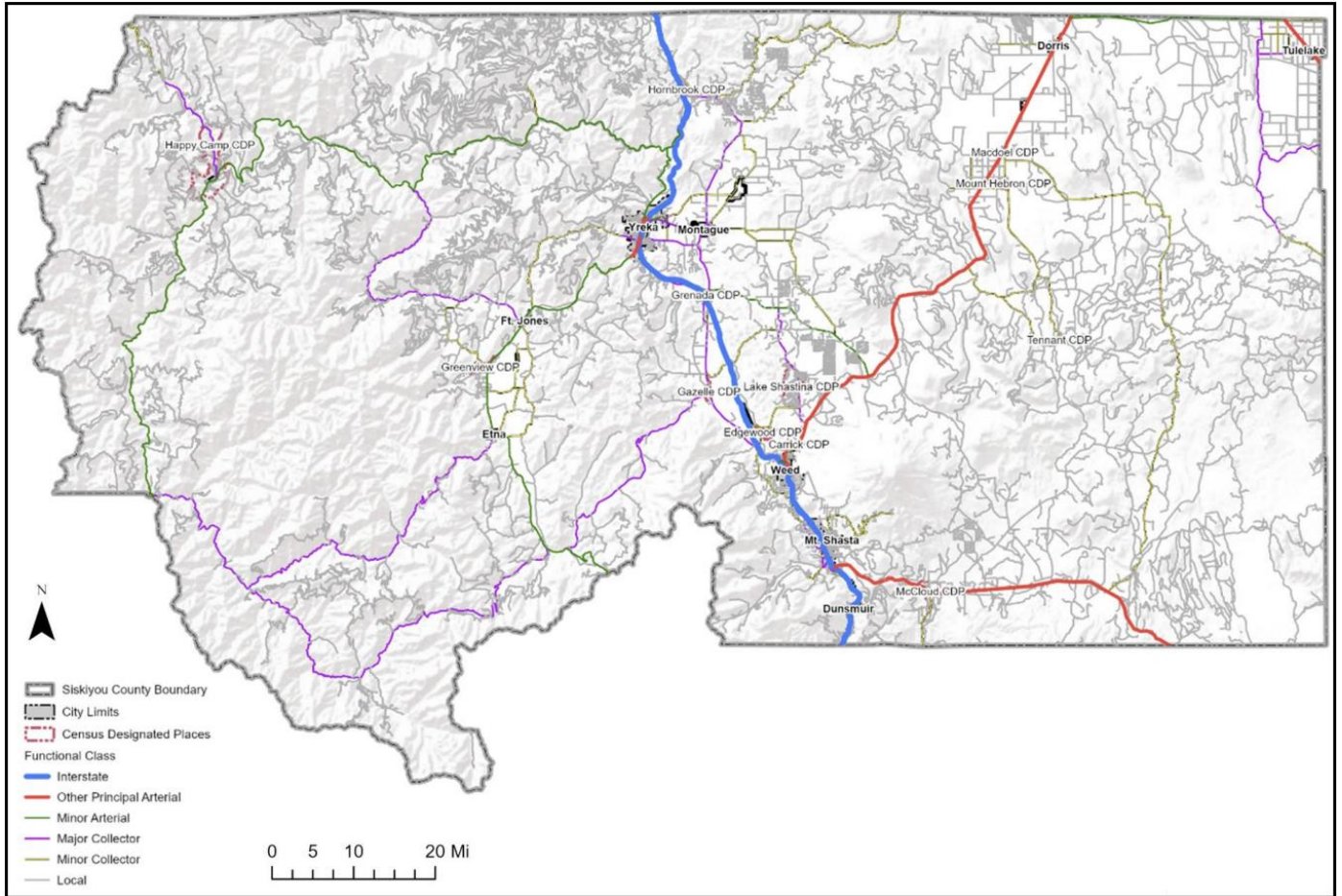
Source: Siskiyou County General Plan

Critical infrastructure refers to the essential systems, assets, and services that are vital for the functioning of society and the economy. These infrastructures are necessary for public safety, economic stability, and quality of life. If disrupted or destroyed, the impacts could be severe, affecting the community’s ability to function. The following is a list of considered critical infrastructure:

- Airports
- Bridges
- Communications
- Energy generation and regulation
- Roads
- Water and wastewater treatment

As of 2021, Siskiyou County contains 2,918 miles of maintained public roads. Responsibility for them is shared between the governments of cities, the county, the state, federal agencies, and other state agencies. The majority of public roads within the county are maintained by Siskiyou County and federal agencies. These roads account for 49.4% and 32.6% respectively, of the total road network within the county as of 2021. The following map details road type and location:

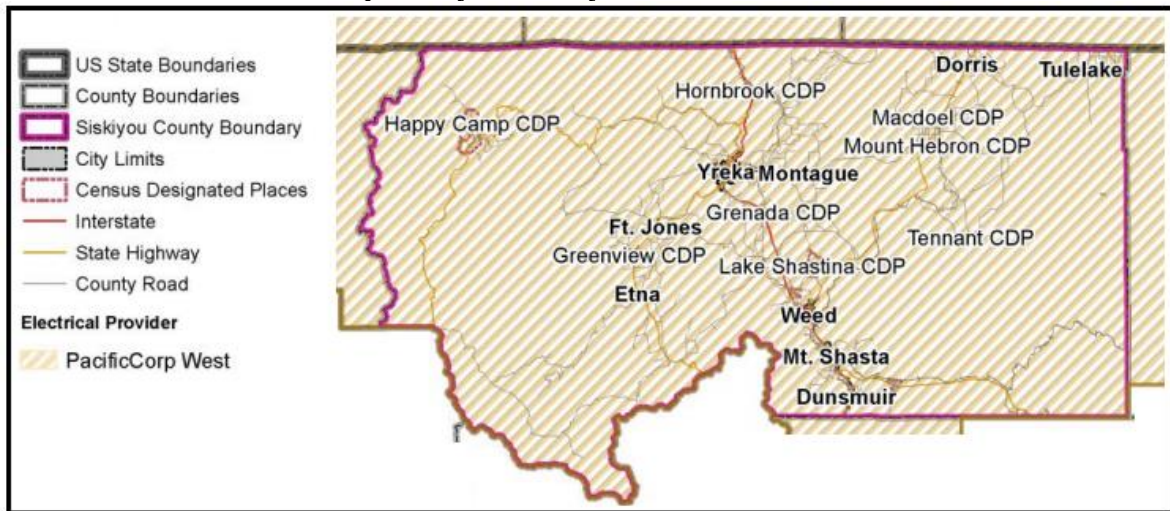
Map: Siskiyou County Roads



Source: Siskiyou County General Plan

Electrical utilities in Siskiyou County and all participating jurisdictions are provided by PacificCorp Energy, as detailed in the following map:

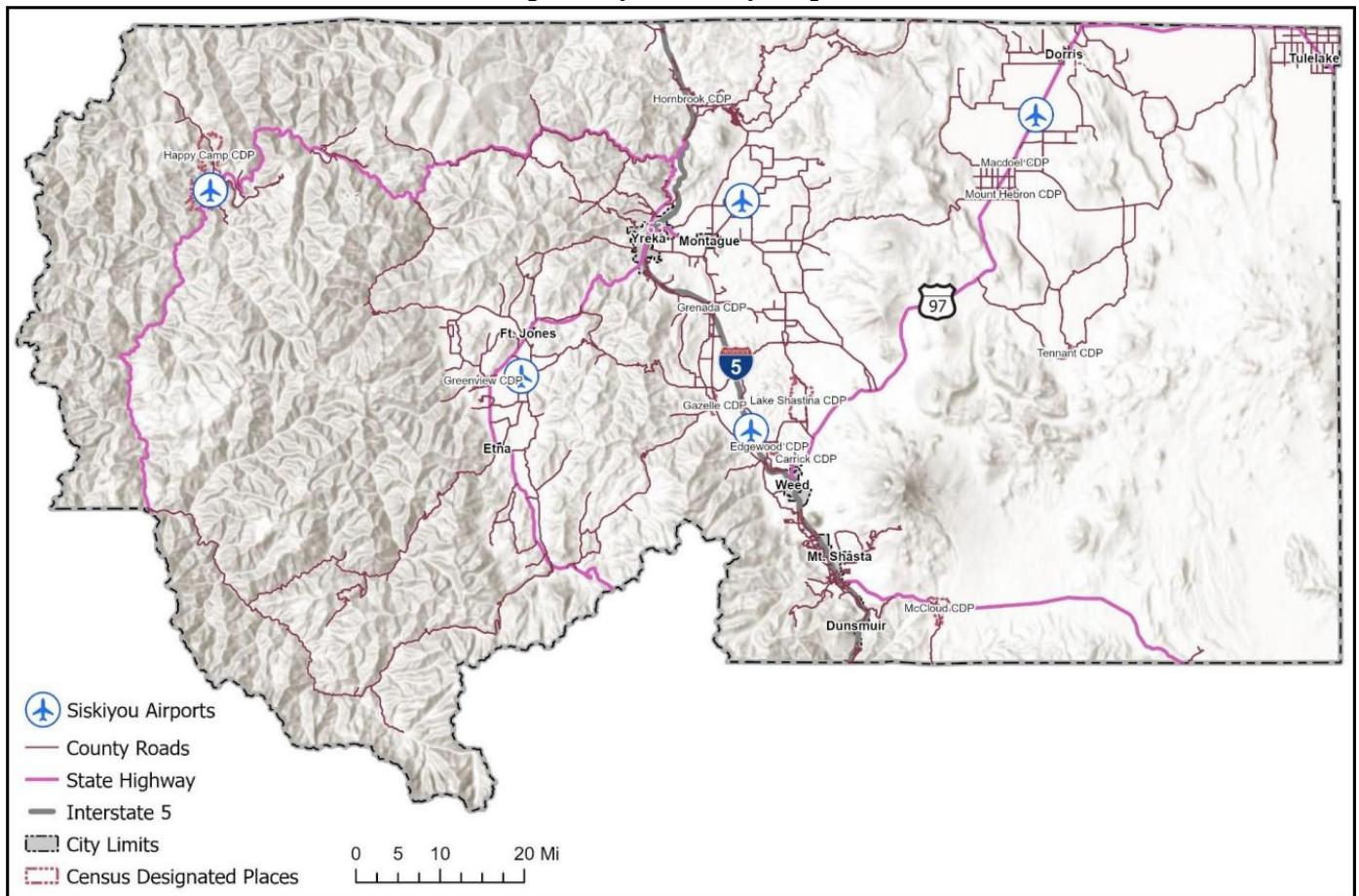
Map: Siskiyou County Electrical Providers



Source: Siskiyou County General Plan

Siskiyou County currently has four public-use general aviation airports, and one airport operated by the U.S National Forest Service (Happy Camp). The following map details the locations of these airports:

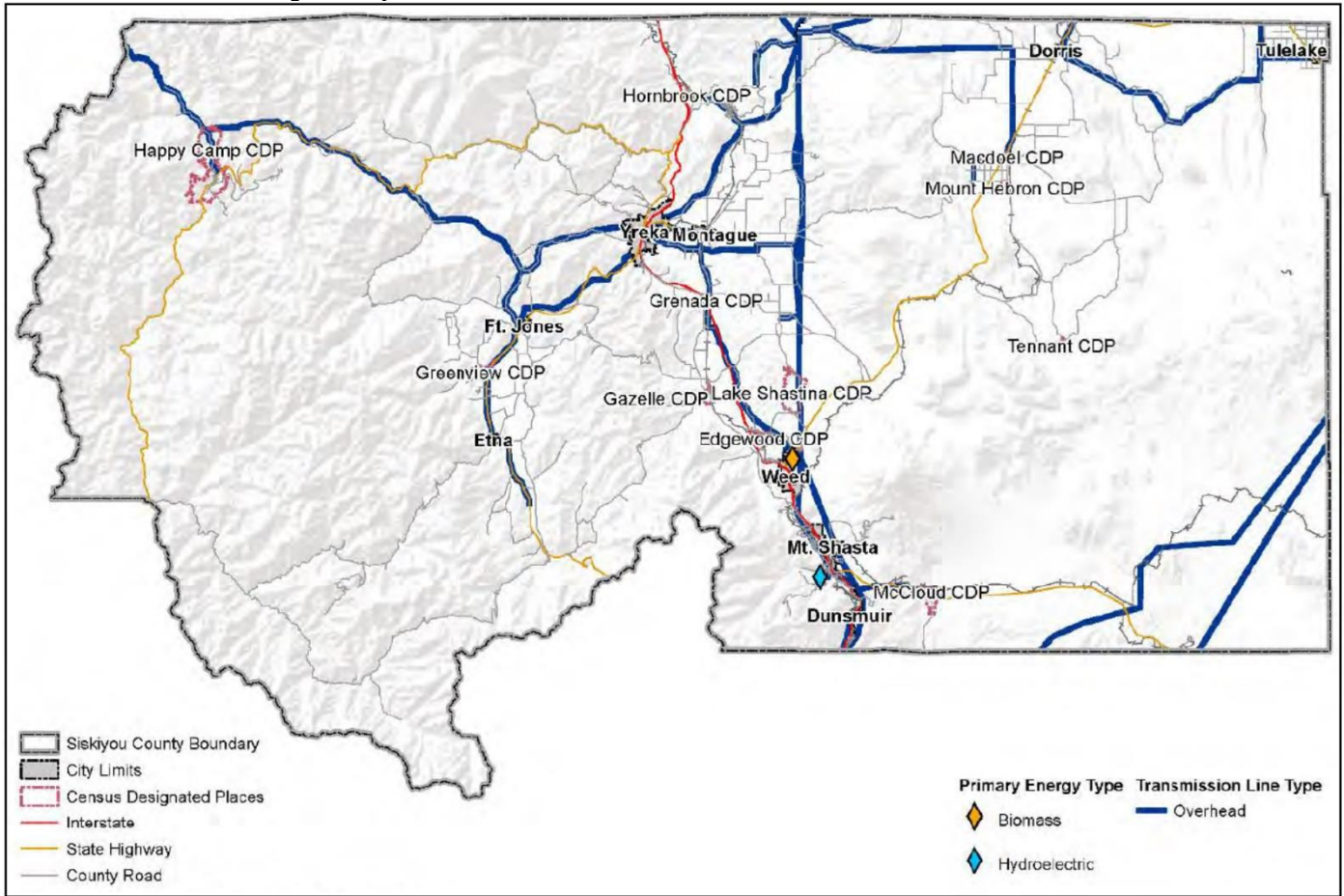
Map: Siskiyou County Airports



Source: Siskiyou County General Plan

All of the electrical energy generated in Siskiyou County is renewable energy. However, the capacity for generation has dropped as in 2024 Copco Dam 2, and Iron Gate Dam (all of which were hydroelectric dams) were removed, This leaves one hydroelectric dam in operation (Box Canyon Dam). The following map details electrical generation and transmission infrastructure:

Map: Siskiyou Electrical Generation and Transmission Infrastructure



Source: Siskiyou County General Plan

Data from FEMA’s Hazus-MH indicates the following for critical infrastructure:

Table : Critical Infrastructure

Type	Number	Replacement Value
Airport and Runways	5	\$74,595,800
Road Bridges	416	\$702,742,600
Road Segments	80	\$3,149,209,400
Railway Bridges	71	\$403,990,000
Railway Segments	141	\$637,016,500
Energy Generation and Regulation	2	\$289,295,600
Communications	8	\$944,000
Water and Wastewater Treatment Facilities	2	\$343,903,600
Water and Wastewater Distribution Lines	Not reported	\$613,792,900

Source: FEMA Hazus-MH

As available, further jurisdictional critical facility information may be found in Appendix C - Critical Facility Details.

Additional critical infrastructure mapping may be found in subsequent hazard analysis sections, as appropriate.

3.10 Economic Conditions

As of current U.S. Census Bureau data, approximately 16,600 civilian residents were in the workforce in 2022, as shown in the following table:

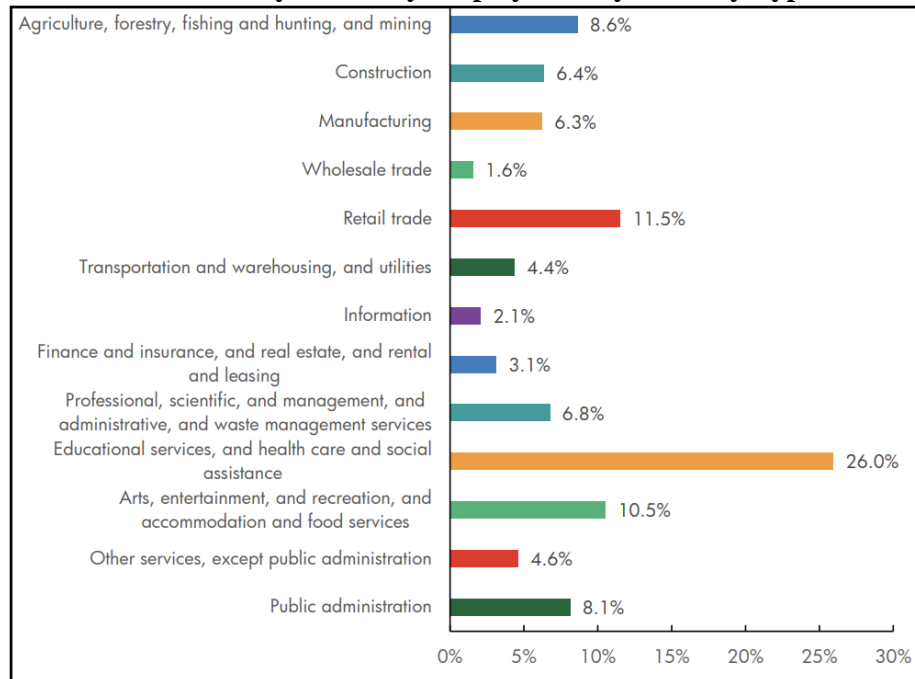
Table : Jobs Held by Siskiyou County Residents, by Type of Worker, 2022

Facility Name	Function
Private for-profit wage and salary workers	9,298
Private not-for-profit wage and salary workers	1,466
Government workers	4,087
Self-employed	1,665
Unpaid family workers	107

Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates

Residents of Siskiyou County are mostly employed in education and health care, retail trade, or in jobs related to arts, tourism, recreation, and food services or public administration. The following chart provides a breakdown of employment by category:

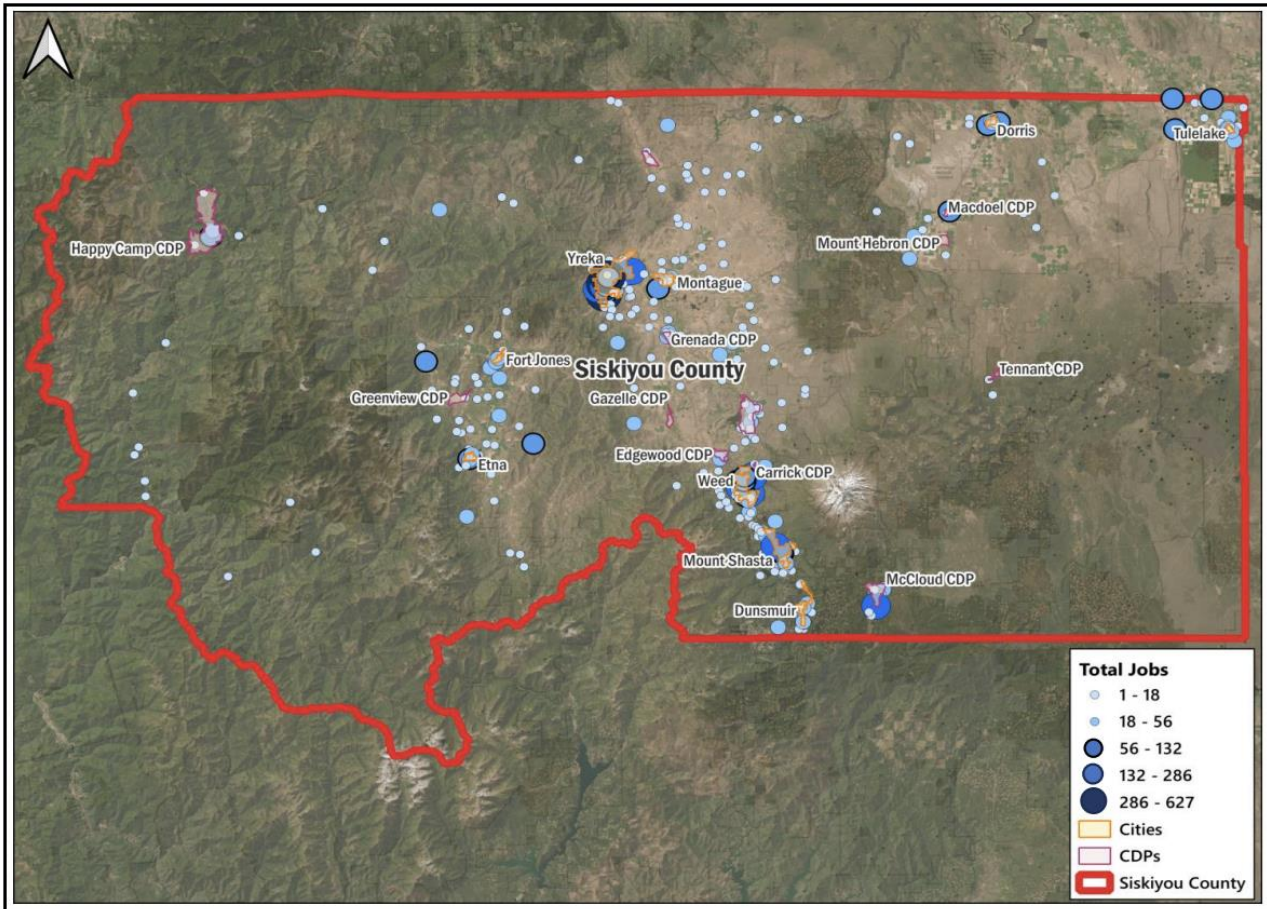
Chart : Siskiyou County Employment by Industry Type



Source: U.S. Census Bureau, Siskiyou County 2025 General Plan

The following map, using data from the U.S. Census Bureau, shows the distribution of jobs throughout Siskiyou County:

Map : Siskiyou County Employment Job Distribution



Source: U.S. Census Bureau, Siskiyou County 2025 General Plan

According to the Siskiyou County 2022-23 budget, the largest source of revenue for Siskiyou County’s General Fund was aid from other government organizations. The following table shows the summary of revenue sources for the Siskiyou County General Fund for the Fiscal Year 2022-23.

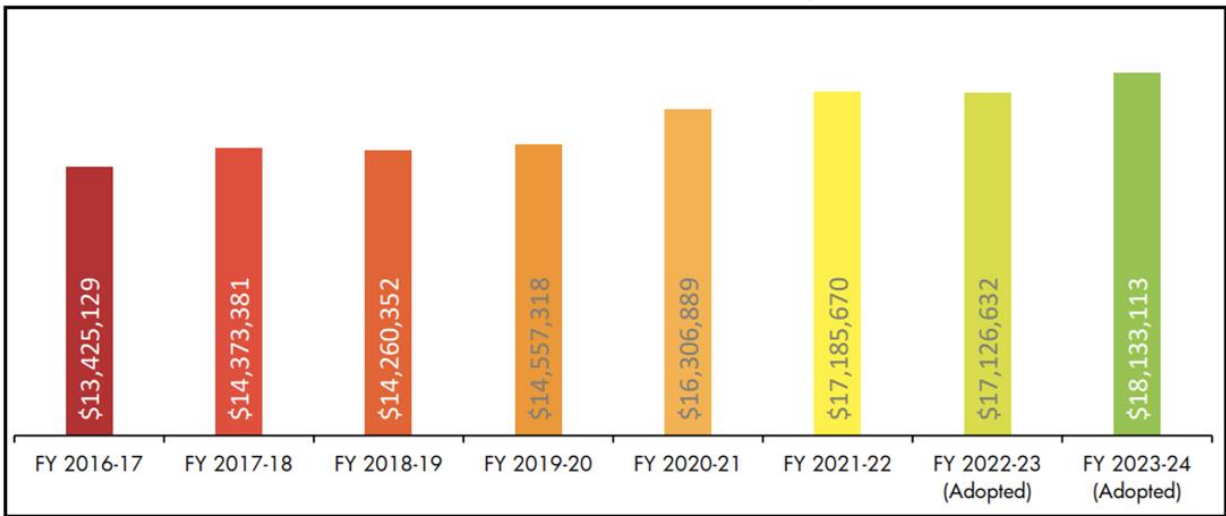
Table : General Fund Revenue Summary, by Type of Worker, 2022

Revenue Source	Amount	Percentage of Total Revenue
Aid from Other Governments	\$19,488,273	31.4%
Other Financing Services	\$17,992,448	29.0%
Taxes	\$17,126,632	27.6%
Charges for Services	\$5,066,344	8.2%
Fines	\$1,263,900	2.0%
Licenses and Permits	\$748,835	1.2%
Other	\$293,948	0.4%

Source: Siskiyou County 2022-2023 budget

Tax revenues have generally risen during the past few years in Siskiyou County, reflecting the relative health of the county’s economy. However, the predicted future decline of Siskiyou County’s population base in the coming years is likely to have an impact on tax revenue. The following chart shows City revenues from taxes from 2016-17 through 2023-2024.

Chart : General Fund Revenue from Taxes, 2016 - 2024



Source: Siskiyou County

Between 2014 and 2022, the number of employed Siskiyou County residents grew by 398 workers, equating to a compounded annual growth rate of 0.3%, lower than 1.3% growth experienced across the state during this period. Siskiyou County saw the greatest job growth in the following industries:

- Transportation, warehousing, and utilities (205 workers added)
- Arts, tourism, recreation, and food services (141 workers added)
- Agriculture and mining (87 workers added).

Data from the California Employment Development Department indicates that in the northern California 10-county region (including Siskiyou County), the largest projected growth rates between 2020 and 2030 are in the following major industry sectors:

- Leisure and hospitality (25.1%)
- Other personal services (14.0%)
- Educational services (private), health care, and social assistance sectors (13.6%)

3.11 Physical Setting and Land Cover

The Siskiyou County region has a complex geologic history of folding, faulting, uplifting, sedimentation, volcanism and erosion. The primary bedrock in Siskiyou County includes igneous, or volcanic, rocks, with an array of surficial alluvial and colluvial deposits. Considerable marble, sandstone and limestone deposits exist throughout the County, many of which have been mined for minerals or road materials. The county features three major geomorphic provinces:

- **Klamath Mountains:** Characterized by rugged topography with jagged peaks and ridges that extend 6,000 to 8,000 feet above sea level. In the western Klamath Range, an irregular drainage pattern is incised into the Klamath peneplain, an uplifted plateau. The uplift has left successive benches exposing gold bearing gravel on the canyon walls. This geomorphic province is considered to be a northern extension of the Sierra Nevada.
- **Cascade Range:** A chain of volcanoes and mountains from Washington, through Oregon and into California. In Siskiyou County, this province is dominated by Mt. Shasta, a glacier covered volcanic peak that rises 14,162 feet above sea level and is the second highest active volcano in the Cascade Range. The broad and relatively flat Medicine Lake Volcano is one of the largest shield volcanoes in the Cascade Range.
- **Modoc Plateau:** A broad volcanic table that ranges from 4,000 to 6,000 feet above sea level. The plateau consists of a thick accumulation of basaltic lava flows and tuff layers and numerous small volcanic cones. The Modoc Plateau is dissected by several north-south fault lines.

With a diverse landscape, the soils in Siskiyou County range from simple to the most complex. Alluvium and terrace deposits, primarily composed of sand, silt, clay and gravel, are prevalent in the lowlands and flat riverine valleys. The intermountain valleys and foothills contain alluvial soils and terrace deposits. The mountainous areas consist of hearty soils from a variety of lithic parent materials, including sedimentary, metamorphic and igneous rocks. Mapping units in the Natural Resources Conservation Service's (NRCS) soil survey for Siskiyou County, Central Part describe the prevailing soils and include information about parent rock material, soil depth, erosion and slope.

Soil erosion in Siskiyou County occurs as a result of intensive land use, wind and water erosion. Erosion may be most severe where urbanization, development, recreational activities, logging and intensive agricultural practices take place. Extreme rainfall events, lack of vegetative cover, fragile soils and steep slopes combine to accelerate erosion. Agricultural crops are subject to the erosive forces of water, and hillside grazing pastures have been strained by reduced root structure due to years of drought conditions. With proper drainage construction and landscaping techniques, these altered soils may return to pre-construction stability and condition.

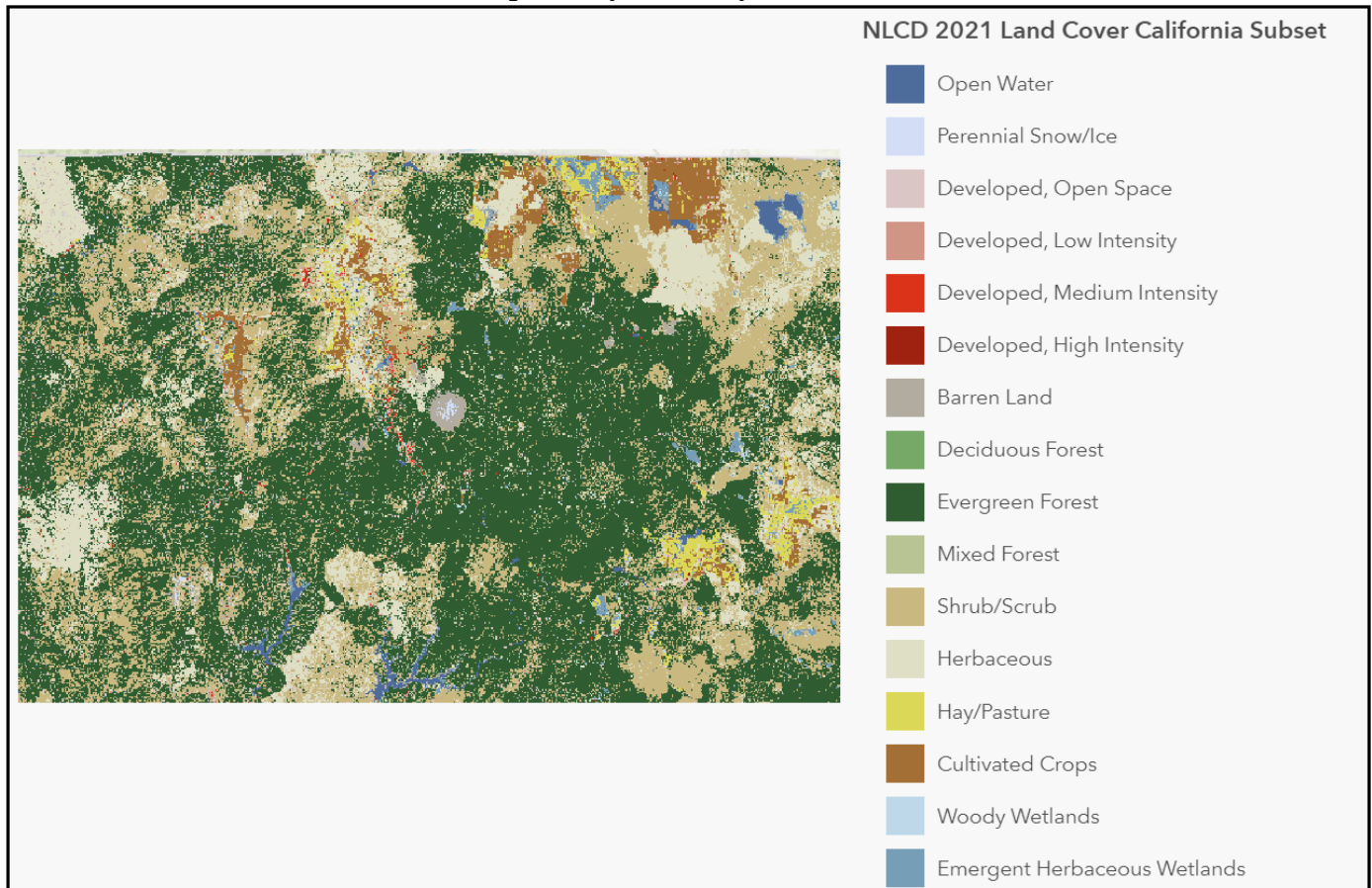
The County is drained by the Sacramento River in the south, the Klamath River in the north and the Salmon River in the west. The Klamath River winds an irregular course from the Cascade Range through the Klamath Mountains. Numerous watercourses drain the snow-capped peaks of the Cascade Range. Lakes, marshes and slow-moving streams meander across the relatively flat Modoc Plateau.

Land use in a region has a profound and lasting impact on future development. The way land is allocated and utilized can shape the economic, social, and environmental aspects of a region for decades. Land use affects that can impact future development include:

- **Economic Development:** Land use decisions influence the location and type of economic activities in a region. Zoning regulations that encourage the development of industrial zones can attract manufacturing businesses, while zoning for commercial and residential areas can promote retail and housing development. These decisions can have long-term implications for job creation, revenue generation, and overall economic health.
- **Transportation and Infrastructure:** Land use planning is closely tied to transportation infrastructure. The location of roads and other transportation facilities is determined in part by land use decisions. Well-planned land use can lead to efficient transportation networks, reducing congestion, and improving mobility. Poorly planned land use, on the other hand, can result in traffic congestion and increased infrastructure costs.
- **Housing and Urbanization:** Land use policies influence the availability and affordability of housing in a region. Zoning regulations, for example, can determine the density of residential areas and the types of housing permitted. Inadequate or restrictive land use policies can lead to housing shortages and higher costs, while well-planned policies can support diverse housing options and affordability.
- **Resilience to Climate Change:** Land use planning plays a critical role in a region's ability to adapt to climate change. Smart land use decisions can reduce vulnerability to natural disasters, such as flooding and wildfires, by avoiding high-risk areas and implementing resilient building codes and infrastructure.
- **Long-Term Costs:** Land use decisions can affect the long-term costs of development. Efficient land use planning can reduce the need for costly infrastructure extensions and maintenance, while inefficient or sprawling development can strain municipal budgets.

As indicated by the following map from the USGS 2021 Nation Land Cover Database, land cover in Siskiyou County consists largely of shrub/scrub and evergreen forests, with no large cities or urban areas and large rural areas:

Map : Siskiyou County Land Cover



Source: USGS 2021 Nation Land Cover Database

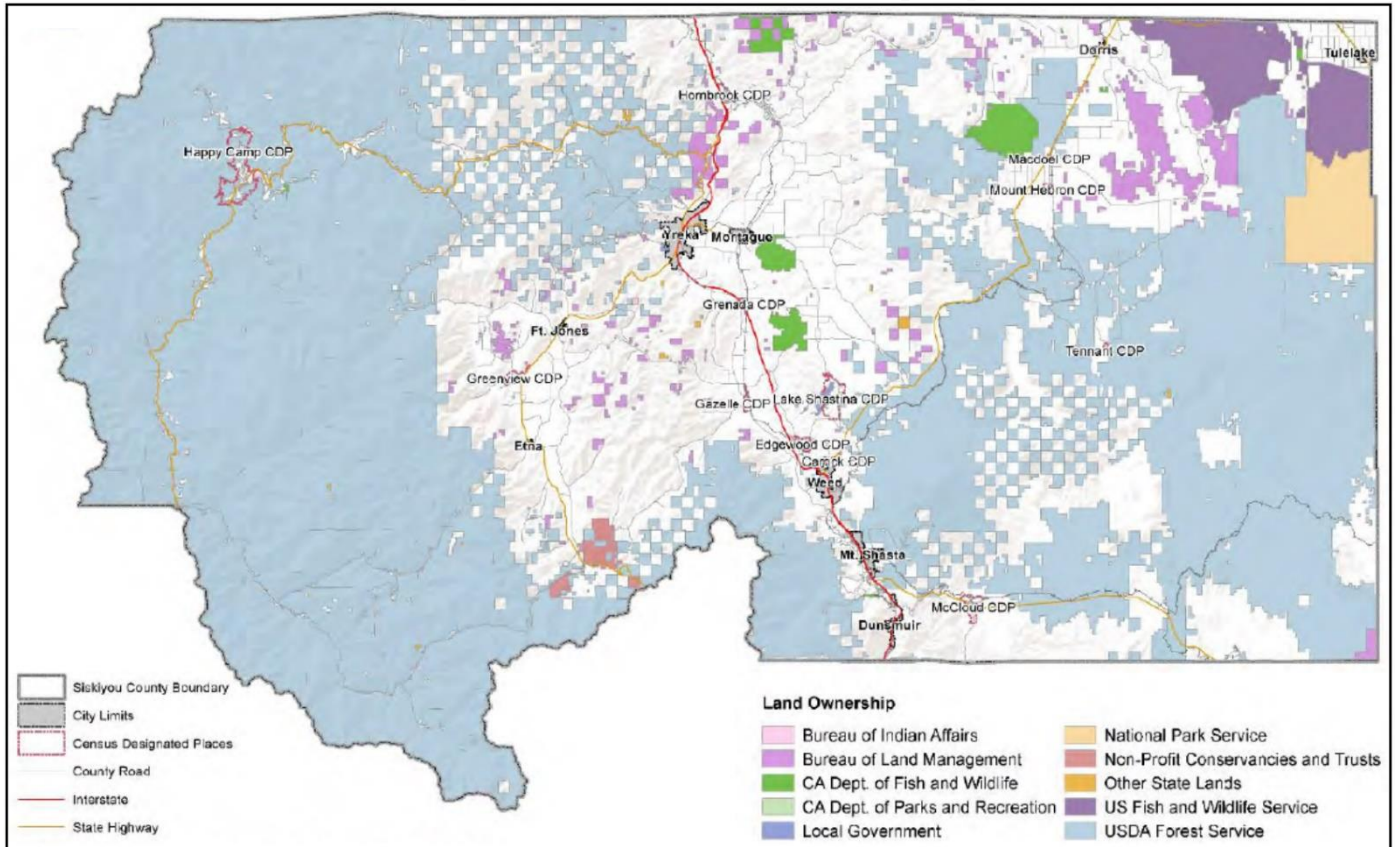
Rural areas tend to retain their rural nature over time, but there are several factors that can influence the evolution of these areas, including:

- **Economic Conditions:** The economic viability of agriculture can vary significantly over time due to factors like crop prices, weather patterns, and changes in agricultural technology. Economic challenges may lead some farmers to sell their land for non-agricultural uses or to consolidate their operations, potentially affecting the rural landscape.
- **Urbanization and Development:** In some cases, rural areas may experience suburbanization or the expansion of nearby urban centers. This can result in residential and commercial development encroaching on agricultural land. However, the extent of this development depends on local zoning and land use regulations.
- **Infrastructure Development:** The construction of new transportation infrastructure, such as highways or railroads, can influence land use patterns. Improved infrastructure may make it easier to transport agricultural products to markets or to access rural areas for development.
- **Government Policies:** Government policies, including agricultural subsidies, land use regulations, and conservation programs, can impact the way rural and agricultural land is used. For example, conservation programs may encourage farmers to preserve land for wildlife habitat rather than development.
- **Local Planning and Zoning:** Local governments play a key role in land use planning and zoning regulations. These policies can determine whether agricultural land can be converted to non-agricultural uses, such as residential or commercial development. Some areas may have strict zoning that preserves agricultural character, while others may allow more flexibility.

- Population Trends: Demographic trends, including population growth or decline, can influence the demand for land in rural areas. If there is an influx of new residents seeking a rural lifestyle, it can drive demand for residential development in formerly agricultural areas.

Property owners are often responsible for implementing mitigation measures to protect their land and structures from natural hazards. The following map indicates landownership within Siskiyou County:

Map: Siskiyou County Land Ownership Map



Source: Siskiyou County General Plan

Information on currently vacant land that is zoned to allow for future development (also known as buildable land) can be used to assess future growth. Data from Cal OES, developed using the LandVision system, indicates that Siskiyou County has 508,754 acres of buildable land. While Siskiyou County has a large amount of buildable land, population and housing data indicate that this land will not be fully developed during the life of this plan. Additionally, based on the available data, it is likely that Siskiyou County and all participating jurisdictions will retain a mostly rural character during the life of this plan.

3.12 Regional Infrastructure Development

Infrastructure repair can have a significant impact on regional development, both positive and negative. The specific effects depend on the scale of the repair projects, the quality of the infrastructure, and the overall economic and social context of the region, and may include:

- Improved Connectivity: Repairing and upgrading infrastructure, such as roads, bridges, and ports, can enhance connectivity within and between regions. This improved connectivity can reduce transportation costs, facilitate the movement of goods and people, and attract businesses and investments to the region.
- Economic Growth: Functional infrastructure supports economic activities. When infrastructure is repaired, it can create jobs directly in the construction and maintenance sectors. Additionally, it can indirectly stimulate

economic growth by providing a reliable foundation for businesses to operate and expand, leading to increased production and trade.

- **Enhanced Productivity:** Well-maintained infrastructure can increase productivity by reducing downtime and transportation delays. This, in turn, can make regional industries more competitive and efficient.
- **Attracting Investment:** Regions with modern and well-maintained infrastructure are often more attractive to investors. Businesses are more likely to invest in regions with reliable transportation, utilities, and communication networks, as it reduces operational risks and costs.
- **Quality of Life:** Infrastructure repair can enhance the quality of life for residents by providing access to essential services such as clean water, sanitation, healthcare, and education. This can contribute to improved human development indicators and overall well-being.
- **Resilience and Disaster Mitigation:** Infrastructure repair can include upgrades to make infrastructure more resilient to natural disasters and climate change impacts. This can help protect communities and assets and reduce the long-term costs of recovery and reconstruction.
- **Social Equity:** Infrastructure repair can address disparities in access to essential services. It can benefit marginalized communities by providing them with equal access to transportation, utilities, and public facilities.

However, it is important to note that there can be negative impacts as well, including:

- **Disruption During Construction:** Repair projects can disrupt communities and businesses during the construction phase, leading to short-term challenges.
- **Costs and Budget Constraints:** Large-scale infrastructure repair projects can be costly, and they may strain regional budgets or lead to increased taxes or debt.
- **Environmental Concerns:** If not done carefully, infrastructure repair projects can have adverse environmental impacts, such as habitat disruption or water pollution.

Recent significant state, county, and local infrastructure projects within Siskiyou County include:

- From 2016 to 2021, an average of 45 new homes were built each year, with over 90% as single-family homes.
- From 2022 to 2027, an average of 60 new homes per year are expected to be constructed (largely single-family). However, approximately half of these will be homes rebuilt due to wildfires.
- The \$26,000,000 No Place like Home 50-unit affordable housing development is currently under construction in Yreka.
- Currently under construction, the Siskiyou County Jail Expansion project consists of a new two-story, 24,000 square foot facility that includes a new housing tier and 4,000 square feet of exterior yard space.
- Completed in 2021, the Siskiyou County Superior Courthouse is a 67,459 square foot two story, five-courtroom building.
- Currently underway, the Weed Airport is conducting a taxiway and apron reconstruction project
- In progress, an electrical transmission cable 22 miles south of Tulelake on Harvey Jones Butte is being repaired.

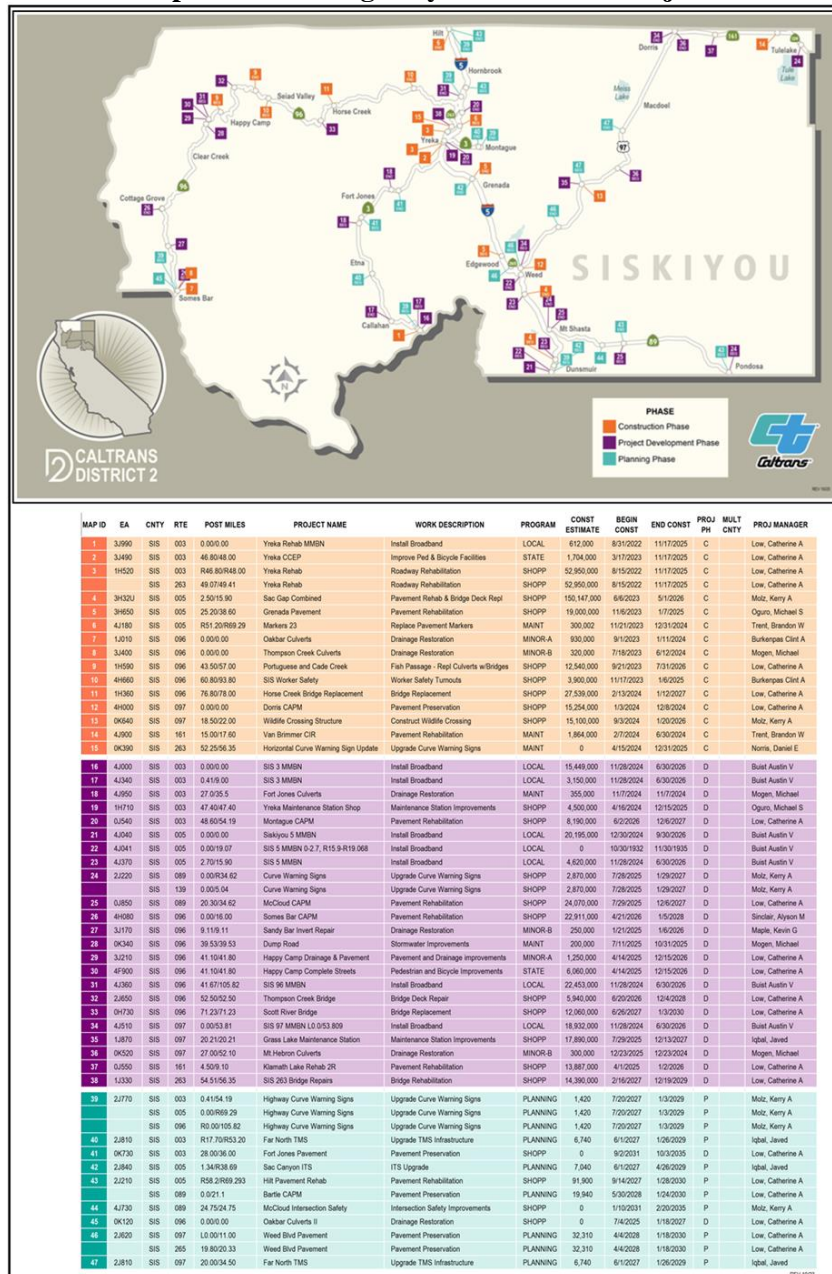
Road maintenance projects play a critical role in hazard mitigation by improving the resilience and functionality of transportation infrastructure. Consistent repair and maintenance can help mitigate against hazards by:

- **Reduced Flooding Risk:** Regular maintenance, such as cleaning and repairing drainage systems, helps prevent flooding on roadways. Properly maintained culverts, ditches, and stormwater systems ensure that water can flow away from roads, reducing the risk of water damage and road erosion.
- **Strengthening Infrastructure:** Road maintenance projects often include reinforcing bridges, overpasses, and retaining walls to withstand seismic activity, heavy rain, and other hazards.
- **Slope Stabilization:** Road maintenance projects often include measures to stabilize slopes and prevent landslides that can block roads and isolate communities. This includes planting vegetation, installing retaining walls, and improving drainage.

- **Erosion Control:** Implementing erosion control measures such as riprap, geotextiles, and retaining structures helps protect roadways from erosion caused by heavy rains and flooding.
- **Resilient Design:** Maintenance projects can incorporate resilient design features that account for climate change impacts, such as increased precipitation, higher temperatures, and more frequent extreme weather events. This includes elevating roadways, improving drainage systems, and using materials that can withstand changing conditions.
- **Monitoring and Adaptation:** Ongoing maintenance allows for continuous monitoring and adaptation of road infrastructure to climate change conditions, ensuring long-term resilience.

The California Department of Transportation (Caltrans) manages approximately 320 miles of highways in Siskiyou County, including eight state and interstate routes. The following map and associated table, from Caltrans, indicates current and future maintenance projects:

Map : Caltrans Highway Maintenance Projects



Source: Caltrans

Additionally, the Siskiyou County Public Works Department is currently completing a rehabilitation project on Big Springs Road.

3.13 Agricultural Data

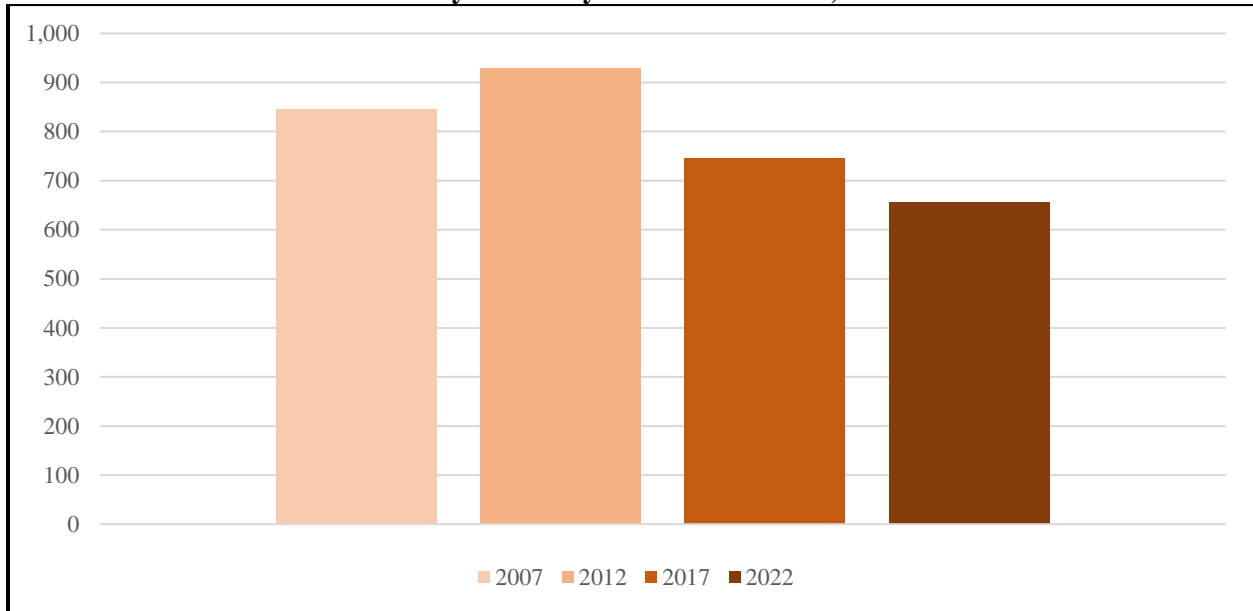
Agriculture forms a large part of both the economic and social fabric of Siskiyou County. USDA National Agricultural Statistics Service data from 2007, 2012, 2017, and 2022 (the latest available data) was used to develop an understanding of the agricultural footprint within the county, as detailed in the following table and charts:

Table : Siskiyou County Regional Agricultural Data

Year	2007	2012	2017	2022
Number of Farms	846	929	745	655
Total Farm Acreage	597,534	722,855	687,313	672,775
Market Value of Products Sold	\$136,392,000	\$233,096,000	\$192,435,000	\$295,726,000
Value of Machinery and Equipment	\$94,449,978	\$113,320,000	\$106,318,000	\$130,793,000
Value of Lands and Buildings	\$1,766,360,000	\$1,586,711,000	\$2,828,476,000	\$4,287,179,000

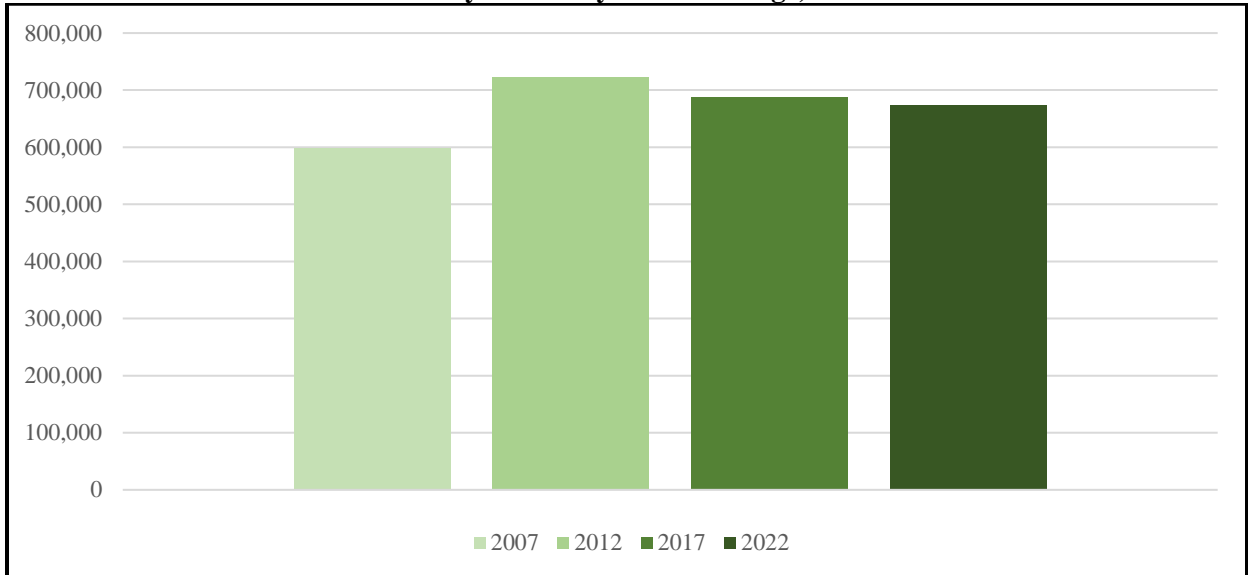
Source: USDA National Agricultural Statistics Service

Chart : Siskiyou County Number of Farms, 2007-2022



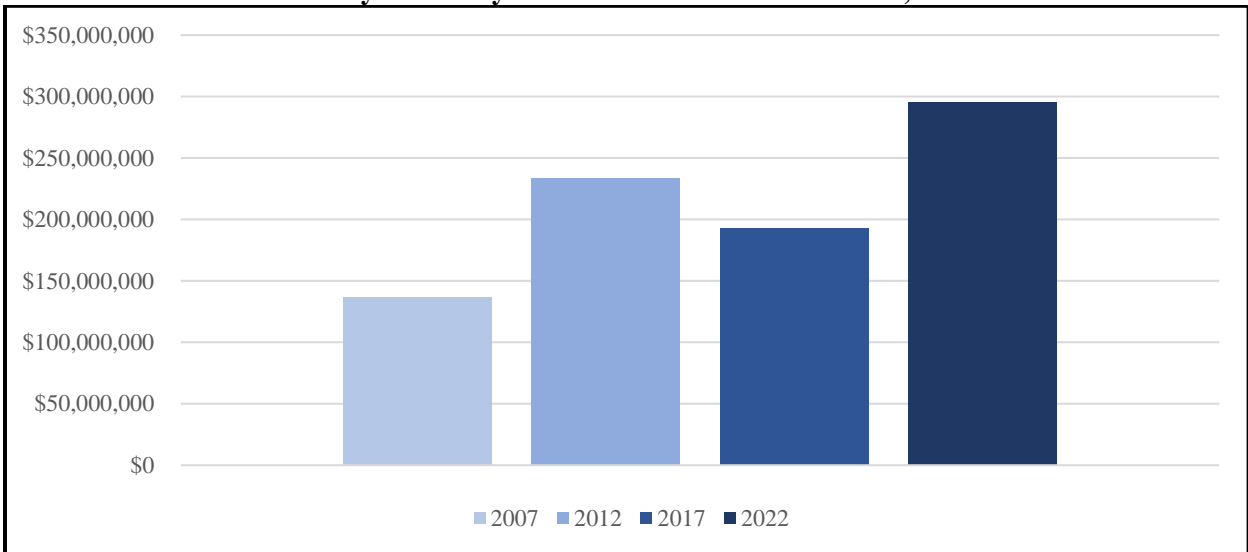
Source: USDA National Agricultural Statistics Service

Chart : Siskiyou County Farm Acreage, 2007-2022



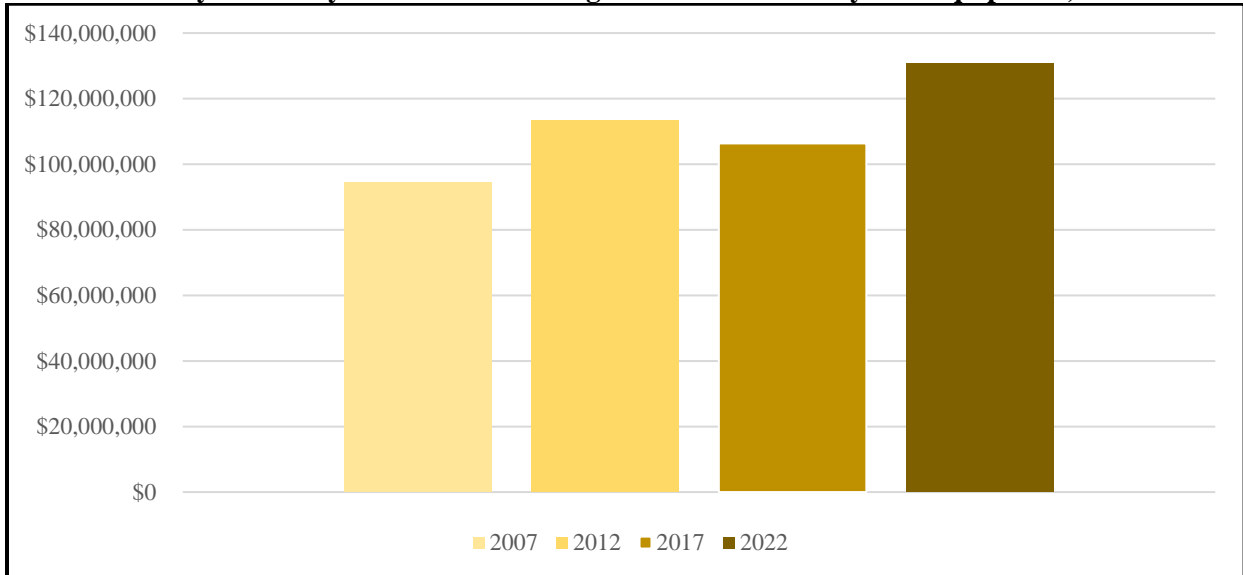
Source: USDA National Agricultural Statistics Service

Chart : Siskiyou County Market Value of Products Sold, 2007-2022



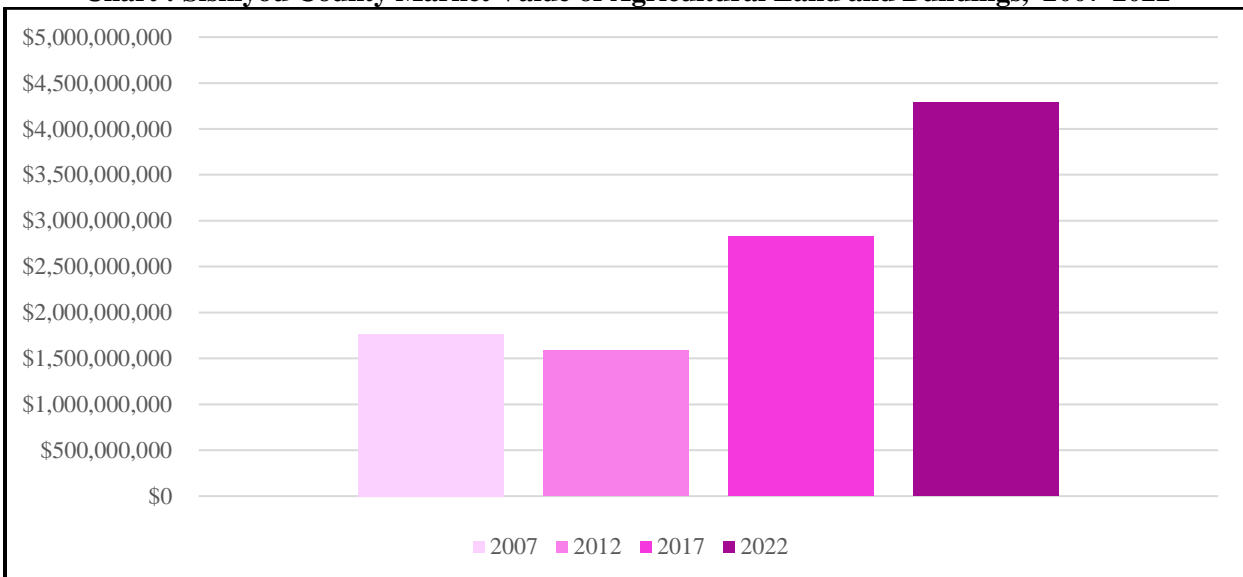
Source: USDA National Agricultural Statistics Service

Chart : Siskiyou County Market Value of Agricultural Machinery and Equipment, 2007-2022



Source: USDA National Agricultural Statistics Service

Chart : Siskiyou County Market Value of Agricultural Land and Buildings, 2007-2022



Source: USDA National Agricultural Statistics Service

3.14 Regional Climate

In general, Siskiyou County’s climate is characterized by warm, dry summers and cool, wet winters typical of Mediterranean climates. However, since Siskiyou County is at the northern extreme of the Mediterranean climate zone and is in a mountainous region, winters tend to be colder than the average Mediterranean region. The geographic diversity of Siskiyou County contributes to a broad range of regional micro-climates. Elevation differences, along with distance from the Pacific Ocean, which is the main source of precipitation, account for most of the variability in Siskiyou County’s climate. The alpine areas around Mount Shasta and other mountainous areas receive considerable snow in the winter. In contrast, the valleys receive only a light dusting of snow in winter.

Due to the influence of coastal air masses, the western portion of Siskiyou County receives the most moisture and it becomes progressively drier toward the east. High elevation and proximity to the Pacific Ocean results in the Klamath Mountains receiving an average of 40 to 60 inches per year in the valley regions and from 80 to 100 inches per year in the higher elevations. The Shasta Valley lies in the rain shadow of the Klamath Range, so on average the valley receives less than 20 inches each year. As winter storms move eastward with the prevailing westerlies, they reach the Cascade

Range, where uplift results in relatively high precipitation (approximately 30 to 60 inches per year). As coastal storms pass over the Coast Range (west of Siskiyou County) and the ranges in the County, much of the moisture precipitates out, so the Modoc Plateau in the eastern county receives little precipitation, about 10 to 20 inches each year.

Due to the distance from the moderating influence of the Pacific Ocean, the Modoc Plateau has more extreme temperature ranges and much colder winter temperatures. This eastern, interior part of Siskiyou County is better classified as having a steppe climate rather than a Mediterranean climate.

3.15 Potential Impacts of Climate Change

For hazards related to weather patterns, climate change may cause significant changes in patterns and event frequency. There is a scientific consensus that climate change is occurring, and recent climate modeling results indicate that extreme weather events may become more common. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events, including:

- Longer and more intense heat waves
- An increased risk of wildfires
- Higher wind speeds
- Greater rainfall intensity, but less rainfall frequency

California's Fourth Climate Change Assessment was reviewed to determine the potential effects of climate change on Siskiyou County (part of the North Coast region). The report indicates that major impacts could include:

- Average annual maximum temperatures are likely to increase by 5-9 °F by 2100, with interior regions such as Siskiyou County experiencing the greatest degree of warming.
- Winter season temperatures are expected to increase markedly, with a 5–7°F increase by 2050 and 8–11°F increase by 2100.
- Annual precipitation is not expected to significantly change. However, precipitation will likely be delivered in more intense rainfall events.
- There will be a higher likelihood of extreme wet and extreme dry years.
- An increase in intense rainfall events will increase the frequency and extent of flooding.
- Changes to streamflow patterns are expected, with flows expected to decline in dry seasons and increase in wet seasons.
- Less precipitation will fall as snow, and the total snowpack will decrease markedly.
- Data suggests a longer fire season, with increased wildfire frequency and an expansion of susceptible areas.
- Temperature increases, significantly lower snowpack, and extreme dry years (drought) will likely extend the wildfire season.

Additionally, Cal Adapt's Local Climate Snapshot Tool estimates that by the end of the century, under high emissions scenarios, Siskiyou County can expect the following changes:

- The annual average maximum temperature is expected to reach highs of 68.7 degrees Fahrenheit, up 8.9 degrees Fahrenheit from the baseline average of 59.8 degrees Fahrenheit.
- Extreme heat days, or days when the maximum temperature is above 91.4 degrees Fahrenheit, are expected to increase from four days per year to 53 days per year by the end of the century.
- Projected precipitation levels are expected to show increasing levels of variability.
- Due to the high variability of precipitation events, flooding risks are likely to increase.
- Due to the high variability of precipitation events, landslides occurrences are expected to increase.
- With temperatures increasing significantly by the end of the century, drought events are expected to worsen.

The average projected annual burned area is projected to increase in Northern California by over 50,000 acres by the end of the century as a result of climate change-related impacts.

Section 4 –Capability Assessment

4.1 Introduction

This section of the plan discusses the current capacity of Siskiyou County and participating jurisdictions to mitigate the effects of identified hazards. A capability assessment is conducted to determine the ability to execute a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects.

This capability overview documents codes, ordinances, programs, policies, and funding mechanisms for all participating jurisdictions. All listed capabilities documented in the previous LHMP were reviewed for relevance and updated to reflect the current environment, as necessary. Additionally, any codes, ordinances, programs, policies, or funding mechanisms that are no longer applicable, are outdated, or are no longer in existence have been removed.

A thoughtful review of capabilities will assist in determining gaps that could limit current or proposed mitigation activities, or potentially aggravate vulnerability to an identified hazard. Additionally, a capability assessment can detail current successful mitigation actions that should continue to receive support.

4.2 Administrative and Technical Capabilities

The administrative and technical functions of Siskiyou County and participating jurisdictions are critical in the effective implementation of hazard mitigation strategies. These functions ensure that the jurisdiction is prepared to reduce risks associated with natural and human-made hazards and can efficiently identify, integrate, and manage mitigation projects.

Siskiyou County has a dedicated staff across multiple departments for hazard mitigation roles including planning, engineering, and mapping. Additionally, the county has numerous communication channels available, including websites and social media platforms, and a variety of trained Public Information Officers and general staff to disseminate hazard mitigation information to all stakeholders and the public. The staffing capabilities of participating jurisdictions vary, with many having small, but dedicated teams.

The following table details Siskiyou County and participating jurisdiction departments and positions and their roles in supporting hazard mitigation planning:

Table : Departments Supporting Mitigation Planning

Department or Position	Hazard Mitigation Roles
Governing Council	<ul style="list-style-type: none"> • Provides adoption resolution for LHMP. • Approves ordinances and bylaws and facilitates capital improvements budget.
Building Department	<ul style="list-style-type: none"> • Enforces building codes that enhance structural resilience to hazards. • Conducts inspections and issues permits ensuring compliance.
Emergency Management Department*	<ul style="list-style-type: none"> • Develops, implements, and updates the LHMP. • coordinates between various departments, agencies, and external stakeholders to ensure a cohesive approach to hazard mitigation. • Provides public education on matters concerning hazard mitigation. • Coordinates hazard grant application process. • Involving local businesses, non-profits, and residents in the planning process to foster a collaborative approach to mitigation. • Supports the planning and implementation of mitigation projects.
Finance Department	<ul style="list-style-type: none"> • Allocates funding for hazard mitigation projects. • Manages grants and other financial resources to support mitigation efforts.
Fire Department	<ul style="list-style-type: none"> • Wildfire mitigation through controlled burns and fuel management. • Outreach programs to educate the public on fire safety, such as how to prevent home fires, create defensible spaces around properties.

Table : Departments Supporting Mitigation Planning

Department or Position	Hazard Mitigation Roles
	<ul style="list-style-type: none"> Community planning to create defensible spaces and ensure buildings are more fire-resistant
Geographic Information System (GIS)	<ul style="list-style-type: none"> Provides critical data and mapping services for hazard identification and risk assessments. Utilizes advanced modeling techniques to predict the impact of various hazards on the community. Supports the planning and implementation of mitigation projects.
Health Department	<ul style="list-style-type: none"> Addresses public health risks associated with identified hazards. Plans for emergency medical response and disease control measures. Monitors environmental hazards (e.g., water contamination, hazardous materials).
Parks Department	<ul style="list-style-type: none"> Manage open space and wetlands for flood control. Manage vegetation in parks to reduce fire hazards. Provision of green spaces to help mitigate the urban heat island effect by cooling surrounding areas through shade and evapotranspiration
Planning Department	<ul style="list-style-type: none"> Enforces zoning and land-use policies to minimize hazard risks. Integrates hazard mitigation into comprehensive and capital improvement plans.
Public Works Department	<ul style="list-style-type: none"> Manages infrastructure resilience projects (e.g., road improvements, drainage systems).

Note: * Role may be taken by local fire or police department, and not dedicated emergency management department

The following table indicates if a participating jurisdictions have the above noted departments:

Table: Participating Jurisdiction Departments

Jurisdiction	Council	Building	Emergency Management	Financial	Fire	GIS	Health	Parks	Planning	Public Works
Siskiyou County	x	x	x	x		x	x		x	x
Dorris	x	x	x	x	x				x	x
Dunsmuir	x	x	x	x	x	x		x	x	x
Etna	x	x	x	x	x			x		x
Fort Jones	x	x	x	x	x				x	x
Happy Camp CSD	x	x	x	x				x		x
Lake Shastina CSD	x	x	x	x	x					x
McCloud CSD	x	x	x	x				x		x
Montague	x	x	x	x	x			x	x	x
Mt. Shasta	x	x	x	x	x				x	x
Tulelake	x	x	x	x	x					x
Weed	x	x	x	x	x				x	x
Yreka	x	x	x	x	x	x		x	x	x

4.3 Regulation of Development

The regulation of development plays a crucial role in helping a community become more resilient in the face of various hazards. Effective regulation of development contributes to community resilience through:

- Risk Reduction: Regulations guide land use and construction practices, ensuring that they provide strong protection against hazards.

- **Public Safety:** Building codes and land-use regulations establish minimum safety standards for construction, including structural integrity, fire resistance, and the use of resilient materials.
- **Infrastructure Resilience:** Regulations may require infrastructure improvements, such as the construction of resilient roads, bridges, utility systems, and drainage systems. This strengthens a community's ability to withstand hazards, ensures the continued operation of critical services, and aids in recovery.
- **Floodplain Management:** Regulations in flood-prone areas can mandate elevation requirements for new construction, ensuring that structures are built above the base flood elevation. This minimizes flood damage, reduces the need for costly post-disaster repairs, and protects property values.
- **Land Use Planning:** Effective land-use planning helps communities avoid inappropriate development in areas at high risk of hazards.
- **Community Awareness:** Public education and outreach can be incorporated into regulations, requiring communities to inform residents about local hazards, evacuation routes, and preparedness. Informed residents are more likely to take protective measures and respond effectively to disasters.

The following sections provide further details on building codes, zoning ordinances, and floodplain management.

Building Codes

In California, building codes are enforced through a combination of state and local regulations. The California Building Standards Code (Title 24) sets statewide standards for construction, which local governments may adopt and modify to address regional needs. Enforcement is carried out by local building departments, which review plans, issue permits, and conduct inspections to ensure compliance. Violations can result in fines, stop-work orders, or mandatory corrections. Local agencies also work with state agencies to ensure safety and sustainability in building practices.

Building codes establish general minimum construction standards and are enforced through authorized local building inspection agencies and inspectors. Building codes provide for:

- **Life Safety:** Building codes include provisions for fire safety, emergency egress, and the use of fire-resistant materials.
- **Accessibility and Life Support:** Building codes incorporate accessibility standards, ensuring that buildings are designed to accommodate all individuals. This is crucial during and after disasters when people with mobility issues may require assistance. Accessible features also benefit emergency responders and support recovery efforts.
- **Retrofitting Existing Buildings:** Building codes may require the retrofitting of older structures to meet modern safety standards.
- **Public Awareness:** Building codes promote public awareness of hazards and the importance of resilient construction. This can lead to informed decision-making by property owners, builders, and developers, resulting in safer structures.

Key hazard resistant building code provisions found in current building codes include:

- **Structural Design Requirements:** Provides requirements for the structural design of buildings to ensure their resistance to various hazards, including earthquakes, high winds, and snow loads. These requirements are aimed at enhancing the overall structural integrity and safety of buildings.
- **Wind Design Requirements:** Provides specific provisions for wind design, considering the geographical location of the structure. Wind loads are calculated based on factors such as wind speed, exposure, and building height.
- **Seismic Design Requirements:** Incorporates seismic design provisions to address earthquake hazards. The code includes seismic design categories and requirements for the design and construction of buildings in seismic-prone regions.

- Flood-Resistant Design Requirements: Includes provisions related to flood-resistant design, particularly in areas prone to flooding. It may specify elevation requirements, construction materials, and other considerations to reduce the risk of flood damage. The vast majority of the regulations required by the NFIP are included within the International Building Code and the International Residential Code.
- Fire-Resistant Construction Requirements: Requirements for fire-resistant construction are included to mitigate the risk of fire hazards. This includes specifications for fire-resistant materials, assemblies, and building features.
- Material and Construction Standard Requirements: Establishes standards for building materials and construction methods to ensure the durability and safety of structures, considering various hazards.

Additionally, analysis indicates that adopting the latest building code could provide a savings of \$11 per \$1 invested. Building codes have greatly improved society’s disaster resilience, while adding only about 1% to construction costs relative to 1990 standards. The greatest benefits accrue to communities using the most recent code editions.

For Siskiyou County, the enforcement of building codes is overseen by the Building Department, which is part of the Community Development Department. This department is responsible for reviewing building plans, issuing permits, and conducting inspections to ensure compliance with the California Building Standards Code and any local amendments. The department works to ensure that all construction meets safety and environmental standards.

California Building Standards Commission adopts updated versions of the amended model Building Codes called the California Code of Regulations Title 24 every three years. Effective January 1, 2023, the following Building Codes are currently in effect and must be consulted in the preparation of your construction plans.

- 2022 California Building Administrative Code, Title 24, Part 1
- 2022 California Building Code, Title 24, Volumes 1 and 2, Part 2
- 2022 California Residential Code, Title 24, Part 2.5
- 2022 California Electrical Code, Title 24, Part 3
- 2022 California Mechanical Code, Title 24, Part 4
- 2022 California Plumbing Code, Title 24, Part 5
- 2022 California Energy Code, Title 24, Part 6
- 2022 California Historical Code, Title 24, Part 8
- 2022 California Fire Code, Title 24, Part 9
- 2022 California Existing Building Code, Title 24, Part 10
- 2022 California Green Building Standards Code, Title 24, Part 11
- 2022 California Referenced Standards Code, Title 24, Part 12
- 1997 Edition Uniform Housing Code, published by the International Conference of Building Officials (ICBO)
- 1997 Uniform Code for the Abatement of Dangerous Buildings, published by the International Conference of Building Officials (ICBO)
- 1997 Uniform Administrative Code, published by the International Conference of Building Officials (ICBO)
- 1997 Uniform Sign Code, published by the International Conference of Building Officials (ICBO)
- Title 25, Housing and Community Development

In general, Siskiyou County and all participating jurisdictions require building permits for the following activities:

- Construction
- Manufactured home placement
- New Utility service/meter relocation/service upgrade
- Grading-Solar panels
- Accessory structures
- Additions

- Roofs
- Wells
- Demolition

As part of this planning effort, both Siskiyou County and participating jurisdiction personnel charged with regulating or overseeing development were given the opportunity to review and comment of the elements of this plan. Please note that not all counties have building or zoning departments. The following personnel involved in regulating development were identified:

Table : Participating Jurisdiction Building Department Representatives

Jurisdiction	Name	Title
Siskiyou County	Glenn Shockency	Deputy Director
Dorris	John Pemberton (Contracted)	Building Inspector/Code Enforcement
Dunsmuir	James McIntyre (Contracted)	Building Inspector
Etna	Dan Burbank	Director of Public Works
Fort Jones	Glenn Shockency (County)	Deputy Director
Happy Camp CSD	Glenn Shockency (County)	Deputy Director
Lake Shastina CSD	Glenn Shockency (County)	Deputy Director
McCloud CSD	Glenn Shockency (County)	Deputy Director
Montague	Vacant	Code Enforcement Officer
Mt. Shasta	Leo DePaola	Building Official
Tulelake	John Pemberton (Contracted)	City Building Inspector
Weed	John Pemberton (Contracted)	Building Inspector/Code Enforcement
Yreka	James McIntyre	Building Inspector

The following details the relevant municipal code sections for building codes for participating jurisdictions:

- Siskiyou County Code of Ordinances: Title 9: Building Regulations.
- Dorris Municipal Code Title 15: Buildings and Construction
- Dunsmuir Code of Ordinances Title 15: Buildings and Construction
- Etna Municipal Code Title 15: Buildings and Construction
- Fort Jones Code of Ordinances: Buildings and Construction
- Montague Municipal Code Title 15: Buildings and Construction
- Tulelake Municipal Code Title 15: Buildings and Construction
- Mt. Shasta Municipal Code Title 15: Buildings and Construction
- Weed Code of Ordinances Title 16: Buildings and Construction
- Yreka Code of Ordinances Title 11: Buildings and Construction

Zoning Ordinances

Zoning ordinances in Siskiyou County govern land use, development, and building requirements. These ordinances work by dividing the land into different zoning districts and establishing rules and guidelines for land use, building placement, density, and setback within the zoning districts. In general, zoning ordinances establish:

- **Zoning districts:** Areas designated for specific types of land use, such as residential, commercial, industrial, agricultural, mixed-use, or special districts.
- **Land usage within a zoning district:** Specifications as to which activities, buildings, and operations are permitted in each zoning district.
- **Enforcement:** Zoning ordinances are enforced by the local building department or zoning enforcement officers.

Zoning is the traditional, and most common, tool available to local jurisdictions to control the use of land. Zoning is used to promote health, safety, and the general welfare of the community. Zoning is used to dictate the type of land use and to set minimum specifications for use such as lot size, building height and setbacks, and density of population.

Zoning ordinances play a significant role in enhancing hazard resilience for communities and can help reduce vulnerability to various natural and man-made hazards by regulating land use and development practices. In Siskiyou County, locally instituted and enforced zoning ordinances provide for:

- **Land Use Planning:** Zoning ordinances designate land use zones within a community, ensuring that certain areas are reserved for particular uses. This can prevent the construction of critical infrastructure, homes, or businesses in high-risk zones, such as floodplains or wildfire-prone areas.
- **Setback Requirements:** Zoning ordinances often mandate specific setbacks, which are distances between structures and property lines or natural features. These setbacks can help prevent buildings from being too close to potential hazards, potentially reducing the risk of damage.
- **Building Height and Design Standards:** Zoning codes can establish building height limits to reduce exposure to certain hazards. Design standards, including materials and construction methods, can be specified to make structures more resilient.
- **Floodplain Management:** Many zoning ordinances incorporate floodplain regulations, which dictate where and how buildings can be constructed within flood-prone areas. These regulations may require buildings to be elevated, use flood-resistant materials, or include openings to allow floodwater to pass through.
- **Wildfire Mitigation Zones:** In regions susceptible to wildfires, zoning ordinances can establish wildfire mitigation zones with specific requirements for defensible space, fire-resistant landscaping, and building materials to reduce the risk of wildfires spreading to structures.

Properly applied, zoning restriction and historic preservation are some of the most effective hazard mitigation tools available against a wide variety of hazards.

The following details the relevant municipal code sections for building codes for Siskiyou County and participating jurisdictions:

- Siskiyou County Code of Ordinances: Title 10: Planning and Zoning.
- Dorris Municipal Code Title 18: Zoning
- Dunsmuir Code of Ordinances Title 17: Zoning
- Etna Municipal Code Title 17: Zoning
- Fort Jones Code of Ordinances Title 18: Zoning
- Montague Municipal Code Title 17: Zoning
- Mt. Shasta Municipal Code Title 18: Zoning
- Tulelake Municipal Code Title 17: Zoning
- Weed Code of Ordinances Title 18: Zoning
- Yreka Code of Ordinances Title 16: Zoning

Floodplain Management Ordinances

Floodplain ordinances and management are one of the most effective hazard mitigation tools available against flooding. Local floodplain ordinances, required for NFIP participants, are often used to prevent inappropriate development in floodplains and to reduce flood hazards. In general, they allow the jurisdiction to:

- Minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage.
- Prevent and minimize loss of life, injuries, and property damage in flood hazard areas.
- Promote the public health, safety and welfare of citizens in flood hazard areas.

- Manage planned growth.
- Grant permits for use in development within special flood hazard areas that are consistent with the community ordinance and the NFIP under 44 CFR 60.3.

The NFIP floodplain management regulations work alongside local building codes by providing specific flood-related requirements that must be met in addition to general building code standards. In NFIP communities, when constructing or substantially improving a structure in a Special Flood Hazard Area, the structure must be elevated to or above the Base Flood Elevation, which is a requirement imposed by the NFIP's regulations.

The following details the relevant municipal code sections for floodplain management for Siskiyou County and participating jurisdictions. Please note that not all participating jurisdictions have floodplain management codes or ordinances:

- Siskiyou County Code of Ordinances Title 10, Chapter 10: Flood Damage Prevention
- Dunsmuir Code of Ordinances Title 19: Flood Damage Prevention
- Etna Municipal Code Title 14: Flood Damage Prevention
- Fort Jones Code of Ordinances Chapter 18.56: Flood Damage Prevention
- Montague Municipal Code Chapter 15.16: Flood Damage Prevention
- Weed Code of Ordinances Chapter 16.20: Floodplain Management
- Yreka Code of Ordinances Chapter 16.12.510: Floodplain

Additionally, the following State of California Assembly Bills apply to floodplain management:

- Assembly Bill 70: Flood Liability: A city or county may be required to partially compensate for property damage caused by a flood if it unreasonably approves new development in areas protected by a State flood control project.
- Assembly Bill 162: Flood Planning: Cities and counties must address flood-related matters in the land use, conservation, safety, and housing elements of their general plans.

Wildfire Management Ordinances

Currently, homeowners in Siskiyou County are encouraged, but not required, by Siskiyou County or participating jurisdiction code or ordinance to maintain defensible space around their properties, with the exception of the City of Dunsmuir. This includes removing dead plants, clearing low branches, spacing tree crowns, and using fire-resistant materials in home construction. These measures help reduce the likelihood of homes igniting during a wildfire.

The following details the relevant municipal code section for wildfire management for the City of Dunsmuir. This section provides for the removal of hazardous vegetation and combustible material from improved and unimproved properties situated in the city and outlines defensible space requirements:

- Dunsmuir Code of Ordinances Chapter 8.05: Hazardous Vegetation and Combustible Material Abatement

The State of California has adopted defensible space requirement. Defensible space laws and building codes for the State of California outline the minimum standards, but the requirements may vary depending on factors such as proximity to wildland areas, slope steepness, the presence of combustible materials on the property, home hardening measures, and local defensible space ordinances. The following California regulations relate to wildfire defensible space requirements:

- Public Resource Code § 4291
- 14 California Code of Regulations § 1299.02
- 14 California Code of Regulations § 1299.03
- Assembly Bill 3074 (Full enforcement on new construction anticipated to be in 2025, and full enforcement on existing structures anticipated to be in 2026).

Additionally, the following State of California Assembly Bills and Senate Bills are related to wildfire management and mitigation:

- Assembly Bill 38 provides mechanisms to develop best practices for community-wide resilience against wildfires through home hardening, defensible space, and other measures.
- Assembly Bill 1823 facilitates fuel reduction and other forest health projects.
- Assembly Bill 9: Fire safety: Fire Adapted Communities: Wildfire Hazard Establishes the Regional Forest and Fire Capacity Program to support regional leadership to build local and regional capacity and develop, prioritize, and implement strategies and projects that create fire adapted communities and landscapes by improving watershed health, forest health, community wildfire preparedness, and fire resilience.
- Assembly Bill 38: Fire safety: Low-Cost Retrofits: Regional Capacity Review: Wildfire Hazard Directs the California Natural Resources Agency (CNRA) to review the regional capacity of each county that contains a very high fire hazard severity zone and establishes a comprehensive wildfire mitigation and assistance program.
- Assembly Bill 380: Forestry: Priority Fuel Reduction Projects: Requires CAL FIRE to identify priority fuel reduction projects annually and exempts the identified priority fuel reduction projects from certain legal requirements.
- Assembly Bill 497: Forestry and Fire Protection: Local Assistance Grant Program: Fire Prevention Activities: Street and Road Vegetation Management: Appropriates funds for local assistance grants for fire prevention activities with priority for projects that manage vegetation along streets and roads to prevent the ignition of wildfire.
- Assembly Bill 575: Civil Liability: Prescribed Burning Activities: Gross Negligence: Provides that a private entity engaging in a prescribed burning activity that is supervised by a person certified as burn boss is liable for damages to a third party only if the prescribed burning activity was carried out in a grossly negligent manner.
- Assembly Bill 642: Wildfires: Makes changes to support cultural and prescribed fire, including the creation of a Cultural Burning Liaison at CAL FIRE, and requires a proposal for creating a prescribed fire training center.
- Government Code Section 65302.5: Any county that has State Responsibility Areas or a very high fire hazard severity zone within its boundaries must submit a copy of the proposed safety element of a general plan to any agency with responsibility for fire protection in the county prior to adoption or amendment.
- Senate Bill 1241: Land use: general plan: safety element: fire hazard impacts: Mandates wildfire planning responsibilities of local governments that have jurisdiction in State Responsibility Areas and Very High Fire Hazard Severity Zones.

Code and Ordinance Summary

The following table indicates the status of the above enumerated codes and ordinances for participating jurisdictions:

Table: Participating Jurisdiction Codes and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Zoning Ordinance	Wildfire Ordinance
Siskiyou County	x	x	x	
Dorris	x		x	
Dunsmuir	x	x	x	x
Etna	x	x	x	
Montague	x	x	x	
Fort Jones	x	x	x	
Happy Camp CSD	x			
Lake Shastina CSD	x			
McCloud CSD	x			
Mt. Shasta	x		x	
Tulelake	x			
Weed	x	x	x	
Yreka	x	x	x	

4.4 Jurisdictional Plans

Planning plays a critical role in hazard mitigation by helping communities identify, assess, and reduce risks associated with natural and man-made hazards. Effective planning involves a proactive, strategic, and comprehensive approach to minimize the impact of disasters and enhance community resilience. Jurisdictions were asked if they had completed the following plans:

- **Capital Improvement Plan:** Allocates funding for infrastructure projects, including those that enhance resilience, such as stormwater management systems and seismic retrofits.
- **Community Wildfire Protection Plan:** Focused on reducing wildfire risks, this plan involves community input and includes strategies for fuel reduction, public education, and emergency response improvements.
- **Climate Action Plan:** Addresses climate-related risks by integrating mitigation and adaptation strategies to reduce the impacts of climate change.
- **Comprehensive Plan:** A comprehensive plan establishes the overall vision for a jurisdiction and serves as a guide to decision making, and generally contains information on demographics, land use, transportation, and facilities. As a comprehensive plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.
- **Emergency Operations Plan:** An emergency operations plan outlines the responsibility and means and methods by which resources are deployed during and following an emergency or disaster. In Siskiyou County, the overarching county provides emergency operation planning for jurisdictions within its borders.
- **Floodplain Management Plan:** This plan aims to manage flood risks through zoning, building codes, and public education, often in coordination with FEMA’s NFIP.
- **Land Use and Zoning Plan:** These plans regulate development to minimize exposure to hazards, such as restricting construction in flood-prone or wildfire-prone areas.

The following table details the status of these plan types for Siskiyou County:

Table : Siskiyou County Plans

Plan	Plan Name	Year	Maintained by
Comprehensive Plan	Siskiyou County General Plan	2024	Siskiyou County Planning Department
Emergency Operations Plan	Siskiyou County Emergency Operations Plan	2024	SCOES
Community Wildfire Protection Plan	Community Wildfire Protection Plan - Siskiyou County Addendum	2023	Fire Safety Council
Floodplain Management Plan	Siskiyou County Flood Management Plan	2024	Flood Control and Water Conservation District
Land Use Plan	Siskiyou County General Plan	2024	Siskiyou County Planning Department
Zoning Plan	Siskiyou County General Plan	2024	Siskiyou County Planning Department
Climate Action Plan	Climate Resiliency Plan	In development	Siskiyou Climate Collaborative
Capital Improvement Plan	Siskiyou County General Plan	2024	Siskiyou County Planning Department

Participating Stakeholder Plan Summary

The following table indicates the status of the above enumerated plans for participating jurisdictions. Please note that some of these are umbrella plans from Siskiyou County providing coverage to the community:

Table: Participating Jurisdiction Plans

Jurisdiction	Capital Improve	Climate Action	Community Wildfire Protection	Comprehensive	Emergency Operations	Floodplain Management	Land Use and Zoning
Siskiyou County	x	x	x	x	x	x	x
Dorris	x	x	x	x	x		x
Dunsmuir	x	x	x	x	x	x	x
Etna		x	x	x	x	x	x
Fort Jones		x	x	x	x	x	x
Happy Camp CSD			x		x		
Lake Shastina CSD			x		x		
McCloud CSD			x		x		
Montague		x	x	x	x		x
Mt. Shasta	x	x	x	x	x		x
Tulelake		x	x	x	x		x
Weed		x	x	x	x	x	x
Yreka	x	x	x	x	x	x	x

4.5 Financial Capabilities

Siskiyou County is recognized by the California Constitution as a Charter County. In general, Charter Counties operate under a charter which gives them greater flexibility in governing themselves, including setting up their own systems for budgeting, taxation, and financial management. This can allow for more innovative or tailored financial practices.

The Siskiyou County Board of Supervisor can raise revenue through the application of a tax, an assessment, or a fee, each approved by a distinct constitutional and statutory authority. The differences between a tax, assessment, and fee are primarily related to their purpose and how they are imposed:

- **Tax:** A mandatory financial charge imposed by a government on individuals or entities to generate revenue for public services, such as schools, roads, and public safety. Taxes are broad and general in nature.
- **Assessment:** A charge levied on property owners to fund specific local improvements that benefit their property, like road paving or sewer systems. It is usually proportional to the benefit received.
- **Fee:** A charge for a specific service provided by the government, such as a building permit, park entry, or utility connection. Fees are usually voluntary and paid directly by the user of the service.

Additionally, Siskiyou County and all participating jurisdictions can borrow money in a number of different ways, generally used as a means of financing large projects such as infrastructure and buildings. Major methods include:

- **General Obligation Bonds:** General obligation bonds have been the traditional form of financing for capital projects such as land acquisition, park development, and transportation projects that are owned and operated by the county. In general, repayment is guaranteed by both tax revenue and operating revenue.
- **Revenue Bonds:** Generally used to finance water and wastewater projects, airports, and stormwater systems. Payment for debt service on revenue bonds comes from user fees generated by the capital facility that is being built.
- **Local Improvement District Bonds:** When a capital project is going to primarily benefit a subset of the population, a Local Improvement District can be formed. Local Improvement Districts are commonly used for projects such as street improvements, water and sewer systems, and the burying of power lines. Bond payment is through an assessment to property owners in the improvement district.

Concerning hazard mitigation, Siskiyou County and all participating jurisdictions have numerous avenues to fund potential projects, including:

- **Grants:** Siskiyou County can apply for state and federal grants for hazard mitigation projects through myriad programs.
- **Bond Issuance:** Siskiyou County can issue bonds to finance large-scale mitigation projects, such as infrastructure upgrades.
- **Public-Private Partnerships:** Siskiyou County can collaborate with private entities to fund and implement mitigation measures.
- **Reserves and General Funds:** Siskiyou County may allocate funds from their general budget or reserves for mitigation activities.

Participating Stakeholder Financial Capability Summary

The following table indicates the status of the above enumerated financial capabilities for participating jurisdictions:

Table: Participating Jurisdiction Financial Capabilities

Jurisdiction	Tax	Assessment	Fee	Grant Application	Public-Private Partnership	Reserves and General Funds
Siskiyou County	x	x	x	x	x	x
Dorris	x	x	x	x	x	x
Dunsmuir	x	x	x	x	x	x
Etna	x	x	x	x	x	x
Fort Jones	x	x	x	x	x	x
Happy Camp CSD	x	x	x	x	x	x
Lake Shastina CSD	x	x	x	x	x	x
McCloud CSD	x	x	x	x	x	x
Montague	x	x	x	x	x	x
Mt. Shasta	x	x	x	x	x	x
Tulelake	x	x	x	x	x	x
Weed	x	x	x	x	x	x
Yreka	x	x	x	x	x	x

4.6 Community-Based Classifications

The following community-based classifications attest to the continued investment in community resilience.

Public Protection Classification

An Insurance Services Office (ISO) Fire Suppression Rating, officially known as the Public Protection Classification (PPC) rating, is a score given to evaluate the fire protection capabilities of a community. This ISO Fire Suppression Rating assesses how well-equipped a local fire department is to respond to fires, which can impact insurance premiums for homeowners and businesses within that community. Key components of the ISO Fire Suppression Rating include:

- **Emergency Communications:** This evaluates the community's emergency call center and dispatch system. The speed and efficiency of handling emergency calls are critical factors.
- **Fire Department:** The number, training, and equipment of the firefighters are assessed. This includes the department's ability to handle fires, the number of engines, and the availability of water supply.
- **Water Supply:** The availability and reliability of water sources, such as hydrants and water mains, are evaluated. This also includes the volume of water available for firefighting.
- **Community Risk Reduction:** This includes fire prevention efforts, public fire safety education, and building code enforcement. Effective risk reduction programs can positively impact the ISO rating.

The ISO Fire Suppression Rating is given on a scale from 1 to 10, with a Class 1: rating representing the best public protection and superior fire protection services and a Class 10 rating indicating that the community's fire protection does not meet ISO's minimum standards. A better (lower) ISO Fire Suppression Rating can lead to lower insurance premiums for property owners because it indicates a lower risk of fire damage.

The following table details ISO Fire Suppression Rating for program participants:

Table : Participating Jurisdiction Community ISO Ratings

Name	ISO Rating
Siskiyou County	
Dorris	
Dunsmuir	3/3Y
Etna	
Fort Jones	
Happy Camp CSD	
Lake Shastina CSD	
McCloud CSD	
Montague	
Mt. Shasta	
Tulelake	3
Weed	
Yreka	3

Source: Insurance Services Office and local jurisdictions

Firewise USA Program

The Firewise USA program is a national initiative designed to help communities at risk from wildfires take proactive steps to reduce their vulnerability. Managed by the National Fire Protection Association (NFPA), the program encourages local solutions for wildfire safety by involving homeowners, community leaders, and other stakeholders in reducing fire risks. Key elements of the program include:

- **Community Engagement:** The program focuses on encouraging communities to work together to develop and implement plans that reduce the risk of wildfire damage. This includes organizing community events, educational workshops, and fire preparedness activities.
- **Risk Assessment:** The program helps communities assess their wildfire risk by identifying vulnerable areas, such as overgrown vegetation or homes with flammable roofing materials. Communities then create a plan to address these risks.
- **Mitigation Actions:** The program encourages property owners to take specific actions to make their homes and surroundings more fire-resistant. These actions might include clearing brush and dead trees, using fire-resistant building materials, and creating defensible space around homes.
- **Education and Resources:** The program provides educational materials and resources to help communities understand wildfire risks and the steps they can take to mitigate them. This includes guidelines for homeowners, tips for creating fire-resistant landscapes, and strategies for community preparedness.
- **Community Cohesion:** The program fosters a sense of shared responsibility and cooperation among community members, which can enhance overall preparedness and resilience.
- **Potential Insurance Discounts:** Some insurance companies offer discounts to homeowners in recognized Firewise communities, reflecting the reduced risk of wildfire damage.

While Siskiyou County is not in the Firewise USA program, one jurisdiction within the county, the City of Dunsmuir, is a participant as of July 23, 2024.

StormReady Community

The StormReady program is a community preparedness initiative developed by the NWS to enhance the ability to prepare for and respond to severe weather events. The goal of StormReady is to help communities develop comprehensive weather safety plans that save lives and protect property. Key Components of the program include:

- **Establishing Warning Systems:** Communities must have multiple ways to receive severe weather warnings and alert the public. This can include NOAA Weather Radios, emergency alert systems, and local broadcast media.
- **Emergency Operations Center:** A designated location where emergency managers and public officials can monitor weather conditions and coordinate responses.
- **Public Education Programs:** Communities in this program must promote weather safety and preparedness through public outreach, including safety fairs, school programs, and distributing weather information materials.
- **Training:** Community leaders and emergency managers undergo training on how to prepare for, respond to, and recover from severe weather.
- **Advanced Monitoring Systems:** Communities are required to monitor local weather conditions in real-time, often using local spotters, weather stations, and other technology to keep track of changing weather patterns.
- **Formal Emergency Plans:** Communities must develop and maintain formal plans for responding to various types of severe weather, including hurricanes, tornadoes, floods, and winter storms. These plans should detail evacuation routes, shelter locations, and post-disaster recovery strategies.
- **Collaboration with the NWS:** Communities work closely with their local NWS office to ensure they have the latest information and resources for weather preparedness and response.
- **Potential Insurance Benefits:** Some insurance providers may offer benefits or discounts to communities that are StormReady certified, reflecting the reduced risk of weather-related damage.

Siskiyou County is a StormReady county. The City of Dunsmuir is currently working to achieve StormReady certification, and is expected to receive the designation in February of 2025

4.7 Special Districts Mitigation Capabilities

Special districts are defined by the California Special Districts Association as “local governments created by the people of a community to deliver specialized services essential to their health, safety, economy, and well-being. A community forms a special district, which are political subdivisions authorized through a state’s statutes, to provide specialized services the local city or county do not provide.” Special districts have several mitigation capabilities:

- **Infrastructure Development and Maintenance:** They can build and maintain infrastructure like levees, drainage systems, or firebreaks to reduce the impact of natural hazards.
- **Emergency Services:** Some districts manage fire protection, flood control, or emergency medical services, which are critical in disaster response and mitigation.
- **Land Use and Zoning:** They can enforce zoning regulations that limit development in high-risk areas.
- **Public Education and Outreach:** Special districts often provide information and resources to help communities prepare for and respond to hazards.
- **Collaboration:** They often work with local, state, and federal agencies to coordinate mitigation efforts and share resources.

Each special district has distinctive mitigation capabilities based on areas of service.

Community Services Districts have a range of mitigation capabilities that help them manage and reduce risks from natural and human-made hazards. These capabilities include:

- **Water and Wastewater Management:** Community Services Districts often manage local water supplies and wastewater systems. This includes maintaining infrastructure to ensure it is resilient to hazards like droughts, floods, and contamination events. They may implement water conservation programs and develop emergency water supply plans.
- **Fire Protection Services:** In some areas, Community Services Districts provide fire protection services, including firefighting, emergency response, and fire prevention programs. They can also be involved in vegetation management and fuel reduction projects to mitigate wildfire risks.

- **Emergency Preparedness and Response:** Community Services Districts play a role in local emergency management by coordinating response efforts, maintaining emergency shelters, and educating the community on disaster preparedness. They may also develop and implement local emergency plans.
- **Parks and Recreation Management:** Community Services Districts that manage parks and recreational areas can contribute to hazard mitigation by maintaining open spaces that serve as natural buffers against flooding and wildfire. They can also retrofit park facilities to withstand hazards.
- **Infrastructure Maintenance:** Community Services Districts are responsible for maintaining and upgrading infrastructure, including roads, stormwater systems, and public buildings. This includes ensuring these structures are resilient to hazards such as earthquakes, floods, and severe weather.
- **Community Outreach and Education:** Community Services Districts often engage with the community through outreach and education programs, promoting awareness of local hazards and encouraging residents to take steps to mitigate risks.

Fire Protection District mitigation capabilities include:

- **Fire Prevention Programs:** They conduct inspections, enforce fire codes, and promote fire-safe practices within communities.
- **Hazardous Fuels Management:** Fire districts manage vegetation to reduce fuel loads, including controlled burns and clearing brush, to prevent the spread of wildfires.
- **Emergency Response Planning:** They develop and implement response plans for wildfires, floods, and other emergencies, ensuring quick and effective action.
- **Public Education:** Fire districts educate residents on fire safety, evacuation procedures, and emergency preparedness.
- **Infrastructure Protection:** They work to protect critical infrastructure and buildings by ensuring compliance with building codes and fire-resistant construction practices.

Flood Control and Water Conservation District mitigation capabilities include:

- **Flood Control:** They manage reservoirs, levees, and drainage systems to prevent or reduce flooding.
- **Water Supply Management:** Water districts ensure the stability and reliability of water supplies during droughts or emergencies by implementing conservation measures and diversifying water sources.
- **Infrastructure Resilience:** They maintain and upgrade water infrastructure to withstand hazards like earthquakes, storms, and wildfires.
- **Emergency Response:** Water districts develop and implement emergency response plans to quickly address disruptions in water services due to natural hazards.
- **Public Education:** They educate the community on water conservation, hazard preparedness, and response strategies.

Irrigation districts possess several key mitigation capabilities that help manage and reduce risks related to water resources, natural hazards, and agricultural sustainability:

- **Water Management and Conservation:** Irrigation districts manage the delivery and allocation of water resources, ensuring efficient use during droughts or water shortages. They implement water conservation practices, such as efficient irrigation techniques, to reduce water waste and improve resilience to drought conditions.
- **Flood Control:** By managing reservoirs, canals, and other water infrastructure, irrigation districts can play a significant role in flood control. They help regulate water flow, prevent overflow during heavy rainfall, and reduce the risk of flooding in agricultural and nearby residential areas.
- **Infrastructure Resilience:** Irrigation districts maintain and upgrade water delivery systems, including canals, pipelines, and storage facilities, to ensure they are resilient to natural hazards like earthquakes, floods, and extreme weather events. This includes retrofitting aging infrastructure to withstand potential damage.

- **Soil and Erosion Control:** These districts may implement soil conservation practices, such as controlling erosion along canals and managing sedimentation in reservoirs, which helps protect water quality and prevent land degradation.
- **Drought Response Planning:** Irrigation districts often develop and implement drought response plans, which may include water rationing, prioritization of water use, and alternative water supply strategies. This helps ensure a stable water supply during prolonged dry periods.
- **Community and Farmer Education:** They provide education and outreach programs to farmers and community members on best practices for water management, conservation, and hazard preparedness, helping to foster a more resilient agricultural community.
- **Collaborative Resource Management:** Irrigation districts often collaborate with local, state, and federal agencies to develop comprehensive water management strategies, participate in watershed management programs, and contribute to regional hazard mitigation efforts.

Recreation and Parks Districts have several mitigation capabilities that help reduce risks and enhance community resilience:

- **Open Space Management:** By maintaining parks and open spaces, these districts provide natural buffer zones that can absorb floodwater, reduce erosion, and lower wildfire risks.
- **Public Education:** Districts can offer educational programs and workshops on disaster preparedness, fire safety, and environmental stewardship, which help communities understand and reduce risks.
- **Infrastructure Improvements:** Recreation and parks districts can enhance facilities to be more resilient to hazards, such as installing flood-resistant features in parks, using fire-resistant materials in buildings, and designing open spaces that reduce heat islands.
- **Community Gathering Spaces:** Parks and recreational facilities can serve as emergency shelters or staging areas during disasters, providing critical support during and after events.
- **Habitat Restoration:** Districts often engage in habitat restoration projects that can mitigate hazards like flooding and erosion by restoring natural landscapes and improving ecosystem health.
- **Collaborative Planning:** Recreation and parks districts often work with local governments, emergency services, and other organizations in planning efforts, ensuring that parks and recreational spaces are integrated into broader hazard mitigation and emergency response plans.

Resource Conservation Districts have several mitigation capabilities focused on natural resource management and environmental conservation. These capabilities include:

- **Soil and Water Conservation:** Resource Conservation Districts implement erosion control measures, manage watershed health, and promote sustainable agricultural practices to reduce the risk of soil degradation and water contamination, which can mitigate flood risks.
- **Wildfire Mitigation:** Resource Conservation Districts work on fuel reduction projects, create defensible space around communities, and restore fire-adapted ecosystems to reduce wildfire risks. They often collaborate with local fire agencies and landowners on these projects.
- **Flood Management:** Resource Conservation Districts participate in the planning and implementation of flood control projects, such as streambank stabilization and riparian restoration, which help manage floodwaters and reduce the impact of floods on communities.
- **Habitat Restoration:** By restoring natural habitats, RCDs help to maintain biodiversity and ecosystem services, which can improve the resilience of natural landscapes to hazards like wildfires, floods, and droughts.
- **Education and Outreach:** Resource Conservation Districts provide technical assistance, training, and educational programs to landowners, farmers, and the public on best practices for resource conservation and hazard mitigation.

- Sustainable Land Use Planning: Resource Conservation Districts often assist in developing land use plans that incorporate conservation practices, which can mitigate the impact of natural hazards by preserving open spaces and protecting critical habitats.

The above enumerated capabilities allow special districts to play a crucial role in reducing risks and enhancing community resilience against natural hazards.

The following table lists relevant special districts within Siskiyou County:

Table : Siskiyou County Special Districts

Special District Name	District Type	Activities
Callahan Water District	Community Services	Water Enterprise
Happy Camp Community Services District	Community Services	Water Enterprise, Lighting and Lighting Maintenance Enterprise, Recreation and Park Enterprise
Hornbrook Community Service District	Community Services	Water Enterprise
Lake Shastina Community Services District	Community Services	Ambulance Service, Drainage and Drainage Maintenance, Fire Protection, Library Services, Lighting and Lighting Maintenance, Pest Control, Police Protection and Personal Safety, Recreation and Park, Streets and Roads - Construction and Maintenance, Underground Electric and Communication Facilities, Governmental Services, Water Enterprise, and Sewer Enterprise
McCloud Community Services District	Community Services	Ambulance Service, Fire Protection, Library Services, Lighting and Lighting Maintenance, Recreation and Park, Streets and Roads - Construction and Maintenance, Solid Waste Enterprise, Water Enterprise, Sewer Enterprise
Tennant Community Services District	Community Services	Solid Waste Enterprise, Water Enterprise, Sewer Enterprise, Fire Protection Enterprise, Lighting and Lighting Maintenance Enterprise
Sawyers Bar County Water District	County Water	Water Enterprise
Butte Valley Fire Protection	Fire Protection	Fire Protection
Copco Lake Fire Protection District	Fire Protection	Fire Protection
Dunsmuir Fire Protection District	Fire Protection	Fire Protection
Gazelle Fire Protection District	Fire Protection	Fire Protection
Grenada Fire Protection District	Fire Protection	Fire Protection
Happy Camp Fire Protection District	Fire Protection	Fire Protection
Hornbrook Fire Protection District	Fire Protection	Fire Protection
Mayten Fire Protection District	Fire Protection	Fire Protection
Montague Fire Protection District	Fire Protection	Fire Protection
Mt. Shasta Fire Protection District	Fire Protection	Fire Protection
Scott Valley Fire Protection District	Fire Protection	Fire Protection
South Yreka Fire Protection District	Fire Protection	Fire Protection
Tulelake Multi - County Fire Protection District	Fire Protection	Fire Protection
Big Springs Irrigation District	Irrigation	Water Enterprise

Table : Siskiyou County Special Districts

Special District Name	District Type	Activities
Butte Valley Irrigation District	Irrigation	Water Enterprise
Grenada Irrigation District	Irrigation	Water Enterprise
Montague Water Conservation District	Irrigation	Water Enterprise
Scott Valley Irrigation District	Irrigation	Water Enterprise
Tulelake Irrigation District	Irrigation	Water Enterprise
Dunsmuir Recreation and Park District	Recreation and Park	Recreation and Park
Mt. Shasta Recreation and Park District	Recreation and Park	Recreation and Park
Weed Recreation and Park District	Recreation and Park	Recreation and Park
Shasta Valley Resource Conservation District	Resource Conservation	Resource Conservation
Siskiyou Resource Conservation District	Resource Conservation	Resource Conservation
Butte Valley Unified School District	School District	Education
Dunsmuir School District (High School)	School District	Education
Scott Valley Unified School District	School District	Education
Siskiyou Union High School District	School District	Education
Yreka Union High School District	School District	Education

4.8 Jurisdictional Compliance with NFIP

All NFIP participating jurisdictions are required to meet the minimum standards set forth in the program. The jurisdictions’ NFIP coordinator ensures all new construction projects are properly surveyed and receive an elevation certificate.

NFIP participants are committed to continued involvement and compliance. To help facilitate compliance, NFIP participating jurisdictions:

- Adopted floodplain regulations through local ordinance
- Enforces floodplain ordinances through building restrictions
- Regulates new construction in Special Flood Hazard Areas as outlined in their floodplain ordinance
- Utilizes FEMA DFIRMs, where available
- Monitors floodplain activities

Participation in the NFIP is based on an agreement between the municipality and the federal government. If a municipality agrees to adopt and enforce a floodplain ordinance designed to reduce future flood risks, all citizens in the participating municipality can purchase flood insurance.

In Siskiyou County, as part of NFIP participation, communities must:

- Use current NFIP flood maps in adopting floodplain management regulations.
- Require permits for all development in SFHAs
- Ensure that development does not increase the flood hazard on other properties.
- Meet current elevation standards. Ensuring the lowest occupied floor is elevated to or above the base flood elevation indicated on the NFIP flood map.

While most floodplain requirements have been incorporated into the current Building Codes, some additional provisions and regulations may be required by a community. Communities participating in the NFIP are required to adopt, enforce and maintain a local floodplain ordinance as a stipulation of compliance with the program. The purpose of this ordinance is to ensure public safety, minimize impact to people and property from flooding, protect watercourses from

encroachment, and maintain the capability of floodplains to retain and carry off floodwaters. The local floodplain administrator is typically the municipal official responsible for overseeing the enforcement and update of the document.

Floodplain ordinances are typically enforced by law enforcement departments or code enforcement offices. In general, the enforcement process generally works as follows:

- **Identification of Violations:** Violations are often identified through various means, such as citizen complaints, routine inspections, or observations by enforcement officers.
- **Notification:** Once a violation is identified, the responsible party is typically notified of the violation. This notification may come in the form of a written citation, warning letter, or verbal communication depending on the severity of the violation and local procedures.
- **Correction Notice:** In many cases, the responsible party is given a certain amount of time to correct the violation. They may be required to remedy the situation, obtain necessary permits, or comply with specific regulations.
- **Follow-up Inspections:** After the designated correction period, enforcement officers may conduct follow-up inspections to ensure that the violation has been addressed satisfactorily.
- **Penalties and Fines:** If the responsible party fails to comply with the ordinance or correct the violation within the specified timeframe, they may face penalties or fines. These penalties can vary depending on the nature and severity of the violation and may escalate for repeated offenses.
- **Legal Action:** In cases of persistent non-compliance or serious violations, local authorities may initiate legal proceedings against the responsible party. This can involve court appearances, injunctions, or other legal measures to compel compliance.

The following figure represents both pre- and post-disaster community NFIP requirements:

Figure : Pre- and Post-Disaster Community NFIP requirements



Source: FEMA

When structures located in the SFHAs are substantially modified (more than 50% damaged or improved) they are required to be brought into compliance with current NFIP standards and local building codes. In cases of repairs being conducted as a result of damage, jurisdictional NFIP Coordinators are responsible for substantial damage and improvement determinations. These determinations are required for compliance in the NFIP and must be completed before residents begin repairs or permits are issued.

However, the May 2020 Report to Congressional Committees on the National Flood Insurance Program by the United States Government Accountability indicates “FEMA generally does not collect or analyze the results of these assessments, limiting its ability to ensure the process operates as intended. Furthermore, FEMA has not clarified how communities can access NFIP claims data. Such data would help communities target substantial damage assessments after a flood.” This has been found to be true in Siskiyou County, with submitted information and data underutilized and some FEMA available data unshared and/or unadvertised.

Section 1206 of the Disaster Recovery Reform Act of 2018 authorizes the FEMA to provide communities with the resources to administer and enforce building code and floodplain management ordinances following a major disaster declaration through FEMA’s Public Assistance Program. To be eligible for reimbursement under the Public Assistance Program, including for the Disaster Recovery Reform Act of 2018 Section 1206, communities must be designated for

Public Assistance permanent work under a major disaster declaration and be legally responsible to administer and enforce building codes or floodplain management regulations. Communities must also be in good standing with the NFIP. Available assistance includes:

Figure : Disaster Recovery Reform Act of 2018 Available Assistance



Source: FEMA

It is worth noting that this assistance is available for a variety of hazards occurrence types, not just flooding.

Key to achieving across the board reduction in flood damages is a robust community assistance, education, and awareness program. As such, Siskiyou County will continue to develop both electronic (including social media) and in person outreach activities.

4.9 Challenges and Opportunities for Capability Improvement

As always, challenges exist due to the day-to-day demands of the working environment, including staffing issues, budget restrictions, and staffing turnover. These issues can, and do, impact the utilization and incorporation of the LHMP and the completion of identified hazard mitigation projects.

As part of this planning process, the MPC worked to identify gaps and deficiencies identified in the completion of this LHMP. Resulting from this assessment is a series of problem statements, concise descriptions of issues or challenges that need to be addressed. These problem statements were determined to be applicable to all participating jurisdictions:

- Continued climate change is driving an increased incidence of major hazard occurrences, stressing the response, recovery, and mitigation capabilities of even the most prepared jurisdiction.
- Available funding for the completion of hazard mitigation projects is at a premium, with only occasional room in available budgets for required project match.
- The difficulties in applying for and managing hazard mitigation grants can be a challenge.
- Staffing at all levels is stretched thin, with many personnel wearing multiple hats, compromising mitigation capabilities.

Improving capabilities can lead to enhanced performance, increased efficiency, and better outcomes in hazard mitigation planning and implementation. The following identify recommended improvements:

- Continued instruction should be solicited from Cal OES and FEMA Region IX on grant application and grant management strategies to reflect changing requirements.
- All participating jurisdictions should conduct more extensive educational outreach to all communities, especially vulnerable and underserved communities, on mitigation actions and methodologies
- Participating jurisdictions not in the NFIP should apply for membership,
- Participating NFIP communities should apply for membership in the CRS to allow citizens to receive discounts off their federally backed flood insurance policies.

- Participating jurisdictions who are not current participants should apply for membership in the Firewise USA program.
- Participating jurisdictions without an ISO Fire Suppression Rating should apply for a rating.
- Siskiyou County and participating jurisdictions should continue to explore and engage in public-private emergency planning partnerships to further increase hazard resiliency through the infusion of additional funding and expertise to help complete mitigation projects.

To help overcome many of these identified challenges, participating jurisdictions will work collaboratively using the following strategies, as appropriate:

- **Innovation and Adaptation:** Foster a culture of innovation and adaptability. Encourage employees to think creatively, embrace change, and explore new ways of doing things to overcome challenges.
- **Training and Development:** Invest in training and development to enhance skills and knowledge.
- **Communication Improvement:** Enhance communications and provide clear and transparent communication when sharing information, aligning teams, and addressing concerns.
- **Collaboration and Teamwork:** Encourage collaboration and teamwork which allows for the pooling of diverse skills and perspectives, leading to more effective problem-solving (the MPC is a good example of effective use of this strategy).
- **Technology Adoption:** Embrace technology to streamline operations and enhance productivity.
- **Agile Project Management:** Implement agile project management methodologies to enhance flexibility and responsiveness to changing conditions. Agile approaches allow teams to adapt quickly to challenges.

As appropriate, these strategies will be tailored for specific circumstances, with a combination of these strategies often being more effective than relying on a single approach.

Section 5 – Hazard Identification and Risk Assessment

5.1 Introduction

The goal of this hazard mitigation is to reduce the future impacts of hazards, including deaths and injuries, property damage, and disruption to local and county economies, and to further reduce the amount of public and private funds spent to assist recovery. To complete this goal, hazard mitigation decision-making in this plan has been based on a robust risk assessment, completed to identify natural, human caused, and technological hazards that represent a risk to Siskiyou County. The following provide a definition of the risk assessment terms used during this assessment:

- **Hazard:** An act or phenomenon that has the potential to produce harm or other undesirable consequences to a person or thing.
- **Exposure:** The people, property, systems, or functions that could be lost to a hazard. Generally, exposure includes what lies in the area the hazard could affect.
- **Vulnerability:** Vulnerability is susceptibility to physical injury, harm, damage, or economic loss. It depends on an asset’s construction, contents, and economic value of its functions.
- **Risk:** A function of hazard, vulnerability, and exposure. It refers to the likelihood of an event resulting in an adverse condition that causes injury or damage.

In order to accomplish this assessment, all relevant natural, human caused, and technological hazards, potential vulnerabilities, and exposures were identified. As potential hazards, vulnerabilities, and exposure are identified Siskiyou County can continue to develop a strategy to identify and prioritize mitigation action to defend against these potential risks.

5.2 Declared Federal Disasters

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. §§ 5121-5206) provides for the Federal support of State and local governments and their citizens when impacted by an overwhelming disaster. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, establishes the process for requesting a Presidential disaster declaration and defines the type of assistance available.

If it is apparent that a Presidential disaster declaration may be necessary to assist in the recovery of an impacted area, Siskiyou County and FEMA Region IX will conduct a Preliminary Damage Assessment (PDA). This assessment is used to determine:

- The extent of the event.
- The impact of the event on individuals and public facilities.
- The types of federal assistance that may be needed.

Once the PDA is complete, and if a determination is made that the damages exceed available State of Nevada resources, the Governor may submit through FEMA Region IX a declaration request to the President.

A major disaster declaration provides a wide range of federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work. Not all programs, however, are activated for every disaster. The determination of which programs are authorized is based on the types of assistance specified in the Governor’s request and the needs identified during the initial and subsequent PDAs. FEMA disaster assistance programs may include:

- Individual Assistance
- Public Assistance
- Hazard Mitigation

To recognize and encourage mitigation, FEMA considers the extent to which mitigation measures contributed to the reduction of disaster damages. This could be especially significant in those disasters where, because of mitigation, the estimated public assistance damages fell below the per capita indicator.

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. The MPC reviewed the historical federal disaster declarations to assist in hazard identification. The following table details Disaster Declarations for Siskiyou County:

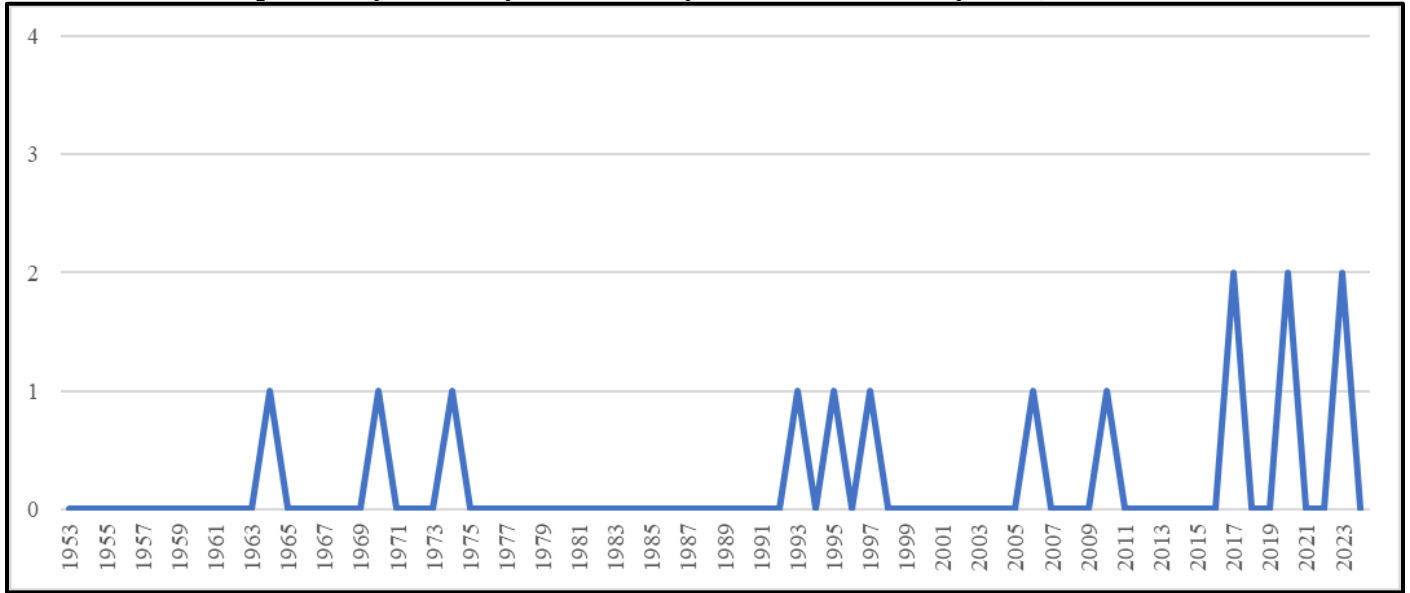
Table : Siskiyou County Presidentially Declared Disasters

Designation	Declaration Date	Incident Type	Individual and Public Assistance	Mitigation Dollars Obligated
DR-4570-CA	11/21/2023	Hurricanes (Tropical Storm Hilary)	\$5,891,570	\$72,286
DR-4683-CA	1/14/2023	Severe Winter Storms, Flooding, Landslides, and Mudslides	\$152,481,240	\$11,290,426
DR-4569-CA	10/16/2020	California Wildfires	\$207,894,170	\$33,655,435
DR-4482-CA	3/22/2020	California Covid-19 Pandemic	\$1,232,934,886	\$74,335,415
DR-4308-CA	4/1/2017	Severe Winter Storms, Flooding, Mudslides	\$427,999,655	\$15,012,050
DR-4301-CA	2/14/2017	Severe Winter Storms, Flooding, and Mudslides	\$130,483,948	\$22,708,200
DR-4142-CA	08/29/2013	Wildfire (Karuk Reservation)	\$444,517	-
DR-1884-CA	3/8/2010	Severe Winter Storms, Flooding, and Debris and Mud Flows	\$28,353,445	-
DR-1628-CA	2/3/2006	Severe Storms, Flooding, Mudslides, and Landslides	\$163,229,337	-
DR-1155-CA	1/4/1997	Severe Storms, Flooding	-	-
DR-1046-CA	3/12/1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	-	-
DR-979-CA	2/3/1993	California Severe Storm, Winter Storm, Mud & Landslides, Flooding	-	-
DR-412-CA	1/25/1974	California Severe Storms, Flooding	-	-
DR-283-CA	2/16/1970	California Severe Storms, Flooding	-	-
DR-183-CA	12/24/1964	California Heavy Rains & Flooding	-	-

Source: FEMA

-: Not reported

Graph : Siskiyou County Presidentially Declared Disaster By Year, 1953 - 2024



Source: FEMA

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Emergency Declarations supplement State and local or Indian tribal government efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe. The total amount of assistance provided for in a single emergency may not exceed \$5,000,000. The following types of assistance are available under an Emergency Declaration:

- Public Assistance, Categories A (debris removal) and B (emergency protective measures)
- Individual Assistance, the Individuals and Households Program

The MPC reviewed the historical federal disaster declarations to assist in hazard identification. The following table details Emergency Declarations for Siskiyou County.

Table 13: Siskiyou County Emergency Declarations

Designation	Declaration Date	Incident Type	Individual and Public Assistance
EM-3428-CA	3/13/2020	California Covid-19	\$8,313,848
EM-3248-CA	9/13/2005	California Hurricane Katrina Evacuation	\$988,951
EM-3032-CA	1/20/1977	Drought	-

Source: FEMA

The Governor, or the Governor's Authorized Representative, may submit a request for a fire management assistance declaration as required. FEMA will approve declarations for fire management assistance when it is determined that a fire or fire complex on public or private forest land or grassland threatens such destruction as would constitute a major disaster.

The MPC reviewed the historical fire management declarations to assist in hazard identification. Research indicates that there have been six fire management declarations for Siskiyou County since 1953:

Table : Siskiyou County Fire Management Declarations

Designation	Declaration Date	Incident Name	Public Assistance	Emergency Work
FM-5450-CA	9/2/2022	California Mill Fire	\$8,303,965	\$253,281
FM-5393-CA	6/29/2021	California Lava Fire	\$3,697,476	\$503,088
FM-5361-CA	9/9/2020	California Slater Fire	-	-

Table : Siskiyou County Fire Management Declarations

Designation	Declaration Date	Incident Name	Public Assistance	Emergency Work
FM-5250-CA	9/5/2018	California Klamathon Fire	\$18,158,242	\$585,590
FM-5079-CA	9/15/2014	California Boles Fire	\$5,294,855	\$165,882
FM-5068-CA	8/2/2014	California Oregon Gulch Fire	\$1,134,200	\$22,006

Source: FEMA

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. The following table details the proclamations for Siskiyou County:

Table : Siskiyou County California Proclamations of State of Emergency

Designation	Declaration Date	Incident Type	Damages*
2023-09	09/12/2023	Tropical Storm Hilary	-
2023-08	08/29/2023	Happy Camp Fire	-
2023-01	01/04/2023	Winter Storm	\$1,234,636,773
2022-08	09/02/2022	Mill Fire	\$84,513,380
2022-07	07/30/2022	McKinney Fire	\$15,061,500
2021-04	07/16/2021	Lava Fire	\$9,310,474
2020-07	09/10/2020	Wildfire	\$245,298,163
2020-01	03/04/2020	Pandemic	\$13,958,966,199
2018-04	07/05/2018	Wildfire	\$32,808,626
2017-03	03/07/2017	Severe Storms	\$1,038,319,506
2017-01	01/23/2017	Severe Storms	\$186,874,243
2015-05	10/30/2015	Drought	-
2007-01	12/29/2007	Flood	-
2007-02	01/12/2007	Freeze	\$2,700,400
2001-03	05/04/2001	Drought	\$14,858,480
97-01	01/02/1997	Winter Storm	-
-	09/10/1987	Wildfire	\$18,000,000
-	04/17/1972	Freeze	\$111,517,260

Source: Cal OES

*: Damages reported for all impacted counties, tribal reservations, and cities

-: Not reported

5.3 Identified Potential Hazards

One of the first steps in developing a hazard assessment is to identify the hazards that have a reasonable risk of occurring. Proper identification allows for appropriate and well-planned action in order to mitigate the extent and cascading impacts of an incident. Furthermore, while not all disaster contingencies can be planned for, applying an all-hazards approach to the mitigation process does yield greater awareness and better preparedness for unforeseen hazard incidents overall.

The MPC met to discuss previously identified hazards and deliberate on any changes or additions to the regional hazard profile. A thorough and comprehensive revision of data for each hazard was completed as part of this plan update. Additionally, this plan has worked, as per FEMA recommendations, to merge similar hazards together with the aim of both simplifying the usage of the plan and reducing duplication of effort.

The MPC confirmed the following natural hazards that may impact the Siskiyou County:

- Dam Failure
- Drought
- Earthquake

- Extreme Heat
- Flood
- Landslide
- Severe Weather
- Subsidence
- Volcanic Activity
- Wildfire

The following table indicates the improvement of worsening of conditions related to the identified hazards in this LHMP since the completion of the 2018 LHMP:

Table : Natural Hazard Change in Conditions

Natural Hazard	Change in Conditions	Notes
Dam Failure	Improving	The number of extremely high hazard dams in the county has declined, with only one remaining.
Drought	Worsening	Available data indicates that the rate of drought occurrence is increasing.
Earthquake	Unchanged	Geologic conditions have not changed.
Extreme Heat	Worsening	Data indicates that the number of high temperature days has been increasing. Continued climate change is expected to exacerbate these conditions.
Flood	Worsening	Data indicates that while rainfall occurrence has lessened, the number of heavy rainfall events have increased. Additionally, increased wildfire and drought occurrences have exacerbated conditions related to flash flood events.
Landslide	Worsening	Increased wildfire and drought occurrences have exacerbated conditions related to flash flood events.
Severe Weather	Worsening	Data indicates that incidences of severe weather are likely to increase due to changes in climate.
Subsidence	Worsening	Drought conditions and aquifer drawdown have exacerbated subsidence events.
Volcanic Activity	Unchanged	Geologic conditions have not changed.
Wildfire	Worsening	Increased extreme heat and drought occurrences have exacerbated conditions related to wildfire events.

The following table indicates the increase or decrease in vulnerabilities to the identified hazards in this LHMP since the completion of the 2018 LHMP:

Table : Natural Hazard Change in Vulnerability

Natural Hazard	Change in Vulnerability	Notes
Dam Failure	Decreasing	The number of citizens and property exposed to a dam failure event has decreased.
Drought	Increasing	A continued decline in population will decrease the human vulnerability to drought. However, aging water infrastructure and a slight increase in agricultural land will tend to increase the overall vulnerability.
Earthquake	Unchanged	A continued decline in population will decrease vulnerability.
Extreme Heat	Increasing	A continued increase in both the age of residences and an aging population will increase vulnerability.

Table : Natural Hazard Change in Vulnerability

Natural Hazard	Change in Vulnerability	Notes
Flood	Increasing	A continued decline in population and a static level of housing will decrease vulnerability. However, the expanded extent of flash flood events, due largely to wildfire scars, in areas previously not determined as susceptible will increase vulnerability.
Landslide	Increasing	A continued decline in population and a static level of housing will decrease vulnerability. However, the expanded extent of potential landslide areas, due largely to wildfire scars will increase vulnerability.
Severe Weather	Unchanged	A continued decline in population and a static level of housing will decrease vulnerability. However, aging infrastructure and housing will increase potential vulnerability.
Subsidence	Increasing	Aging infrastructure and structures are at increased risk.
Volcanic Activity	Decreasing	A continued decline in population and a static level of housing will decrease vulnerability.
Wildfire	Unchanged	A continued spread of citizens into remote areas of the county will increase potential vulnerability. However, current programs to harden exposed structures and educated community members will decrease potential vulnerability.

Based on discussion with the MPC, a lack of identified risk or history, and geographic improbability, numerous FEMA identified hazards such as coastal erosion and hurricane were not included in the scope of this plan. Additionally, the following natural hazards, while recognized as potential hazards, did not warrant full discussion for the enumerated reasons:

- **Avalanche:** The FEMA NRI indicates that the avalanche risk for Siskiyou County and participating stakeholder communities, both on a county and census tract analysis level, is very low. Additionally, the relatively limited occurrence data indicates that the majority of avalanches causing recorded deaths, injuries, or damage occur on privately operated ski areas, who maintain their own avalanche mitigation programs.
- **Sea Level Rise:** Siskiyou County has no exposure to rising sea levels.
- **Levee Failure:** A review of the National Levee Database, maintained by the United States Army Corps of Engineers, indicates that there are 35 levee systems within Siskiyou County. Further analysis indicates that the majority of these systems protect farmland from flooding, however a small subset of levees provides protection for 157 people, 60 buildings valued at \$28,201,00, and no critical facilities. However, no instances of levee failure, injuries, deaths, or property loss from a levee failure event were found in Siskiyou County for available history.
- **Severe Winter Weather:** Data from the NCEI indicates that from 1950 through present Siskiyou County has numerous winter weather events (blizzard, ice storm, winter storm), but no recorded damages, deaths, or injuries. Additionally, the FEMA NRI indicates that the winter weather risk for Siskiyou County and participating stakeholder communities, both on a county and census tract analysis level, is very low, and rates ice storms as not applicable.
- **Tsunami:** Siskiyou County has no coastal exposure, and thus no exposure to a Tsunami event.

Should future conditions change, or new data become available, these hazards will be reevaluated and, if necessary, included with a full analysis in an amended LHMP.

5.4 Hazard Planning Significance

For the purposes of this plan, hazard planning significance refers to the relevance of the identified hazard to the jurisdictions of Siskiyou County when calculating risk and vulnerability. In order to help quantify the planning significance for a hazard, data was reviewed on three levels, federal (various data sets), state (State of California 2023

Hazard Mitigation plan and available state databases and GIS resources), and local (data relevant to occurrence and vulnerability on a county and local level). This allowed for a comparison between data sets for each hazard type and allowed for a summation at the county level. It is recognized that inconsistencies in methodologies and data make it difficult to make a direct comparison across all data levels. However, as possible, collected data was translated into a unified model that accounted for any variability in data and methodologies. The result of this assessment provides a larger scale snapshot of how Siskiyou County jurisdictions view risk and allowed for integration of hazard data into the LHMP.

Augmenting state and local data, FEMA’s NRI dataset and online tool was used to help determine local community risk for identified natural hazards in this LHMP. This tool is useful in that it helps provide a simple, visual method of understating local level jurisdictional vulnerability. However, like all clearinghouse databases, it is recognized to have some limitations. As such, and as mentioned above, the data was vetted by Siskiyou County and participating jurisdictions against local and state data and analysis. Where discrepancies exist, they are noted and discussed in the relevant hazard section.

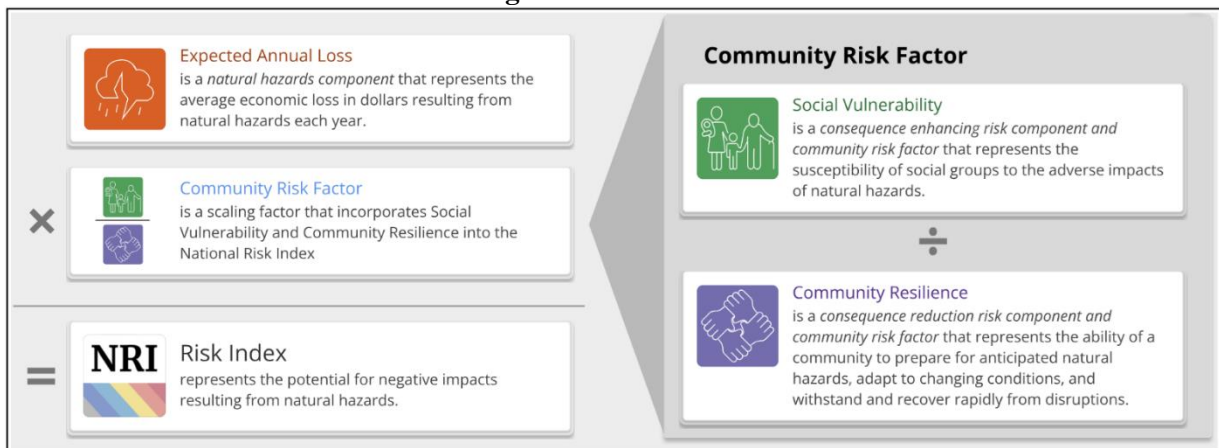
The risk equation behind the Risk Index includes three components, Expected Annual Loss (EAL), social vulnerability (previously discussed), and community resilience (previously discussed). The dataset supporting EAL provides estimates measured in 2022 U.S. dollars. The datasets supporting the social vulnerability and community resilience components have been standardized using a minimum-maximum normalization approach prior to being incorporated into the NRI risk calculation.

As part of the NRI, EAL represents the average economic loss in dollars resulting from a hazard each year. It quantifies loss for relevant consequence types, buildings, people, and agriculture. An EAL score and rating represent a community's relative level of expected losses each year when compared to all other communities at the same level. EAL is calculated using an equation that includes exposure, annualized frequency, and historic loss ratio risk factors. Exposure is a factor that measures the building value, population, and agriculture value potentially exposed to a natural hazard occurrence. Annualized frequency is a factor that measures the expected frequency or probability of a hazard occurrence per year. Historic loss ratio is a factor that measures the percentage of the exposed consequence type value (building, population, or agriculture) expected to be lost due to an occurrence. EAL represents the average economic loss in dollars resulting from natural hazards each year and is proportional to a community’s risk.

To calculate Risk Index values, the NRI generates a Community Risk Adjustment to scale EAL values up or down, depending on their community risk factors, increasing with social vulnerability and decreases with community resilience. For a jurisdiction, a higher social vulnerability results in a higher Risk Index value while higher community resilience results in a lower Risk Index value.

Using these three components, Risk Index values are calculated for each jurisdiction (county and Census tract). The calculated Risk Index values form an absolute basis for measuring Risk within the NRI, and they are used to generate Risk Index percentiles and ratings across communities. The risk equation behind the NRI is as follows:

Figure 1: FEMA NRI



Source: FEMA

For both the Risk Index and EAL there is a qualitative rating that describes the nature of a community’s score in comparison to all other communities at the same level, ranging from “Very Low” to “Very High.” Because all ratings are relative, there are no specific numeric values that determine the rating.

The National Risk Index provides relative Risk Index percentiles and ratings based on data for Expected Annual Loss due to natural hazards, Social Vulnerability, and Community Resilience. Separate percentiles and ratings are also provided for each component: Expected Annual Loss, Social Vulnerability, and Community Resilience. For the Risk Index and Expected Annual Loss, percentiles and ratings can be viewed as a composite score for all hazards or individually for each of the 18 hazard types.

A community's score is represented by its percentile ranking among all other communities at the same level for Risk, Expected Annual Loss, Social Vulnerability and Community Resilience. For example, if a given Census tract's Risk Index percentile for a hazard type is 85.32 then its Risk Index value is greater than 85.32% of all US Census tracts. These scores are then assigned a qualitative rating that describes the community in comparison to all other communities at the same level, ranging from “Very Low” to “Very High.” To determine Risk and Expected Annual Loss ratings, a methodology known as k-means clustering or natural breaks is applied to each value. This approach divides all communities into five groups such that the communities within each group are as similar as possible (minimized variance) while the groups are as different as possible (maximized variance). A cubed root transformation is applied to both Risk and Expected Annual Loss values before k-means clustering. Without the transformation, these values are heavily skewed by an extreme range of population and building value densities between urban and rural communities. By applying a cube root transformation, the National Risk Index controls for this characteristic and provides ratings with greater differentiation and usefulness.

The following table summarizes the FEMA NRI for Siskiyou County and participating stakeholder communities for all identified natural hazards identified in this plan.

Table : Participating Jurisdiction All Natural Hazard Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile
Siskiyou County	All	Relatively Moderate	90.61
Dorris	06093000200	Very High	99.46
Dunsmuir	06093001100	Relatively Moderate	69.06
Etna	06093000800	Very High	97.8
Fort Jones	06093000600	Relatively High	85.3
Happy Camp CSD	06093001300	Relatively High	94.91
Lake Shastina CSD	06093000902	Relatively Moderate	76.25
McCloud CSD	06093001200	Relatively Moderate	79.11
Montague	06093000300	Relatively High	96.7
Mt. Shasta	06093001003	Relatively Low	40.59
Tulelake	06093000100	Very High	98.7
Weed	06093000901	Relatively High	93.71
Yreka	06093000703	Relatively Low	51.66

Source: FEMA NRI

In order to gain an understanding of vulnerability, the following table details the estimated FEMA EAL data for Siskiyou County and participating jurisdictions (by census tract):

Table : Participating Jurisdiction All Natural Hazard EAL

Jurisdiction	Census Tract	EAL	National Percentile	Building EAL	Population Equivalence EAL (fatalities)	Agricultural EAL	Composite EAL
Siskiyou County	All	Relatively Moderate	88.61	\$17,186,244	\$1,831,557 (0.16)	\$15,161,692	\$34,179,493
Dorris	06093000200	Very High	99.01	\$507,412	\$148,704 (0.01)	\$5,541,375	\$6,197,491

Table : Participating Jurisdiction All Natural Hazard EAL

Jurisdiction	Census Tract	EAL	National Percentile	Building EAL	Population Equivalence EAL (fatalities)	Agricultural EAL	Composite EAL
Dunsmuir	06093001100	Relatively Low	60.28	\$530,077	\$116,242 (0.01)	\$0.51	\$646,319
Etna	06093000800	Very High	97.41	\$2,460,612	\$269,996 (0.02)	\$1,418,041	\$4,148,650
Fort Jones	06093000600	Relatively High	86.32	\$971,662	\$146,300 (0.01)	\$521,556	\$1,639,519
Happy Camp CSD	06093001300	Relatively High	91.54	\$1,999,570	\$251,000 (0.02)	\$2,715	\$2,253,285
Lake Shastina CSD	06093000902	Relatively Moderate	78.37	\$355,263	\$59,231 (0.01)	\$735,370	\$1,149,863
McCloud CSD	06093001200	Relatively Moderate	79.99	\$1,074,465	\$136,335 (0.01)	\$15,211	\$1,226,011
Montague	06093000300	Relatively High	95.68	\$975,276	\$120,315 (0.01)	\$2,140,460	\$3,236,051
Mt. Shasta	06093001003	Relatively Low	59.95	\$608,519	\$31,099 (0.00)	\$786	\$640,403
Tulelake	06093000100	Very High	97.46	\$372,162	\$71,831 (0.01)	\$3,740,543	\$4,184,537
Weed	06093000901	Relatively High	88.39	\$1,508,759	\$192,623 (0.02)	\$132,433	\$1,833,815
Yreka	06093000703	Relatively Low	42.25	\$346,796	\$55,855 (0.00)	\$436	\$346,796

Source: FEMA NRI

Where appropriate, differences in vulnerability to identified hazards are noted in each individual hazard section.

5.5 Hazard Occurrence and Assessment Data

NOAA’s National Centers for Environmental Information (NCEI) Storm Events Database was used as the primary source of information for previous occurrences of storm events. It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or National Weather Service (NWS) office. When reporting an event, the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages. Most of the events from NCEI are not associated with a federal emergency or disaster. If the event occurred at the same time as an event that was later determined to be a federal emergency or disaster, it is included with the NCEI data even if it occurred in a county not included in the federal declaration.

Environmental Systems Research Institute ArcGIS v10 was used to determine which critical and state owned or operated facilities were located within the boundaries of identified hazards (when applicable, and if data was available). Data was provided by the following agencies:

- Siskiyou County and participating jurisdiction GIS departments
- SCOES
- FEMA’s National Flood Hazard Layer
- University of Wisconsin–Madison Spatial Analysis for Conservation and Sustainability Silvis Lab
- NOAA

Data was also obtained and utilized using Hazus-MH, Version 2.2 SP1, a program administered by the FEMA used to model losses. Modelling for hazards uses Hazus analysis to estimate losses and projected impacts from historical and annualized hazard events. Hazus default data was used in the analysis, including the 2020 Census and other State and Federal government facility databases. A level I analysis was run in Hazus for flood and earthquake, meaning the default population, building stock, and critical infrastructure data within the program was used to calculate losses and damages. Multiple hazard scenarios were run to estimate losses for the identified hazards. For the earthquake and hurricane

hazards, historic event scenarios and probabilistic scenarios were run. Flood losses were analyzed using the 100 return scenarios as well as a probabilistic scenario.

Where appropriate, other utilized modeling types and systems are detailed in the relevant hazard analysis section.

5.6 Jurisdictional Critical Facilities, Assets, and Community Lifelines

Certain facilities and assets, such as infrastructure and community lifelines, have a net positive value on the community as they contribute to the public good by facilitating the basic functions of society. These facilities maintain order, public health, education, and help the economy function. Additionally, there are infrastructure and facilities integral to disaster response and recovery operations. Conversely, some infrastructure and facilities are of extreme importance due to the negative externalities created when they are impacted by a disaster. What fits these definitions will vary slightly from community to community, but the definitions remain as a guideline for identifying critical facilities and infrastructure. Siskiyou County maintains critical facility details under separate cover for security purposes. For this LHMP, it is assumed that all critical facilities are at equal risk to non-point hazard occurrence but may have varying risk to point hazard occurrence (dam failure and flood). Data concerning critical facilities potentially impacted by these point hazards, as available, is detailed under the respective hazard section.

Each hazard section provides a discussion on potentially vulnerable community lifelines. Community lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security, and include safety, health, energy, communication, transportation, and water systems.

5.7 Hazard Profiles

Each identified hazard is profiled in the subsequent sections, with the level of detail varying based on available information. Sources of information are cited in the detailed hazard profiles below.

For hazards that have a higher chance of occurrence for specific jurisdictions throughout Siskiyou County, a discussion is provided as to the differing levels of potential vulnerability. All other hazards have been determined to have an equal chance of occurrence for all participating jurisdictions.

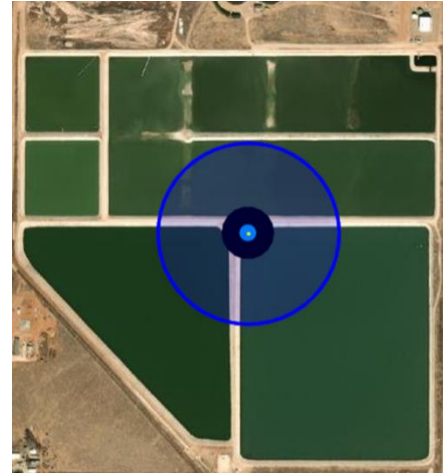
The following hazards are presented in alphabetical order, and not by planning significance, for ease of reference.

5.8 Dam Failure

5.8.1 Hazard Description

A dam is a barrier across flowing water that obstructs, directs, or slows down the flow, often creating a reservoir, lake, or impoundment. Most dams have a section called a spillway or weir, over or through, which water flows, either intermittently or continuously. Dams commonly come in two types, embankment (the most common) and concrete (gravity, buttress, and arch), as well as sizes. They also serve a number of purposes and provide essential benefits, including drinking water, irrigation, hydropower, flood control, and recreation.

Large or small, dams have a powerful presence that is frequently overlooked until a failure occurs. Dams fail in two ways, a controlled spillway release done to prevent full failure, or the partial or complete collapse of the dam itself. In each instance, an overwhelming amount of water, and potentially debris, is released. Dam failures are rare, but when they do occur, they can cause loss of life and immense damage to property, critical infrastructure, and the environment.



Possible reasons for dam failure include but are not limited to:

- Sub-standard construction materials/techniques
- Spillway design error
- Geological instability caused by changes to water levels during filling or poor surveying
- Sliding of a mountain into the reservoir
- Poor maintenance, especially of outlet pipes
- Human, computer, or design error
- Internal erosion, especially in earthen dams
- Earthquakes
- Terrorism

There are three classifications of dam failure, hydraulic, seepage, and structural. The following is an explanation of each of these failure classifications:

- **Hydraulic:** This failure is a result of an uncontrolled flow of water over and around the dam structure as well as the erosive action on the dam and its foundation. The uncontrolled flow causing the failure is often classified as wave action, toe erosion, or gulying. Earthen dams are particularly susceptible to hydraulic failure because earthen materials erode more quickly than other materials, such as concrete and steel. This type of failure constitutes approximately 40% of all dam failures.
- **Seepage:** Seepage is the velocity of an amount of water controlled to prevent failure. This occurs when the seepage occurs through the structure to its foundation, where it begins to erode within. This type of failure accounts for approximately 4% of all dam failures.
- **Structural:** A failure that involves the rupture of the dam or the foundation by water movement, earthquake, or sabotage. When weak materials construct dams (large, earthen dams) are the primary cause of this failure. Structural failure occurs with approximately 30% of dam failures.

5.8.2 Location and Extent

The California Department of Water Resources Division of Safety of Dams oversees all dam safety programs. These programs are responsible for developing and maintaining an inventory of dams, classifying dams, and ensuring the compliance of all regulated dams.

Dams in the State of California are ranked by Dam Hazard Classification, which is determined by the potential for infrastructure and property damage downstream if a dam failure were to occur. Current Dam Hazard Classifications are:

Table : Dam Hazard Potential Classification

Hazard Classification	Potential Downstream Impacts	Number of Dams
Low	No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner’s property.	12
Significant	No probable loss of human life but can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.	3
High	Expected to cause loss of at least one human life.	3
Extremely High	Expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.	1

Source: National Inventory of Dams

The U.S. Army Corps of Engineers National Inventory of Dams (NID) program indicates that there are 19 dams in Siskiyou County, with two extremely high hazard dams, Copco No. 1 and Iron Gate recently removed. Additionally, the NID provides a condition assessment on each dam. The definition of dam condition assessment are as follows:

- **Satisfactory:** No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions in accordance with state engineers’ rules and regulations for dams or tolerable risk guidelines.
- **Fair:** No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic incidents may result in a dam safety deficiency. Risk may be in the range to take further action.
- **Poor:** A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A poor condition is used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary.
- **Unsatisfactory:** A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

As low and significant hazard dams were determined by the MPC to be of minimal concern, the following table details information concerning the four identified extremely high and high hazard dams within the county:

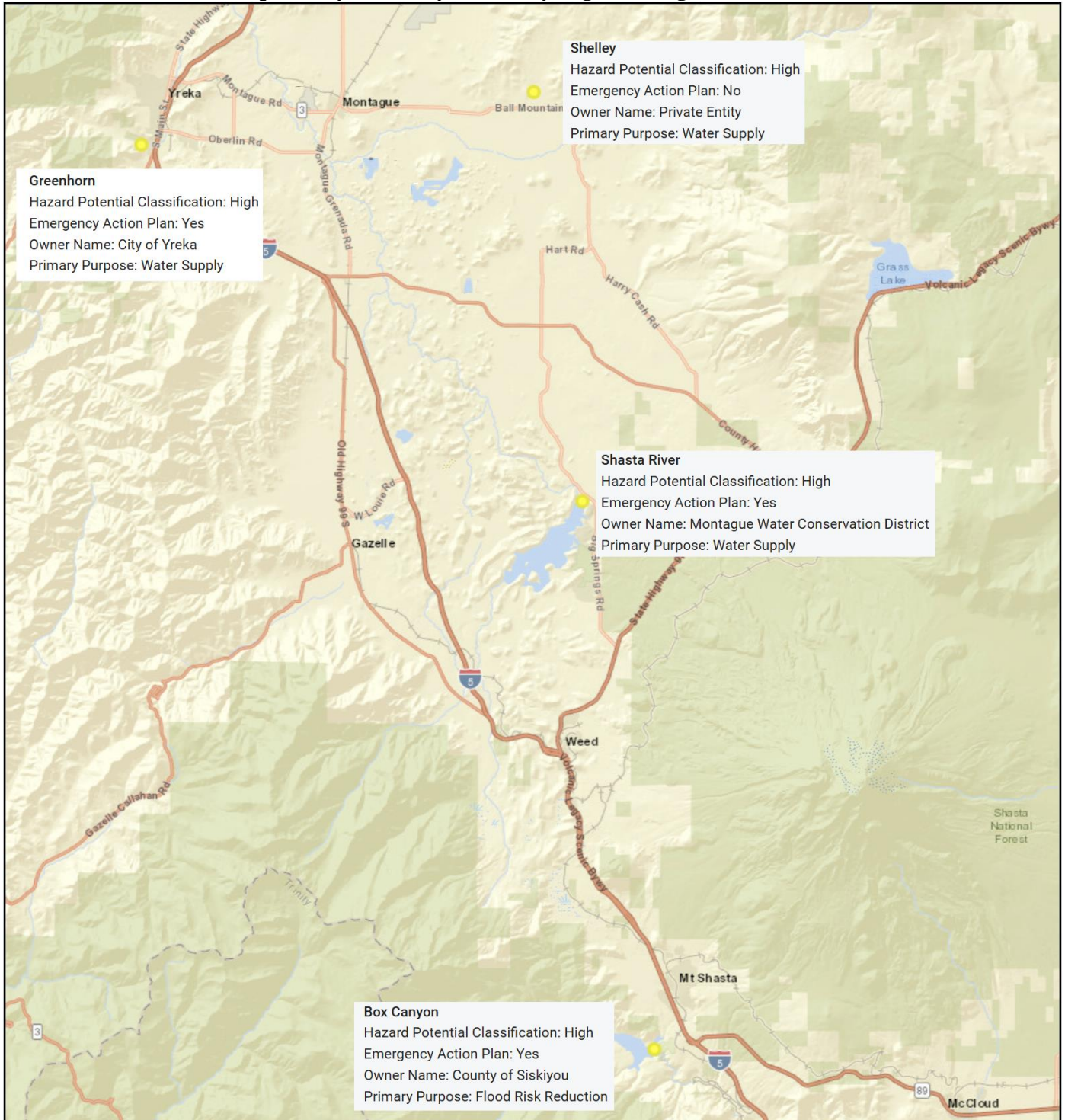
Table : Siskiyou County Extremely High and High Hazard Dams

NID Number	Name	Nearest Jurisdiction	Owner	Hazard Potential Classification	Condition Assessment	Emergency Action Plan
CA008889	Box Canyon	Dunsmuir	Siskiyou County	Extremely High	Satisfactory	Yes
CA00244	Shasta River	Montague	Montague Water Conservation District	High	Satisfactory	Yes
CA00826	Greenhorn	Yreka	City of Yreka	High	Satisfactory	Yes
CA00926	Shelley	Montague	Private Entity	High	Satisfactory	No

Source: NID

The following map, from the NID, indicates the location of extremely high and high hazard dams within Siskiyou County:

Map : Siskiyou County Extremely High and High Hazard Dams



Source: National Inventory of Dams

5.8.3 Previous Occurrences

Data from the National Performance of Dams Program at Stanford University indicates Siskiyou County has had no reported dam failure incidents.

5.8.4 Probability of Future Incidents

Despite no historical occurrences of dam failure, there remains a significant concern due to the presence of one extremely high hazard dam within the county. The probability of dam failure events is not easily measured, but may be aligned with:

- The probability of future flood events
- Preventative measures taken by dam owners and operators, maintenance and repair
- Frequent condition inspections
- Proper operating procedures

At present, there is no history of a dam failure of any size in Siskiyou County or its participating jurisdictions. In lieu of any historical events, the next best prediction tool would be based on the structural state of the dam. However, maintenance and structural information on the dams was not available for public use. As such, available historic occurrence data suggests that there is a near zero percent probability of dam failure in a given year. However, it is important to note that the lack of past incidents does not protect against future incidents.

The California Department of Water Resources Division of Safety of Dams conducts routine monitoring and inspection of dams within the state on an identified schedule, with priority placed on those dams which pose the greatest potential threat. However, to fully determine the probability of a future event, a full engineering inspection would need to be completed on each dam, something beyond the scope of this plan.

Dams undergoing repair and/or reconstruction are required to be designed to pass at least the 1%-annual-chance rainfall event with one foot of freeboard. The most critical and hazardous dams are required to meet a spillway design standard much higher than passing the runoff from a 1%-annual-chance rainfall event. Although not all the dams have been shown to withstand the 1%-annual-chance rainfall event, most of the dams meet this standard due to original design requirements or recent spillway upgrades.

5.8.5 Projected Changes in Hazard Location, Intensity, Frequency, and Duration

As indicated by California's Fourth Climate Change Assessment, Siskiyou County is likely to see less available water for both storage and recreation. A warming climate will continue to decrease the snowpack, which has been steadily declining. Combined with the predicted decrease in annual rainfall, it is likely that smaller amounts of water will be available for storage in lakes and reservoirs. Additionally, the changing climate and resultant higher temperatures is likely to increase the rate of water usage while concurrently increasing evaporation from surface waters. As such, it is expected that the amount of water stored behind dams in Siskiyou County will potentially decrease, lessening the potential impact of this hazard.

However, a potential outcome of changing climate in Siskiyou County is an increase in extreme precipitation events which may lead to more severe floods and a greater risk of dam failure. Additional projected greater periods of drought conditions and high heat may result in ground cracking, a reduction of soil strength, erosion, and subsidence in earthen dams.

The 2018 National Climate Assessment report indicates that much of the water infrastructure in the United States, including dams, is nearing the end of its planned life expectancy. As indicated in the report:

- "Aging and deteriorating dams and levees also represent an increasing hazard when exposed to extreme or, in some cases, even moderate rainfall. Several recent heavy rainfall events have led to dam, levee, or critical infrastructure failures, including the Oroville emergency spillway in California in 2017, Missouri River levees in 2017, 50 dams in South Carolina in October 2015 and 25 more dams in the state in October 2016, and New Orleans levees in 2005 and 2015. The national exposure to this risk has not yet been fully assessed."

At present there is no comprehensive assessment of the climate-related vulnerability and risks to existing dams. Additionally, there are no common design standards concerning the repair or modification of existing dams nor for the design and construction of new dams operated in the face of changing climate risk.

Land use trends can significantly impact a community's vulnerability to dam failure. The way land is developed and used in proximity to dams can influence the potential consequences of failure, affecting the safety of residents and infrastructure. Development in potential dam failure inundation areas without adequate consideration for flood risk increases vulnerability. Increased urbanization and population density near dams can intensify the consequences of failure. Higher population density means more people and assets are at risk, leading to greater potential for loss of life and property damage. However, Siskiyou County and participating stakeholder communities are seeing a decrease in population, potentially lowering the vulnerability to a dam failure event.

The location of critical infrastructure, such as hospitals, schools, and emergency services, in close proximity to dams or levees can heighten vulnerability. Infrastructure assets may be at risk of damage or disruption, impacting the community's ability to respond effectively to a failure. However, Siskiyou County and participating stakeholder communities are not projecting any major infrastructure projects or growth in the number of structures, potentially lowering the vulnerability to a dam failure event.

5.8.6 Vulnerability and Impact Analysis

FEMA NRI

The National Risk Index does not provide rankings for the dam failure hazard.

Extremely High Hazard and High Hazard Dam Failure Inundation Mapping

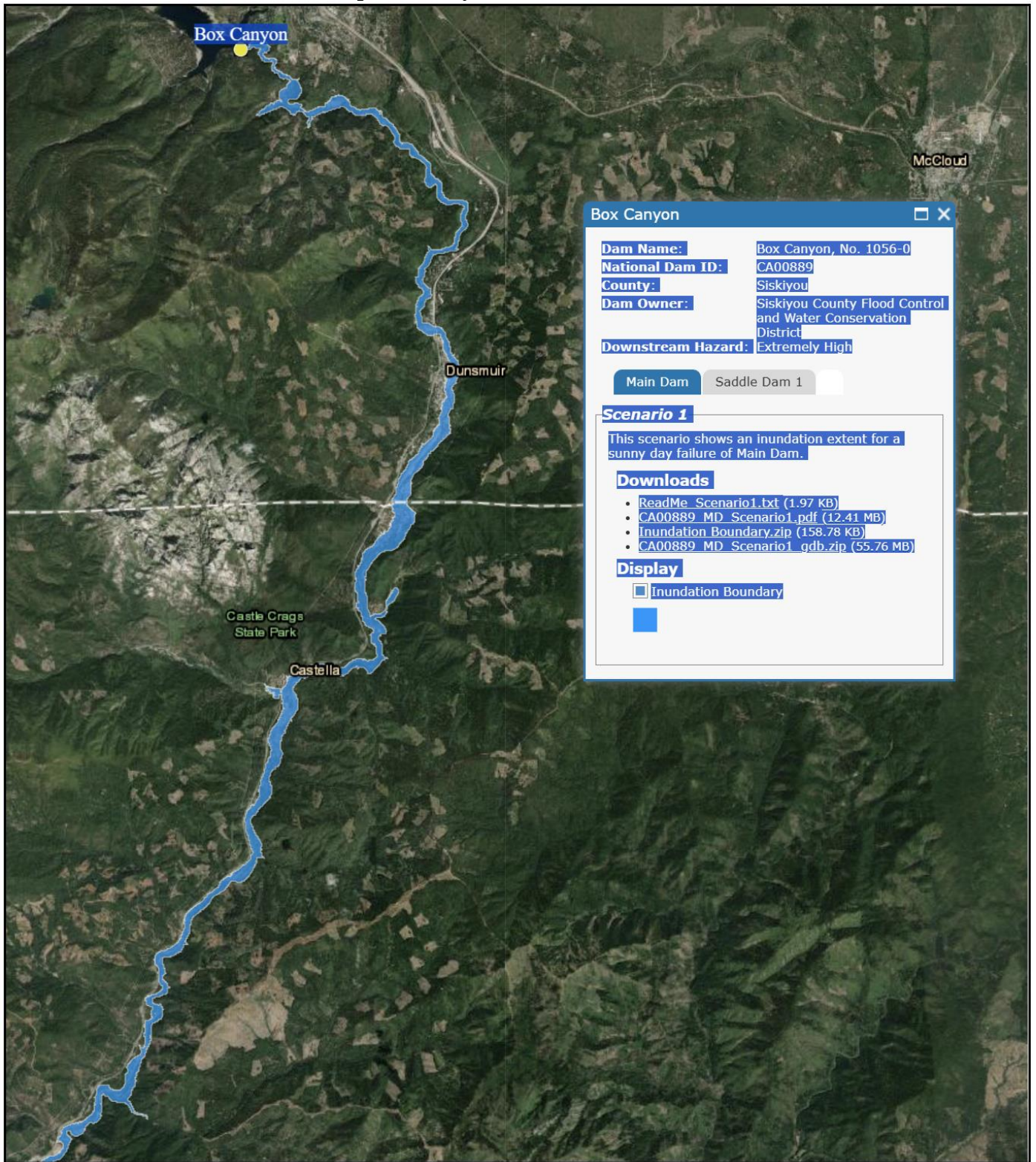
Dams in the State of California with an extremely high or high Hazard classification are required to have an Emergency Action Plan. An Emergency Action Plan delineates:

- Incidents that can lead to emergency conditions and failure
- Downstream locations that could be affected by a failure event
- Actions to be taken to minimize property damage, infrastructure loss, and loss of life

In general, the dam owner is responsible for development and maintenance of the Emergency Action Plan.

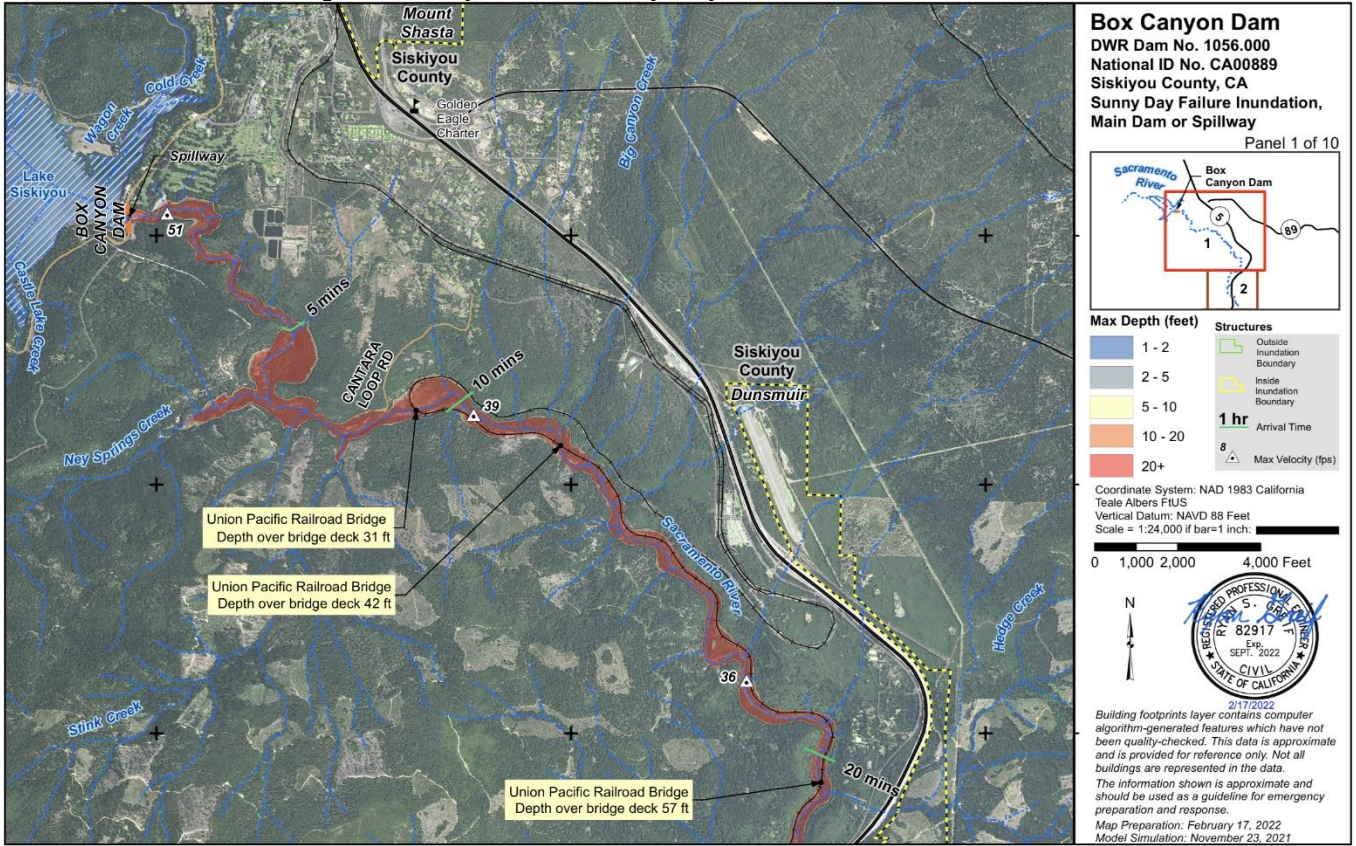
In order to understand the potential risk to Siskiyou County, efforts were made to review all available Emergency Action Plans for extremely high and high hazard dams. Data from the California Department of Water Resources Dam Breach Inundation Map Web Publisher, a repository of Emergency Action Plan inundation maps, was used for this review. The following maps indicate potential dam failure inundation areas for extremely high and high hazard dams in Siskiyou County:

Map: Box Canyon Dam Inundation Zone



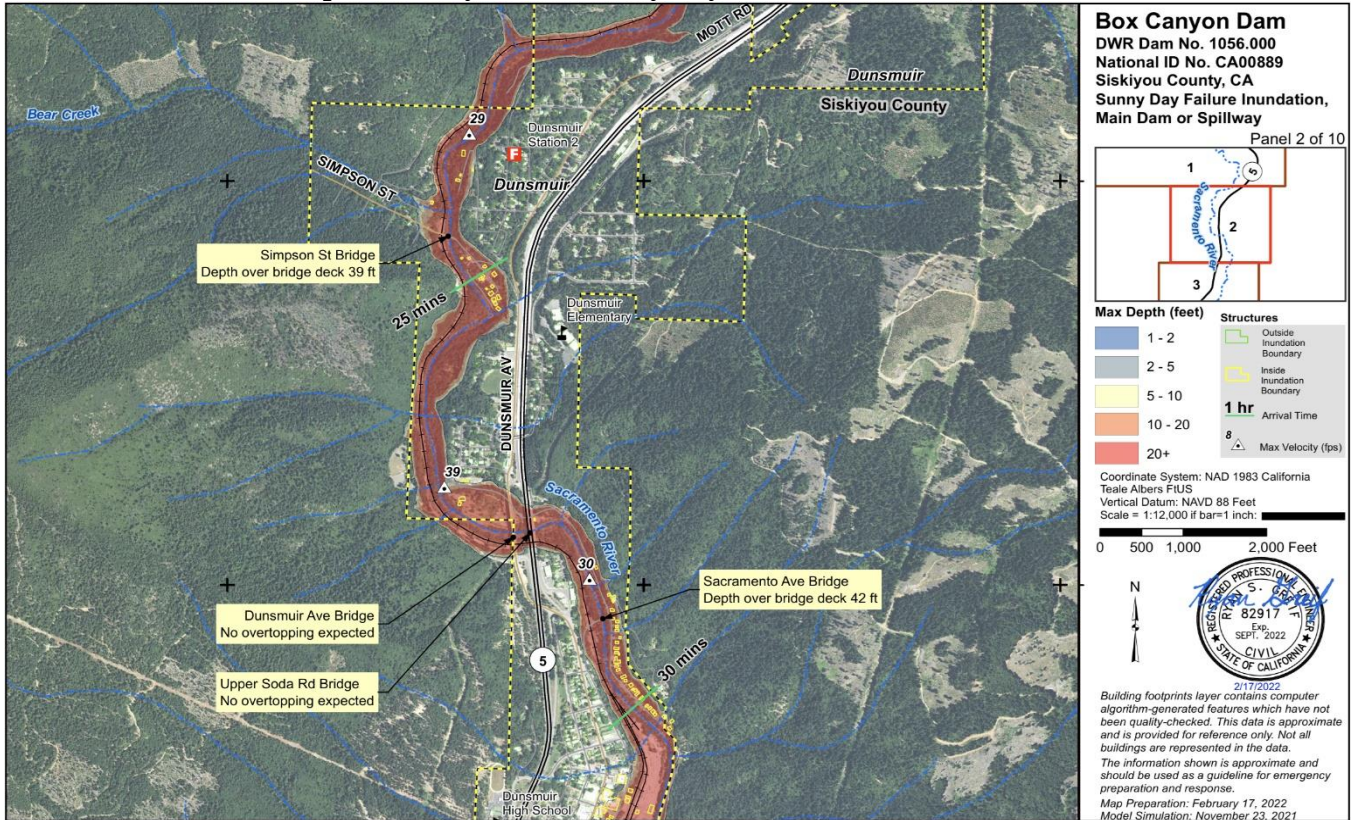
Source: California Department of Water Resources Dam Breach Inundation Map Web Publisher

Map: Box Canyon Dam Sunny Day Failure Inundation, Panel 1



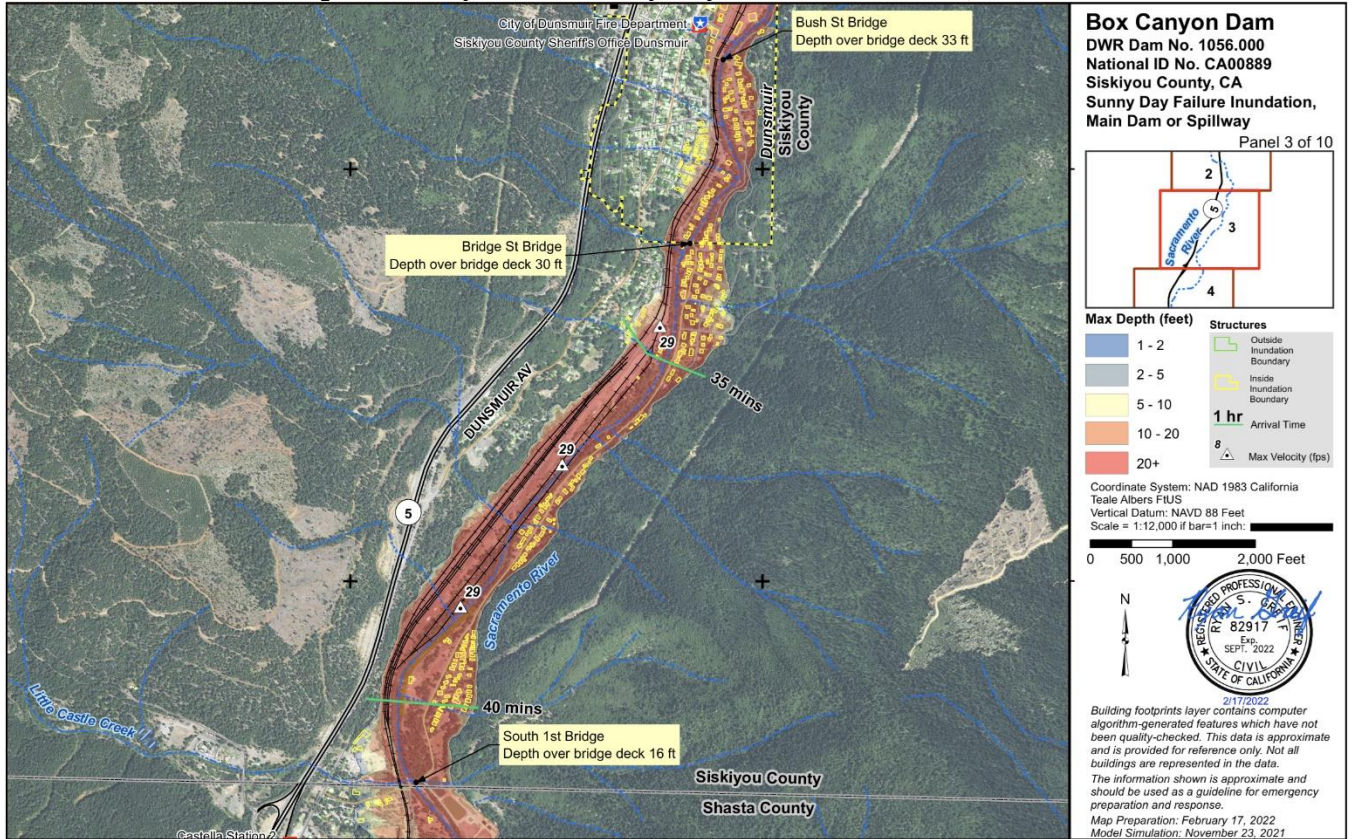
Source: Box Canyon Dam Sunny Day Failure Inundation, Main Dam or Spillway

Map: Box Canyon Dam Sunny Day Failure Inundation, Panel 2



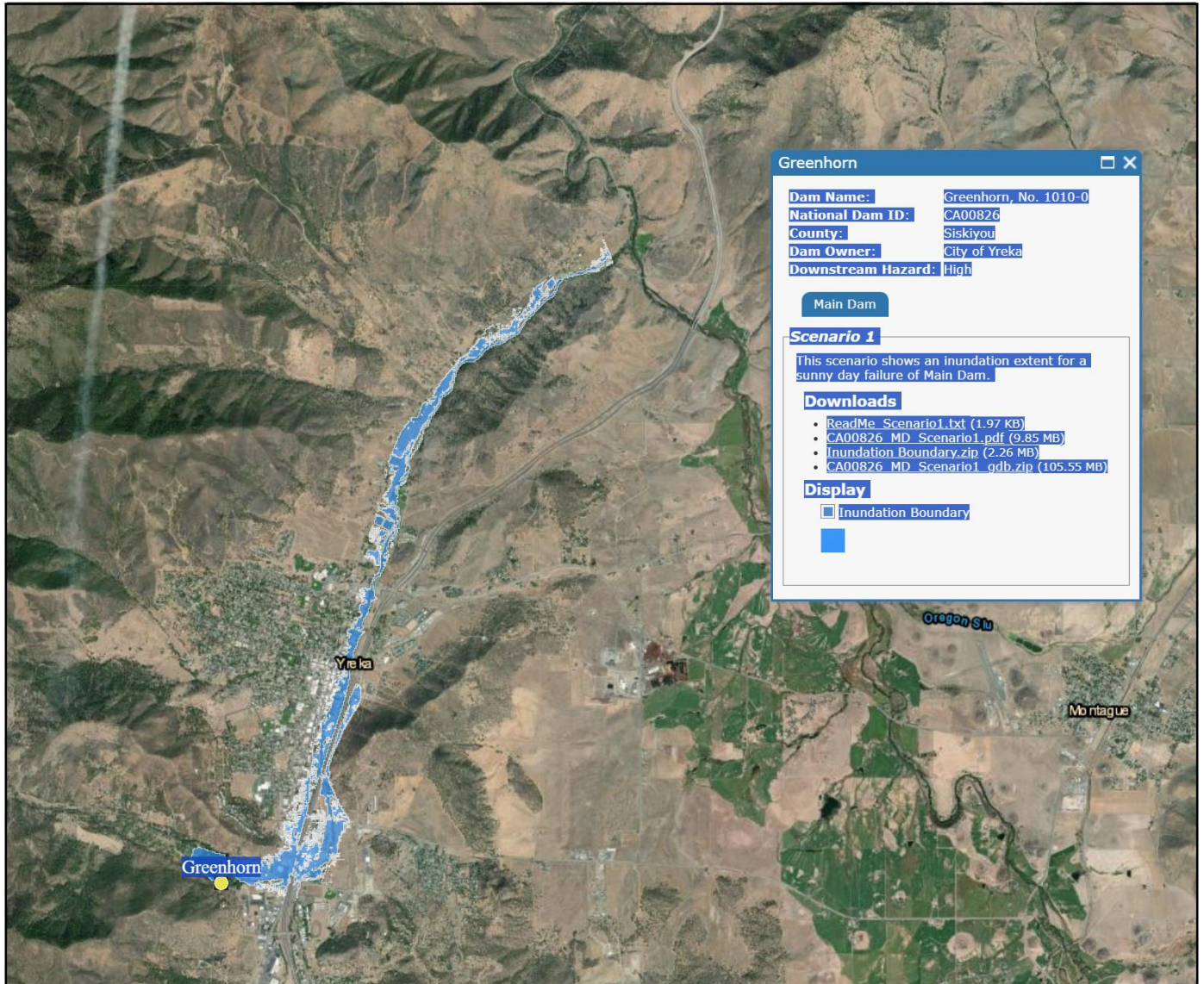
Source: Box Canyon Dam Sunny Day Failure Inundation, Main Dam or Spillway

Map: Box Canyon Dam Sunny Day Failure Inundation, Panel 3



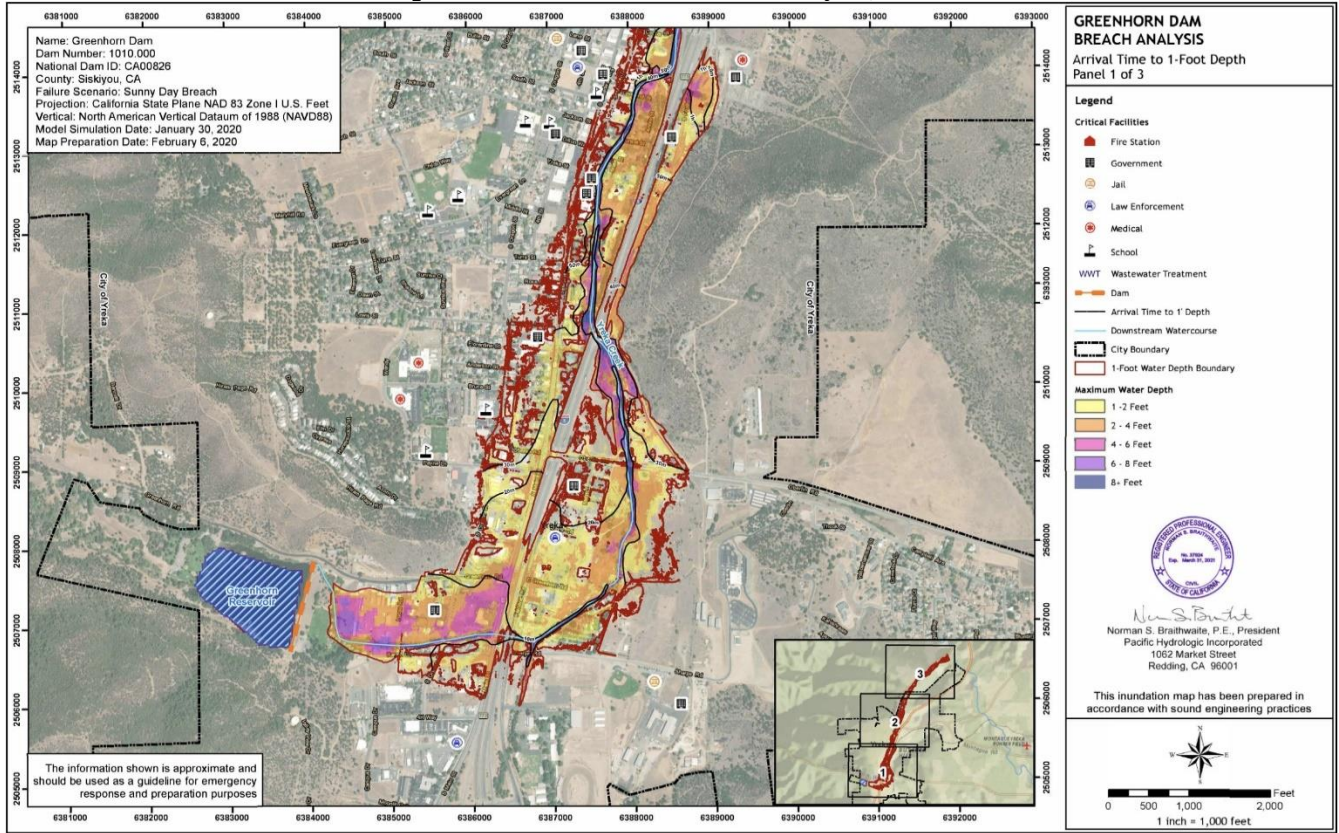
Source: Box Canyon Dam Sunny Day Failure Inundation, Main Dam or Spillway

Map : Greenhorn Dam Inundation Zone



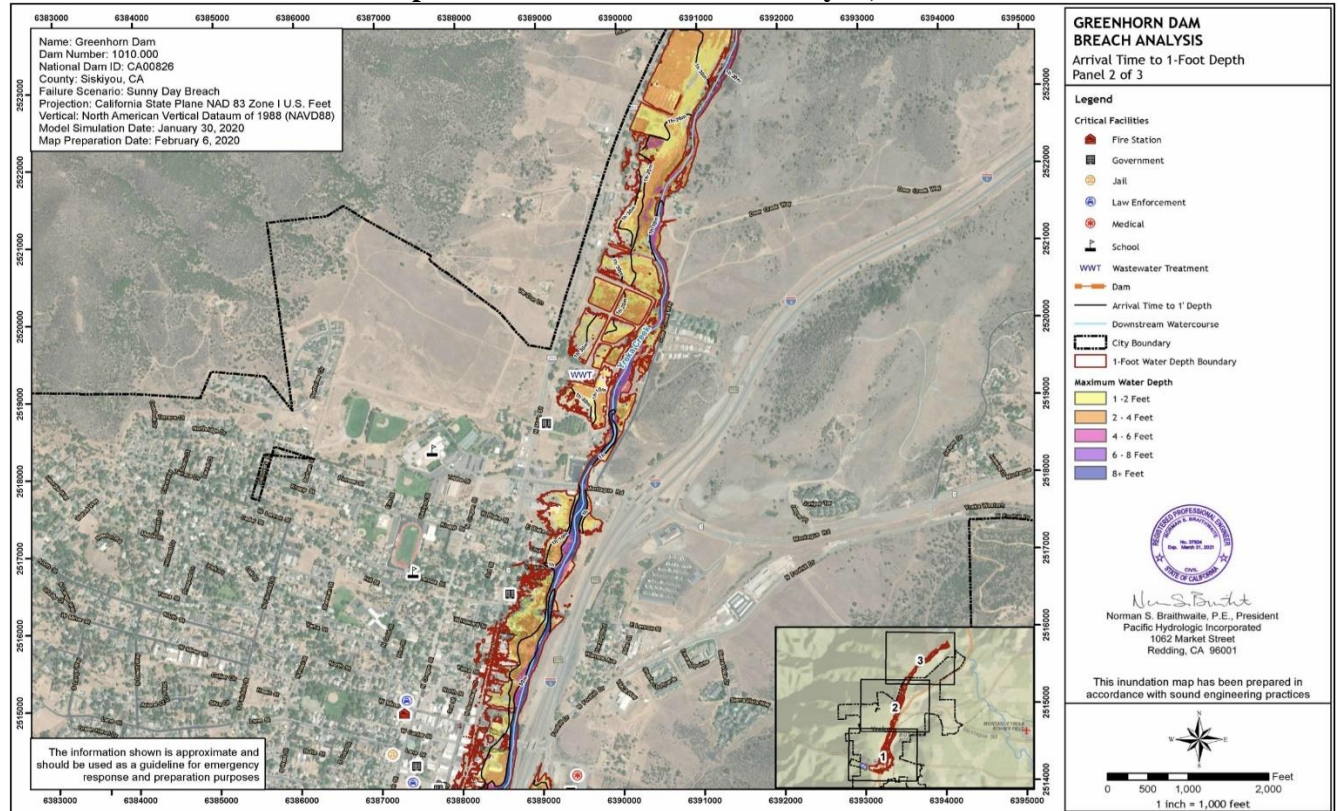
Source: Dam Breach Inundation Map Publisher

Map : Greenhorn Dam Breach Analysis, Panel 1



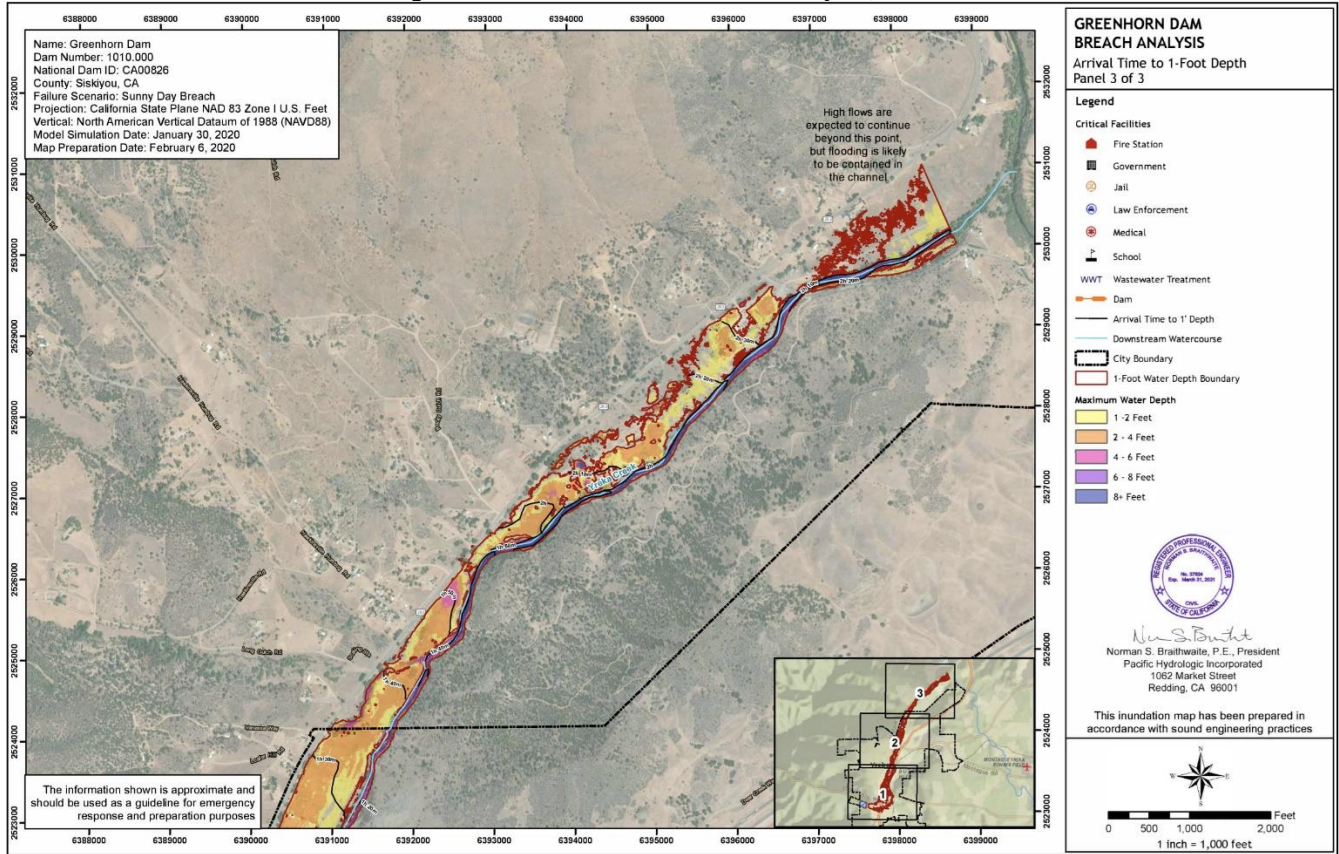
Source: Greenhorn Dam Breach Analysis

Map : Greenhorn Dam Breach Analysis, Panel 2



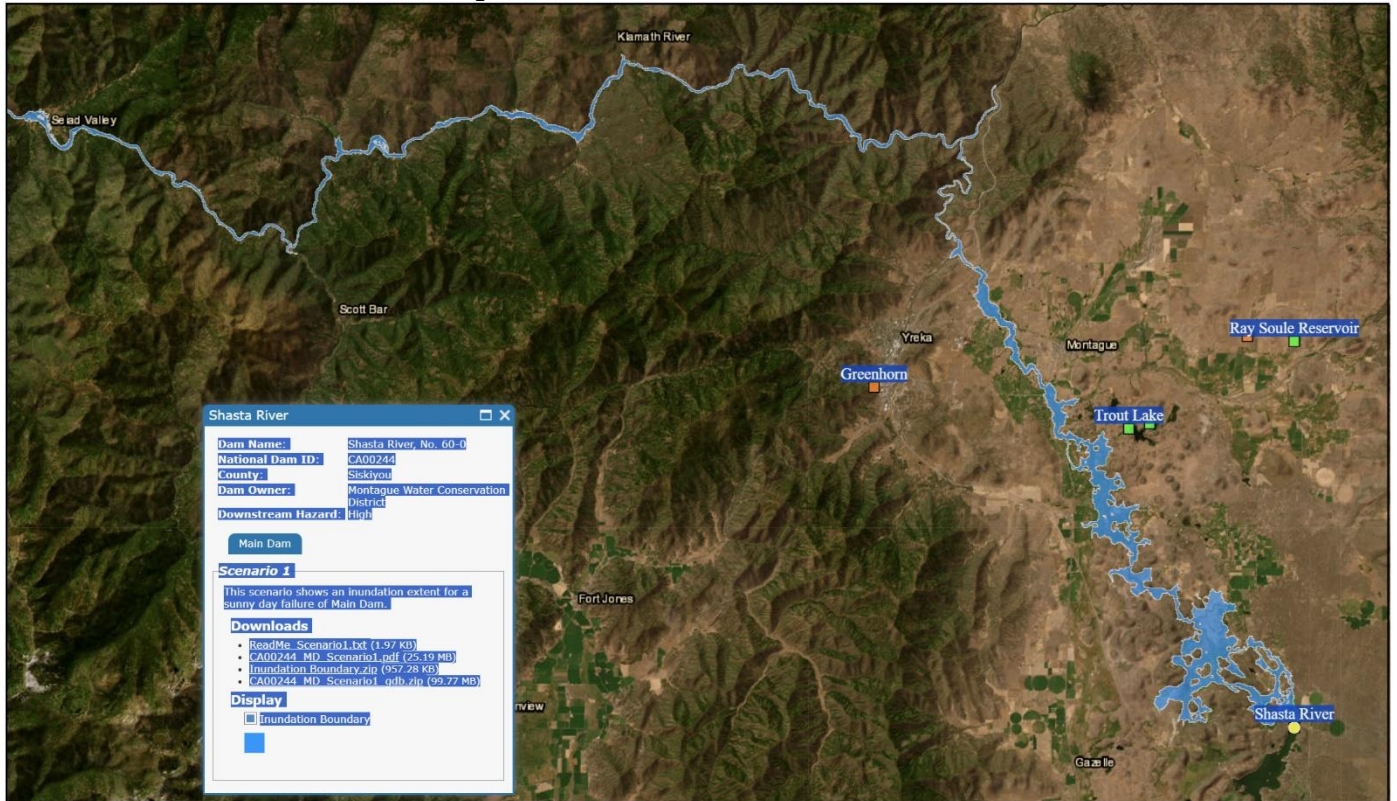
Source: Greenhorn Dam Breach Analysis

Map : Greenhorn Dam Breach Analysis, Panel 3



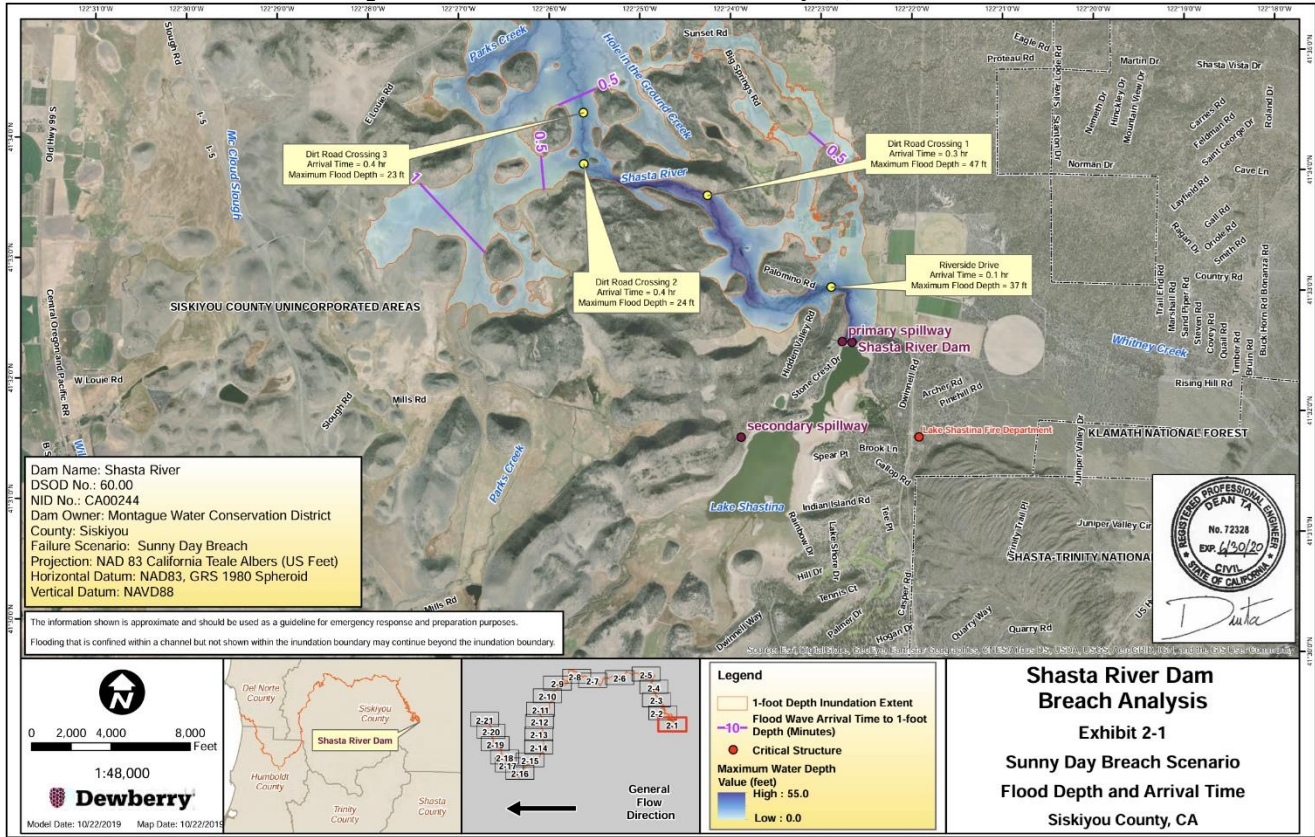
Source: Greenhorn Dam Breach Analysis

Map : Shasta River Dam Inundation Zone



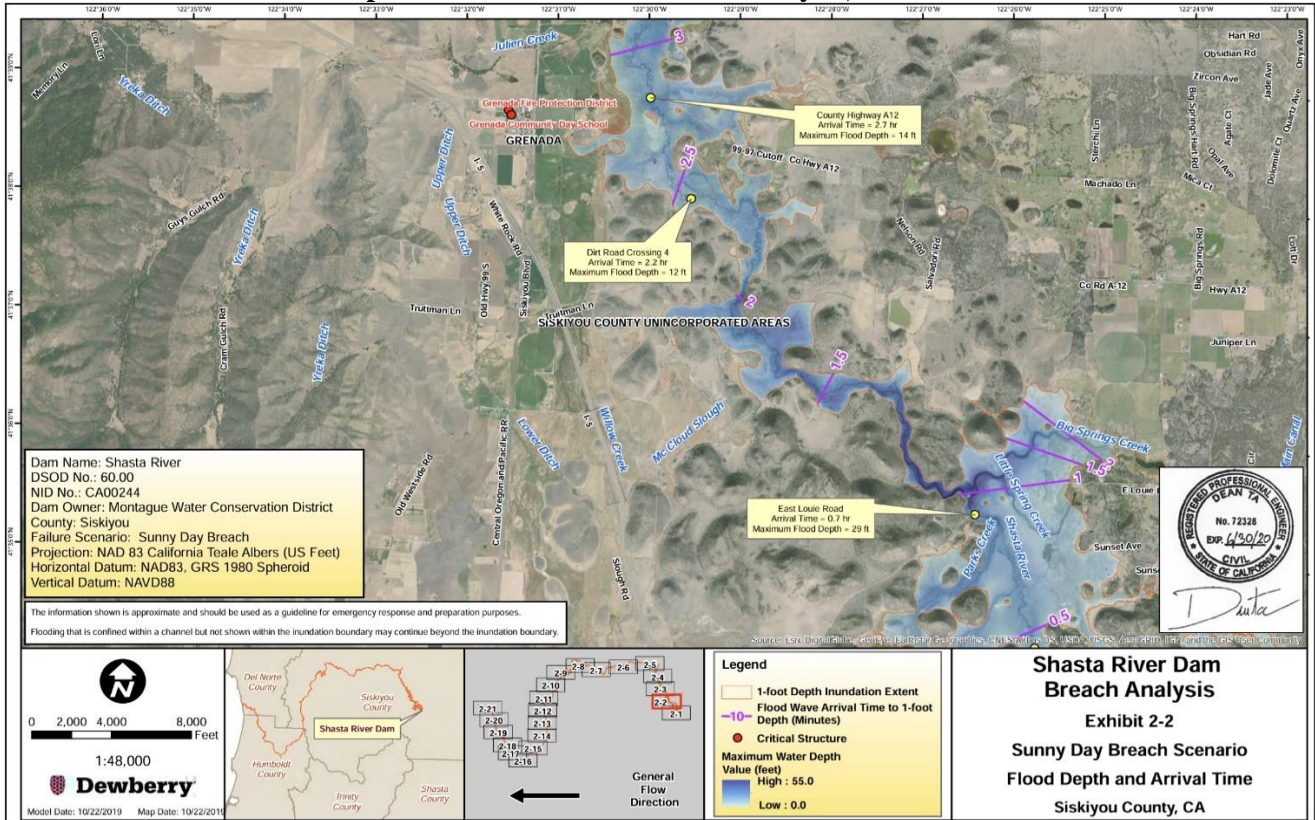
Source: Dam Breach Inundation Map Publisher

Map : Shasta River Dam Breach Analysis, Exhibit 2-1



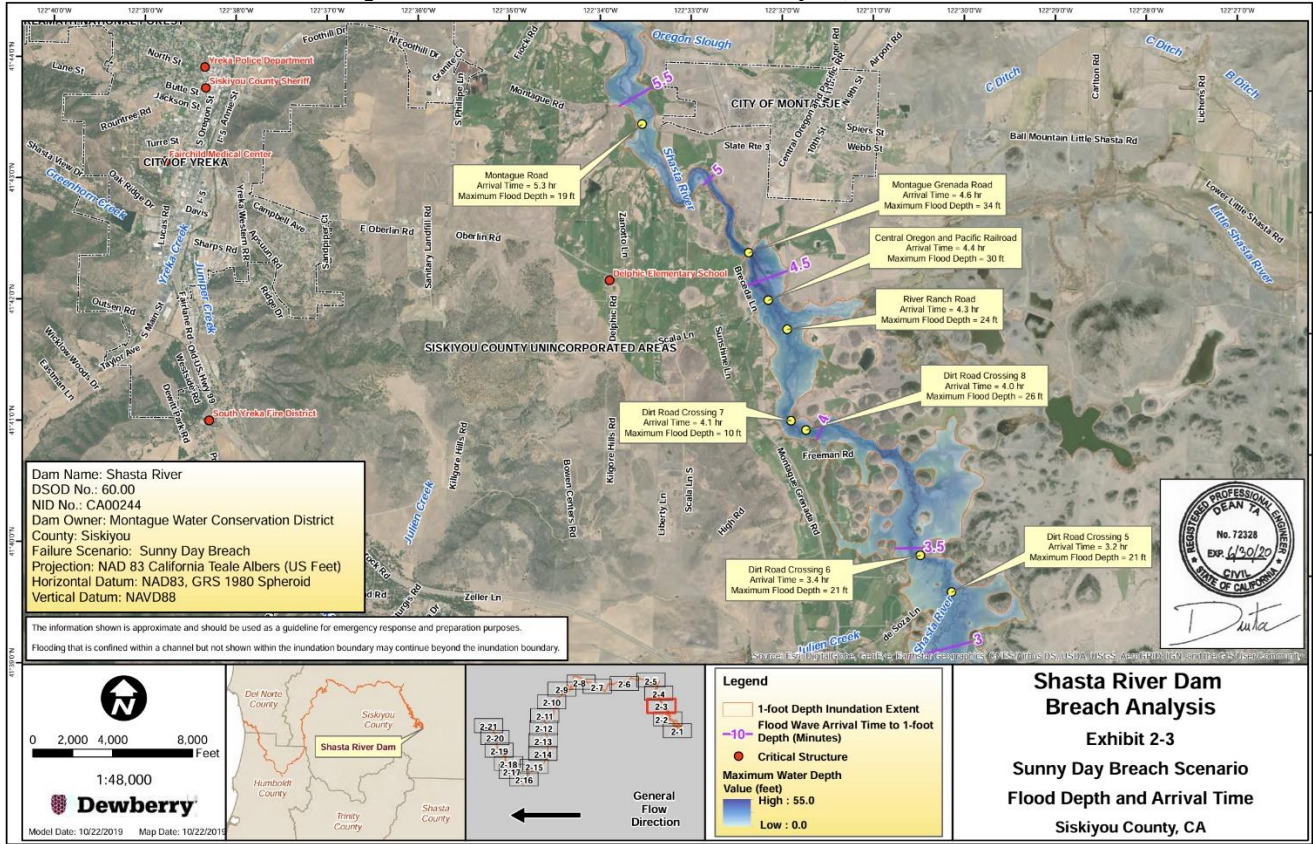
Source: Shasta River Dam Breach Analysis

Map : Shasta River Dam Breach Analysis, Exhibit 2-2



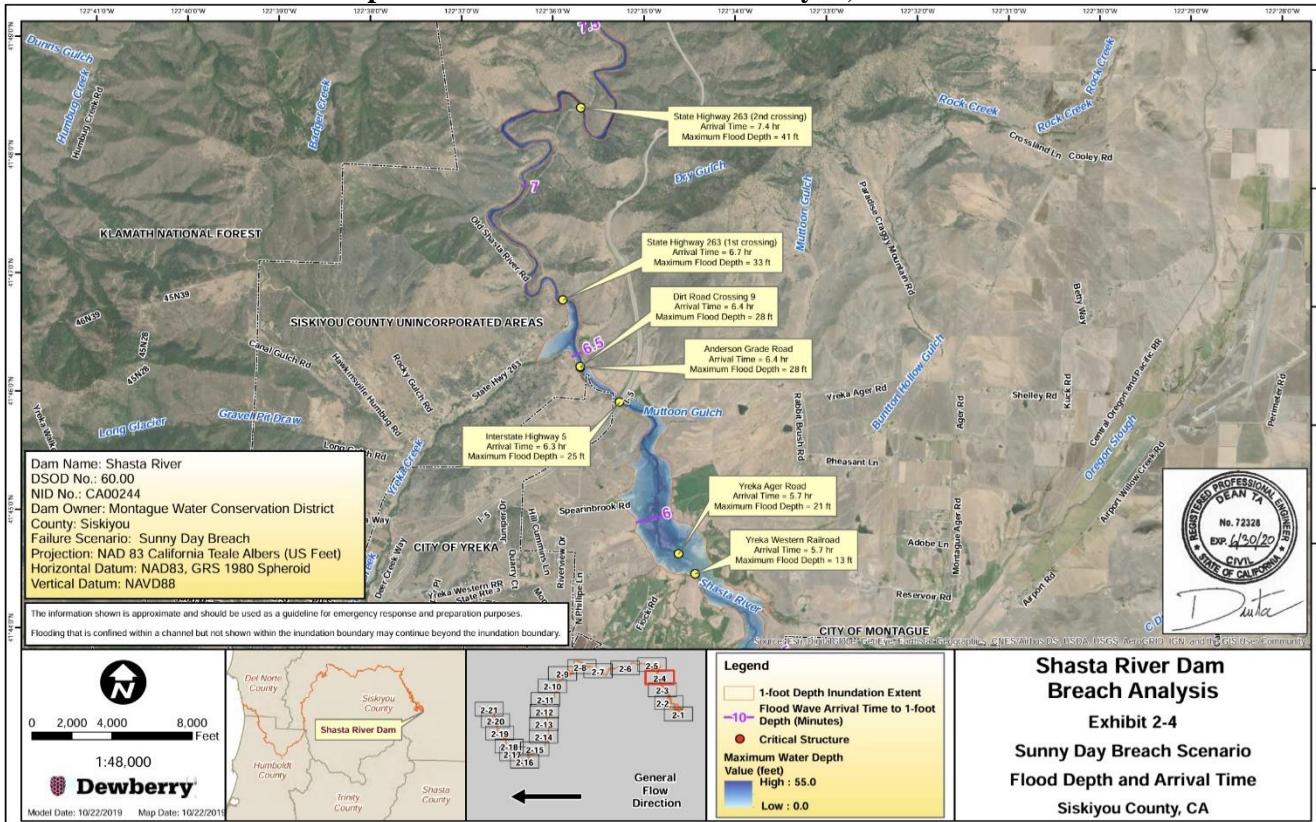
Source: Shasta River Dam Breach Analysis

Map : Shasta River Dam Breach Analysis, Exhibit 2-3



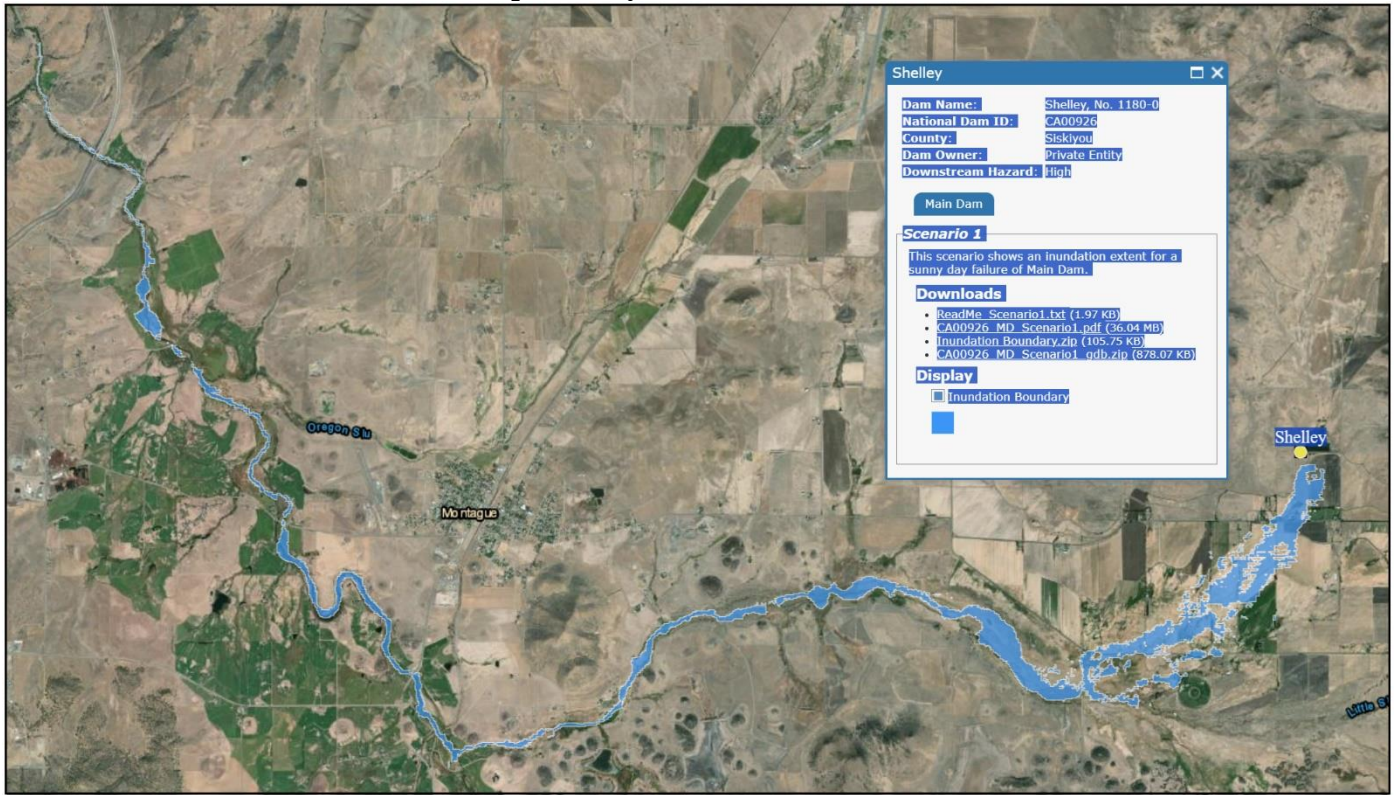
Source: Shasta River Dam Breach Analysis

Map : Shasta River Dam Breach Analysis, Exhibit 2-4



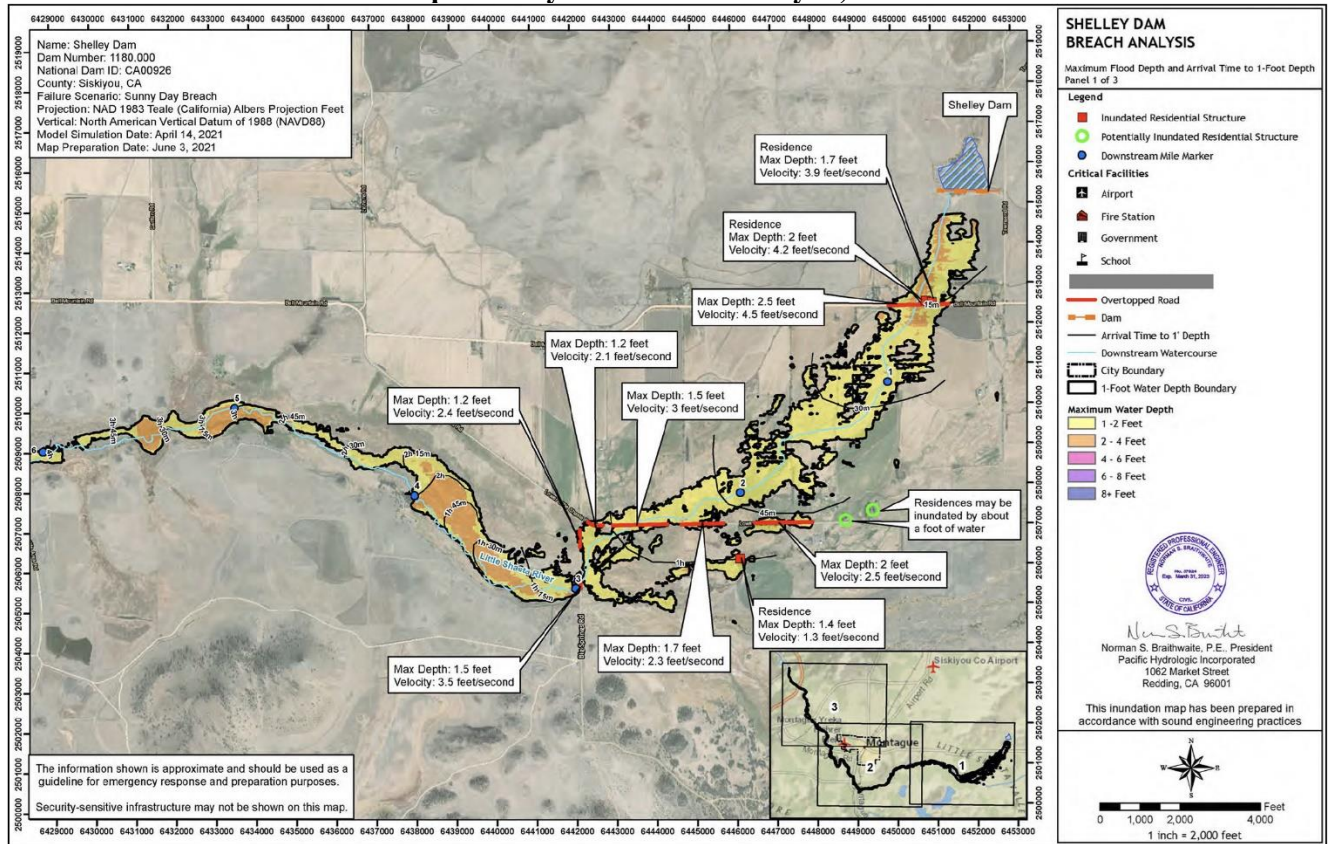
Source: Shasta River Dam Breach Analysis

Map : Shelley Dam Inundation Zone



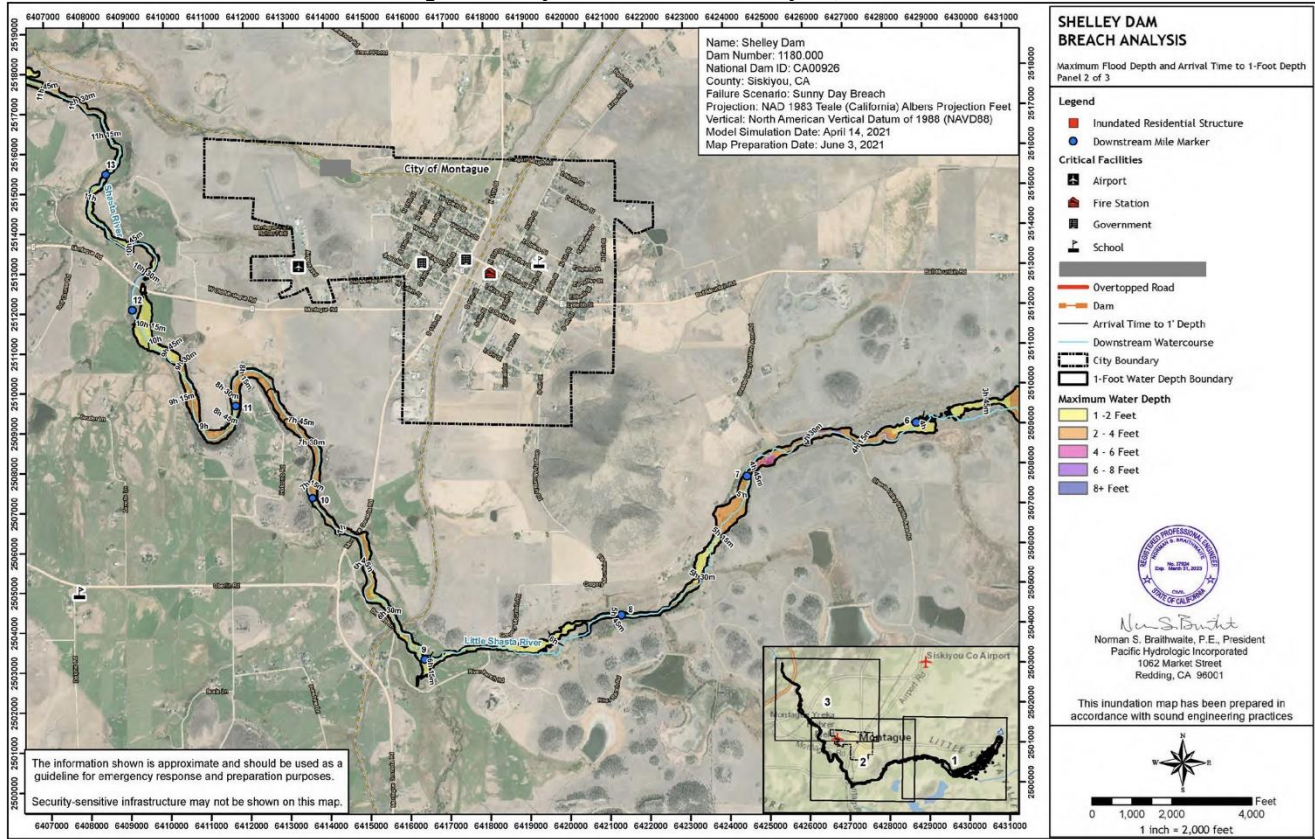
Source: Dam Breach Inundation Map Publisher

Map : Shelley Dam Breach Analysis, Panel 1



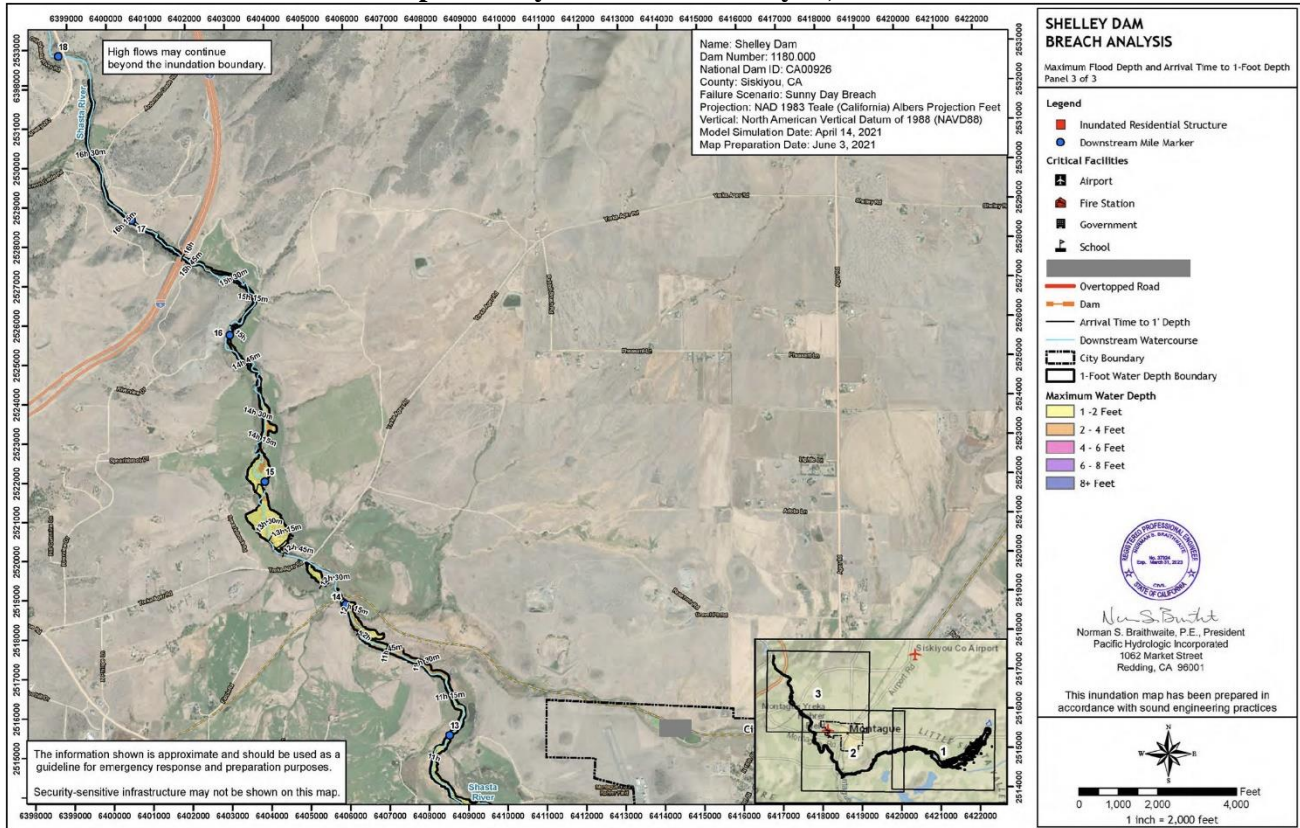
Source: Shelley Dam Breach Analysis

Map : Shelley Dam Breach Analysis, Panel 2



Source: Shelley Dam Breach Analysis

Map : Shelley Dam Breach Analysis, Panel 3

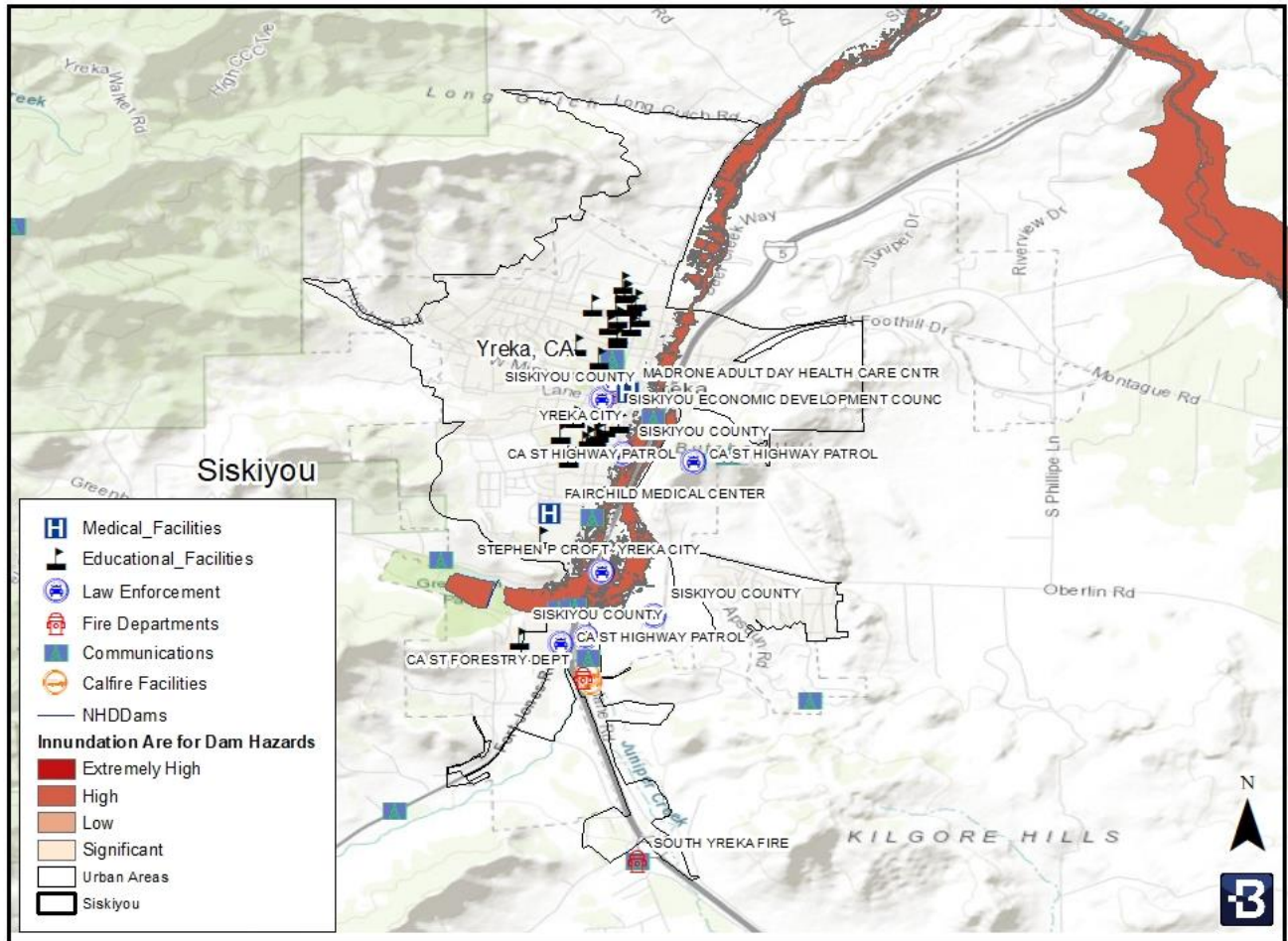


Source: Shelley Dam Breach Analysis

Community Lifelines and Critical Facilities in and Near Inundation Areas

The following maps illustrate community lifelines and critical facilities in and near dam failure inundation areas for extremely high and high hazard dams. Please note that Box Canyon Dam, Shasta River Dam, and Shelly Dam have no such facilities in mapped inundation areas.

Map : Community Lifelines and Critical Facilities in and Near Greenhorn Dam Inundation Area



Source: Siskiyou County and BOLDplanning

Population

A dam failure event can have devastating and wide-ranging impacts on both people and communities. The severity of these impacts depends on the volume of water released and the location of the dam in relation to communities, and may include:

- **Loss of Life:** The sudden release of a large volume of water can result in flooding downstream, leading to drowning and casualties. The loss of life can be particularly high if a dam failure occurs in highly populated areas or when people are unable to evacuate in time.
- **Long Term Displacement:** People living downstream may be forced to evacuate their homes leading to displacement and requiring long-term shelter assistance.
- **Economic Consequences:** Both property damage and the disruption of transportation and utilities could affect local economies.
- **Psychological Trauma:** Survivors of dam failure events may experience psychological trauma, including post-traumatic stress disorder and anxiety.

As of this plan, a complete analysis has not been conducted on the potential impact of a dam failure event on the population of Siskiyou County. However, the following table, utilizing data from the U.S. Census Bureau, the California

Department of Water Resources Dam Breach Inundation Map Web Publisher, and GIS analysis, provides an estimate of the potentially impacted population from a dam failure by jurisdiction:

Table : Potentially Impacted Population, Dam Failure

Jurisdiction	Potentially Impacted Population
Siskiyou County	6,845
Dorris	0
Dunsmuir	345
Etna	0
Montague	0
Mt. Shasta	0
Tulelake	0
Weed	0
Yreka	6,500

Source: U.S. Census Bureau, California Department of Water Resources Dam Breach Inundation Map Web Publisher

Additionally, the loss of community lifelines can have a direct economic impact on the population. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table : Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	\$199
Loss of Wastewater Services	\$66
Loss of Water Services	\$138
Loss of Communications/Information Technology Services	\$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

Buildings and Structures

Any structure within an identified inundation zone of a dam failure will be potentially impacted (depending on the severity on the failure incident). Potential impacts may include:

- **Structural Damage:** Facilities located downstream could sustain severe structural damage. Floodwater can inundate buildings, causing structural failures, collapsing walls, and damaging foundations. This can render facilities inoperable or unsafe for use.
- **Equipment and System Damage:** Equipment and systems can be severely damaged or destroyed by floodwater and debris carried by the flood. This can include electrical systems, water and wastewater systems, machinery, data centers, and communication equipment.
- **Long-Term Recovery:** The recovery process could be lengthy and resource intensive. It may involve rebuilding damaged infrastructure, restoring functionality, and implementing measures to prevent future vulnerabilities.

As of this plan, a complete analysis has not been conducted on the potential impact of a dam failure event on the buildings of Siskiyou County. However, the following table, utilizing data from the U.S. Census Bureau, the California Department of Water Resources Dam Breach Inundation Map Web Publisher, and GIS analysis, provides an estimate of the potentially impacted buildings from a dam failure by jurisdiction:

Table : Potentially Impacted Population, Dam Failure

Jurisdiction	Potentially Impacted Buildings	Valuation
Siskiyou County	6,845	
Dorris	0	\$0
Dunsmuir		
Etna	0	\$0

Table : Potentially Impacted Population, Dam Failure

Jurisdiction	Potentially Impacted Buildings	Valuation
Fort Jones	0	\$0
Montague	0	\$0
Mt. Shasta	0	\$0
Tulelake	0	\$0
Weed	0	\$0
Yreka		

Source: U.S. Census Bureau, California Department of Water Resources Dam Breach Inundation Map Web Publisher

Governmental

Government operations may be immediately impacted, especially if any facilities are within the inundation area of failure. The extent of the impact depends on multiple factors concerning the extent of the failure, and may include:

- **Emergency Response and Management:** Jurisdictional response agencies may be called upon to respond to a failure event. They must coordinate rescue operations, evacuations, and disaster response efforts to mitigate the immediate risks to human life and property.
- **Public Health and Safety:** Jurisdictional public health agencies would provide support for public health needs during and after a dam failure, including responding to injuries, managing emergency shelters, and addressing potential health risks from contaminants or waterborne diseases.
- **Financial Impact:** A dam failure event can strain state budgets due to the costs associated with emergency response, infrastructure repair, environmental cleanup, and long-term recovery efforts. Local governments may need to allocate additional funds to address these needs.

The following table, utilizing information from the Greenhorn Dam Breach Analysis, details downstream government facilities likely to be impacted by a failure event:

Table : Greenhorn Dam Breach Analysis Impacted Infrastructure

Infrastructure Classification	Name	Square Footage	Arrival Time After Failure (minutes)	Maximum Flood Depth (feet)
Government	US Fish and Wildlife Department Service		5	2-4
Government	Siskiyou County Administration		22	1-2
Government	Siskiyou County Probation Department		50	1-2
Government	Siskiyou County Air Pollution		55	1-2

Source: Greenhorn Dam Breach Analysis and Siskiyou County

A review of identified inundation areas for Box Canyon Dam, Shasta River Dam, and Shelly Dam indicates that no government buildings in identified inundation areas.

Transportation and Electrical Infrastructure

The failure of a dam can have significant and wide-ranging impacts on transportation infrastructure, affecting roads, bridges, railways, and other critical components of transportation systems. Potential impacts may include:

- **Flooding and Erosion:** Dam failures can lead to rapid and extensive flooding, causing erosion of roadways and bridge foundations. This can result in the collapse or significant damage to roads and bridges, disrupting transportation routes.

- Extended Downtime: The repair of transportation infrastructure, especially major roads and bridges, can take a significant amount of time. During this period, transportation networks may be partially or entirely unavailable.

The following table, utilizing information from the Box Canyon Dam Sunny Day Failure Inundation, Main Dam or Spillway Map, details downstream transportation infrastructure likely to be impacted by a failure:

Table : Box Canyon Sunny Day Failure Impacted Infrastructure

Infrastructure Classification	Name	Arrival Time After Failure (minutes)	Maximum Flood Depth (feet)
Railroad	Union Pacific Railroad Bridge	9	31
Railroad	Union Pacific Railroad Bridge	12	42
Railroad	Union Pacific Railroad Bridge	21	57
Road	Simpson Street Bridge	24	39
Railroad	Sacramento Avenue Bridge	28	42
Road	Bush Street Bridge	32	33
Road	Bridge Street Bridge	34	30
Railroad	South 1 st Bridge	41	16

Source: Box Canyon Dam Sunny Day Failure Inundation, Main Dam or Spillway

A review of the Greenhorn Dam Breach Analysis indicates that the majority of Yreka would be impacted by a Greenhorn Dam failure event, including the majority of roads and bridges within city limits. Due to the extensive nature of the road network a full listing would be impractical. Please see the above referenced inundation maps for a detailing of impacted transportation infrastructure.

The following table, utilizing information from the Shasta River Dam Breach Analysis, details downstream transportation infrastructure likely to be impacted by a failure:

Table : Shasta River Dam Breach Analysis, Transportation Infrastructure

Infrastructure Classification	Name	Arrival Time After Failure (hours)	Maximum Flood Depth (feet)
Road	Riverside Drive	0.1	37
Road	Louie Road	0.7	29
Road	County Highway A12	2.7	14
Road	River Ranch Road	4.3	24
Railroad	Central Oregon and Pacific Railroad	4.4	30
Road	Montague Grenada Road	4.6	34
Road	Montague Road	5.3	19
Railroad	Yreka Western Railroad	5.7	13
Road	Yreka Ager Road	5.7	21
Interstate Highway	Interstate Highway 5	6.3	25
Road	Anderson Grade Road	6.4	28
Road	State Highway 263	6.7	33
Road	State Highway 263	7.4	41
Road	State Highway 263	7.5	29
Road	Klamath River Road	8.0	36
Road	Walker Bridge Connection Road	11.5	24
Road	State Highway 96	12.9	24
Road	Bar Road	13.2	30
Road	Bar Road	13.2	30
Road	State Highway 96	16.2	24
Road	Elk Creek Road	21.2	24

Table : Shasta River Dam Breach Analysis, Transportation Infrastructure

Infrastructure Classification	Name	Arrival Time After Failure (hours)	Maximum Flood Depth (feet)
Road	Independence Creek Road	23.7	24
Road	State Route 96	25.8	25
Road	State Route 96	25.8	25
Road	State Route 96	28.5	30
Road	State Route 96	28.5	30

Source: Shasta River Dam Breach Analysis

The following table, utilizing information from the Shelley Dam Breach Analysis, details downstream transportation infrastructure likely to be impacted by a failure:

Table : Shelley Dam Breach Analysis, Transportation Infrastructure

Infrastructure Classification	Name	Arrival Time After Failure (hours)	Maximum Flood Depth (feet)
Road	Ball Mountain Road	0.25	2
Road	Lower Little Shasta Road	1	1.2
Road	Big Springs Road	1.1	1.5

Source: Shelley Dam Breach Analysis

A wide variety of data sources, from the Federal Highway Administration to state and federal Departments of Transportation, can be sourced for construction and repair costs. Average per-mile repair costs for local roads, state highways, and interstates can vary widely depending on factors such as the type of repair (resurfacing, reconstruction, or major rehabilitation), local labor and material costs, geographic conditions, and traffic volumes. The following details a range of repair costs for local, state, and interstate roadway systems:

- Local Roads
 - Resurfacing/Repaving: Costs generally range between \$20,000 to \$100,000 per mile.
 - Major Rehabilitation or Reconstruction: Costs generally range between \$150,000 to \$1 million per mile.
- State Highways
 - Resurfacing/Repaving: Costs generally range between \$100,000 to \$300,000 per mile.
 - Major Rehabilitation or Reconstruction: Costs generally range between \$500,000 to \$2,000,000 per mile.
- Interstates
 - Resurfacing/Repaving: Costs generally range between \$250,000 to \$1,000,000 per mile.
 - Major Rehabilitation or Reconstruction: Costs generally range between \$2,000,000 to \$5,000,000 per mile.

Factors affecting roadway construction and repair costs can include:

- Extent of Damage: Minor repairs such as resurfacing are cheaper than full-depth reconstruction.
- Geography and Terrain: Roads in mountainous or difficult terrains may cost more due to drainage and foundation issues.
- Traffic Control and Detours: Roads with heavy traffic may require expensive detour systems and safety measures, especially for interstates and state highways.
- Urban vs. Rural: Repairs in urban areas are typically more expensive due to higher labor costs, complex traffic patterns, and higher land costs.
- Material Costs: Prices for materials like asphalt, concrete, and steel can vary significantly based on regional supply chains.

- Environmental and Regulatory Costs: Permitting, environmental mitigation, and compliance with federal/state regulations can add to the cost.

Bridges crossing rivers can pose significant concerns during flooding events resulting from a dam failure due to the increased risk of structural failure. Floodwater caused by a dam failure can exert powerful hydraulic forces on bridge structures, with the flow of water, debris, and floating objects impacting the bridge's substructure and foundation. Scouring, the removal of soil or sediment around bridge foundations can increase during a flood event, increasing the risk of failure. Floodwater can also cause the deformation and misalignment of bridge components. As water levels rise and fall, the structural elements may undergo stress and strain, potentially leading to long-term damage and misalignment.

A wide variety of data sources, including the Federal Highway Administration and state and federal Departments of Transportation, can be sourced for bridge construction and repair costs. The average construction and repair costs for bridges vary significantly depending on factors like the size and complexity of the bridge, its location, materials used, and the extent of the repairs or construction required. The following details a range of construction costs for bridges:

- Small Bridge (local, 2-lane bridge over a small waterway or road): Costs generally range between \$150 to \$400 per square foot.
- Medium-Sized Bridge (state highway, spanning larger rivers or railways): Costs generally range between \$300 to \$600 per square foot.
- Large Bridge (interstate or urban multi-lane bridge, often requiring complex engineering): Costs generally range between \$500 to \$1,000+ per square foot.

The following details a range of repair costs for bridges:

- Minor Repairs (deck resurfacing, guardrail fixes, minor structural repairs): Costs generally range between \$50,000 to \$500,000.
- Medium Repairs (replacing sections of the deck, repairing piers or abutments): Costs generally range between \$500,000 to \$5,000,000.
- Major Repairs or Rehabilitation (full deck replacement, structural strengthening, or seismic retrofitting): Costs generally range between \$5,000,000 to \$50,000,000.
- Emergency Repairs (post-disaster or structural failure): Costs generally range between \$10,000,000 to \$100,000,000.

Factors affecting bridge construction and repair costs can include:

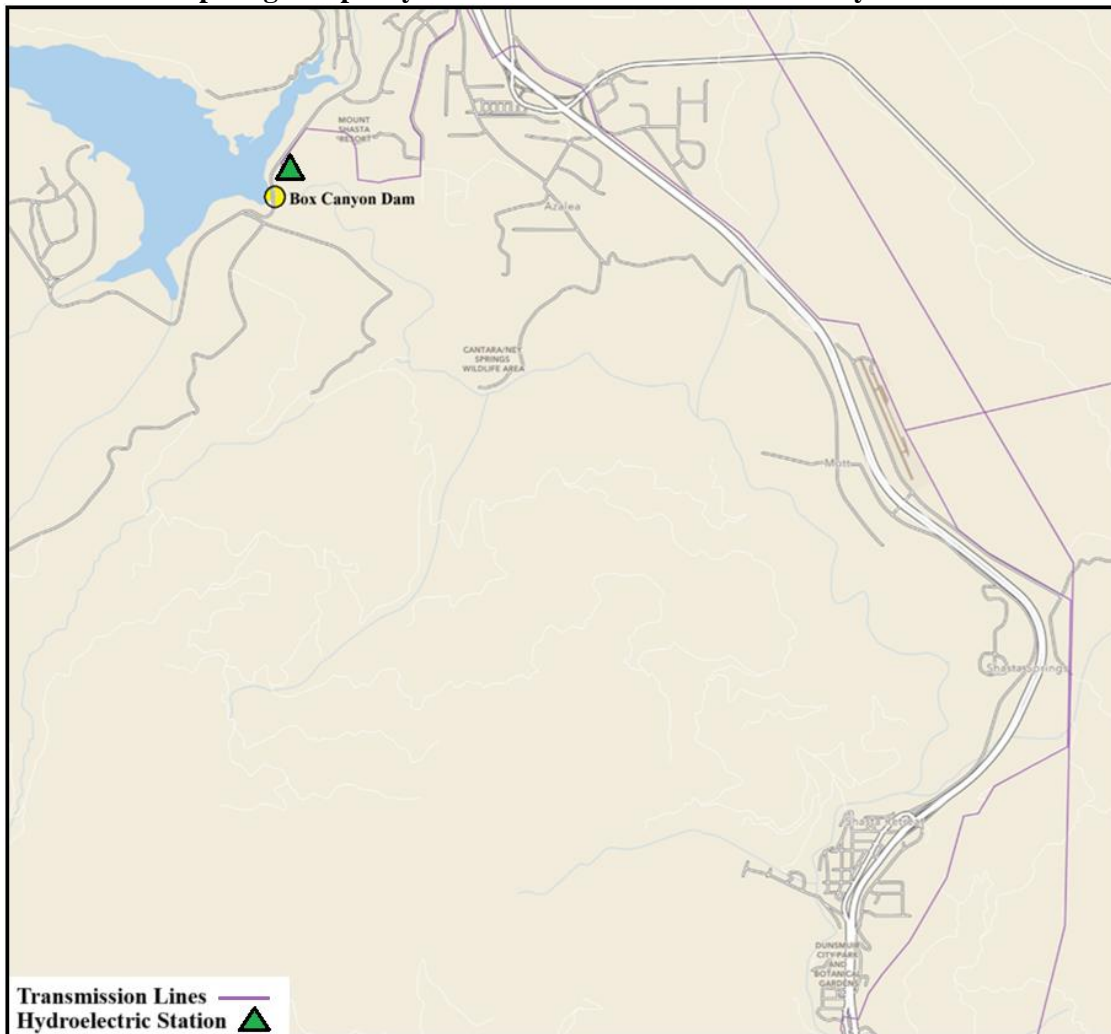
- Bridge Type and Design: Suspension, cable-stayed, truss, arch, or simple beam bridges each have different design requirements and associated costs.
- Location: Urban areas or difficult terrains (e.g., over water, in mountainous regions) can significantly increase costs due to land acquisition, permitting, and construction challenges.
- Materials: The use of steel, concrete, or composite materials impacts the price. Specialized materials (e.g., weathering steel for durability) increase costs.
- Traffic Management: Bridges over busy roads or waterways may require costly traffic diversion plans or temporary structures.
- Environmental and Regulatory Compliance: Projects near sensitive areas (rivers, wetlands, protected lands) or those requiring special permits may face higher costs.
- Labor and Regional Costs: Labor costs, equipment rates, and material availability can vary widely by region.

The failure of a dam can have significant impacts on power utilities, affecting both the generation and distribution of electrical power. Potential consequences may include:

- **Power Line Disruption:** Dam or levee failures can cause flooding and erosion, potentially damaging power lines and transmission towers. This can result in the disruption of electricity transmission from power generation facilities to distribution networks.
- **Substation Impact:** Substation Flooding: Flooding from a dam or levee failure can impact electrical substations, which play a crucial role in transforming and distributing electricity. Substation failures can lead to widespread power outages.
- **Grid Instability:** The sudden loss of a significant power source can lead to voltage and frequency fluctuations. This instability can affect the overall reliability of the power grid.
- **Emergency Shutdowns:** In the event of a dam or levee failure, power utilities may need to implement emergency shutdowns of affected power plants and electrical infrastructure to prevent further damage and ensure the safety of personnel.

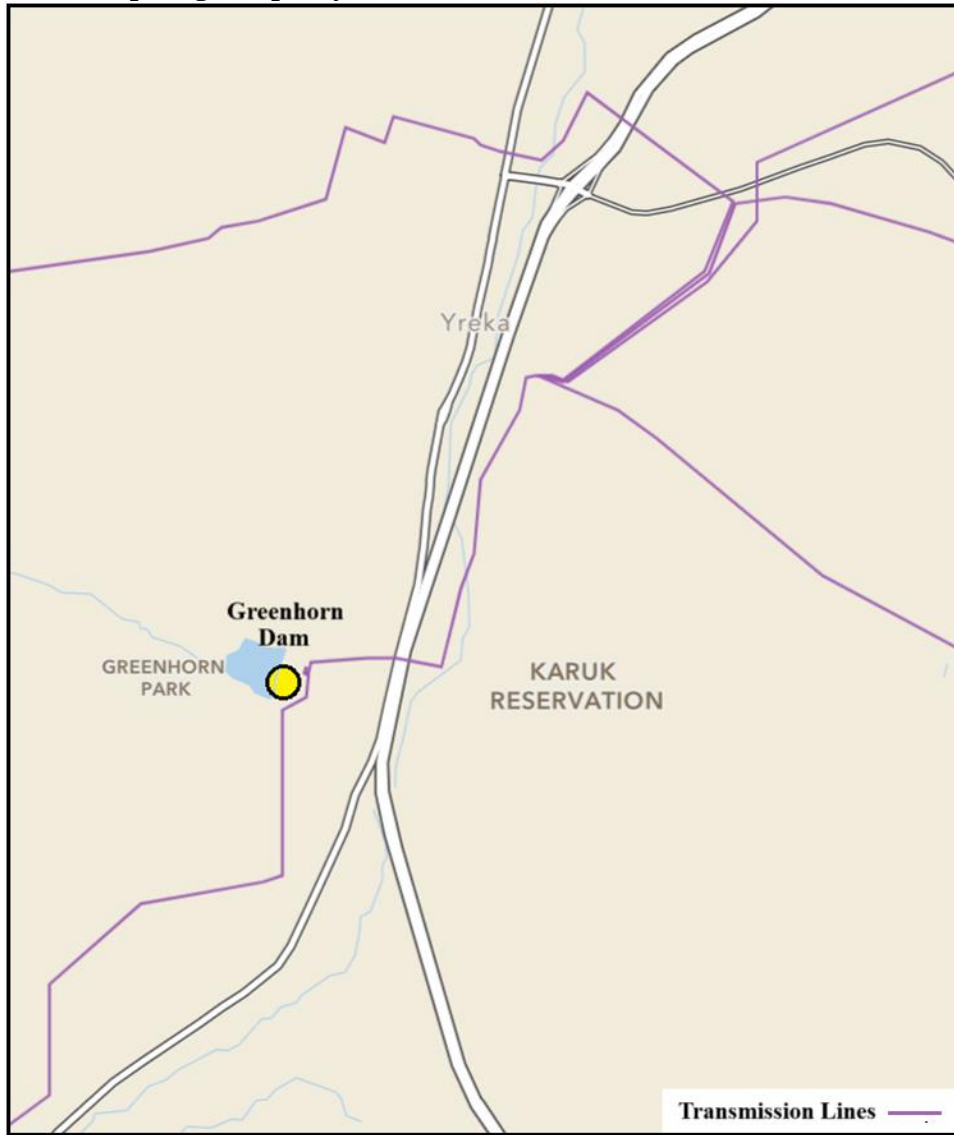
The following maps detail the locations of high-capacity transmission lines and power generation facilities near extremely high and high hazard dams in Siskiyou County:

Map: High-Capacity Transmission Lines Near Box Canyon Dam



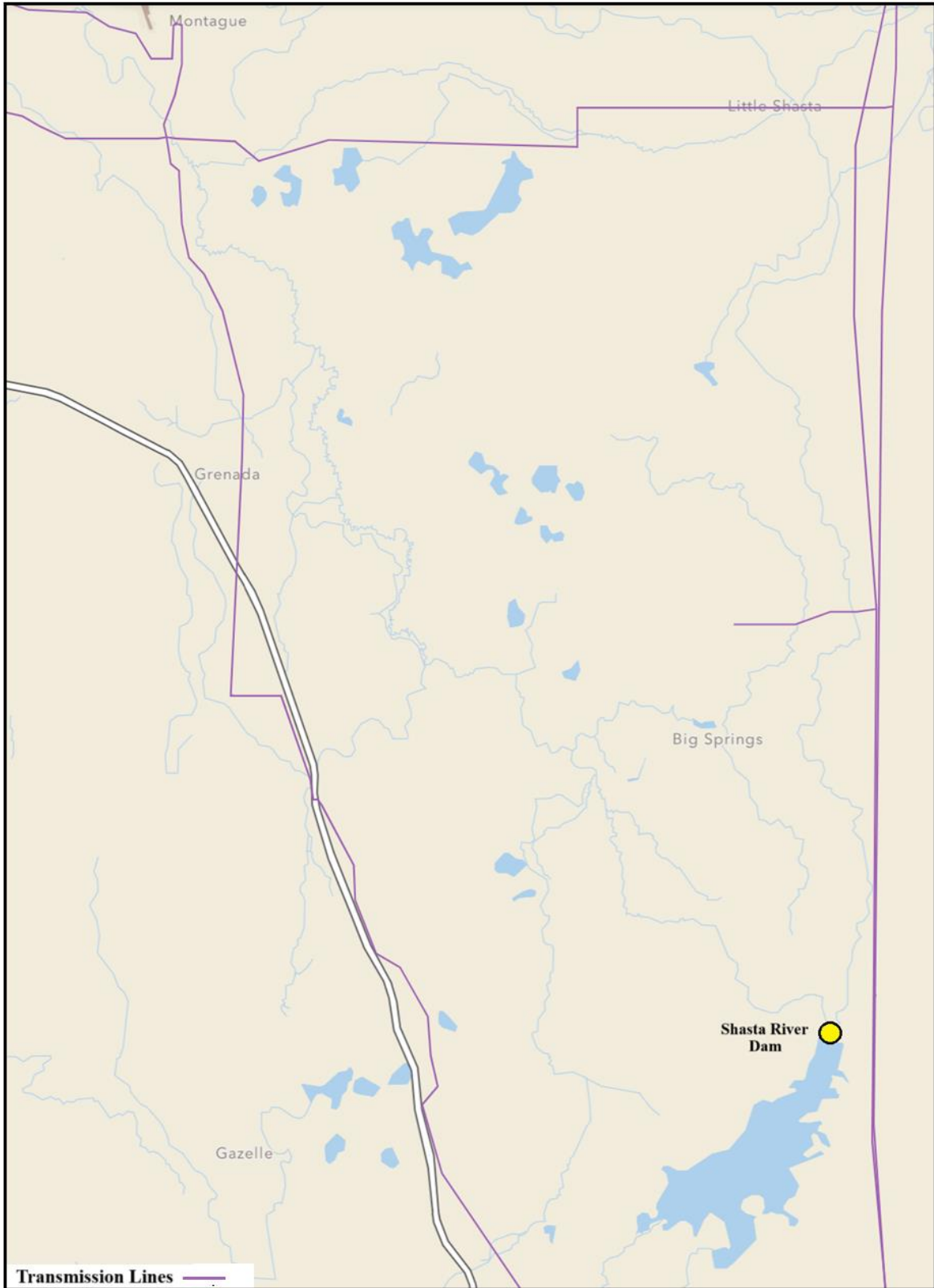
Source: FEMA RAPD

Map: High-Capacity Transmission Lines Near Greenhorn Dam



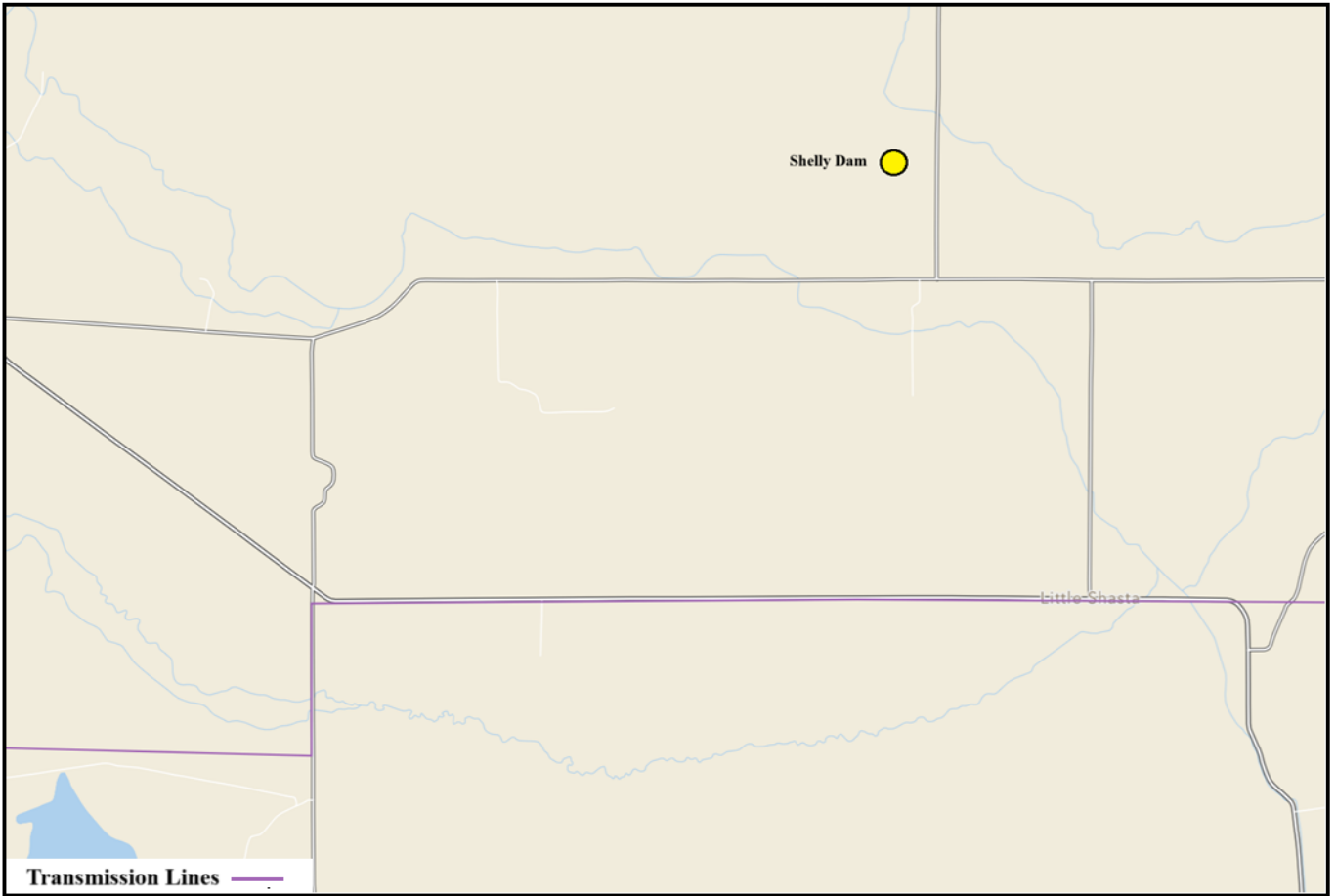
Source: FEMA RAPT

Map: High-Capacity Transmission Lines Near Shasta River Dam



Source: FEMA RAPT

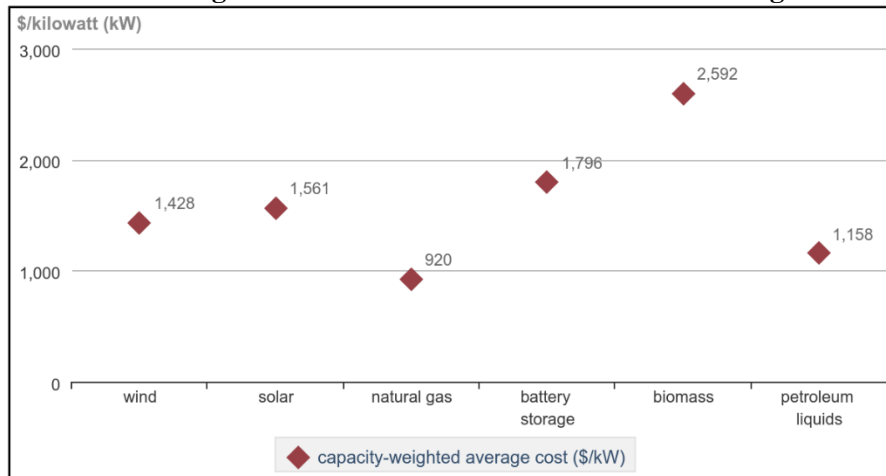
Map: High-Capacity Transmission Lines Near Shelly Dam



Source: FEMA RAPT

The construction costs for a hydroelectric plant can vary significantly depending on the size, type of plant, location, and complexity of the project. Data concerning the construction costs of electrical generating plants from the U.S. Energy Information Administration indicates the following average per kW cost, by generating plant type, for new construction:

Chart : Average Construction Cost of Electrical Generating Plants



Source: U.S. Energy Information Administration

The Box Canyon Dam hydroelectric generating station is rated at five megawatts of capacity, and reconstruction costs can be estimated at \$60,000,000.

A wide variety of data sources, including the U.S. Energy Information Administration, Federal Energy Regulatory Commission, and the Electric Power Research Institute, can be sourced for construction and repair costs. The repair costs for a hydroelectric plant can vary greatly depending on the type of repair, the size of the plant, and the specific components that require attention. Typical repairs cost are:

- Minor Repairs (Routine Maintenance & Component Replacement): Costs generally range between \$10,000 to \$100,000.
- Moderate Repairs (Replacing Medium-Sized Components): Costs generally range between \$100,000 to \$1 million.
- Major Repairs (Structural or Extensive Mechanical/Electrical Work): Costs generally range between \$1,000,000 to \$50,000,000, depending on the scale.
- Emergency Repairs (After Natural Disasters or Accidents): Costs generally range between \$5,000,000 to \$100,000,000.

For context, after major flooding, the Oroville Dam spillway repairs in Butte County California cost approximately \$1,100,000,000.

The cost to reconstruct high-capacity (voltage) power transmission lines varies significantly based on several factors, such as the voltage of the line, geographic terrain, regulatory requirements, and environmental considerations. The following present rough cost estimates for construction:

- High-Voltage Alternating Current (HVAC) Transmission Lines:
 - Overhead lines: Costs generally range between \$300,000 to \$1,000,000 per mile.
 - Underground lines: Costs generally range between \$1,000,000 and \$10,000,000 per mile.
- High-Voltage Direct Current (HVDC) Transmission Lines:
 - Overhead lines: Costs can range between \$500,000 to \$2 million per mile.
 - Underground lines: Costs can range between \$3,000,000 to \$15,000,000 per mile

The cost to construct neighborhood power distribution lines (rather than large high-capacity transmission lines) depends on whether the lines are overhead or underground, as well as factors like geography, local labor rates, and regulatory requirements. The following present rough cost estimates for construction:

- Overhead Neighborhood Power Distribution Lines: Costs generally range between \$150,000 to \$500,000 per mile.
- Underground Neighborhood Power Distribution Lines: Costs generally range between \$500,000 to \$2,000,000 or more per mile.

The cost to repair high-capacity power transmission lines varies widely depending on the extent of the damage, the location, and the type of transmission line. Here are some general considerations:

- High-Voltage Overhead Transmission Lines:
 - Minor Repairs (fixing or replacing a small section of damaged wire, insulators, or hardware): Costs generally range between \$10,000 and \$50,000 per mile.
 - Moderate Repairs (replacing several towers or larger segments of lines): Costs generally range between \$50,000 and \$200,000 per mile.
 - Major Repairs (such as extensive damage from storms, fires, or other disasters requiring multiple towers, wires, and more complex restoration): Costs generally range between \$200,000 to over \$1,000,000 per mile.

- High-Voltage Underground Transmission Lines:
 - Minor Repairs: Costs generally range between \$100,000 to \$500,000 per mile.
 - Major Repairs: Costs generally range between \$1,000,000 to \$5,000,000 or more per mile.

The cost to repair neighborhood power distribution lines, which typically carry lower voltage power than high-capacity transmission lines, also depends on several factors, such as the extent of the damage, whether the lines are overhead or underground, and the location.

- Overhead Neighborhood Distribution Lines:
 - Minor Repairs (such as fixing downed lines, poles, or transformers): Costs generally range between \$5,000 to \$20,000 per mile.
 - Moderate Repairs (replacing several poles, wires, or small transformers): Costs generally range between \$20,000 to \$100,000 per mile.
 - Major Repairs (extensive damage from a major storm or accident affecting many poles, transformers, and lines): Costs generally range between \$100,000 to \$500,000 per mile.
- Underground Neighborhood Distribution Lines:
 - Minor Repairs (fixing small sections of cable or minor equipment malfunctions): Costs generally range between \$50,000 to \$150,000 per mile.
 - Moderate Repairs (replacing larger segments of underground cable): Costs generally range between \$150,000 to \$500,000 per mile.
 - Major Repairs (extensive damage to underground systems, possibly caused by floods, storms, or construction accidents): Costs generally range between \$500,000 to \$2,000,000 per mile.

Factors influencing both reconstruction and repair costs for electrical transmission lines include:

- Terrain: Building lines through mountainous or densely populated areas will increase costs.
- Permitting and Land Acquisition: Securing permits and land can add significant costs.
- Environmental and Regulatory Costs: Meeting environmental impact requirements and complying with local regulations can also influence the final price.
- Voltage Level: Higher voltage transmission lines, such as those over 500 kV, are generally more expensive than lower voltage lines.

Medical, Education, and Response Facilities

The following table, utilizing information from the Greenhorn Dam Breach Analysis, details downstream medical, education, and response facilities likely to be impacted by the failure:

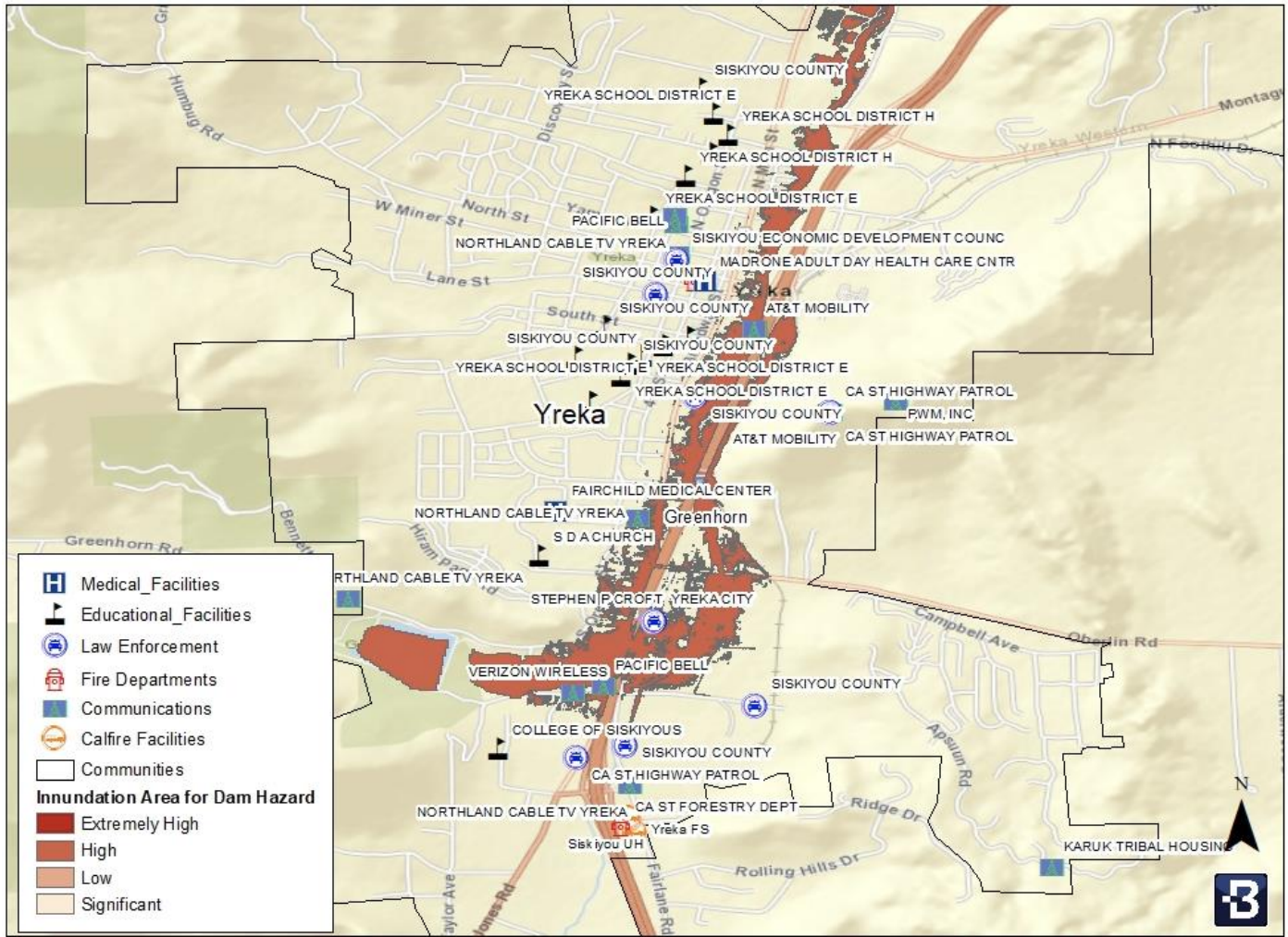
Table : Greenhorn Dam Breach Analysis Potentially Impacted Medical, Educations, and Response Facilities

Infrastructure Classification	Name	Arrival Time After Failure (minutes)	Maximum Flood Depth (feet)
Police	Yreka Police Department (Animal Control)	19	1-2
Medical	Yreka Rural Health Clinic - VA	20	1-2

Source: Greenhorn Dam Breach Analysis

The following table, utilizing information from the Greenhorn Dam Breach Analysis, details downstream medical, education, and response likely to be impacted by a failure:

Map : Critical Facilities in Greenhorn Dam Inundation Area



Source: Greenhorn Dam Breach Analysis and BOLDplanning

The following table, utilizing information from the Shasta River Dam Breach Analysis, details downstream medical, education, and response likely to be impacted by a failure:

Table : Shasta River Dam Breach Analysis Potentially Impacted Medical, Educations, and Response Facilities

Infrastructure Classification	Name	Arrival Time After Failure (hours)	Maximum Flood Depth (feet)
Fire	Klamath River Volunteer Fire Company	~12.5	~24 (border of area)
School	Klamath Union Elementary School	~12.5	~24 (border of area)

Source: Shasta River Dam Breach Analysis

Neither Box Canyon Dam or Shelly Dam had any medical, education, and response facilities in identified inundation areas.

Communication Systems

No comprehensive mapping of communications systems was available for review to compare against known inundation zones. However, it is assumed that communications lines and towers are in known inundation areas. Of particular concern are 911 and dispatch systems. All jurisdictions are served by a 911 and dispatch system, providing direct dispatching for:

- Law Enforcement
- Emergency Medical Services

- Fire

Flood water from a dam failure can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Damage to Infrastructure:** Flood water can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- **Power Outages:** Flood water can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.
- **Structural Instability:** Flood water can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. The following data, from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency, indicates cost ranges for communications system components:

Table : Summary of Communication System Component Costs

Components	Examples	Cost	Expected Lifespan
Infrastructure	Towers, shelters, commercial and backup power equipment,	\$\$\$-\$\$\$\$\$	20–25 years
Fixed Station Equipment	Antennas, repeaters, towers on wheels, consoles, mobile stations, servers, computers, physical and electronic security elements (e.g., fencing, cameras, monitors, environmental conditions)	\$\$-\$\$\$	3-15 years
Devices	Handheld portable radios, cellular phones, satellite phones, mobile data devices	\$\$	2-10 years
Accessories	Holsters, chargers, speakers, lapel microphone extensions, Bluetooth, vehicle kits, air cards, intercoms	\$	2-10 years
Features	Encryption to protect against security risks, ruggedization to ensure reliable services, Over-the-Air-Programming, automatic roaming	\$\$-\$\$\$	-
Software and Data Storage	Global information system, emergency notifications, monitoring, call answering, database access, Automatic Vehicle Locator	\$\$	-

Source: U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency

Environmental Impacts

The environmental impact of dam or levee failures depends on the circumstances of the failure. After a failure occurs, the resulting flooding and moving debris can affect wildlife and natural habitats. The spread of pollution and hazardous materials can have negative impacts on the environment. Ecosystems and natural habitats may be destroyed, causing the migration or death of local wildlife. Depending on the timing and location of the failure, it can result in rapid changes in water temperature downstream. This can be harmful to temperature-sensitive aquatic species and ecosystems. Dam failures can disrupt natural ecological processes, such as nutrient cycling, sediment transport, and flow regimes. These disruptions can have cascading effects on ecosystems.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with dam failure may include:

- Flooding
- Landslides
- Erosion
- Environmental degradation
- Loss of power associated with facilities that provide hydropower
- Loss of water supply
- Damage to agricultural lands

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Dam Failure Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Heavy flooding can cause power loss, property damage, injury, and death, and the displacement of populations. Standing water can also pose a public health risk due to the reproduction of disease vectors such as mosquitos.
Impact on Responders	Heavy flooding may cause inaccessibility of roadways for first responders as well as damage of materials and resources. First responders will also have to facilitate evacuation measures to move people from the flooded area.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Flooding caused by dam failure may create power outages, debris damage, and road closures.
Delivery of Services	Delivery of services may be disrupted due to flood-damaged bridges and roadways. Transit systems may face closures due to public safety concerns. The ability to deliver food, drinking water, and services will be heavily disrupted. Flooding may also interrupt communications and transportation due to power failure and accessibility challenges.
Property, Facilities, and Infrastructure	Flooding from failures impacts roads and bridges, businesses, hospitals, and other critical entities. Water and sewer systems may also be damaged. Homes and businesses may be completely destroyed if situated close to the failure point.
Impact on Environment	Flooding and moving debris can affect natural areas and wildlife, spreading pollution and hazardous materials. Ecosystems and natural habitats may be completely destroyed, causing migration or death of wildlife.
Economic Conditions	There is a fiscal impact on the government after a failure due to disruption of travel and commerce routes and employee’s ability to travel to work. Recourses at all levels are utilized, impacting the ability to access resources long-term.
Public Confidence in Governance	Direct, immediate, and effective actions must be taken in order to maintain public confidence. Response activities must include all levels of government.

5.8.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the dam failure hazard.

Table : Potential Dam Failure Mitigation Actions

Category	Example Action
Planning and Regulation	Advising the public about the local dam inundation areas and flood protection measures.
	Requiring a thorough watershed analysis for all proposed dam or reservoir projects.

Table : Potential Dam Failure Mitigation Actions

	Establishing a green infrastructure program to link, manage, and expand existing parks, preserves, greenways, etc.
	Taking action to minimize the effects of flooding on people, property, and building contents through measures including flood warning, emergency response, and evacuation planning.
Infrastructure	Implementing an inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.
	Routinely cleaning debris from support bracing underneath low-lying bridges.
	Remove dam and return to natural system.
Natural Systems	Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
	Preserve floodplain storage capacity by limiting or prohibiting the use of fill within the floodplain.
	Compensating an owner for partial rights, such as easement or development rights, to prevent a property from being developed.
Education	Educating the public about securing debris, propane tanks, yard items, or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwater.
	Using outreach programs to advise homeowners of risks to life, health, and safety.
	Offering GIS hazard mapping online for residents and design professionals.

5.9 Drought

5.9.1 Hazard Description

Drought is defined as an abnormally dry period lasting months or years when an area has a deficiency of water and precipitation in its surface and or underground water supply. It is, however, a normal, seasonal, and recurrent feature of climate that occurs in virtually all climate zones—typically in late spring through early fall. The duration of drought varies widely. There are cases when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind, and there are other cases when drought spans multiple years, or even decades. The hydrological imbalance can be grouped into the following non-exclusive categories:



- Agricultural: When the amount of moisture in the soil no longer meets the needs of previously grown crops
- Hydrological: When surface and subsurface water levels are significantly below their normal levels
- Meteorological: When there is a significant departure from the normal levels of precipitation
- Socio-Economic: When the water deficiency begins to significantly affect the population

When below average, little or no rain falls, soil can dry out, and plants can die. If unusually dry weather persists and water supply problems develop, the period is defined as a drought. Human activity such as over-farming, excessive irrigation, deforestation, and poor erosion controls can exacerbate a drought’s effects. It can take weeks or months before the effects of below average precipitation on bodies of water are observed. Depending upon the region, droughts can happen more quickly, and be noticed sooner, or have their effects naturally mitigated. The more humid and wet an area is, the faster the effects will be realized. A naturally dry region, which typically relies more on subsurface water, will take more time to actualize its effects.

Periods of drought can have significant environmental, agricultural, health, economic, and social consequences. The effects vary depending upon vulnerability and regional characteristics. Droughts can also reduce water quality through a decreased ability for natural rivers and streams to dilute pollutants and increase contamination. The most common effects are diminished crop yield, increased erosion, dust storms, ecosystem damage, reduced electricity production due to reduced flow through hydroelectric dams, shortage of water for industrial production, and increased risk of wildland fires.

5.9.2 Location and Extent

All of Siskiyou County, including all participating jurisdictions, is susceptible to drought conditions. However, the specific susceptibility to drought depends on various factors, including climate patterns, land use practices, and water management strategies.

Droughts are regularly monitored by multiple federal agencies using a number of different indices. One of the best indicators of historic drought periods is provided by the U.S. Drought Monitor. The U.S. Drought Monitor provides a summary of drought conditions across the United States, including Siskiyou County. Often described as a blend of art and science, the map is updated weekly by combining a variety of data-based drought indices and indicators, along with local expert input, into a single composite drought indicator. The following table details the U.S. Drought Monitor categories:

Table : U.S. Drought Monitor Categories

Rating	Described Condition	Possible Impacts
None	No drought conditions	None
D0	Abnormally Dry	<ul style="list-style-type: none"> • Short-term dryness slowing planting, growth of crops • Some lingering water deficits

Table : U.S. Drought Monitor Categories

Rating	Described Condition	Possible Impacts
		<ul style="list-style-type: none"> Pastures or crops not fully recovered
D1	Moderate Drought	<ul style="list-style-type: none"> Some damage to crops, pastures Some water shortages developing Voluntary water-use restrictions requested
D2	Severe Drought	<ul style="list-style-type: none"> Crop or pasture loss likely Water shortages are common Water restrictions imposed
D3	Extreme Drought	<ul style="list-style-type: none"> Major crop/pasture losses Widespread water shortages or restrictions
D4	Exceptional Drought	<ul style="list-style-type: none"> Exceptional and widespread crop/pasture losses Shortages of water creating water emergencies

Source: U.S. Drought Monitor

Precipitation data is collected by the University of California Siskiyou County Cooperative Extension Office. The following chart indicates annual precipitation averages for Siskiyou County from 2021 - 2024:

Table : Average Rainfall Monthly Totals, 2021 - 2024

Year	2024	2023	2022	2021
January	1.37	0.04	0.2	0.44
February	1.49	0.23	0	0.92
March	0.73	1.11	0.2	0.16
April	0.97	0.29	1.72	0.68
May	0.33	1.58	0.36	0.24
June	0.21	0.28	1.14	0.16
July	0	0	0	0.2
August	0.69	1.68	0.02	0.16
September	0.09	0.49	0.09	1.47
October	n/a	0.32	0.02	1.92
November	n/a	0.58	0.07	0.56
December	n/a	1.25	0.13	0.72

Source: University of California Siskiyou County Cooperative Extension Office

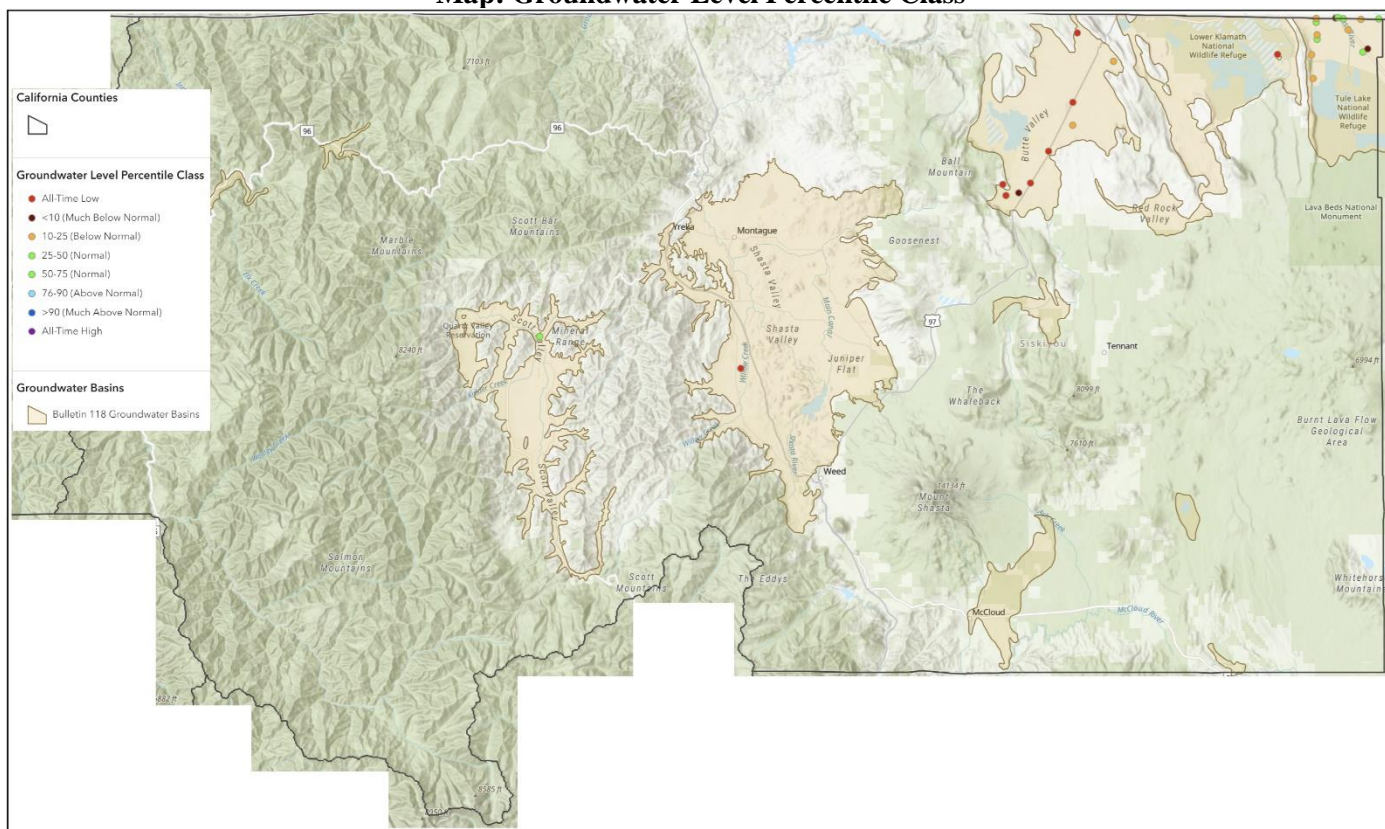
Groundwater in Siskiyou County is a vital resource for agriculture, domestic use, and the environment. Groundwater is heavily used in Siskiyou County for irrigating crops, especially during the dry summer months. The reliance on groundwater is more pronounced during drought periods when surface water becomes less available. In many areas of the county a significant portion of irrigation water comes from groundwater wells, which can strain local aquifers. The peak pumping season for agriculture often coincides with the lowest natural recharge periods, which can lead to overdraft, when more water is pumped from the aquifer than is naturally replenished. This seasonal overdraft puts pressure on groundwater reserves, affecting water availability for future use.

Many rural residents of Siskiyou County depend on groundwater for their domestic water needs, as municipal water systems are limited in more isolated areas. Private wells are common, and during times of drought or groundwater depletion, residents can face shortages or need to deepen wells.

In September 2014, Governor Jerry Brown signed legislation requiring that California's critical groundwater resources be sustainably managed by local agencies, through the Sustainable Groundwater Management Act. In Siskiyou County there are four basins that fall under the requirements of act, the Shasta, Scott and Butte Valley Basins and the Tulelake Subbasin. To carry out the requirements of act, the Siskiyou County Flood Control and Water Conservation District serves as the Groundwater Sustainability Agency for the three basins, and the Siskiyou County Board of Supervisors serves as the member the Tulelake Subbasin, alongside Tulelake Irrigation District, Modoc County and the City of Tulelake. These agencies were required to develop Groundwater Sustainability Plans for each of the basins that assessed the current and projected future conditions of the basins, and established management and monitoring activities and long-term goals. The Scott Valley and Shasta Valley plan have been approved, while Butte Valley and Tulelake are still awaiting a determination.

The following map, from the California Natural Resources Agency, shows the current groundwater level percentile class for Siskiyou County:

Map: Groundwater Level Percentile Class



Source: California Natural Resources Agency

Current drought conditions, which change weekly, may be found on the U.S. Drought Monitor website.

5.9.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced no Presidential Disaster Declarations related to drought.

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. The following table details drought Emergency Declarations for Siskiyou County.

Table : Siskiyou County Drought Emergency Declarations

Designation	Declaration Date	Incident Type	Individual and Public Assistance
EM-3032-CA	1/20/1977	Drought	-

Source: FEMA

-: Not reported

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. The following table details drought proclamations for Siskiyou County:

Table : Siskiyou County California Drought Proclamations of State of Emergency

Designation	Declaration Date	Incident Type	Damages*
2015-05	10/30/2015	Drought	-
2001-03	05/04/2001	Drought	\$14,858,480

Source: Cal OES

*: Damages reported for all impacted counties, tribal reservations, and cities

-: Not reported

Comprehensive data on droughts, drought impacts, and drought forecasting is extremely limited and often inaccurate. Due to the complexity of drought monitoring and the large areas droughts impact, agencies have difficulty quantifying and standardizing drought data.

One of the best indicators of historic drought periods is provided by the U.S. Drought Monitor, which lists weekly drought conditions for the Siskiyou County. Historical data was gathered from the U.S. Drought Monitor weekly reports for the 20-year period between 2005 and 2024. This data was compiled and aggregated to provide a yearly estimate of the percentage of Siskiyou County in each Drought Monitor category.

Table : Percentage Area in U.S. Drought Monitor Category, 2005 - 2024

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2024 (YTD)	54.9%	45.1%	11.7%	0.1%	0.0%	0.0%
2023	18.4%	81.6%	29.4%	14.5%	1.4%	0.0%
2022	0.0%	100.0%	99.8%	96.3%	75.5%	0.3%
2021	0.0%	100.0%	99.8%	95.0%	78.3%	12.0%
2020	7.7%	92.3%	82.6%	70.6%	47.9%	0.0%
2019	76.8%	23.2%	13.3%	7.1%	1.0%	0.0%
2018	16.9%	83.1%	37.2%	18.6%	2.7%	0.0%
2017	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2016	28.9%	71.1%	27.4%	12.5%	1.5%	0.0%
2015	0.0%	100.0%	99.9%	96.0%	25.6%	0.0%
2014	0.0%	100.0%	100.0%	98.4%	61.8%	6.3%
2013	12.3%	87.7%	68.6%	45.7%	0.0%	0.0%
2012	32.1%	67.9%	27.6%	1.5%	0.0%	0.0%
2011	90.6%	9.4%	0.8%	0.0%	0.0%	0.0%
2010	40.1%	59.9%	38.5%	7.7%	0.0%	0.0%
2009	4.7%	95.3%	82.4%	6.7%	0.1%	0.0%
2008	41.9%	58.1%	22.7%	1.7%	0.0%	0.0%
2007	48.5%	51.5%	10.1%	0.0%	0.0%	0.0%
2006	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2005	84.0%	16.0%	1.3%	0.0%	0.0%	0.0%

Source: U.S. Drought Monitor

The Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans available to producers suffering losses in those counties and in counties that are contiguous to a designated county. USDA Secretarial disaster designations must be requested of the Secretary of Agriculture by a governor or the governor’s authorized representative, and there is an expedited process for drought. The following table represents the total number of Secretarial Disaster Declarations, by county, for the 10-year period of 2015 to 2024 for Siskiyou County:

Table : Secretarial Drought Disaster Declarations, 2015 -2024

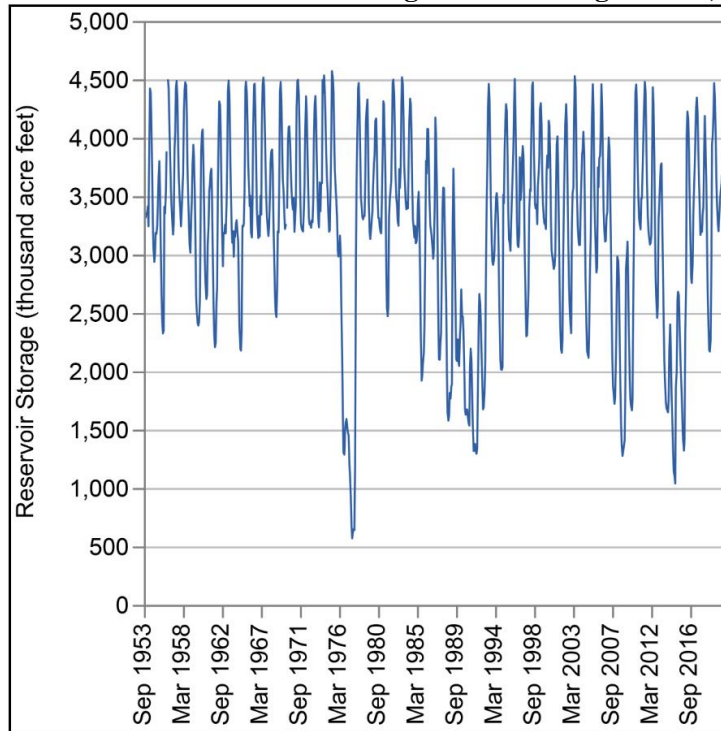
Jurisdiction	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Siskiyou County	-	S5371, S5431	S5146, S5157, S5165	S4916, S4927, S4941, S4995	S4675, S4676, S4741	S4467	S4390, S4399	-	S3952, S3964	S3784, S3803, S3810, S3813 S3858, S3943

Source: USDA Farm Service Agency

Note: - designates no declarations

The Shasta Dam Reservoir generally experiences seasonal cycles in water levels from year to year. However, water levels have dropped significantly several times over the past 68 years due to drought conditions. In 2014, the reservoir reached its second-lowest level, surpassed only by extremely low levels during the 1977 drought.

Chart : Shasta River Dam Reservoir Average Water Storage Levels, 1953 to 2020



Source: California Department of Water Resources

5.9.4 Probability of Future Events

Historically, drought has affected Siskiyou County and all participating jurisdictions on a reoccurring basis. In reviewing historical data from the U.S. Drought Monitor weekly reports for Siskiyou County from 2005 through 2024 a weekly average can be created indicating the percentage time in each Drought Monitor category. This average can be used to extrapolate the potential likelihood of future drought conditions.

Table : Estimated Weekly Probability of Siskiyou County Being in U.S. Drought Monitor Category

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
37.9%	62.1%	42.7%	28.6%	14.8%	0.9%

Data: U.S. Drought Monitor

Siskiyou County and all participating jurisdictions can experience rapid droughts, with a sudden onset of intense dry periods following a period of normal precipitation. While these conditions may last only a few months, they can result in agricultural losses, water supplies shortages, and low stream and river volume.

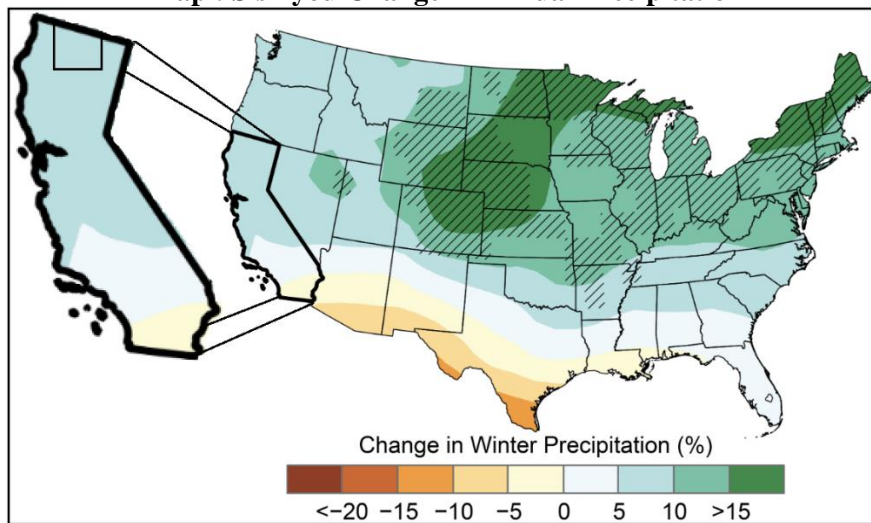
While predicting drought provides many challenges, NOAA’s National Integrated Drought Information System provides the Drought Early Warning System to improve drought early warning capacity. The system is a network of regional and national partners that share information and coordinate actions to help communities in the region cope with drought. Developing and implementing the system allows Nevada, and Siskiyou County to quickly respond to emerging drought conditions. Through developing regional systems, the National Integrated Drought Information System is building the foundation for a nationwide system to improve drought forecasting.

5.9.5 Projected Changes in Hazard Location, Intensity, Frequency, and Duration

According to the National Institutes of Health National Center for Biotechnology Information publication Global Drought Trends and Future Projections “Drought is one of the most difficult natural hazards to quantify and is divided into categories (meteorological, agricultural, ecological and hydrological), which makes assessing recent changes and future scenarios extremely difficult.” However, using long term data estimates of future drought conditions can be determined through a combination of climate modeling, historical data analysis, and scientific assessments. This modelling takes into account factors such as temperature, precipitation, soil moisture, and other relevant variables. Because snowpack plays an important role in the management of California’s complex water system, some of the most impactful droughts have coincided with years of abnormally low snowpack accumulation during the winter months. The historical record indicates periodic prolonged wet and dry periods (Figure 5). Drought conditions can be exacerbated by warm temperatures. The record warmth in 2014 and 2015, in combination with multiple years of below average precipitation (Figure 2b), led to one of California’s most severe droughts.

Current modelling from the NOAA State Climate Summary 2022 for California suggests that winter precipitation is projected to increase slightly in Siskiyou County and all participating jurisdictions, but these changes are small relative to the natural variability. The following map indicates the expected slight annual increase in winter precipitation for Siskiyou County and all participating jurisdictions:

Map : Siskiyou Change in Annual Precipitation

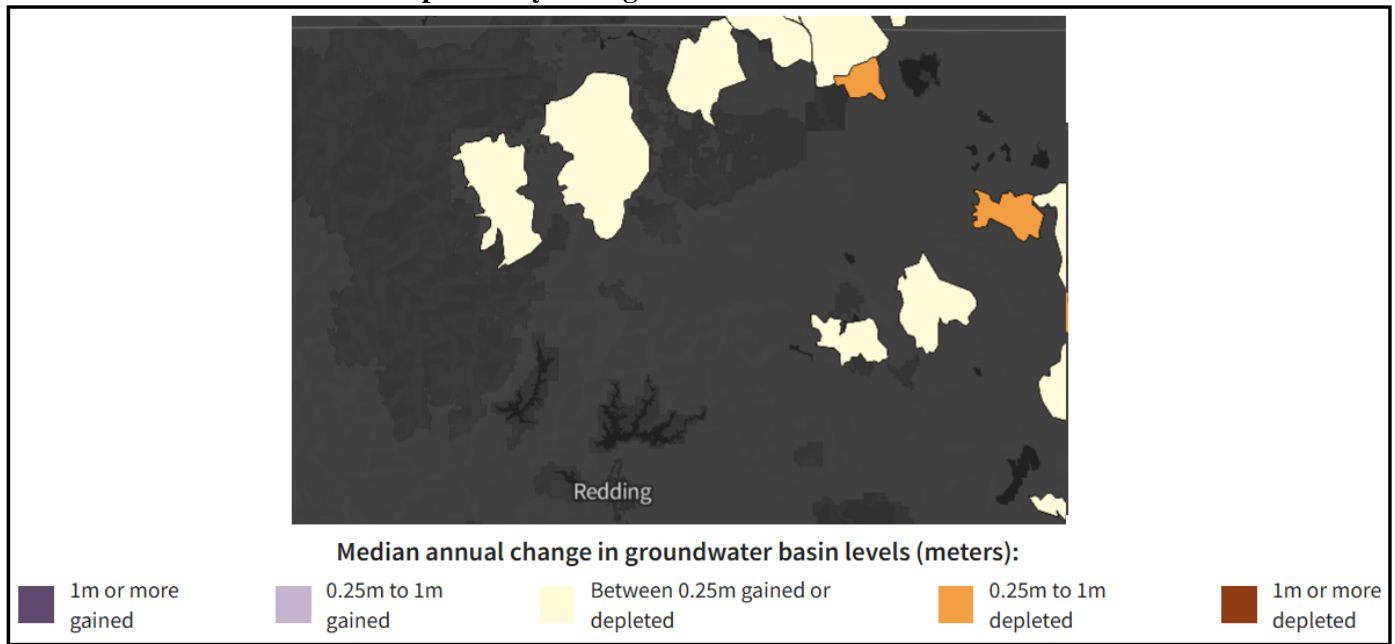


Source: NOAA NCEI State Climate Summary 2022 for California

Projected rising temperatures are projected to raise the snow line, which will increase the likelihood that precipitation will fall as rain rather than snow. This will result in a reduced snowpack and consequently a reduction in water storage. Additionally, projected higher spring temperatures will result in an earlier melting of the snowpack, which can have critical implications for Siskiyou County and participating jurisdictions. This is due to flood control rules requiring that water be allowed to flow downstream and prohibiting the storage of water in reservoirs for use in the dry season. A new management strategy called Forecast-Informed Reservoir Operations is being tested to address such challenges.

There are continued concerns about the amount and usage of groundwater in Siskiyou County. The following map, from the 2024 study *Nature: Rapid Groundwater Decline and Some Cases of Recovery on Aquifers Global*, illustrates the per years losses and gains for aquifers in Siskiyou County:

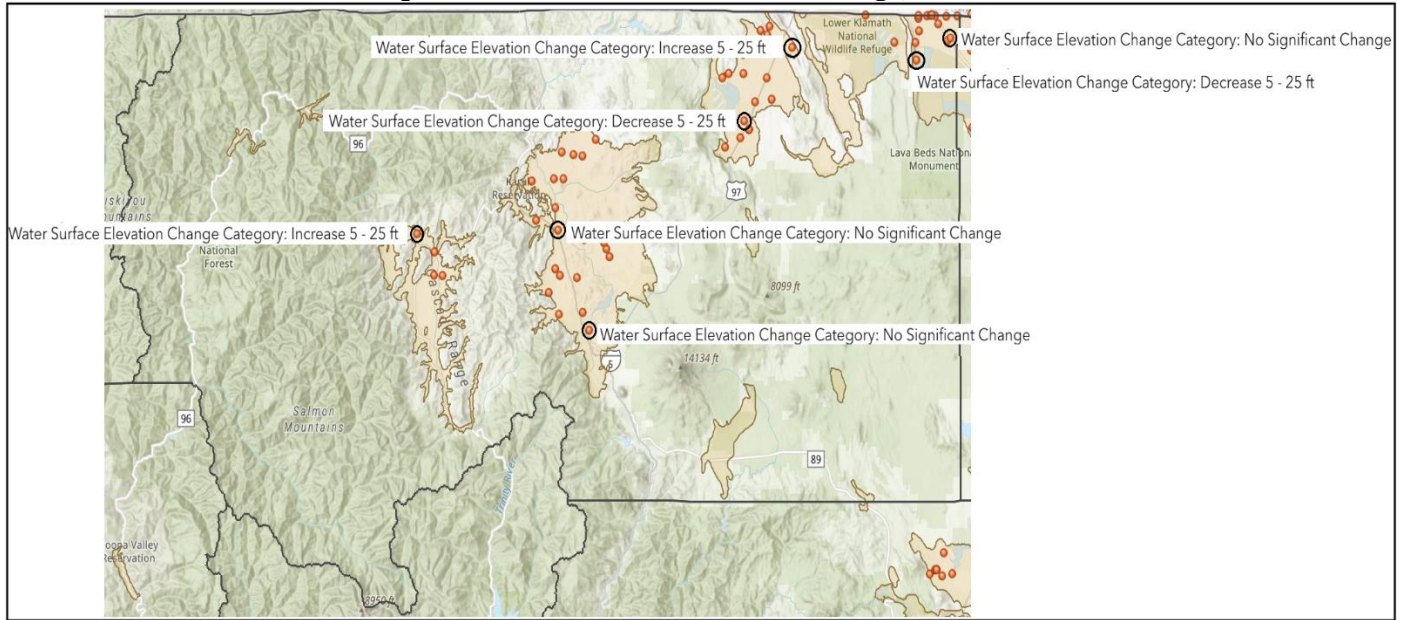
Map : Yearly Changes in Groundwater Conditions



Source: *Nature: Rapid Groundwater Decline and Some Cases of Recovery on Aquifers Globally*

The following map, from the Division of Water Resources, indicates seasonal changes in water surface elevation at production wells throughout the county over the previous 10 years. Data indicates that eastern areas of the county are seeing groundwater level drawdowns:

Map: Groundwater Level Seasonal Change, 2015-2024



Source: Division of Water Resources

5.9.6 Vulnerability and Impact

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from drought. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Drought Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per year
Siskiyou County	All	Relatively High	99.5	60.9
Dorris	06093000200	Very High	100.0	72.5
Dunsmuir	06093001100	No Rating	0.0	45.5
Etna	06093000800	Relatively High	99.8	54.1
Fort Jones	06093000701	Relatively High	99.7	52.5
Happy Camp CSD	06093001300	No Rating	0.0	55.7
Lake Shastina CSD	06093000902	Relatively High	99.6	52.2
McCloud CSD	06093001200	Relatively Low	93.4	71.9
Montague	06093000300	Very High	99.9	71.3
Mt. Shasta	06093001003	Relatively Low	81.4	45.5
Tulelake	06093000100	Very High	99.9	66.5
Weed	06093000901	Relatively High	98.8	48
Yreka	06093000703	Relatively Low	81.8	47.7

Source: FEMA NRI

Table : Participating Jurisdiction Drought Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Drought EAL
Siskiyou County	All	Relatively Moderate	99.5	\$15,000,000
Dorris	06093000200	Very High	99.9	\$5,400,000
Dunsmuir	06093001100	No Rating	0	\$0

Table : Participating Jurisdiction Drought Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Drought EAL
Etna	06093000800	Relatively High	99.8	\$1,300,000
Fort Jones	06093000701	Relatively High	99.7	\$883,000
Happy Camp CSD	06093001300	No Rating	0	\$0
Lake Shastina CSD	06093000902	Relatively High	99.7	\$730,000
McCloud CSD	06093001200	Relatively Moderate	93.5	\$15,000
Montague	06093000300	Very High	99.9	\$2,100,000
Mt. Shasta	06093001003	Relatively Low	83.5	\$777,000
Tulelake	06093000100	Very High	99.9	\$3,700,000
Weed	06093000901	Relatively Moderate	98.3	\$130,000
Yreka	06093000703	Relatively Low	81.2	\$402,000

Source: FEMA NRI

Population

Droughts are rarely a direct cause of death, though the associated heat, dust, and stress can all contribute to increased mortality. However, drought can severely challenge a public water supplier through depletion of the raw water supply and greatly increased customer water demand. Even if the raw water supply remains adequate, problems due to limited treatment capacity or limited distribution system capacity may be encountered. Water supply planning is the key to minimizing the effects of drought on the population. Public water suppliers should continue to work to identify vulnerabilities and develop infrastructure, conservation plans, and partnerships to reduce the likelihood of running out of water during a drought.

Additionally, the loss of community lifelines can have a direct economic impact on the population. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values for community lifelines:

Table : Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Wastewater Services	\$66
Loss of Water Services	\$138

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

At greater risk may be the vulnerable populations and equity priority communities, including the especially young, the elderly, and those below the poverty level. Hazard occurrences can exacerbate existing vulnerabilities and create new challenges. Vulnerable populations may have pre-existing health conditions that make them more susceptible to heat-related illnesses and dehydration, both of which can be exacerbated during droughts. People on fixed incomes and with limited resources may face difficulties in adapting their homes to withstand hazard conditions or may lack financial resources to cope with the increased costs of food, water, and energy. Details concerning potentially vulnerable populations may be found in Section 3.4: Equity Priority Communities.

Buildings and Structures

In general, buildings are not directly vulnerable to losses as a result of drought. However, there is a potential that building occupants could be impacted by power failures caused by either increased utility demand or damaged power delivery infrastructure. In addition, drinking water infrastructure may be specifically vulnerable to the impacts of drought. Any decrease in groundwater supplies would stress this infrastructure and may cause shortages or rationing.

Governmental Operations

Governmental operations and facilities will likely experience minimal impacts from drought conditions, unless there are substantial power, communications, or water outages. However, reduced water availability would likely have an

immediate impact on firefighting efforts in urban and suburban areas as fire suppression equipment requires a minimum level of water pressure to activate.

Transportation and Electrical Infrastructure

Droughts can have numerous impacts on both transportation and electrical distribution systems, often leading to challenges that require proactive management. The impacts of droughts on transportation systems may include:

- **Cracking and Shifting:** Drought conditions can cause soil to dry out and shrink, leading to cracks and shifts in roadways, especially in areas with expansive clay soil. This can result in uneven surfaces, potholes, and damage to the structural integrity of roads, making them unsafe for use.
- **Roadbed Damage:** Low moisture levels can cause subsidence and roadbed instability, requiring more frequent road repairs and maintenance.
- **Soil Subsidence:** The foundations of bridges can be compromised if the surrounding soil dries out and shifts. This can increase the stress on bridge supports, potentially leading to structural issues that require costly repairs.
- **Track Shifting and Damage:** The ground beneath railroad tracks can shift or crack during prolonged droughts, leading to track misalignment or buckling. This increases the risk of derailments and requires more frequent inspection and maintenance.
- **Runway Damage:** The same soil subsidence issues that affect roadways can also impact runways, causing cracks and instability that may need repairs.

Additionally, drought can impact both the electrical generation capacity and transmission. The impacts of droughts on electrical systems may include:

- **Hydropower Generation Reduced Water Availability:** Drought directly impacts hydropower plants by reducing the water available to generate electricity. Lower water levels in reservoirs and rivers mean reduced flow through turbines, limiting the amount of power that can be produced. In severe droughts, hydropower plants may have to shut down altogether, reducing overall grid capacity.
- **Thermal Power Plant (Water-Cooled) Cooling Water Shortages:** Thermal power plants (such as coal, natural gas, and nuclear plants) rely on water for cooling. Drought can reduce the availability of water for these cooling processes, forcing plants to reduce output or shut down temporarily.
- **Damage to Power Lines:** Drought increases the risk of wildfires, which can damage or destroy electrical transmission lines, substations, and other infrastructure. Wildfires can cause widespread power outages, as seen in several instances in California and Australia.
- **Preemptive Power Shutoffs:** To prevent wildfires, power utilities may preemptively shut down power lines during extreme drought and dry wind conditions to avoid sparking fires. This can lead to significant disruptions for businesses and residents.
- **Transmission Line Sag:** Droughts often coincide with extreme heat, which can cause power as the wires expand. This increases the risk of contact with trees or the ground, potentially leading to power outages or safety hazards.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

Water utilities are particularly vulnerable to drought conditions due to the direct impact on both water availability and supply. Water utilities can be affected by drought through:

- **Reduced Water Availability:** The reduction in water availability directly impacts the amount of water that water utilities can draw from local sources.

- **Lower Reservoir Levels:** Lower reservoir levels can affect the ability to meet water demand during periods of high usage.
- **Declining Groundwater Levels:** Lower groundwater levels make it more challenging for utilities to extract water.
- **Water Quality Challenges:** Lower water levels can lead to higher concentrations of contaminants, minerals, and sediments in the available water sources, requiring more extensive and costly treatment processes.
- **Increased Treatment Costs:** Treating water from depleted or lower-quality sources during drought conditions may require additional treatment steps, technologies, or chemicals, leading to increased operational costs for water utilities.
- **Competition for Water Resources:** During droughts, there is increased competition for limited water resources among various users, including agriculture, industry, and households. Water utilities may face challenges in securing sufficient water supplies amid this heightened competition.
- **Impact on Water Infrastructure:** Reduced water flow in rivers and streams can expose water infrastructure, such as pipelines, to the risk of corrosion.
- **Water Use Restrictions:** To conserve water during droughts, authorities may implement water use restrictions and conservation measures.

The State Water Resources Control Board Division of Drinking Water regulates public drinking water systems. In general, there are three classifications of systems, as follows:

- **Community Water Systems:** These systems supply water to the same population year-round and include subdivisions, mutual water companies, and mobile home parks.
- **Non-transient Non-Community Water Systems:** These systems regularly supply water to the same people for at least six months of the year, and include schools, hospitals, and office buildings.
- **Transient Non-Community Water Systems:** These systems provide water to places where people don't stay for long periods of time, such as campgrounds, gas stations, and restaurants.

The following have been identified as water utility providers in Siskiyou County:

Table : Siskiyou County Water Utility Providers

Water System Name	Type	Primary Source Water Type
Abrams Lake Mobile Estates	Community	Groundwater
Ash Creek Fire Station-Stnf	Transient	Groundwater
Big Springs Union Elem. School	Non-Transient Non-Community	Groundwater
Butteville Union School	Non-Transient Non-Community	Groundwater
CAL FIRE-Deadwood Conservation Camp	Non-Transient Non-Community	Groundwater
Cal Ore Mobile Estates	Community	Groundwater
Callahan Water District	Community	Surface Water
Caltrans-Collier Rest Stop	Transient	Surface Water
Caltrans-Dunsmuir Grade Insp. Facility	Non-Transient Non-Community	Groundwater
Caltrans-Grass Lake Rest Stop	Transient	Groundwater
Caltrans-Weed Rest Stop	Transient	Groundwater
Cold Creek Mutual Water Company	Community	Groundwater
Copco Lake MWC	Community	Groundwater
Cove Mobile Villa	Community	Groundwater
Delphic Elementary School	Non-Transient Non-Community	Groundwater
Dillon Creek Campground	Transient	Groundwater
Doctor's Park Owners Association	Non-Transient Non-Community	Groundwater
Dollar General Store - Weed	Transient	Groundwater
Dorris, City Of	Community	Groundwater
Dunsmuir, City Of	Community	Groundwater

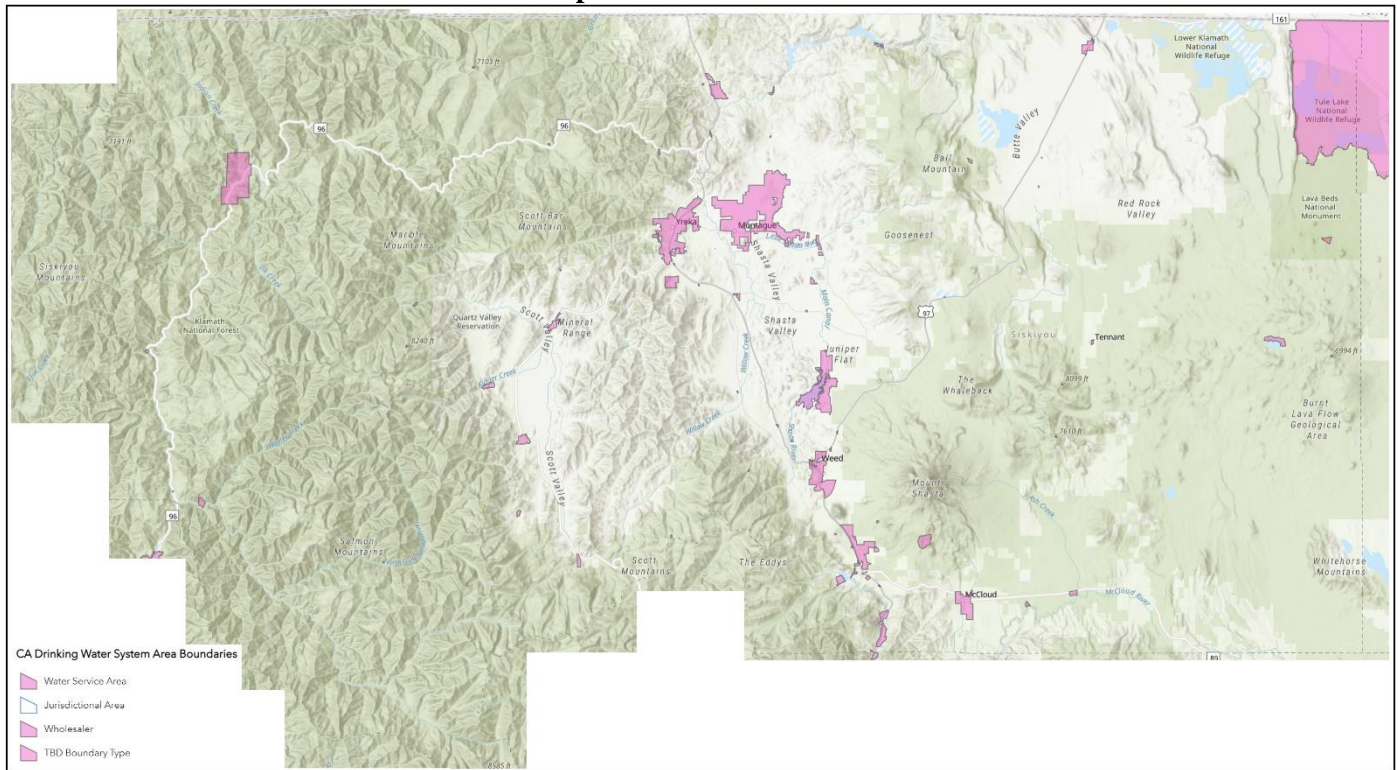
Table : Siskiyou County Water Utility Providers

Water System Name	Type	Primary Source Water Type
Etna, City Of	Community	Surface Water
Fort Jones, Town Of	Community	Groundwater
Fowlers Campground	Transient	Groundwater
Gazelle School	Non-Transient Non-Community	Groundwater
Grenada Sanitary District	Community	Groundwater
Happy Camp C.S.D.	Community	Surface Water
Hornbrook C.S.D.	Community	Groundwater
Indian Scotty Campground	Transient	Groundwater
JH Ranch	Transient	Groundwater
Juanita Lake Campground	Transient	Groundwater
Junction Elementary School	Non-Transient Non-Community	Groundwater
Juniper Village Farm Labor Housing	Transient	Groundwater
Kangaroo Lake Campground	Transient	Groundwater
Kidder Creek Orchard Camp	Transient	Groundwater
Klamath Basin National Wildlife Refuge	Transient	Groundwater
Lake Shastina CSD	Community	Groundwater
Lake Siskiyou Campground	Transient	Surface Water
Lake Siskiyou M.W.C.	Community	Groundwater
Lava Beds National Monument	Transient	Groundwater
McBride Springs Campground	Transient	Groundwater
McCloud C.S.D.	Community	Groundwater
MDF-Medicine Lake	Transient	Groundwater
Montague, City Of	Community	Surface Water
Monte Shasta M.W.C.	Community	Groundwater
Mt. Hebron Work Center	Transient	Groundwater
Mt. Shasta Ski Park	Transient	Groundwater
Mt. Shasta, City Of	Community	Groundwater
Oak Bottom Cg & WC	Transient	Groundwater
Oak Knoll Work Center	Transient	Groundwater
Oak Valley Acres P.O.A.	Community	Groundwater
Pneuma Retreat Center - Stewart Mineral	Transient	Groundwater
Railroad Park Resort	Transient	Groundwater
R-Ranch Headquarters	Transient	Groundwater
R-Ranch Klamath River	Transient	Groundwater
Sawyer S Bar Work Center	Transient	Groundwater
Shadow Mountain Mhp	Community	Groundwater
Shasta Cascade Mobile Home Park	Community	Groundwater
Shasta Horizon Mobile Home Park	Community	Groundwater
Shasta View Heights Owners Association	Community	Groundwater
Shastina Mobile Estates	Community	Groundwater
Siskiyou Co. Rolling Hills MWC	Community	Groundwater
Siskiyou Co. Service Area #5/Carrick	Community	Groundwater
Siskiyou Lake Highlands MWC	Community	Groundwater
Sun Mountain M.W.C.	Community	Groundwater
Swiss Holiday Lodge	Transient	Groundwater
Tennant C.S.D.	Community	Groundwater
Tree Of Heaven Campground	Transient	Groundwater
Tulelake, City Of	Community	Groundwater
Weed Golf Club, Inc.	Transient	Groundwater
Weed, City Of	Community	Groundwater
Willow Creek School	Non-Transient Non-Community	Groundwater
Yreka, City Of	Community	Surface Water

Source: State Water Resources Control Board Division of Drinking Water

The following map, from the State Water Resources Control Board, shows water service areas within Siskiyou County:

Map: Water Service Areas



Source: State Water Resources Control Board

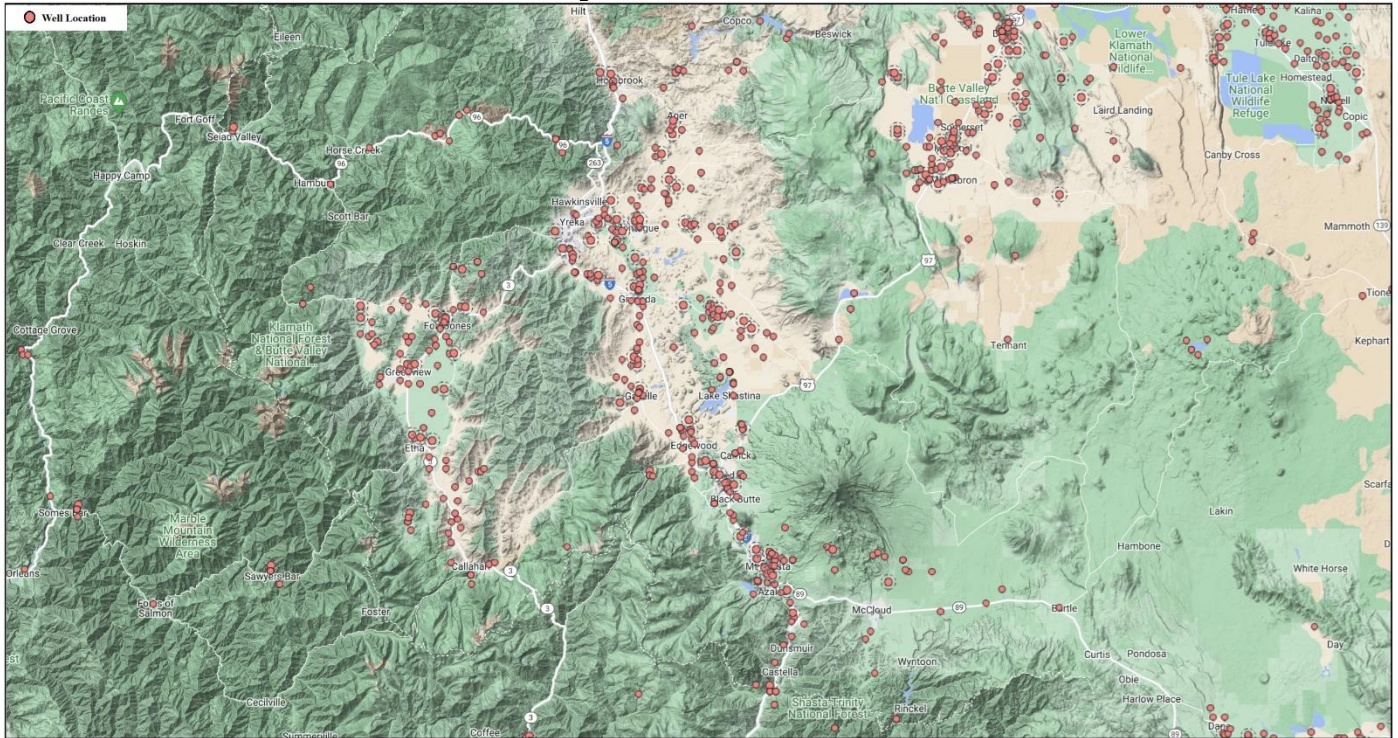
Drought can severely challenge a public water supplier through depletion of the raw water supply and greatly increased customer water demand. Even if the raw water supply remains adequate, problems due to limited treatment capacity or limited distribution system capacity may be encountered. Water supply planning is the key to minimizing the effects of drought on the population. Public water suppliers should continue to work to identify vulnerabilities and develop infrastructure, conservation plans, and partnerships to reduce the likelihood of running out of water during a drought.

Communities and citizens served by private wells rather than water supply districts may be at higher risk to drought conditions, and may see the following impacts:

- **Lowering of Water Table:** Drought conditions can lead to a lowering of the water table, which is the level at which groundwater is located. Private wells that rely on groundwater may experience reduced yields or, in extreme cases, may run dry.
- **Decreased Well Recharge:** Drought reduces the amount of precipitation, leading to decreased recharge of groundwater. Private wells depend on a sustainable recharge rate to maintain a consistent and reliable water supply.
- **Increased Competing Demands:** During a drought, increased water demand for agricultural irrigation, municipal water supply, and other uses can create competition for the available groundwater. Private wells may face challenges due to this increased demand.
- **Water Quality Concerns:** Lower groundwater levels during droughts can lead to changes in water quality. Concentrations of minerals, contaminants, and pollutants may increase, affecting the suitability of water for drinking and other uses.

The following map, from the California Water Boards Groundwater Information System, indicates the location of groundwater wells throughout Siskiyou County:

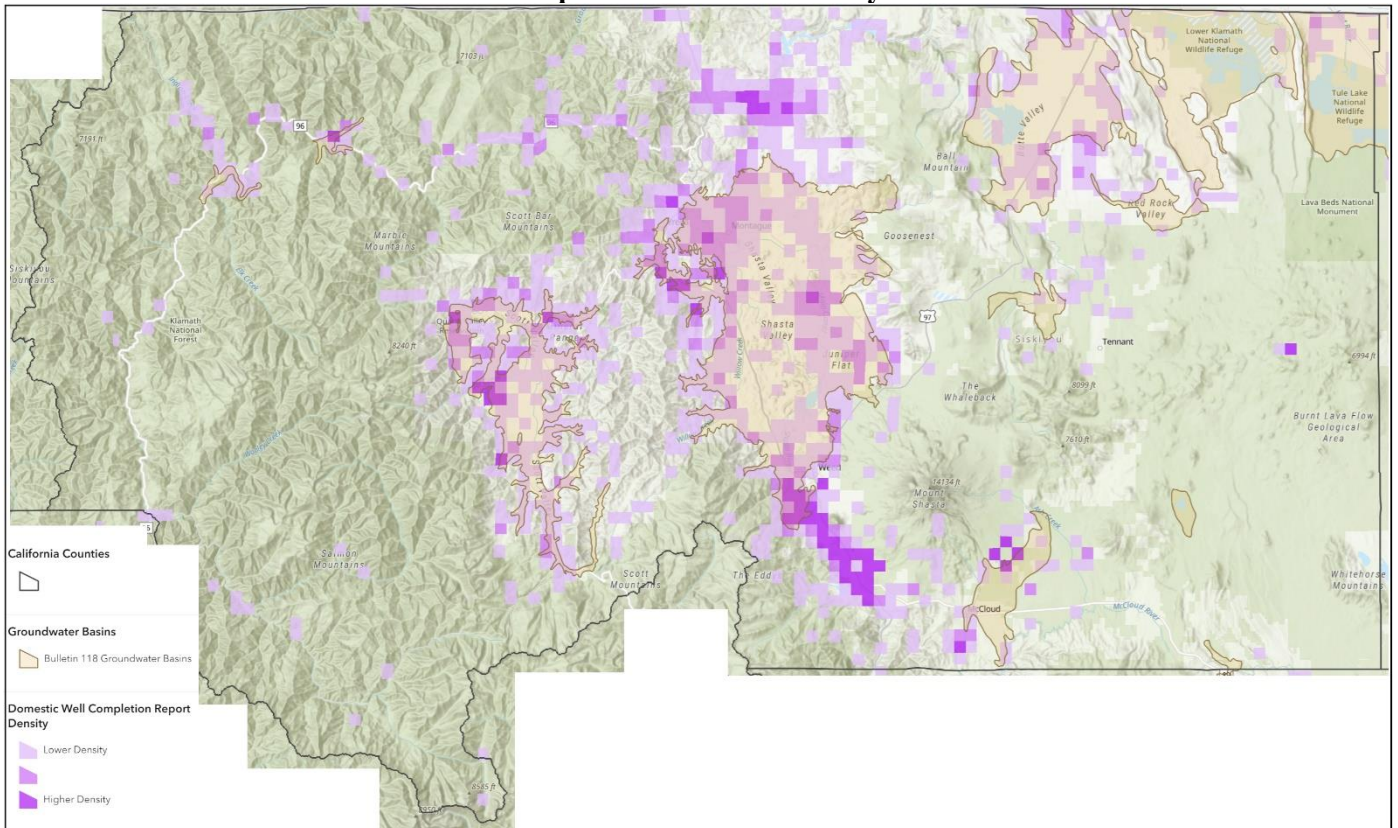
Map: Groundwater Wells



Source: California Water Boards Groundwater Information System

Augmenting this information, the following map from the State Water Resources Control Board shows domestic well density in Siskiyou County:

Map : Domestic Well Density



Source: State Water Resources Control Board

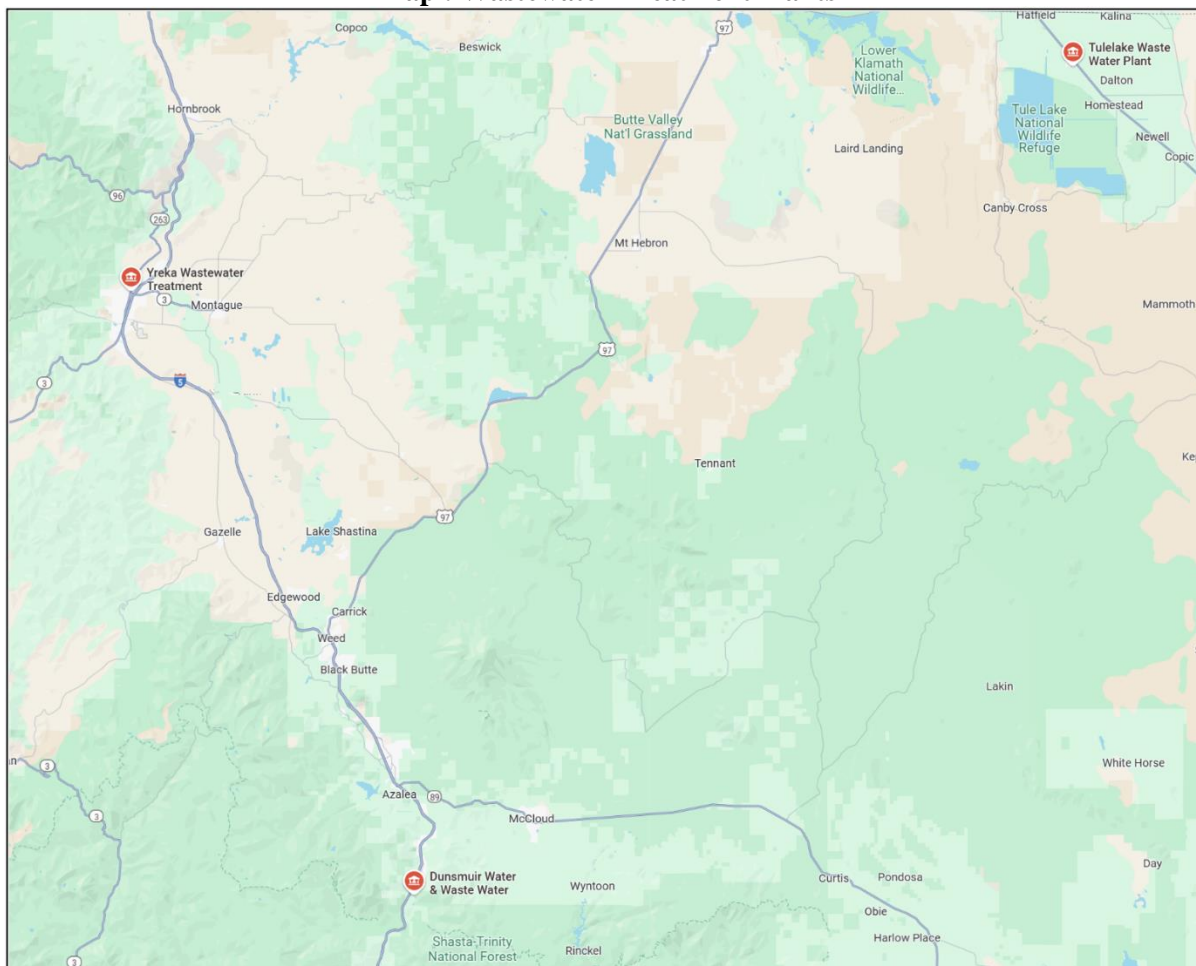
Should it be required to drill a private well deeper to accommodate for drought conditions impacting the level of the water table, on average, the cost to drill a private water well in the United States can range from \$15 to \$45 per foot. However, it's important to note that this is a general estimate, and actual costs can vary based on geological and hydrogeological conditions and well depth.

Additionally, drought can impact wastewater treatment facilities, and operations, including:

- **Biological Treatment Efficiency:** Many wastewater treatment plants use biological processes that rely on microorganisms to break down waste. These microorganisms depend on a certain balance of water, oxygen, and waste concentration to function effectively. During droughts, changes in the wastewater's composition and flow can reduce the efficiency of biological treatment systems, requiring process adjustments or additional chemical treatments.
- **Pipe Cracking and Ground Shifts:** Drought causes soil to dry out and shrink, potentially leading to ground shifts that can crack or damage underground sewer pipes. This can result in leaks, blockages, or sewer line failures that require costly repairs.
- **Increased Infiltration and Inflow:** During drought, groundwater levels may drop, and sewer systems can experience increased infiltration of saline or contaminated water, particularly in coastal areas. This can exacerbate the corrosion of pipes and other infrastructure.

Three wastewater treatment plants were identified in Siskiyou County, serving Dunsmuir, Tulelake, and Yreka. The following map indicates the locations of these treatment plants:

Map : Wastewater Treatment Plants



Source: Google Maps

A wide variety of data sources, including the Federal Highway Administration and state and federal Departments of Transportation, can be sourced for bridge construction and repair costs. The average construction and repair costs for bridges vary significantly depending on factors like the size and complexity of the bridge, its location, materials used, and the extent of the repairs or construction required. The following details a range of construction costs for bridges:

- Small Bridge (local, 2-lane bridge over a small waterway or road): Costs generally range between \$150 to \$400 per square foot.
- Medium-Sized Bridge (state highway, spanning larger rivers or railways): Costs generally range between \$300 to \$600 per square foot.
- Large Bridge (interstate or urban multi-lane bridge, often requiring complex engineering): Costs generally range between \$500 to \$1,000+ per square foot.

The following details a range of repair cost for bridges:

- Minor Repairs (deck resurfacing, guardrail fixes, minor structural repairs): Costs generally range between \$50,000 to \$500,000.
- Medium Repairs (replacing sections of the deck, repairing piers or abutments): Costs generally range between \$500,000 to \$5,000,000.
- Major Repairs or Rehabilitation (full deck replacement, structural strengthening, or seismic retrofitting): Costs generally range between \$5,000,000 to \$50,000,000.
- Emergency Repairs (post-disaster or structural failure): Costs generally range between \$10,000,000 to \$100,000,000.

The costs to repair or reconstruct water and wastewater utility plants and distribution systems can vary significantly based on factors such as the size of the facility, the extent of the damage, local labor costs, and material availability. However, some general estimates can provide insight into the typical expenses.

- **Water Utility Plants**
 - Minor repairs: These may involve fixes to pumps, valves, or small sections of piping. On average, minor repairs for water treatment facilities can range from \$10,000 to \$100,000, depending on the scale of the damage and the equipment involved.
 - Moderate repairs: More substantial repairs, such as fixing filtration systems or repairing damaged tanks, can cost anywhere from \$500,000 to \$2,000,000. These projects often involve replacing large equipment and reconfiguring damaged systems.
 - Major repairs or partial reconstruction: For significant damage, such as structural failures, system-wide overhauls, or upgrades, the cost may rise to \$10,000,000. This typically includes substantial replacement of infrastructure, new piping systems, and modernizations to meet current standards.
 - Reconstruction Costs: Complete reconstruction of a water utility plant can be very expensive, often costing between \$30,000,000 and \$20,000,000, depending on the capacity of the plant and the complexity of the systems involved.
- **Wastewater Treatment Plants**
 - Minor repairs (such as fixing aerators, pumps, or control systems) can cost between \$50,000 and \$500,000, depending on the facility's size and the severity of the issues.
 - Moderate repairs: Involves fixing critical components like clarifiers or digesters and can range from \$1,000,000 to \$5,000,000.
 - Major repairs or upgrades: For larger systems, like upgrading an entire section of a plant or replacing significant infrastructure, the costs can escalate to \$10,000,000.

- Reconstruction Costs: Complete reconstruction of wastewater plants typically ranges between \$50,000,000 and \$30,000,000, depending on the plant's capacity and required technology. Factors such as meeting modern regulatory standards can also drive costs.
- **Distribution Systems (Water and Wastewater)**
 - Water Distribution System Repair Costs: Repairing or replacing damaged pipelines, pumps, or valves in water distribution systems can cost anywhere from \$50,000 to \$200,000 per mile for minor repairs. More extensive pipe replacement, especially in urban areas where digging and rerouting traffic are involved, can escalate to \$500,000 to \$2,000,000 per mile.
 - Wastewater Distribution Repair Costs: pipelines (especially those dealing with larger sewage systems) tend to have higher repair costs due to increased complexity. These can range from \$1 million to \$3 million per mile, especially in densely populated regions or for large diameter pipes.
 - Water Distribution Reconstruction Costs: For water distribution system reconstruction, costs can range from \$1,000,000 to \$5,000,000 per mile, particularly for high-capacity urban systems with large pipe diameters or advanced technology like smart metering.
 - Wastewater Distribution Reconstruction Costs: For wastewater system reconstruction, particularly for larger pipelines, the cost per mile can range from \$3,000,000 to \$8,000,000, depending on the urban density, excavation challenges, and regulatory requirements.

Medical, Education, and Response Facilities

In general, medical, educational, and response facilities are not directly vulnerable to losses as a result of drought. Both operations and facilities will likely experience minimal impacts from drought conditions, unless there are substantial power, communications, or water outages.

Communication Systems

In general, communications systems are not directly vulnerable to losses as a result of drought, and would likely experience minimal impacts from drought conditions, unless there are substantial power outages.

Environmental and Agricultural Impacts

Drought conditions can cause significant agricultural impacts. In addition to obvious losses in yields in both crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of wildfires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk.

The following map from the United States Department of Agriculture details total agricultural losses due to drought conditions from 1989 - 2023:

Map : Agricultural Losses Due to Drought Conditions, 1989 - 2023



Source: United States Department of Agriculture

Although environmental losses are difficult to quantify, increasing public awareness and concern for environmental quality has forced public officials to focus greater attention and resources on these effects. Environmental losses are the result of damage to plant and animal species, wildlife habitat, and air and water quality, wildfires, degradation of landscape quality, loss of biodiversity, and soil erosion. Some of the effects are short-term and conditions quickly return to normal following the end of the drought. Other environmental effects linger for some time or may even become permanent. Wildlife habitat, for example, may be degraded through the loss of wetlands, lakes, and vegetation. However, many species will eventually recover from it if it is a temporary aberration. However, the degradation of landscape quality, with increased soil erosion, may lead to a more permanent loss of biological productivity of the landscape.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with drought may include:

- Decrease in water quality
- Increased wildfire risk
- Environmental degradation
- Land subsidence
- Damage to agricultural lands

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Drought Consequence Analysis

Subject	Potential Impacts
Impact on the Public	If the drought coincides with warmer months, vulnerable populations may face an increased risk of dehydration, death, heat-related illness, heat stroke. Lower quantities of water may also increase the likelihood of contamination due to higher

Table : Drought Consequence Analysis

Subject	Potential Impacts
	concentrations of bacteria. During droughts, dry soils and wildfires increase the number of airborne particles, such as pollen and smoke, which can worsen chronic respiratory illnesses.
Impact on Responders	Reduced water availability would likely complicate firefighting efforts in urban and suburban areas where wildfire-fighting tactics such as chemical retardants and controlled burns are less suitable. Some fire suppression equipment requires a minimum level of water pressure to activate. If the drought coincides with warm months, first responders may face increased risk of heat-related injuries or death.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. While the expectation is minimal, this threat may impact an agency’s ability to implement their continuity plan based on the hazard’s potential to impact power, communications, or water outages. Critical life-saving activities and fire suppression will be directly impacted by these outages.
Delivery of Services	Droughts may impact the delivery of goods and services if there are shortages of raw materials.
Property, Facilities, and Infrastructure	Drought conditions may threaten the levels or quality of municipal public water supplies or impact small communities and/or private potable water wells.
Impact on Environment	The potential of drought-related impacts could have significant impacts on supplies of animal feed, livestock, meat and dairy products, and processed grain products, and on crop production. Drought conditions may also increase the potential for fires. Drought is also associated with insect infestations, plant disease, wind erosion of soil, and decrease in levels of water produced by natural aquifers.
Economic Conditions	The economic impacts from a drought could be significant. Droughts have the potential to drain state, and local resources, which will have a significant fiscal impact on the local government.
Public Confidence in Governance	Droughts can adversely affect the public, first responders, infrastructure, agriculture, economy, and overall operations. Direct, effective, and timely response by all levels of government is required for public confidence in governance, especially in recognizing and mitigating economic impacts of the drought.

5.9.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the drought hazard.

Table : Example Drought Mitigation Actions

Category	Example Action
Planning and Regulation	Gathering and analyzing water and climate data to gain a better understanding of local climate and drought history.
	Identifying available water supplies.
	Improving water supply monitoring.
	Developing a drought emergency plan.
	Developing criteria or triggers for drought-related actions.
	Developing a drought communication plan to facilitate timely communication of relevant information.
	Establishing an irrigation time/scheduling program or process so that all agricultural land gets the required amount of water.
	Developing an ordinance to restrict the use of public water resources for non-essential usage.
	Adopting ordinances to prioritize or control water use, particularly for emergency situations like fire fighting
Infrastructure	Designing water delivery systems to accommodate drought events.

Table : Example Drought Mitigation Actions

	Developing new or upgrading existing water delivery systems to eliminate breaks and leaks
Natural Systems	Incorporating drought tolerance practices into landscape ordinances to reduce dependence on irrigation.
	Providing incentives for xeriscaping.
	Using permeable driveways and surfaces to reduce runoff and promote groundwater recharge
Education	Provide information on installing low-flow water saving showerheads and toilets.
	Provide information on adjusting sprinklers to water the lawn and not the sidewalk or street.
	Provide information on installing rain-capturing devices for irrigation.
	Encouraging the installation of graywater systems in homes to encourage water reuse

5.10 Earthquake

5.10.1 Hazard Description

An earthquake is the result of a sudden release of energy in the Earth’s crust that creates seismic waves that are typically caused by the rupturing of geological faults. A fault is a fracture or zone of fractures between two blocks of rock. Faults allow the blocks to move relative to each other, which, when rapidly occurring, causes an earthquake. When stresses in the crust exceed the strength of the surrounding rock, a rupture or break may occur fault plane. The point of origin of an earthquake is known as the hypocenter, which may be deep beneath the surface. The point at the surface directly above the hypocenter is known as the epicentre. Seismic waves radiate out from the hypocenter causing the ground to shake. These waves can travel long distance, but in general are strongest near the epicenter.



Earthquakes tend to occur along faults, which can be divided into three categories:

- **Normal Fault:** Resulting from pulling or tension with the overlying block moving down the dip of the fault plane
- **Thrust (Reverse) Fault:** Resulting from squeezing or compression, with the overlying block moving up the dip of the fault plane
- **Strike-Slip (Lateral) Fault:** Resulting from either type of stress, with the blocks moving horizontally past one another

5.10.2 Location and Extent

Two scales are used when referring to earthquake activity. Estimating the total force of an earthquake is the Richter scale, and the observed damage from an earthquake is the Modified Mercalli Intensity Scale. Additionally, both Peak Ground Acceleration (%g) and Velocity (cm/s) can be used to measure and quantify force and movement. Peak Ground Acceleration (PGA) is a measure of the maximum acceleration experienced by a point on the Earth’s surface during an earthquake. It quantifies the intensity of ground shaking at a specific location and is a crucial parameter for assessing seismic hazard. PGA is typically measured in units of gravity (g), where 1 g is approximately equal to the acceleration due to Earth’s gravity (about 9.81 meters per second squared or 32.2 feet per second squared). So, if the PGA at a location is 0.2 g, it means the ground acceleration during the earthquake was 20% of the acceleration due to gravity. PGA can vary significantly from one location to another during the same earthquake event. Factors that influence PGA include the earthquake’s magnitude, depth, distance from the epicenter, and local geological conditions.

The following table equates the above referenced earthquake scales.

Table : Earthquake Magnitude Scale Comparison

Mercalli Scale Intensity	Verbal Description	Richter Scale Magnitude	Acceleration (%g)	Velocity (cm/s)	Witness Observations
I	Instrumental	1 to 2	0.17%	<0.1	None
II	Feeble	2 to 3	1.40%	1.1	Noticed only by sensitive people
III	Slight	3 to 4	1.40%	1.1	Resembles vibrations caused by heavy traffic
IV	Moderate	4	3.90%	3.4	Felt by people walking, rocking of free-standing objects
V	Rather Strong	4 to 5	9.20%	8.1	Sleepers awakened; bells ring
VI	Strong	5 to 6	18.00%	16	Trees sway, some damage from falling objects
VII	Very Strong	6	35.00%	31	General alarm, cracking of walls

Table : Earthquake Magnitude Scale Comparison

Mercalli Scale Intensity	Verbal Description	Richter Scale Magnitude	Acceleration (%g)	Velocity (cm/s)	Witness Observations
VIII	Destructive	6 to 7	65.00%	60	Chimneys fall and some damage to building
IX	Ruinous	7	125.00%	116	Ground crack, houses begin to collapse, pipes break
X	Disastrous	7 to 8	>125.0%	>116	Ground badly cracked, many buildings destroyed. Some landslides
XI	Very Disastrous	8	>125.0%	>116	Few buildings remain standing, bridges destroyed.
XII	Catastrophic	8 or greater	>125.0%	>116	Total destruction; objects thrown in air, shaking and distortion of ground

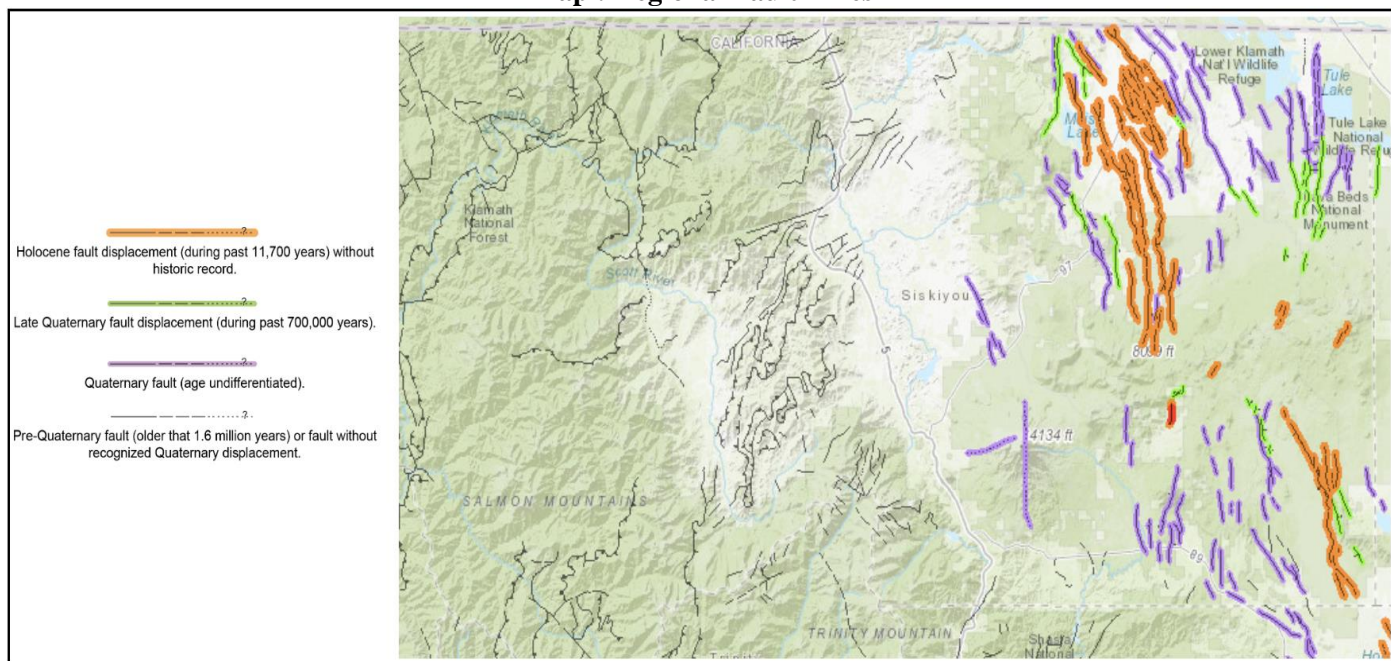
Siskiyou County is located within the North American tectonic plate, a major tectonic plate that covers a significant portion of North America. Siskiyou County is situated near plate boundaries, where tectonic activity is more pronounced.

Faults can be classified based on the time period in which they were most active. These time periods are significant in geology for understanding fault activity, seismic risk, and landscape evolution. The following are generally accepted fault classifications:

- **Holocene Faults:** Active within the last 11,700 years, these are considered the most active faults because they have produced movement (displacement) recently in geologic terms. They are often associated with recent seismic activity and present a higher risk for future earthquakes.
- **Late Quaternary Faults:** Active within the last 700,000 years, these faults pose a moderate earthquake risk. While they may not have moved in the very recent past, they are still considered capable of producing future earthquakes.
- **Quaternary Faults:** Active within the last 2.6 million years, these faults are considered active in the geologic sense. However, the risk they pose for earthquakes today is generally lower than Holocene or late Quaternary faults.
- **Pre-Quaternary Faults:** Active before 2,600,000 years ago, these faults are considered to pose a low risk of earthquakes. Since these faults have not been active in millions of years, they are unlikely to experience reactivation under current tectonic stress conditions.

The following map, from the California Department of Conservation, details regional fault lines:

Map : Regional Fault Lines



Source: California Department of Conservation

The National Earthquake Hazards Reduction Program maps soil types that define the potential for significant impact from an earthquake due to seismic wave amplification. The soil types are generally described as follows:

- Type A: Hard rock
- Type B: Rock
- Type C: Dense soil/soft rock
- Type D: Stiff soil
- Type E: Soft soil
- Type F: Special soils requiring special evaluation

Of concern, Type D and Type E soils have a high potential to cause structural damage during an earthquake due to seismic wave amplification. Type D soils, often referred to as stiff soils, typically consist of dense sand, gravel, or stiff clay. These soils offer moderate resistance to seismic waves, meaning that the amplitude of earthquake waves may be somewhat amplified as they pass through this type of soil. While Type D soils are not as prone to extreme amplification as softer soils, they still can intensify ground shaking during an earthquake.

Type E soils, known as soft soils, typically consist of soft clay, loose sand, or any unconsolidated materials that are prone to higher levels of amplification during seismic events. This soil can significantly increase the amplitude and duration of earthquake shaking, making structures built on them more vulnerable to damage. Type E soils amplify seismic waves much more than stiffer soil types. The soft, loose nature of the soil doesn't absorb seismic energy effectively, causing stronger ground shaking. Buildings or structures located on Type E soils are at higher risk of experiencing severe damage during an earthquake due to this amplification effect. Areas with Type E soils may require additional building reinforcements, such as deeper foundations or vibration-absorbing materials, to protect against earthquake damage.

The following map, from the State of California, details the extent of Type D and Type E soils in Siskiyou County:

Map : Siskiyou County Type D and Class E Soils Map



Source: State of California

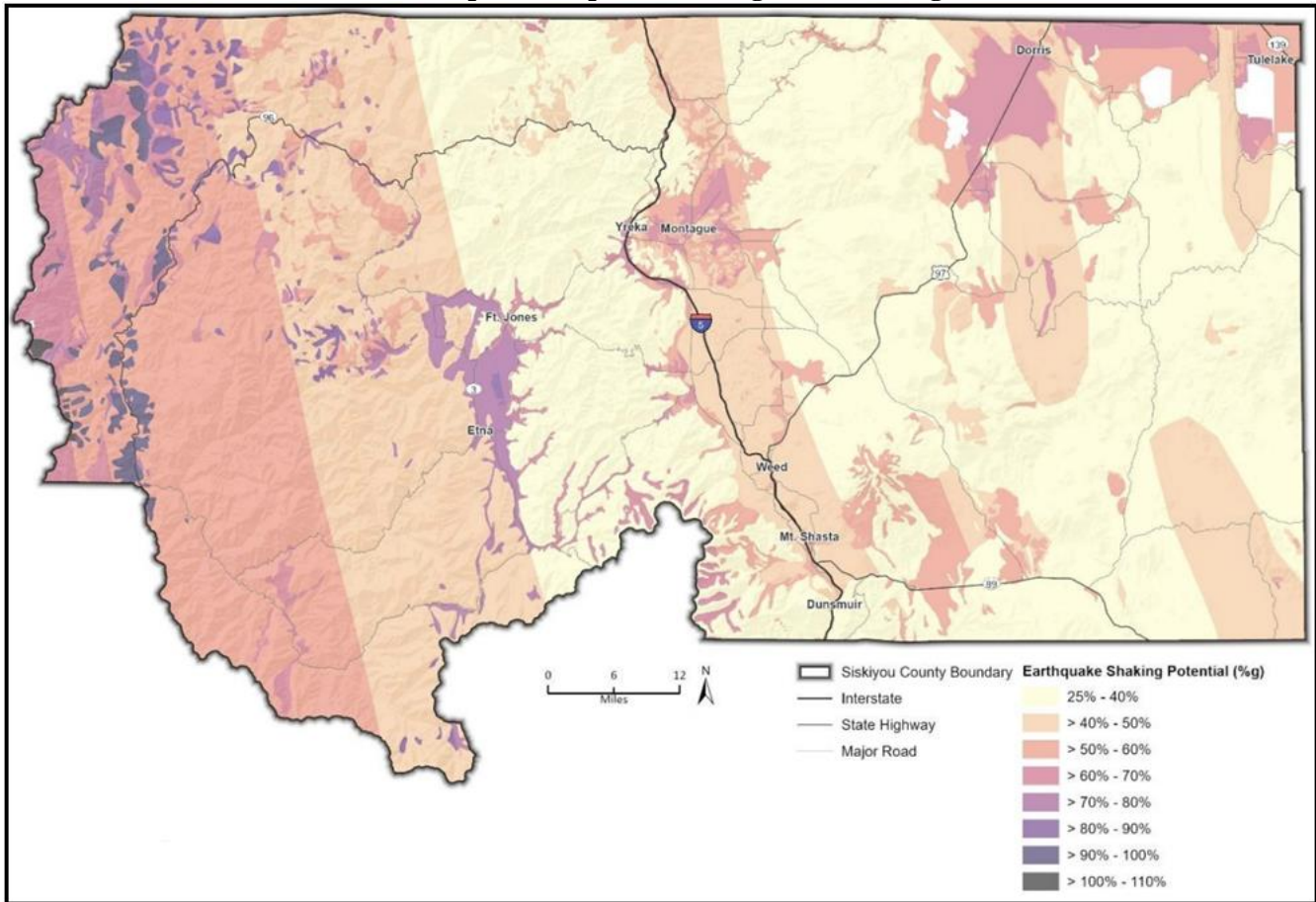
Liquefaction occurs when loosely packed or wet soils near the ground surface lose their strength during strong ground shaking, causing these soils to behave like a liquid. Liquefaction beneath buildings and other structures can cause significant damage during earthquakes. As of this plan, no liquefaction mapping has been completed in Siskiyou County, representing a gap in the understanding of the risk from this hazard.

Earthquake shaking potential (%g) refers to the percentage of the force of gravity (g) that is experienced as ground shaking during an earthquake. The value of g (9.8 m/s²) represents the standard acceleration due to gravity. When describing earthquake shaking potential in terms of %g, it indicates how strong the shaking is relative to gravity. For example, 10%g means the ground is accelerating at 10% of the force of gravity, or 0.98 m/s² while 50%g means the ground is accelerating at 50% of gravity, or 4.9 m/s². In general terms, shaking potential can translate into the following impacts:

- **10%g:** Typically felt as light shaking, which may be noticeable but usually causes little to no structural damage.
- **30%g-50%g:** Moderate to strong shaking. At this level, buildings may sustain some structural damage, especially if not properly designed for seismic activity.
- **100%g (1g):** This represents severe shaking. At 1g, the ground acceleration is equivalent to gravity, and significant damage to structures and infrastructure can occur.
- **Above 100%g:** These extreme levels of shaking, sometimes recorded near the epicenter of large earthquakes, can cause severe and widespread damage to both buildings and the natural landscape.

Seismic hazard maps often express shaking potential in %g to indicate the probability of experiencing certain levels of ground shaking at a location over a given period (e.g., 10% chance of 50%g shaking in 50 years). The following map indicates earthquake shaking potential for Siskiyou County and all participating jurisdictions.

Map : Earthquake Shaking Potential (%g)



Source: California Geologic Society

5.10.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced no Presidential Disaster Declarations related to earthquakes.

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to earthquakes.

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. Siskiyou County has experienced no proclamations of a State of Emergency related to earthquakes.

Siskiyou County has experienced a relatively benign history of seismic activity compared to more active regions of California, such as the San Francisco Bay Area or Southern California. According to the data from the USGS, there have been thousands of earthquakes of various magnitudes in the Siskiyou County over the past 70 years. However, only a small number of these quakes have exceeded a magnitude of 3.0, with an even smaller number exceeding a magnitude of 4.5 on the Modified Mercalli Scale. Over the past 70 years, only seven earthquakes in or near Siskiyou County have registered at or exceeding a magnitude of 4.5, most recently in September of 2023. The following table identifies earthquakes in and near Siskiyou County with a magnitude of 4.5 or greater since 1900:

Table : Siskiyou County Magnitude 4.5+ Earthquakes, 1900 - 2024

Event Year	Magnitude	Nearest City
2023	5.0	Burney
1985	4.6	Etna

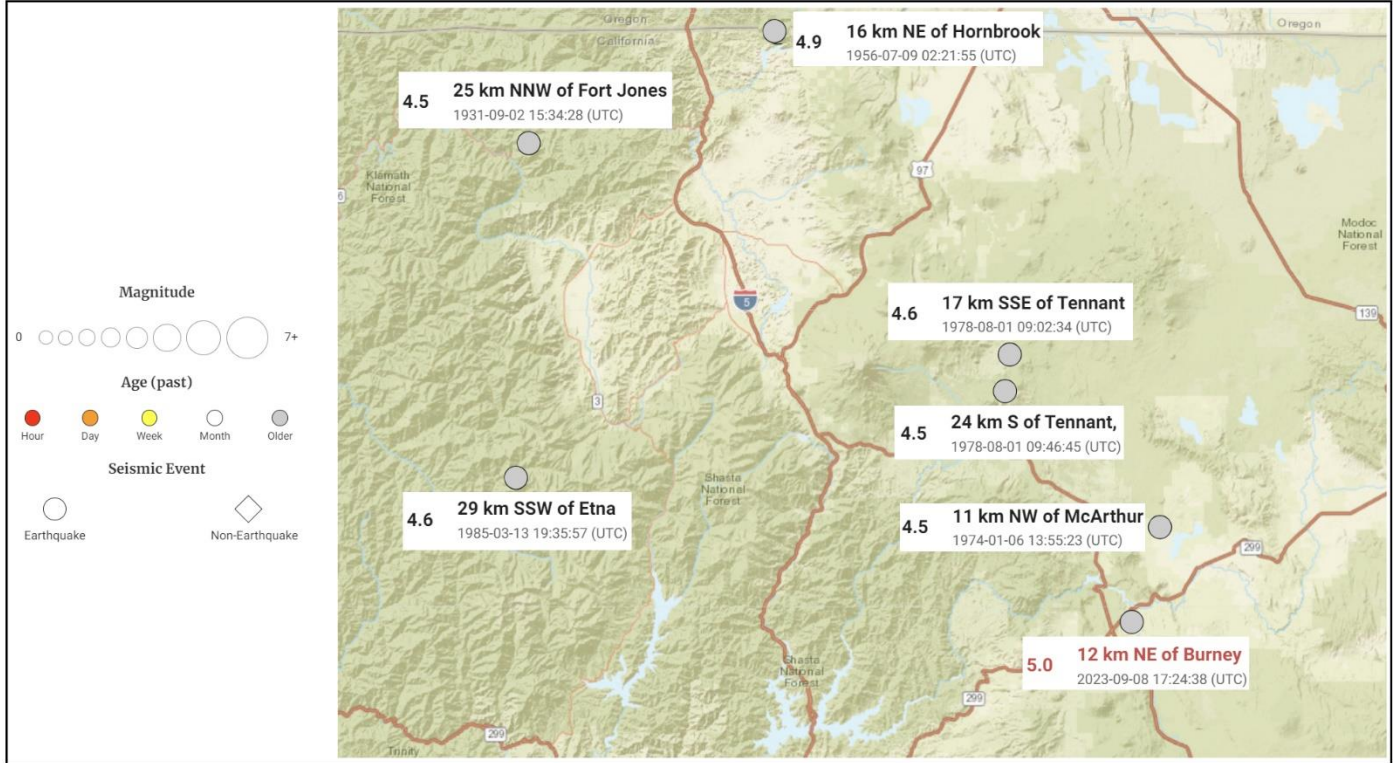
Table : Siskiyou County Magnitude 4.5+ Earthquakes, 1900 - 2024

Event Year	Magnitude	Nearest City
1978	4.5	Tennant
1978	4.6	Tennant
1974	4.5	McArthur
1956	4.9	Hornbrook
1931	4.5	Fort Jones

Source: USGS

The following map illustrates the location of the earthquakes:

Map: Magnitude 4.5 and Great Earthquakes, 1900 – 2024



Source: USGS

Regionally, extending as far north as Eugene, Oregon, as far south as San Francisco, as far east as Carson City, Nevada, and as far West as the Pacific Ocean, there have been ten earthquakes registering greater than magnitude 6.5 since 1900. The quakes are as follows:

Table : Regional Magnitude 6.5+ Earthquakes, 1900 - 2024

Event Year	Magnitude	Location
2014	6.8	Pacific Ocean
2010	6.5	Pacific Ocean
1992	6.6	Pacific Ocean
1992	7.2	Petrolia
1980	7.2	Eureka
1954	6.5	Eureka-Arcata
1941	6.8	Pacific Ocean
1923	7.1	Pacific Ocean
1918	6.5	Pacific Ocean

Table : Regional Magnitude 6.5+ Earthquakes, 1900 - 2024

Event Year	Magnitude	Location
1906	7.9	San Francisco

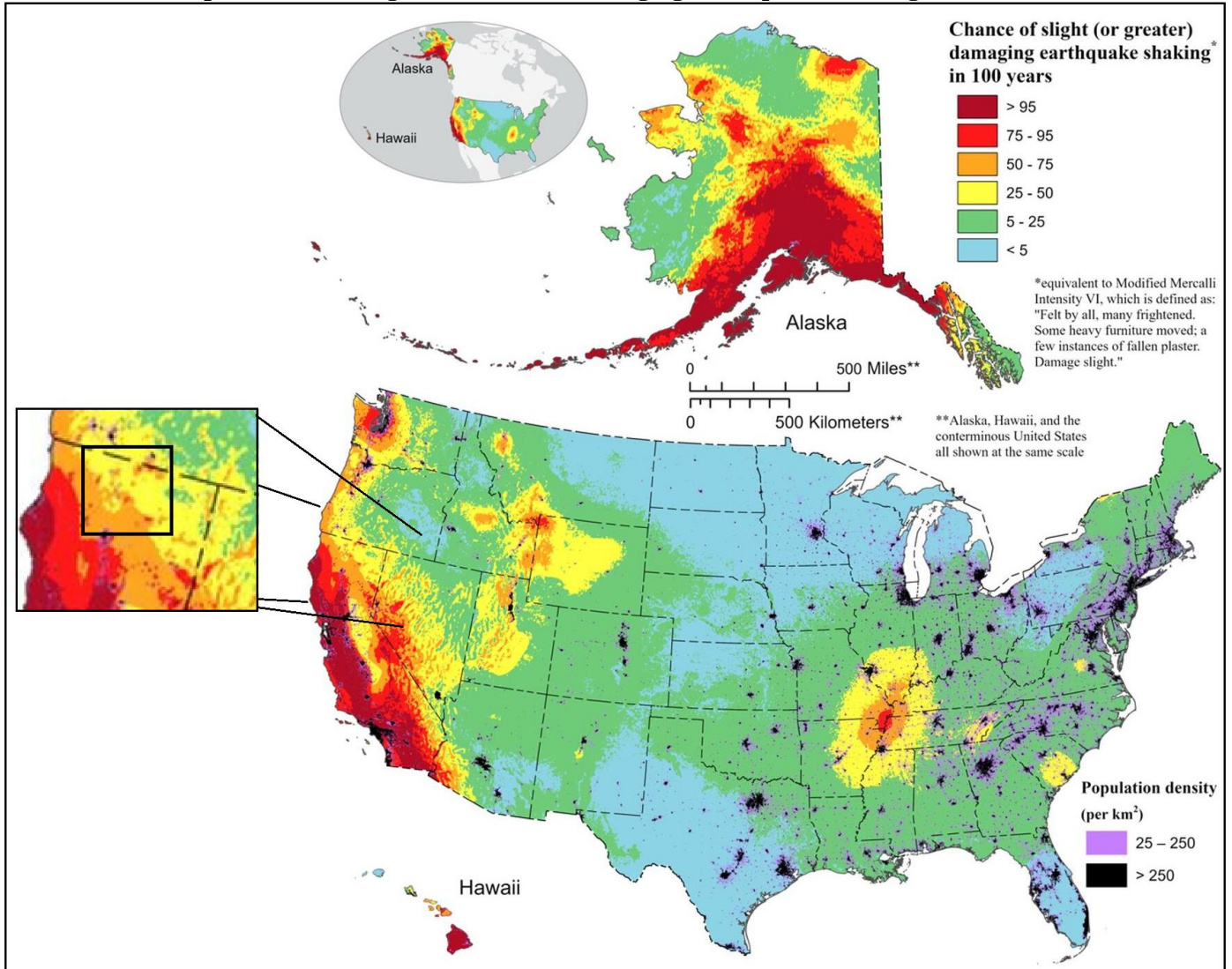
Source: USGS

There have been no state or federal declared earthquake disasters in Siskiyou County.

5.10.4 Probability of Future Events

Predicting the occurrence of earthquakes is tremendously challenging due to the large number of factors involved. However, mapping from the USGS can help detail future earthquake probability. The following map, from the USGS, illustrates the chance of damaging earthquake shaking in 100 Years for Siskiyou County (approximately 25%-75% for the majority of the county):

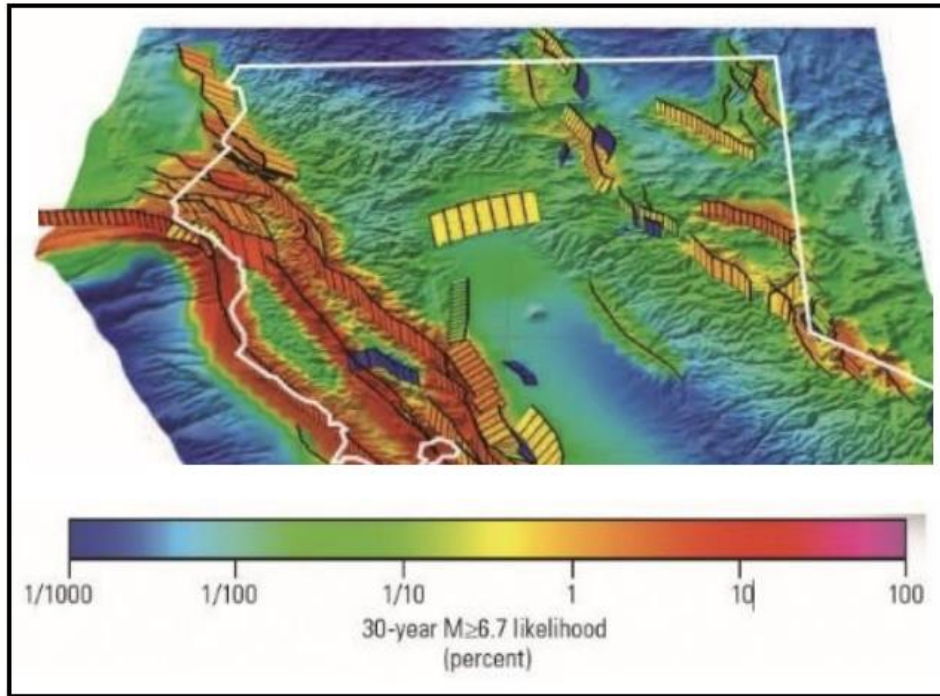
Map : Chance of Slight (or Greater) Damaging Earthquake Shaking in 100 Years



Source: USGS

Additionally, the Statewide California Earthquake Center has developed an earthquake forecast model for California, the third Uniform California Earthquake Rupture Forecast, to provide authoritative estimates of the magnitude, location, and likelihood of earthquake fault rupture throughout the state. The following map shows the likelihood of an earthquake of magnitude 6.7 or greater through 2044. As indicated on the following map, Siskiyou County is in the lowest likelihood percentage:

Map : Likelihood of a Magnitude 6.7 or Larger Earthquake through 2044



Source: Statewide California Earthquake Center Third Uniform California Earthquake Rupture Forecast

5.10.5 Projected Changes in Location, Intensity, Frequency, and Duration

Due to the very long-term nature of geological process, including earthquakes, the seismic hazard for Siskiyou County is not expected to change during the life of this plan.

5.10.6 Vulnerability and Impact

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from earthquakes. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Earthquake Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Frequency (per year)
Siskiyou County	All	Relatively Moderate	94.6	0.394%
Dorris	06093000200	Relatively Moderate	86.6	0.415%
Dunsmuir	06093001100	Relatively Moderate	84.8	0.367%
Etna	06093000800	Relatively Moderate	89.4	0.453%
Fort Jones	06093000701	Relatively Moderate	85.9	0.320%
Happy Camp CSD	06093001300	Relatively High	91.0	0.396%
Lake Shastina CSD	06093000902	Relatively Moderate	81.8	0.374%
McCloud CSD	06093001200	Relatively Moderate	83.3	0.389%
Montague	06093000300	Relatively Moderate	86.6	0.325%
Mt. Shasta	06093001003	Relatively Low	76.4	0.347%
Tulelake	06093000100	Relatively Moderate	87.4	0.412%
Weed	06093000901	Relatively High	92.0	0.358%
Yreka	06093000703	Relatively Moderate	82.6	0.297%

Source: FEMA NRI

Table : Participating Jurisdiction Earthquake Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Earthquake EAL
Siskiyou County	All	Relatively Moderate	93.4	\$6,200,000
Dorris	06093000200	Relatively Moderate	86.3	\$453,000
Dunsmuir	06093001100	Relatively Moderate	82.7	\$242,000
Etna	06093000800	Relatively High	88.4	\$610,000
Fort Jones	06093000701	Relatively Moderate	85.0	\$368,000
Happy Camp CSD	06093001300	Relatively High	88.6	\$624,000
Lake Shastina CSD	06093000902	Relatively Moderate	81.4	\$190,000
McCloud CSD	06093001200	Relatively Moderate	82.6	\$239,000
Montague	06093000300	Relatively Moderate	85.0	\$368,000\$
Mt. Shasta	06093001003	Relatively Moderate	79.3	\$130,000
Tulelake	06093000100	Relatively Moderate	84.8	\$354,000
Weed	06093000901	Relatively High	89.0	\$656,000
Yreka	06093000703	Relatively Moderate	80.8	\$170,000

Source: FEMA NRI

FEMA HAZUS-MH Earthquake Analysis

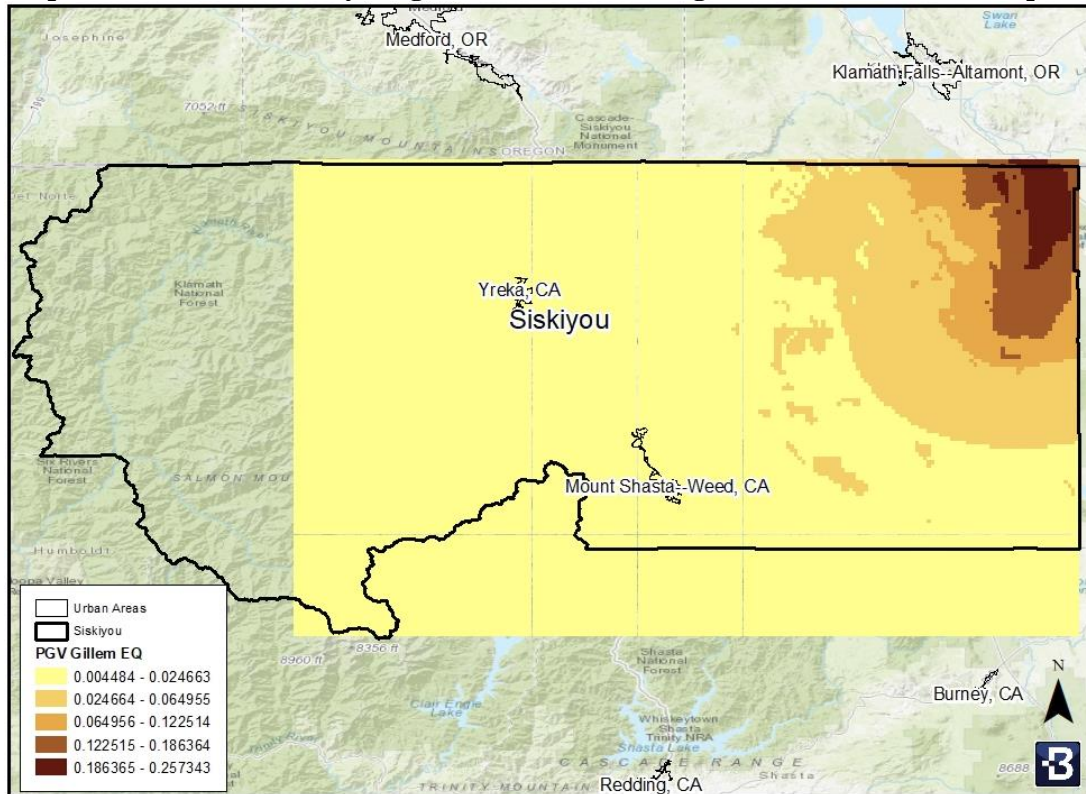
FEMA’s HAZUS-MH was used to conduct two loss estimations, one from a magnitude 7.1 earthquake along the Sky Lakes Fault Zone, and one from a magnitude 6.8 Gillem - Big Crack fault zone. The damage estimate indicated the following:

- **Magnitude 7.1 Sky Lakes Fault Zone Earthquake**
 - Approximately four buildings will be at least moderately damaged.
 - No buildings will be damaged beyond repair.
 - No critical facilities (hospitals, schools, Emergency Operations Centers, Police Stations, and Fire Stations) will be damaged, and all will have functionality of day one.
 - No transportation systems will suffer damage, and all will be operational on day one.
 - No utility facility or systems will suffer damage, and all will be operational on day one.
 - There will be no debris generated.
 - There will be no displaced households.
 - There will be no persons seeking temporary shelter.
 - There will be no casualties or deaths.
 - Total economic loss is estimated at \$51,810,000.
- **Magnitude 6.8 Gillem - Big Crack Fault Zone Earthquake**
 - Approximately 112 buildings will be at least moderately damaged.
 - No buildings will be damaged beyond repair.
 - Four critical facilities (hospitals, schools, Emergency Operations Centers, Police Stations, and Fire Stations) will suffer at least moderate damage (all schools). The remainder will have functionality of day one.
 - No transportation systems will suffer damage, and all will be operational on day one.
 - One utility system facility will suffer moderate damage (a wastewater treatment plant). The remainder will be operational on day one.
 - 342 households will be without power on day one, dropping to 50 household on day 7 and one household on day 90.
 - There are 3,000 tons of debris generated.
 - There will be three displaced households.

- There will be two persons seeking temporary shelter.
- There will be one casualty and no deaths.
- Total economic loss is estimated at \$65,350,000.

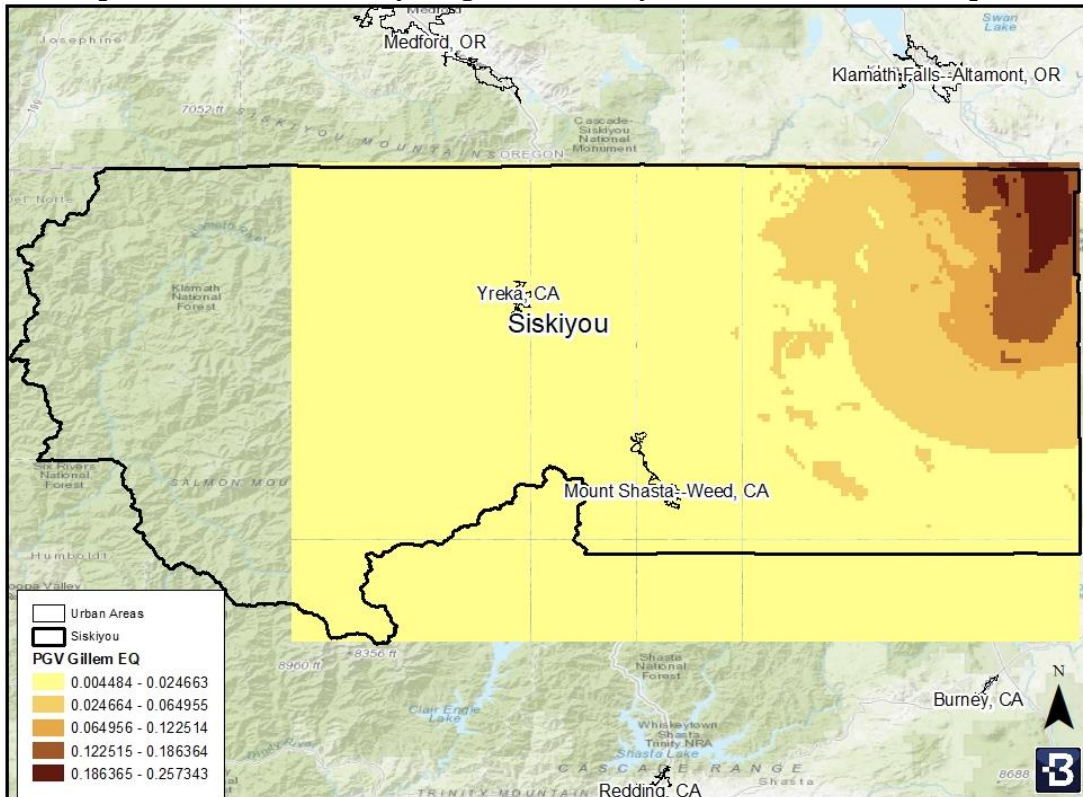
The following maps, created using FEMA Hazus-MH Data, illustrate the peak ground velocity for the two modeled earthquake events. Peak Ground Velocity is a measure of the maximum speed at which the ground moves during an earthquake. Peak Ground Velocity quantifies how fast the ground is moving at its highest point of velocity during seismic shaking. This measure is important because it directly correlates to the potential for structural damage during an earthquake.

Map: Peak Ground Velocity Magnitude 6.8 Gillem - Big Crack Fault Zone Earthquake



Source: FEMA Hazus-MH

Map: Peak Ground Velocity Magnitude 7.1 Sky Lakes Fault Zone Earthquake



Source: FEMA Hazus-MH

Population

Although major earthquakes occur infrequently in Siskiyou County, a large magnitude quake could have profound impacts on people, affecting their physical, emotional, and social well-being. The impacts can be broken down into the following categories:

- **Physical Impact**
 - Injuries and Fatalities: Earthquakes often lead to serious injuries and deaths, usually caused by collapsing buildings, falling debris, or fires triggered by broken gas lines. The extent of these injuries depends on the magnitude of the quake, building standards, and preparedness in the affected area.
 - Access to Medical Services: Hospitals and emergency services can become overwhelmed by the sudden influx of injured people. In some cases, healthcare facilities may also be damaged, reducing their capacity to provide care.
- **Emotional and Psychological Impact**
 - Trauma and Anxiety: Survivors often experience psychological stress, anxiety, and trauma from the quake and aftershocks. The sudden and unpredictable nature of earthquakes can cause long-lasting fear, especially in areas where aftershocks continue for days or weeks.
 - Post-Traumatic Stress Disorder: People who have lost loved ones, their homes, or have experienced life-threatening situations may develop Post-Traumatic Stress Disorder, affecting their long-term mental health.
- **Social and Economic Impact**
 - Displacement: Many people are left homeless after major earthquakes due to the destruction of homes. Temporary shelters may be set up, but displaced families can experience difficult living conditions, lacking access to food, clean water, and sanitation.

- Loss of Livelihood: Economic losses can be devastating, especially for people whose businesses, jobs, or properties are destroyed. In regions where many rely on agriculture or small businesses, the economic recovery can take years.
- Community Disruption: The destruction of infrastructure such as schools, transportation, and utilities (electricity, water, gas) can disrupt daily life for extended periods. Recovery efforts can take months or even years, affecting education, jobs, and community cohesion.

Earthquakes may disproportionately affect socially vulnerable populations, exacerbating pre-existing inequalities and making recovery more difficult for these groups. Earthquakes may disproportionately impact these groups in the following ways:

- **Increased Risk of Injury and Death**
 - Housing in Unsafe Areas: Socially vulnerable groups are more likely to live in poorly constructed housing, which is more prone to collapse during an earthquake. Many low-income communities are located in areas with higher seismic risk, such as near fault lines or on unstable ground.
 - Lack of Access to Earthquake-Resistant Infrastructure: Vulnerable populations, especially in under-resourced areas, may live in buildings not built to modern safety standards, increasing their risk during seismic events.
- **Delayed or Inadequate Emergency Response**
 - Limited Access to Emergency Services: Socially vulnerable populations may experience delayed access to rescue efforts, medical care, and emergency shelters due to geographic isolation, discrimination, or lack of resources like transportation. Rural, low-income, or marginalized communities may not receive the same level of emergency response as wealthier urban areas.
 - Language Barriers: Non-English-speaking populations or those with limited literacy may struggle to receive or understand emergency alerts, evacuation instructions, or recovery information, increasing their vulnerability during and after an earthquake.
- **Economic Impact and Prolonged Recovery**
 - Loss of Livelihoods: Earthquakes can disrupt working conditions, particularly for those in informal employment such as day laborers or small business owners. Socially vulnerable populations often lack savings or insurance to cushion the economic blow of losing their homes or jobs.
 - Housing and Relocation Issues: Low-income households are less likely to have earthquake insurance or the financial means to repair or rebuild their homes. As a result, they may face prolonged displacement and be forced to live in overcrowded or substandard shelters for extended periods.
- **Mental Health and Social Support Challenges**
 - Psychological Impact: Vulnerable populations may have less access to mental health care and social services to help them cope with the trauma.
 - Weakened Social Networks: Socially vulnerable populations often rely on tight-knit community networks for support. Earthquake displacement can disrupt these networks, making recovery more difficult for individuals who lose access to family, friends, and community support systems.
- **Barriers to Recovery Resources**
 - Disparities in Aid Distribution: Vulnerable populations may face challenges accessing recovery assistance, such as government aid, housing assistance, and loans. Bureaucratic obstacles, discrimination, or lack of information can prevent marginalized groups from receiving the help they need.
 - Exclusion from Decision-Making: Marginalized groups are often excluded from post-disaster decision-making processes, meaning their specific needs and challenges may not be addressed in recovery planning. This can lead to inequitable rebuilding and recovery efforts, further disadvantaging these populations.

Additionally, older adults may have limited mobility, making it difficult for them to evacuate during an earthquake or seek assistance afterward. They may also suffer more from disruptions to medical care or loss of essential services. Earthquakes can severely impact people with disabilities who may need specialized evacuation assistance, accessible emergency shelters, and medical care. Often, emergency plans do not fully consider the needs of people with physical or cognitive disabilities. Children are particularly vulnerable during disasters because they rely on adults for safety and care. Displacement from homes, schools, and social networks can cause long-term developmental and psychological effects on children.

The loss of utility and communications services can also have a large impact on individuals. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values:

Table : Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	\$199
Loss of Wastewater Services	\$66
Loss of Water Services	\$138
Loss of Communications/Information Technology Services	\$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

All Siskiyou County and participating jurisdictions are vulnerable to the impacts of earthquakes. Please see Section 3.3: Population Data and Section 3.4: Socially Vulnerable and At-Risk Populations for data concerning jurisdictional populations.

Buildings and Structures

Buildings and structures can be damaged during an earthquake due to the intense ground shaking, surface rupture, and secondary effects such as soil liquefaction or landslides. The severity of the damage depends on factors such as the earthquake's magnitude, distance from the fault, local soil conditions, and the building's design, materials, and age. Here are the main ways in which buildings and structures can be damaged and the types of damage that can occur:

- **Ground Shaking**
 - Cracking of Walls and Foundations: When buildings sway from side to side due to seismic waves, rigid components such as walls, beams, and foundations can crack or split. This is especially common in older buildings not designed for earthquake resistance.
 - Collapse of Load-Bearing Walls: In severe cases, load-bearing walls may fail, leading to partial or complete building collapse.
 - Failure of Columns and Beams: The vertical supports (columns) and horizontal supports (beams) may fail due to excessive forces, leading to the collapse of floors or entire sections of buildings.
 - Damage to Facades: Exterior cladding and facades can crack, detach, or fall off due to shaking, posing hazards to people and property below.
 - Ceiling and Partition Failures: Interior ceilings and non-load-bearing partitions may collapse or become dislodged, causing injuries and further damage to interiors.
- **Surface Rupture**
 - Foundation Shift or Shear: The building's foundation may shear, split, or shift in different directions if it straddles the fault, leading to severe structural damage.
 - Displacement of Structures: Buildings located directly on the fault line can be displaced horizontally or vertically, causing irreparable structural damage.
- **Soil Liquefaction**
 - Foundation Settling or Tilting: Buildings can sink or tilt as the soil beneath them loses its ability to support their weight.
 - Piping and Utility Damage: Underground utilities like water, gas, and sewage lines can rupture due to soil movement, causing leaks, contamination, or service disruptions.

- **Ground Failure and Landslides**
 - Collapse of Slopes: Buildings located on slopes or near cliffs are at risk of sliding down or collapsing if the ground beneath them gives way.
 - Impact Damage from Debris: Landslides can send rocks, trees, and other debris crashing into buildings, causing structural damage.
- **Resonance Effects**
 - Excessive Swaying and Cracking: Buildings that experience resonance may sway much more than those not affected by this phenomenon, leading to cracking, weakening, or failure of structural components.
 - Tall vs. Short Buildings: Taller buildings may experience more severe damage if the ground motion resonates with their height, whereas shorter structures may be less affected by resonance but still suffer other types of damage.

Of particular concern to all jurisdictions are unreinforced masonry buildings. An unreinforced masonry building is constructed of brick or masonry with no steel reinforcing bars. Because these buildings were not built using modern building codes, they are much more likely to experience damage or collapse during an earthquake. As of this plan, no survey has been conducted to determine the number of unreinforced masonry buildings in Siskiyou County or participating jurisdictions.

All participating jurisdiction buildings and structures are at risk to the potential impacts of an earthquake. FEMA’s Hazus-MH estimates that:

- There are 25,608 building in the county
- These building have an aggregate total replacement value of \$11,613,000,000

Additionally, FEMA’s HAZUS-MH indicates the following damage estimates:

- **Magnitude 7.1 Sky Lakes Fault Zone Earthquake**
 - Approximately four buildings will be at least moderately damaged.
 - No buildings will be damaged beyond repair.
 - There will be no debris generation.
- **Magnitude 6.8 Gillem - Big Crack Fault Zone Earthquake**
 - Approximately 112 buildings will be at least moderately damaged.
 - No buildings will be damaged beyond repair.
 - There are 3,000 tons of debris generated.

Governmental Operations

Earthquakes can significantly disrupt governmental operations at various levels. These impacts are especially pronounced in the immediate aftermath, where response efforts, infrastructure damage, and communication breakdowns can severely hamper government functions. Impacts to governmental operations may include:

- **Damage to Government Buildings:** Earthquakes can damage or destroy government offices, courts, police stations, fire departments, and other essential facilities. This makes it difficult for public officials and emergency responders to coordinate disaster response efforts.
- **Emergency Management Strain:** Governments are responsible for coordinating emergency responses, including search and rescue operations, medical assistance, and evacuations. Earthquakes can overwhelm local government capacities, particularly in communities that lack preparedness plans or resources. The scale of the disaster often requires the involvement of state or federal agencies, further complicating coordination.

- **Communication Breakdowns:** Earthquakes can damage communication networks, including internet and phone services, preventing effective communication between government officials, emergency responders, and the public. This hinders the dissemination of critical information such as evacuation routes, safety guidelines, and status updates.
- **Budget Strains:** The cost of responding to and recovering from an earthquake can put significant pressure on government budgets. Resources may need to be diverted from other programs to fund disaster relief, infrastructure repair, and rebuilding efforts. Governments often face additional costs for temporary housing, rebuilding public facilities, and providing social services to displaced populations.
- **Economic Disruption:** Earthquakes can severely disrupt local and regional economies, affecting government revenues from taxes and fees. The temporary shutdown of businesses, loss of jobs, and damage to the tax base can lead to budget shortfalls, making it harder for governments to finance recovery efforts.
- **Accountability and Criticism:** The effectiveness of a government's response to an earthquake can impact public trust and confidence. If governments are perceived as slow or inadequate in their disaster response, they may face public criticism, protests, or political fallout. Conversely, a well-coordinated and effective response can strengthen public trust in leadership.
- **Education and Social Services:** Schools, which are often public institutions, may be destroyed or damaged, delaying the education of children. Government-run social services, including food distribution and welfare programs, may be strained or interrupted, especially as the need for these services often increases post-disaster.

Transportation and Electrical Infrastructure

Earthquakes can have numerous impacts on both transportation and electrical distribution systems, often leading to challenges that require proactive management. The impacts of earthquakes on transportation systems may include:

- **Roads and Highways:** Earthquakes can cause cracking, buckling, and collapse of roads, highways, and bridges. In severe cases, transportation networks are cut off, hindering emergency response, evacuation, and the transportation of goods. Ground shaking and surface rupture can make roads impassable, especially in areas prone to landslides or liquefaction.
- **Bridges and Tunnels:** Bridges are especially vulnerable to collapse during earthquakes due to the extreme forces exerted on their structures. Older bridges not built to modern seismic codes are at higher risk of failure. Tunnels can also collapse or become blocked by debris, cutting off access to critical routes.
- **Railways:** Rail systems can be severely impacted by earthquakes, as tracks may buckle or become misaligned, leading to derailments.

An earthquake can impact both the electrical generation capacity and transmission. The impacts of earthquakes on electrical systems may include:

- **Power Plants:** Earthquakes can damage power generation facilities causing a cessation of services and costly repairs.
- **Transmission Lines:** Power transmission lines and substations can be damaged by ground shaking, especially in areas with unstable soils. This can result in prolonged power outages, which disrupt communication, emergency services, and basic living conditions.
- **Grid Instability:** Damage to power infrastructure can lead to cascading failures within the electrical grid. Substations, transformers, and electrical distribution networks can be knocked offline.

As indicated by the FEMA's Hazus-MH loss estimations, the following transportation and electrical utility impacts can be anticipated:

- **Magnitude 7.1 Sky Lakes Fault Zone Earthquake**
 - No transportation systems will suffer damage, and all will be operational on day one.

- No utility facility or systems will suffer damage, and all will be operational on day one.
- **Magnitude 6.8 Gillem - Big Crack Fault Zone Earthquake**
 - No transportation systems will suffer damage, and all will be operational on day one.
 - One utility system facility will suffer moderate damage (a wastewater treatment plant). The remainder will be operational on day one.
 - 342 households will be without power on day one, dropping to 50 household on day 7 and one household on day 90.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

Water and wastewater utilities are vulnerable to earthquake events due to the potential for plant damages and distribution system damages. Impacts may include:

- **Water Supply:** Earthquakes can rupture underground water pipes and damage water treatment facilities, leading to water shortages or contamination. In many cases, people are left without clean drinking water, and authorities must rely on temporary solutions like bottled water or emergency water delivery.
- **Wastewater Systems:** Sewer lines and wastewater treatment plants are particularly vulnerable to ground movement. Ruptured sewer lines can lead to sewage leaks, contaminating groundwater and local water sources. Damage to wastewater treatment plants can lead to untreated sewage being released into waterways, causing public health hazards.

As indicated by the FEMA’s HAZUS-MH loss estimations, the following water and wastewater utility impacts can be anticipated:

- **Magnitude 7.1 Sky Lakes Fault Zone Earthquake**
 - No water or wastewater utility facility or system will suffer damage, and all will be operational on day one.
- **Magnitude 6.8 Gillem - Big Crack Fault Zone Earthquake**
 - One wastewater treatment plant will suffer moderate damage on day one, but will regain greater than 50% functionality by day 7.

Mapping and details concerning operators of water and wastewater utility providers may be found in Section 5.9.6.

Medical, Education, and Response Facilities

Earthquakes can significantly disrupt medical, education, and response facilities and operations at various levels. These impacts are especially pronounced in the immediate aftermath, where response efforts, infrastructure damage, and communication breakdowns can severely hamper functions. Impacts may include:

- **Damage to Facility:** Earthquakes can damage or destroy facilities, causing a significant drop or cessation of services.
- **Services Strain:** Emergency response, including search and rescue operations and medical assistance may be severely impacted due to the number of casualties.
- **Capacity Strain:** Earthquakes can overwhelm capacities, particularly in communities that lack preparedness plans or resources. The scale of the disaster often requires the involvement of state or federal agencies, further complicating coordination.
- **Communication Breakdowns:** Earthquakes can damage communication networks, including internet and phone services, preventing effective communication and hindering the dissemination of critical information.

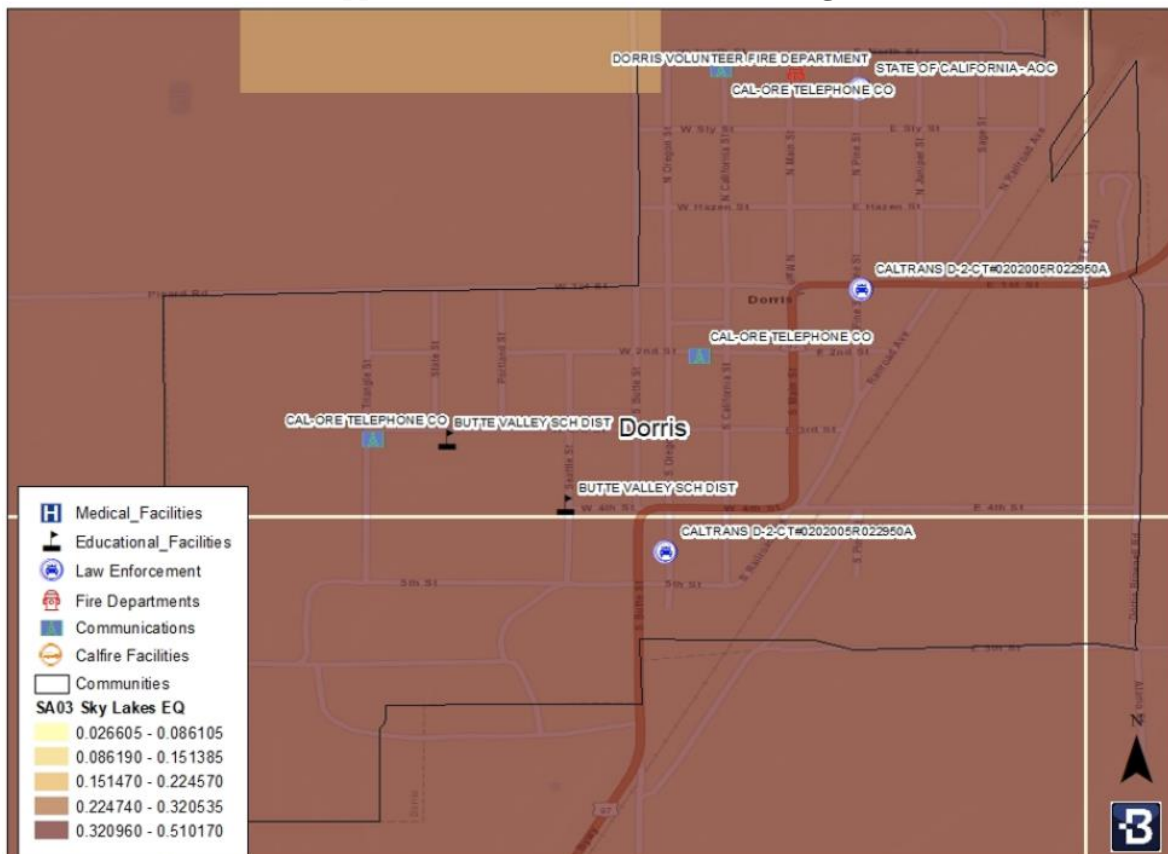
- **Budget Strains:** The cost of responding to and recovering from an earthquake can put significant pressure on budgets.

As indicated by the FEMA’s HAZUS-MH loss estimations, the following medical, education, and response facilities and operations impacts can be anticipated:

- **Magnitude 7.1 Sky Lakes Fault Zone Earthquake**
 - No critical facilities (hospitals, schools, Emergency Operations Centers, Police Stations, and Fire Stations) will be damaged, and all will have functionality of day one.
 - There will be no persons seeking temporary shelter.
 - There will be no casualties or deaths.
- **Magnitude 6.8 Gillem - Big Crack Fault Zone Earthquake**
 - Four critical facilities (hospitals, schools, Emergency Operations Centers, Police Stations, and Fire Stations) will suffer at least moderate damage (all schools). The remainder will have functionality of day one.
 - There will be three displaced households.
 - There will be two persons seeking temporary shelter.
 - There will be one casualty and no deaths

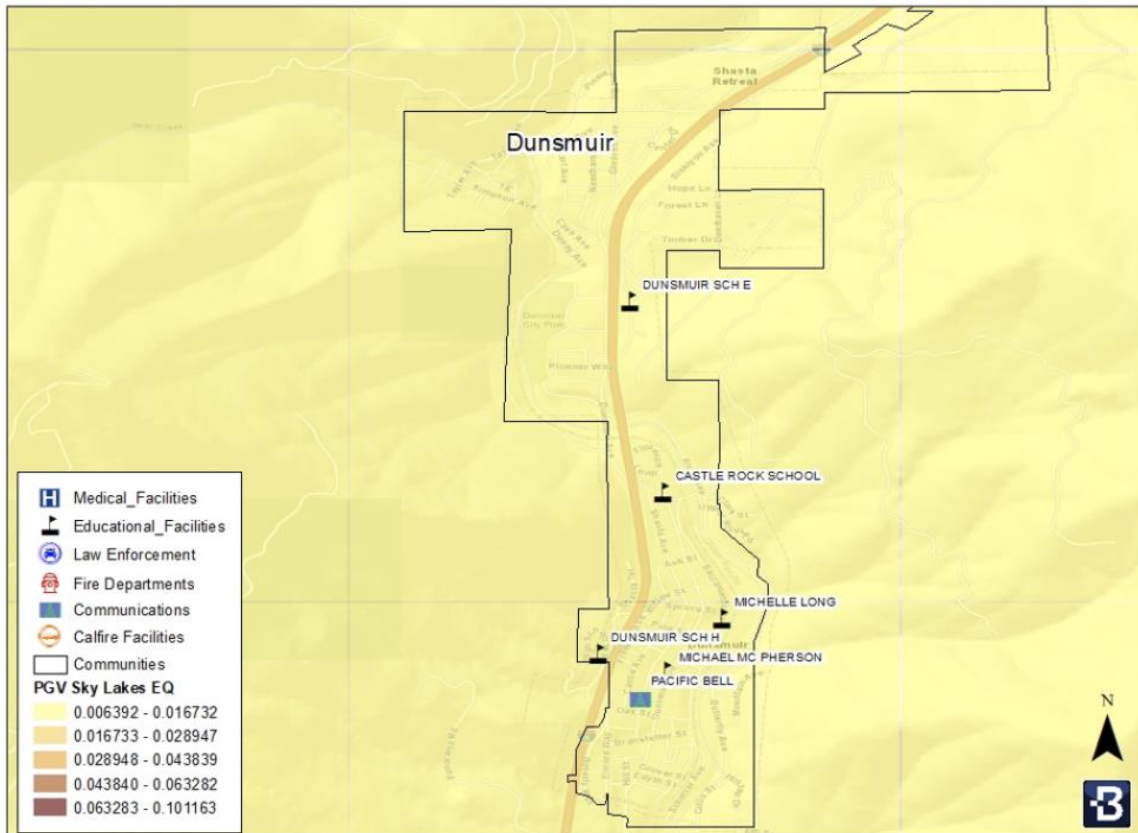
The following maps detail critical facility locations mapped to the expected peak ground velocity from a Magnitude 7.1 Sky Lakes Fault Zone Earthquake:

Map: Dorris Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



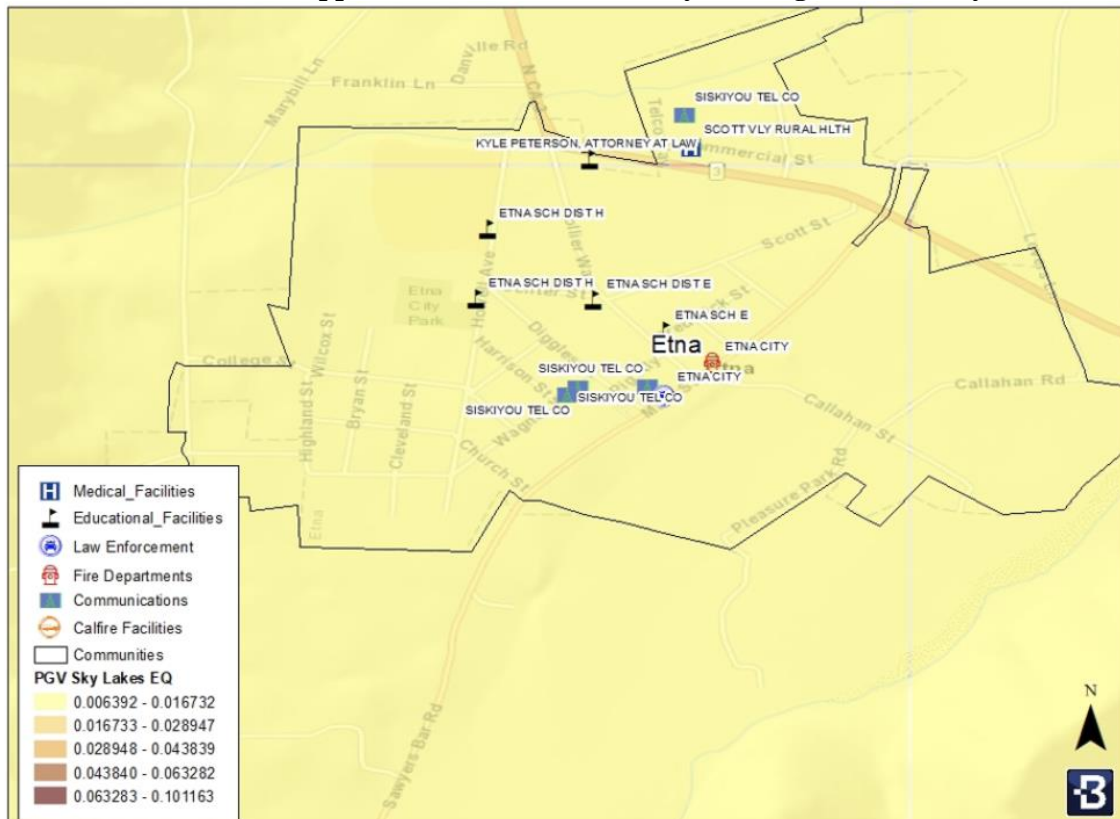
Source: Siskiyou County and BOLDplanning

Map: Dunsmuir Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



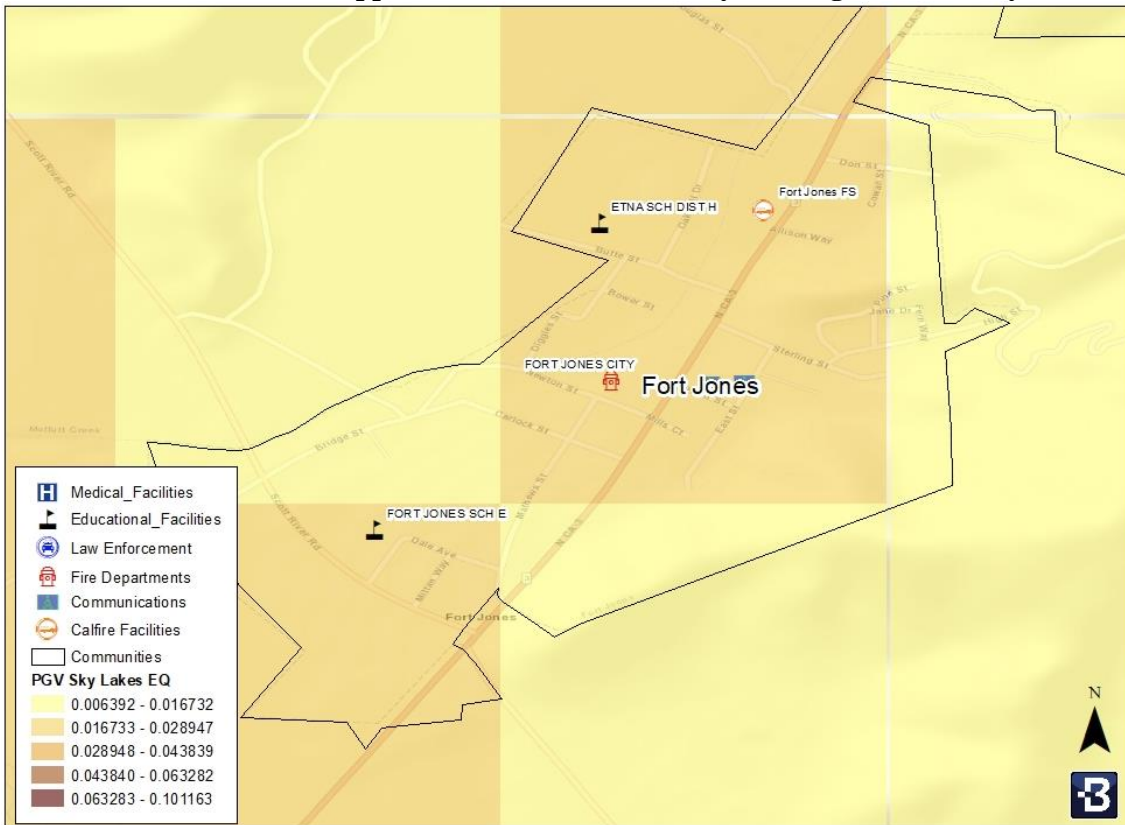
Source: Siskiyou County and BOLDplanning

Map: Etna Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



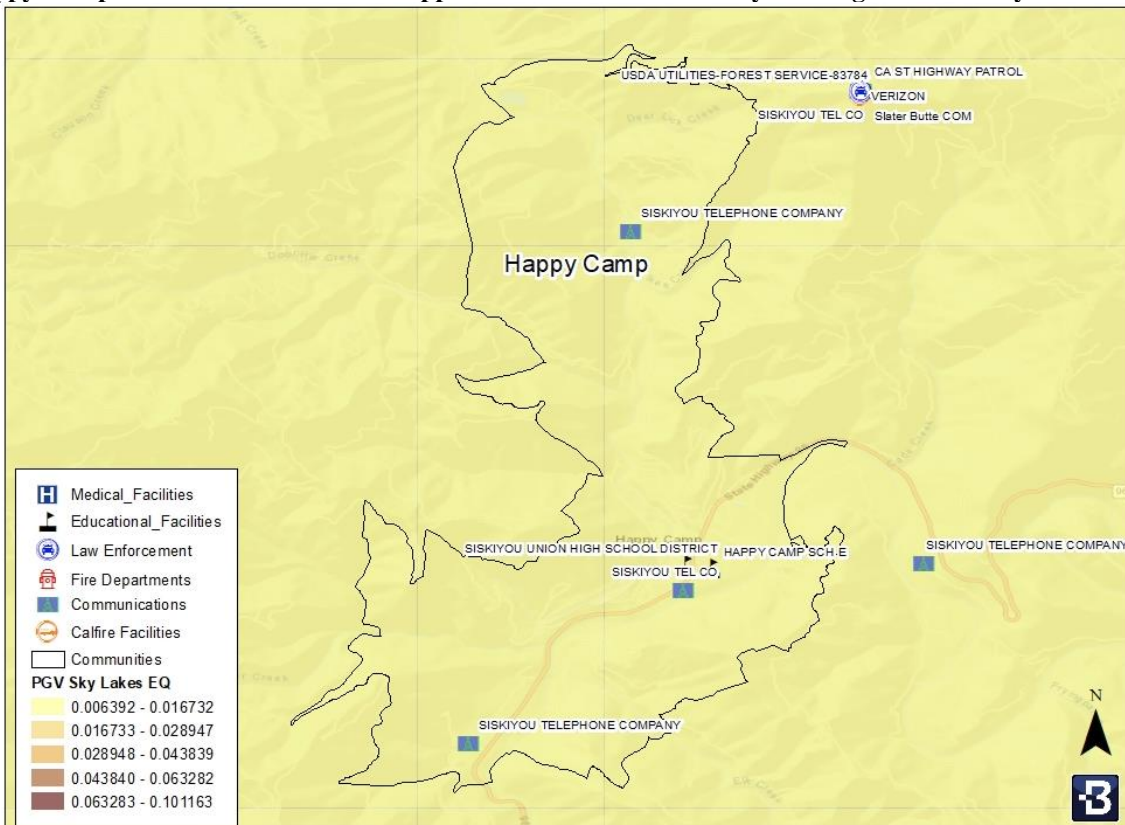
Source: Siskiyou County and BOLDplanning

Map: Fort Jones Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



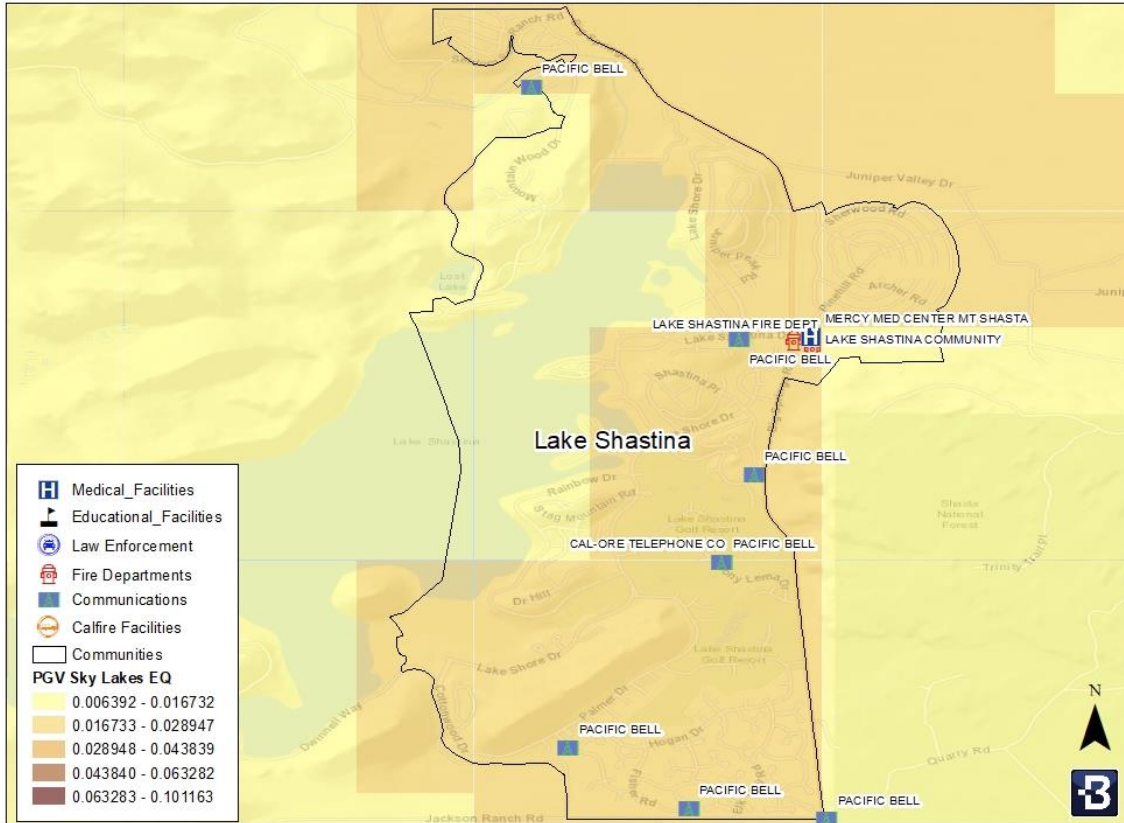
Source: Siskiyou County and BOLDplanning

Map: Happy Camp CSD Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



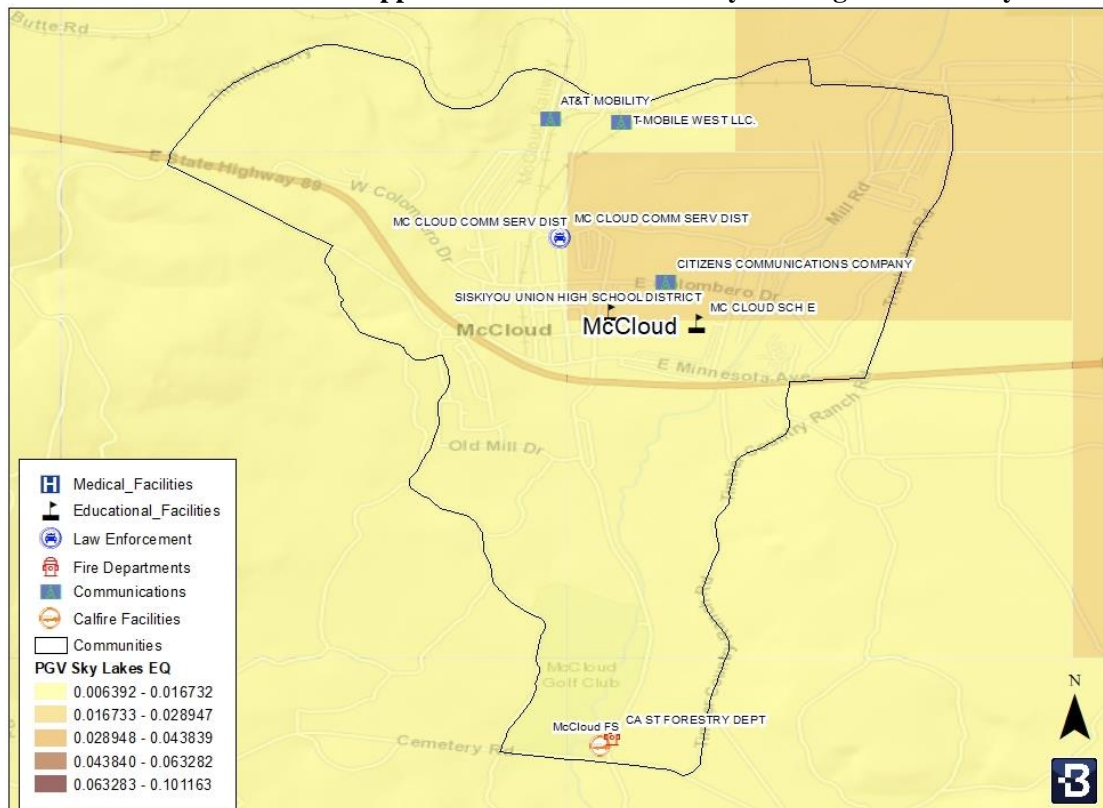
Source: Siskiyou County and BOLDplanning

Map: Lake Shastina CSD Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



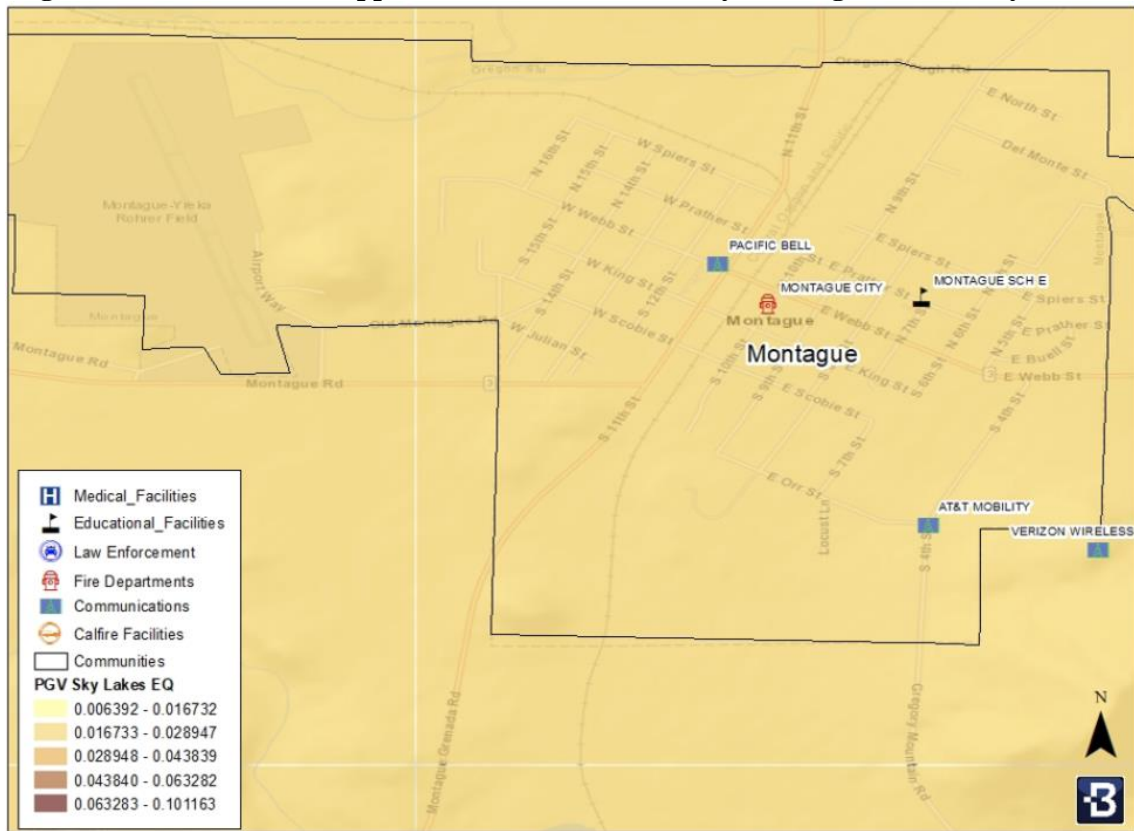
Source: Siskiyou County and BOLDplanning

Map: McCloud CSD Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



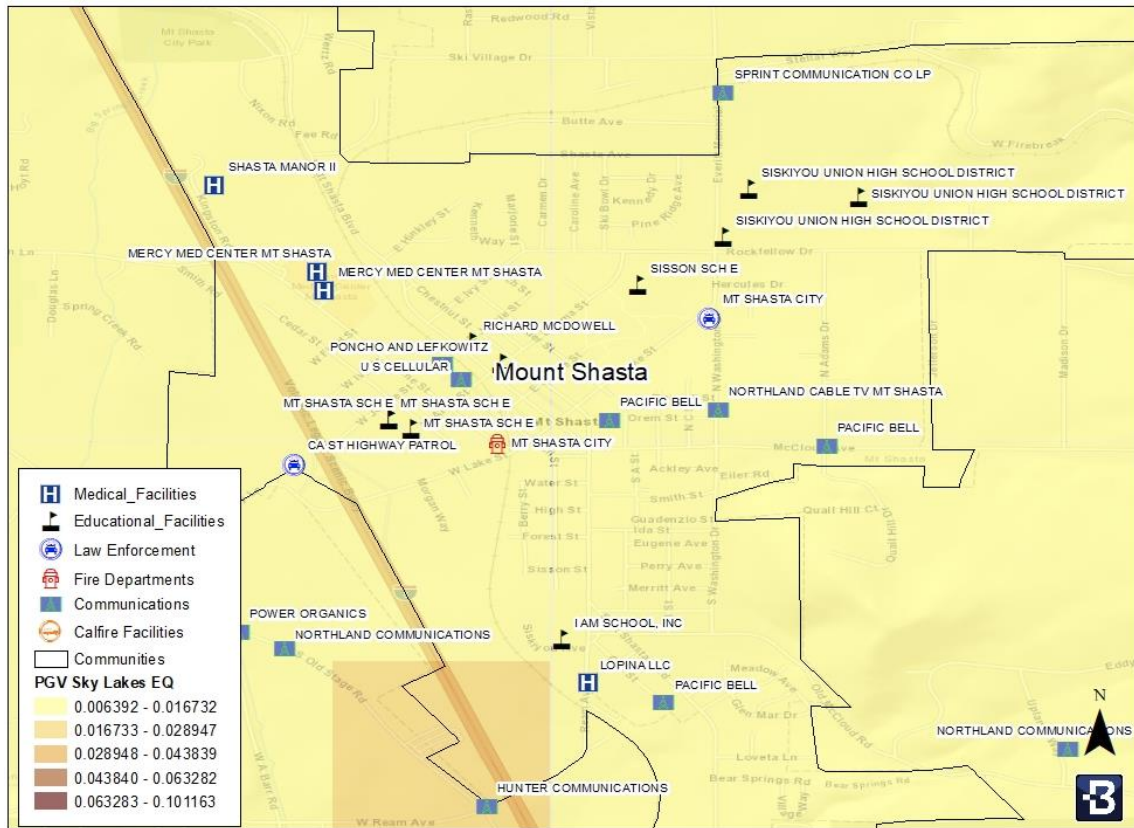
Source: Siskiyou County and BOLDplanning

Map: Montague Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



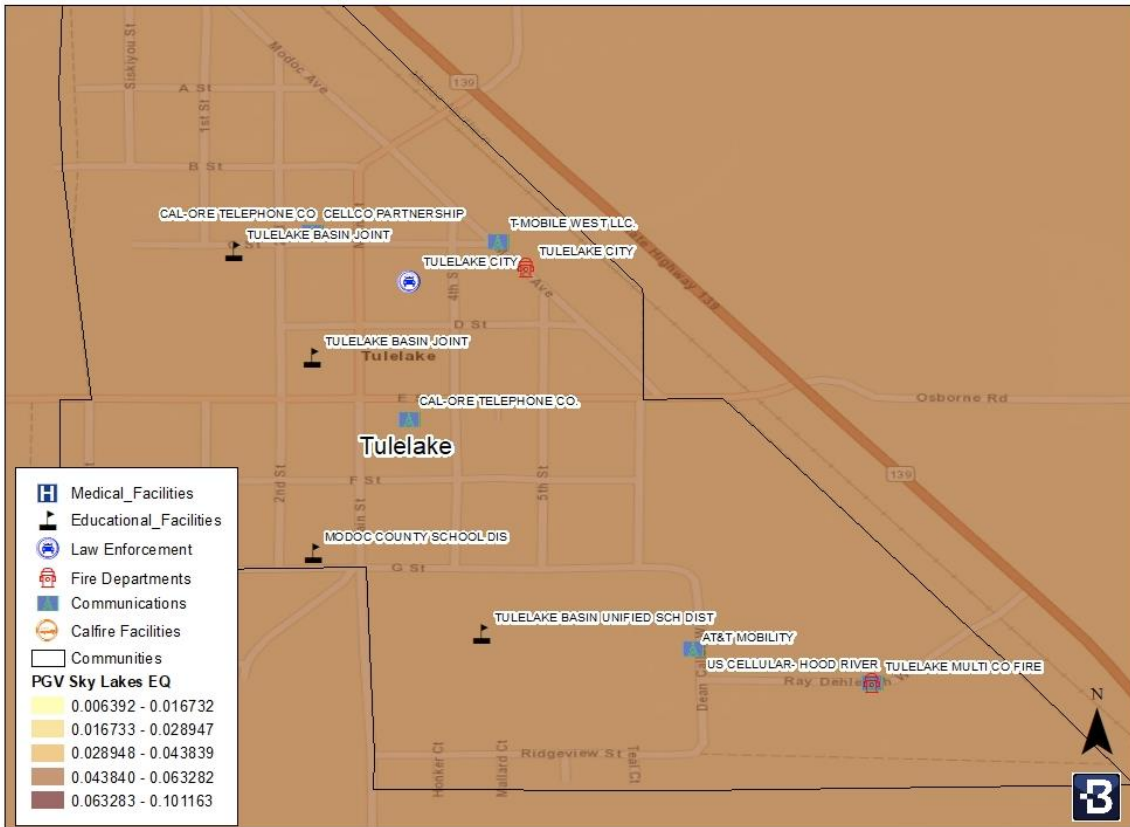
Source: Siskiyou County and BOLDplanning

Map: Mt. Shasta Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



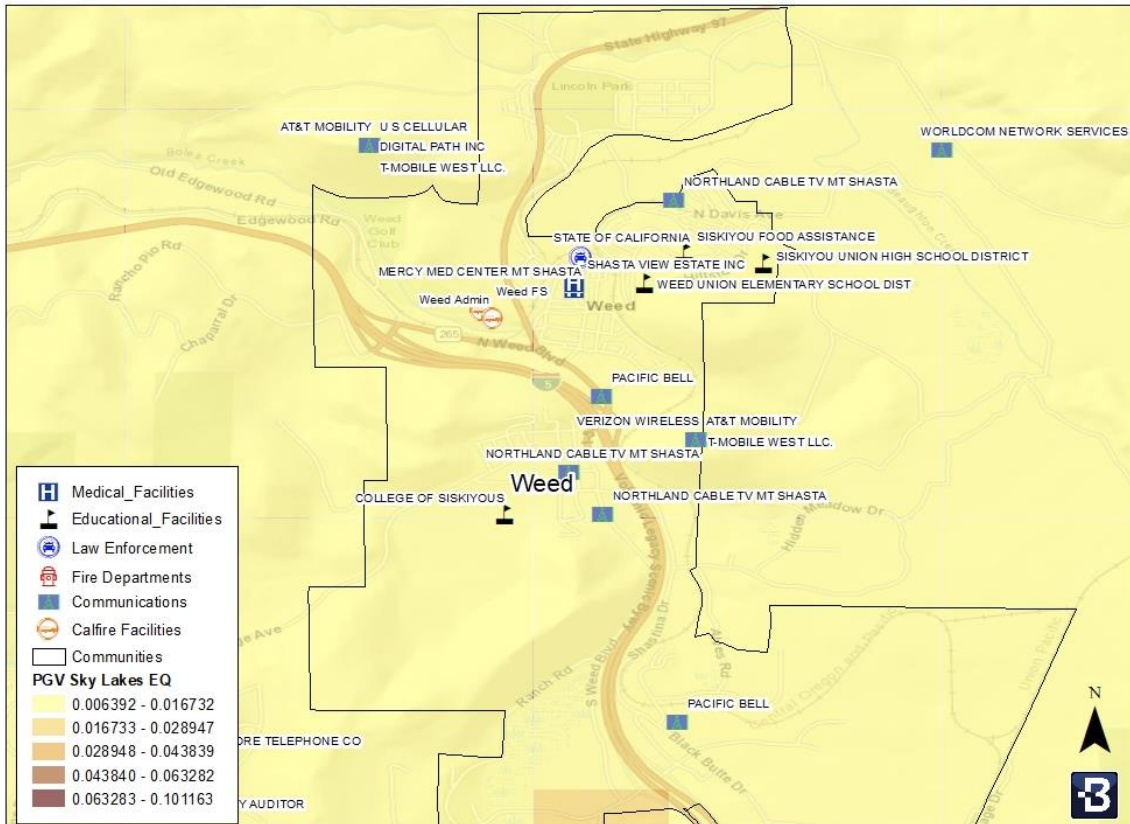
Source: Siskiyou County and BOLDplanning

Map: Tulelake Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



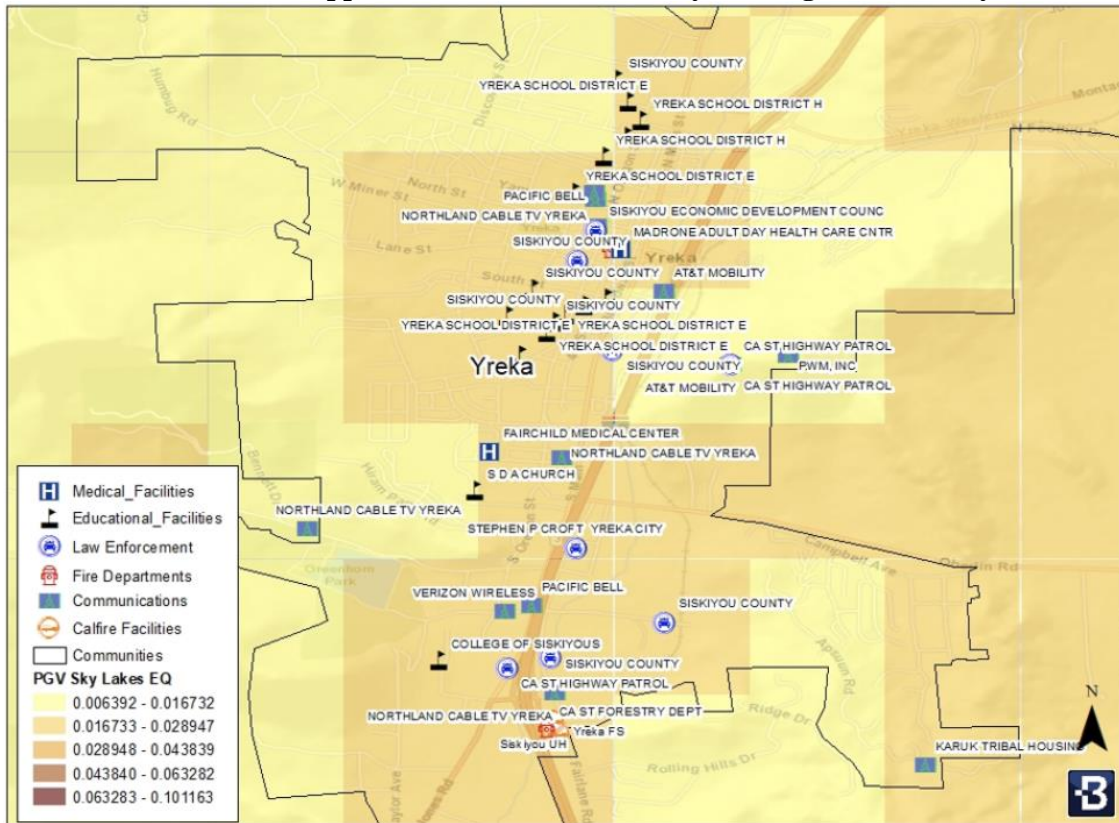
Source: Siskiyou County and BOLDplanning

Map: Weed Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



Source: Siskiyou County and BOLDplanning

Map: Yreka Critical Facilities Mapped to Peak Ground Velocity for Magnitude 7.1 Sky Lakes Earthquake



Source: Siskiyou County and BOLDplanning

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Appendix C.

Communication Systems

No comprehensive mapping of communications systems was available for review to compare against known earthquake hazard areas. However, it is assumed that communications lines and towers are in known hazard areas. Of particular concern are 911 and dispatch systems. All jurisdictions are served by a 911 and dispatch system, providing direct dispatching for:

- Law Enforcement
- Emergency Medical Services
- Fire

Earthquakes can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Damage to Infrastructure:** Shaking can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- **Power Outages:** Shaking can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.

- **Structural Instability:** Shaking can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Earthquakes in Siskiyou County are anticipated to have a limited impact on the agricultural community. However, a disruption in transportation networks could hamper the ability to transport commodities in a timely manner.

Although difficult to quantify, the potential impacts from earthquakes can be numerous. Earthquake-induced impacts can include habitat damage from landslides, degradation of water quality from an influx of soils or debris, and the release of hazardous materials

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with earthquakes may include:

- Fires from various causes, including downed power lines and broken gas pipelines
- Landslides
- Infrastructure failure
- Dam failure
- Power outages
- Hazardous materials release

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Earthquake Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Earthquakes may cause injury or death to people from vehicle accidents, falling objects, or structural failure. There may be a large number of people seeking treatment for traumatic injuries. Ground shaking may result in broken service lines or pipelines, triggering the release of hazardous materials or waste materials.
Impact on Responders	The extent of the damage to infrastructure such as roads and bridges and communications can greatly impact first responders’ ability to access or transport victims. Equipment, facilities, or other assets may be damaged and restrict first responders’ capacity to respond to calls for assistance.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Earthquakes could potentially impact critical infrastructure resulting in power outages, access to roadways or public transportation, damage to facilities or infrastructure, including alternate locations.
Delivery of Services	Delivery of services may be impacted by dangerous transportation conditions, causing food, water, and resource systems to be delayed or halted.

Table : Earthquake Consequence Analysis

Subject	Potential Impacts
Property, Facilities, and Infrastructure	Unreinforced masonry structures are inherently vulnerable to seismic forces. All critical facilities and transportation corridors and pipelines can be impacted. Ground shaking can lead to the collapse of buildings and bridges, and disrupt all utility services.
Impact on Environment	Earthquakes have the potential to trigger secondary hazards such as fire, flash flooding, hazardous materials release, slope failure, and dam failures, all potentially devastating to the environment. These secondary hazards can completely wipe out habitats and environments, cause significant injury to animals or livestock, or contaminate certain components of the environment.
Economic Conditions	Earthquakes pose a fiscal impact on the local and county governments, even if some of those costs can be recouped through federal grant reimbursements. Local, county, and state resources may be drained by response and recovery efforts. Additionally, a severe earthquake would affect the ability of businesses to maintain operations. If the private sector is not able to re-establish operations this would also impact the local economy.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence. If local government takes a long time to begin recovery operations, or for the public to see recovery operations, this will have a negative impact on the public’s confidence in governance.

5.10.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the earthquake hazard.

Table : Example Earthquake Mitigation Actions

Category	Example Action
Planning and Regulation	Adopt and enforce updated building code provisions to reduce earthquake damage risk.
	Develop and distributing guidelines or passing ordinances that require developers and building owners to locate lifelines, buildings, critical facilities, and hazardous materials out of areas subject to significant seismic hazards.
	Support financial incentives, such as low interest loans or tax breaks, for home and business owners who seismically retrofit their structures.
	Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and masonry buildings.
	Use GIS to map hazard areas, at-risk structures, and associated hazards (e.g., liquefaction and landslides) to assess high-risk areas.
	Establish a school survey procedure and guidance document to inventory structural and non-structural hazards in and around school buildings.
	Create an earthquake scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop earthquake mitigation priorities.
Infrastructure	Conduct seismic retrofitting for critical public facilities most at risk to earthquakes.
	Use flexible piping when extending water, sewer, or natural gas service.
	Install shutoff valves and emergency connector hoses where water mains cross fault lines.
	Strengthen and retrofit non-reinforced masonry buildings and non-ductile concrete facilities that are particularly vulnerable to ground shaking.
	Retrofit building veneers to prevent failure.
Education	Installing window film to prevent injuries from shattered glass.
	Develop an outreach program about earthquake risk and mitigation activities in homes, schools, and businesses.
	Offer GIS hazard mapping online for residents and design professionals.

Table : Example Earthquake Mitigation Actions

	Conduct information sessions or other forms of outreach on seismic code provisions for new and existing buildings to enhance code use and enforcement by local architects, engineers, contractors, and code enforcement personnel
	Educate homeowners about structural and non-structural retrofitting of vulnerable homes and encouraging retrofit.
	Develop an outreach program to encourage homeowners to secure furnishings, storage cabinets, and utilities to prevent injuries and damage.

5.11 Extreme Heat

5.11.1 Hazard Description

Extreme heat events occur when climate conditions produce temperatures well outside of the predicted norm. These extremes can have severe impacts on human health and mortality, natural ecosystems, agriculture, and other economic sectors.

The Centers for Disease Control and Prevention (CDC) identifies the following six groups as being especially vulnerable to extreme heat:

- Older Adults (aged 65)
- Infants and Children
- Individuals with Chronic Conditions
- Low-income Individuals
- Athletes
- Outdoor workers



5.11.2 Location & Extent

Siskiyou County experiences a variety of climates due to its diverse geography, which includes mountainous terrain, valleys, and high plateaus. In general, the county can be classified by two major regions, areas with a Mediterranean climate, and areas with a Mountain climate.

In the lower valleys, Siskiyou County experiences a Mediterranean climate, characterized by hot, dry summers and cool, wet winters. Average high temperatures in the summer range from 80°F to 90°F (27°C to 32°C), but they can occasionally exceed 100°F (38°C) during heat waves. Winters are cooler with average highs around 40°F to 50°F (4°C to 10°C). Overnight lows often dip below freezing in these areas. Most rainfall occurs in the winter months, and the county receives around 25 to 50 inches (63 to 127 cm) of rain annually, depending on the location. While lower valleys like Yreka may receive some snow, snowfall is usually light at lower elevations.

The mountainous areas of the county, particularly around Mount Shasta and the Siskiyou Mountains, have a continental mountain climate with colder, snowier winters. Higher elevations are cooler in the summer, with highs ranging from 60°F to 80°F (15°C to 27°C). Winters are much colder, with average highs around 30°F to 40°F (-1°C to 4°C). Overnight lows frequently fall below freezing, and heavy snowfall is common. Areas around Mount Shasta receive significant snowfall, often exceeding 200 inches (508 cm) per year.

While all of Siskiyou County is vulnerable to extreme heat, in general terms mountainous communities are at a much lower risk of extreme heat events. Extreme heat may be defined as follows.

- **Extreme Heat:** Days when the maximum temperature is above 91.4 degrees Fahrenheit.

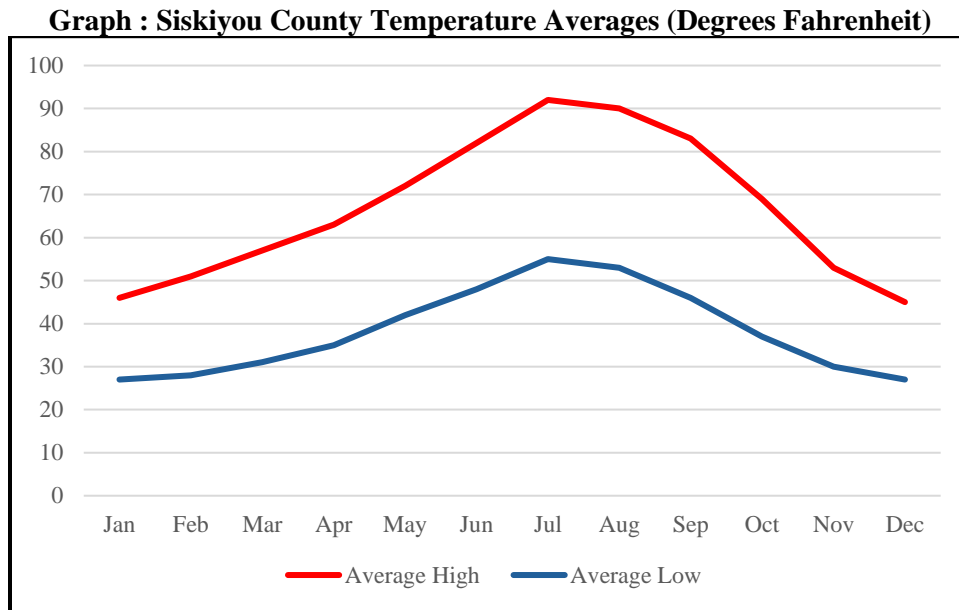
The following table, using data from NOAA, details the average maximum and average minimum temperatures for Siskiyou County:

Table : Siskiyou County Temperature Averages (Degrees Fahrenheit)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temperature (F)	46	51	57	63	72	82	92	90	83	69	53	45	67
Average Min Temperature (F)	27	28	31	35	42	48	55	53	46	37	30	27	38

Source: NOAA

The following graphs illustrate the above data.



Source: NOAA

5.11.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced no Presidential Disaster Declarations related to extreme heat.

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to extreme heat.

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. Siskiyou County has experienced no proclamations of a State of Emergency related to extreme heat.

Data from NOAA indicates the following historic high temperatures for Siskiyou County and participating jurisdictions:

Table : Siskiyou County and Participating Jurisdictions Historic High Temperatures

County	Historic High Temperature (F)
Siskiyou County	109
Dorris	97
Dunsmuir	109
Etna	107
Fort Jones	107
Lake Shastina CSD	101
Montague	101
Mt. Shasta	106
Tulelake	103
Weed	101
Yreka	112

Source: NOAA

Additionally, data from the NCEI from 1950 through 2024 indicates the following recorded extreme temperature events. As these events tend to cover large areas, they are reported as regional:

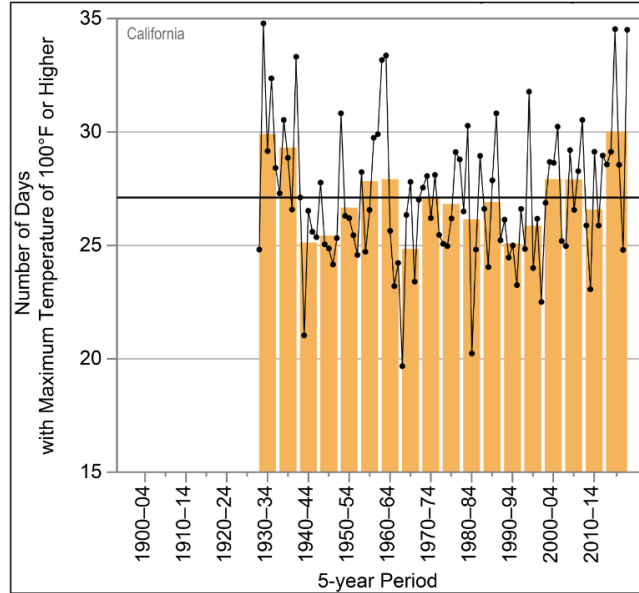
Table : Siskiyou County Extreme Temperature Events, 1950 - 2024

Event Type	Number of Events	Property Damage	Deaths	Injuries
Excessive Heat	12	\$0	0	0

Source: NOAA NCEI

According to the NOAA NCEI State Climate Summary 2022 for California, in the 126-year period of record (1895–2020), the six warmest years have all occurred since 2014 (2014, 2015, 2016, 2017, 2018, and 2020). The 2015–2020 period saw the highest number of extremely hot days and included the years with the second- and third-highest values (2017 and 2020).

Chart : Number of Days with Maximum Temperature of 100° F or Higher



Source: NOAA NCEI State Climate Summary 2022 for California

5.11.4 Probability of Future Events

The following tables, using data from the NCEI, indicate the yearly probability of an extreme heat event, the number of deaths or injuries, and estimated property damage for all Siskiyou County participating jurisdictions based on 75 years’ worth of reporting data:

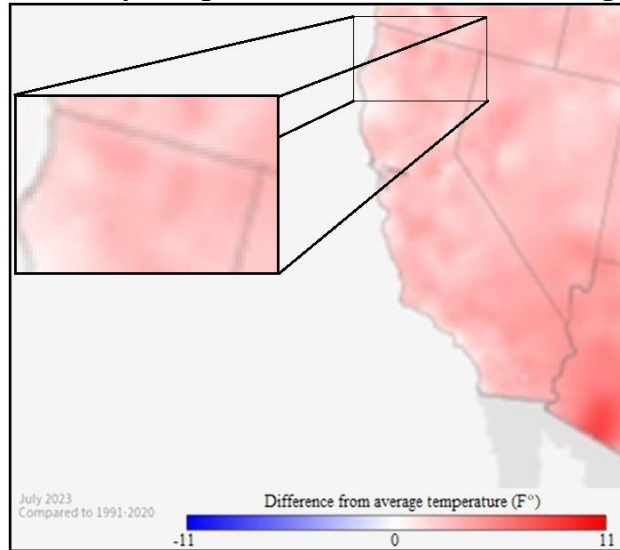
Table : Siskiyou County NCEI Extreme Heat Event Probability Summary

County	Number of Events	Average Events per Year	Deaths / Injuries	Average Deaths / Injuries per Year	Property Damage	Average Property Damage per Year
Siskiyou	12	<1	0	0	\$0	\$0

Source: NCEI

However, available data suggests that both the average high temperatures and the record high temperature will likely continue to increase over the coming years as indicated by the following map from NOAA indicating the temperature difference from average from 1991-2020:

Map : Siskiyou County Temperature Difference from Average, 1991 – 2020



Source: NOAA

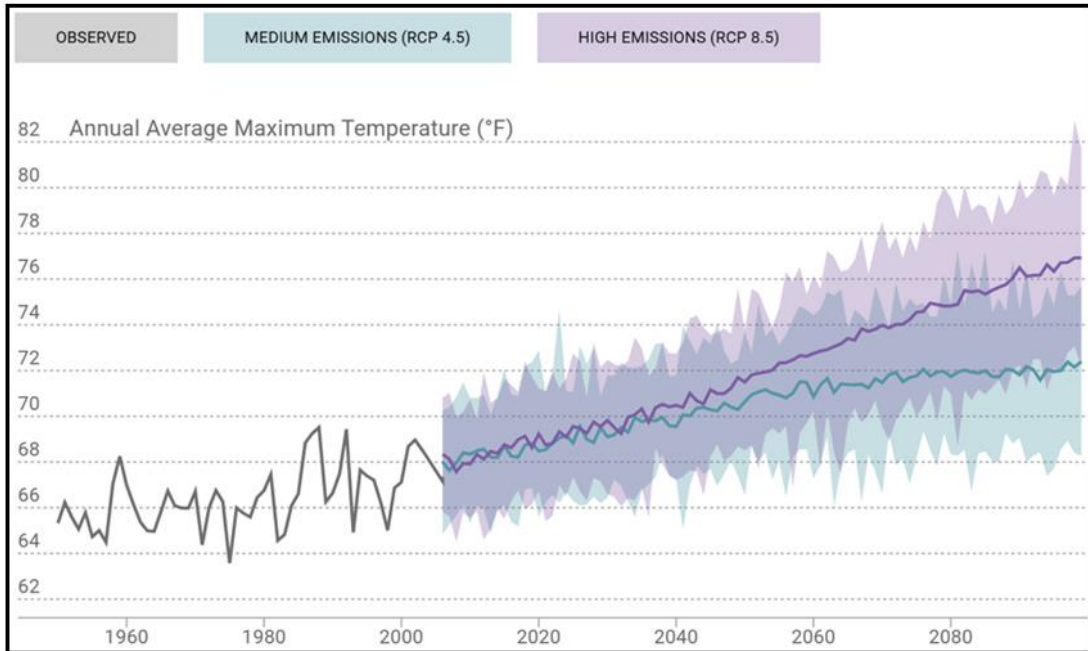
Additionally, according to Cal Adapt’s Local Climate Snapshot Tool, by the end of the century, under high emissions scenarios, Siskiyou County annual average maximum temperature is expected to reach highs of 68.7 degrees Fahrenheit, up 8.9 degrees Fahrenheit from the baseline average of 59.8 degrees Fahrenheit. Additionally, extreme heat days, or days when the maximum temperature is above 91.4 degrees Fahrenheit, are expected to increase from four days per year to 53 days per year by the end of the century.

5.11.5 Projected Changes in Location, Intensity, Frequency, and Duration

When discussing extreme temperatures, climate change should be considered as it may markedly change future events. Recent climate modeling results indicate that extreme heat events may become more common for Siskiyou County. Recent multiyear periods have been among some of the warmest on record for Siskiyou County. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events including longer and hotter heat waves. Additionally, rising temperatures can harm air quality and amplify existing threats to human health. Warmer weather can increase the production of ground-level ozone, a pollutant that causes lung and heart problems. Heat stress is expected to increase as climate change brings hotter summer temperatures and more humidity. Certain people are especially vulnerable, including children, the elderly, the sick, and those living below the poverty line.

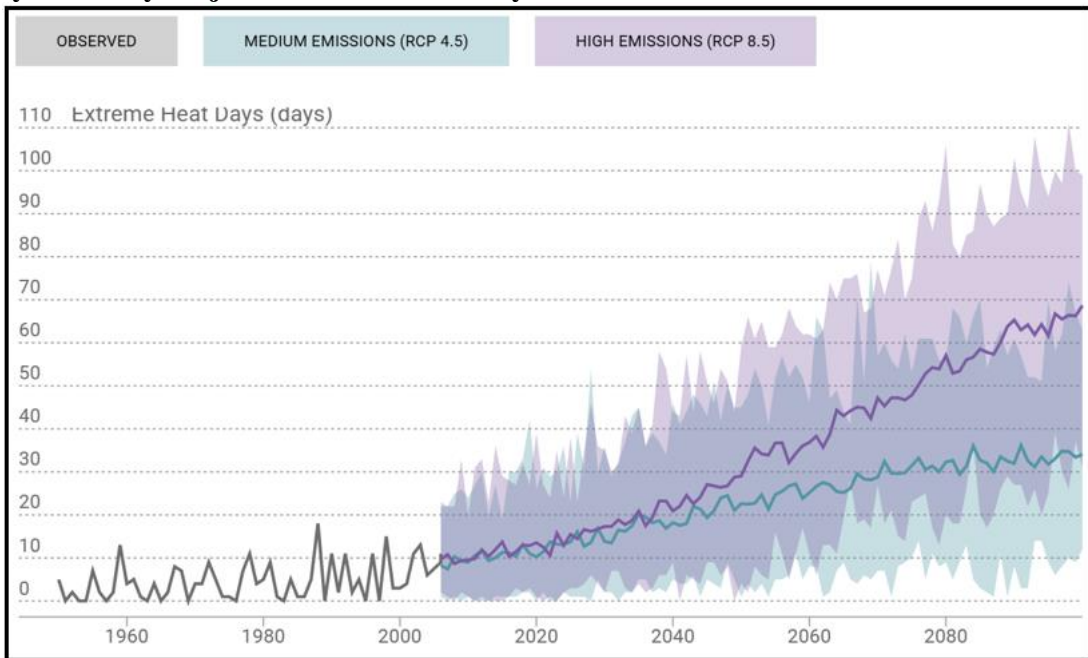
The following climate models, from the Cal-Adapt Local Climate Change Snapshot for Siskiyou County make predictions for the period of 2006 to 2100. Two future climate projections using medium and high greenhouse gas and aerosol emissions scenarios are presented. These scenarios are known as Representative Concentration Pathways, with each representing a standardized set of assumptions about emissions trajectory in the coming years. The Medium Emissions Scenario represents a mitigation scenario where global CO₂ emissions peak by 2040 and then decline. The High Emissions Scenario represents a scenario where CO₂ emissions continue to rise throughout the 21st century.

Chart : Siskiyou County Projected Temperature Change Based on Greenhouse Gas Emission Scenarios



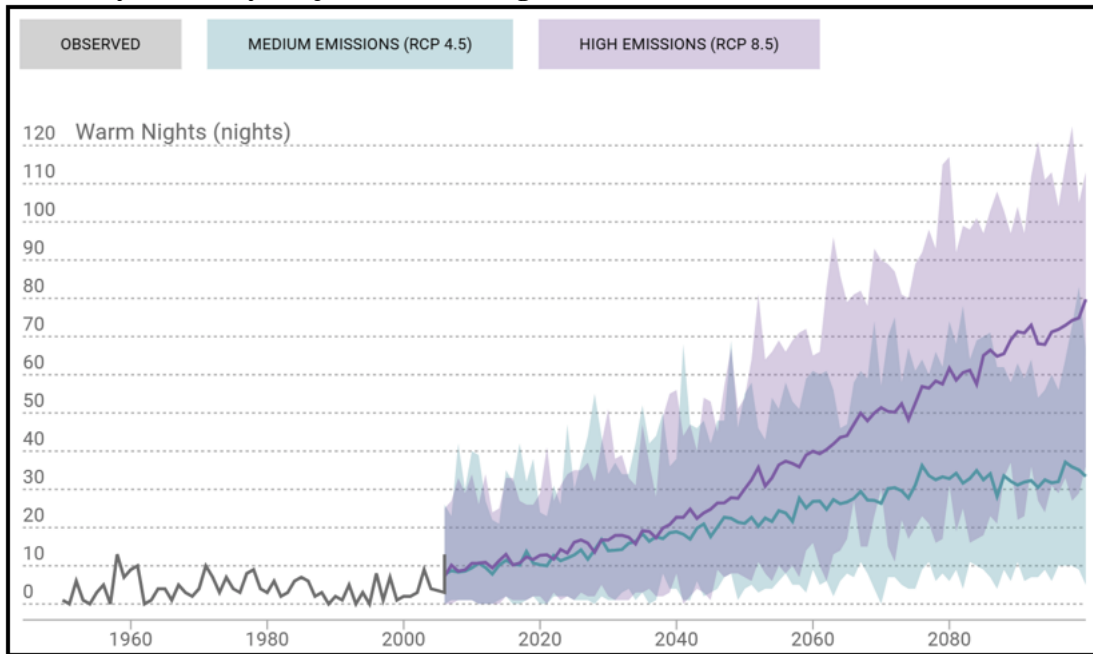
Source: Cal-Adapt Local Climate Change Snapshot for Siskiyou County

Chart : Siskiyou County Projected Extreme Heat Days Based on Greenhouse Gas Emission Scenarios



Source: Cal-Adapt Local Climate Change Snapshot for Siskiyou County

Chart : Siskiyou County Projected Warm Nights Based on Greenhouse Gas Emission Scenarios



Source: Cal-Adapt Local Climate Change Snapshot for Siskiyou County

**5.11.6 Vulnerability and Impact
FEMA NRI**

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from extreme heat. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Extreme Heat Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Relatively Low	43.5	1.6
Dorris	06093000200	Relatively Low	39.7	0.5
Dunsmuir	06093001100	Relatively Low	22.1	1.3
Etna	06093000800	Relatively Low	47.9	0.1
Fort Jones	06093000701	Relatively Low	44.2	2.2
Happy Camp CSD	06093001300	Relatively Low	31.0	2.4
Lake Shastina CSD	06093000902	Relatively Low	36.1	1.8
McCloud CSD	06093001200	Relatively Low	18.1	0.7
Montague	06093000300	Relatively Moderate	52.5	1.3
Mt. Shasta	06093001003	Very Low	17.5	1.3
Tulelake	06093000100	Relatively Low	30.8	0.5
Weed	06093000901	Relatively Low	38.7	2.1
Yreka	06093000703	Relatively Low	30.7	2.2

Source: FEMA NRI

Table : Participating Jurisdiction Extreme Heat Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Extreme Heat EAL
Siskiyou County	All	Relatively Low	43.1	\$43,000

Table : Participating Jurisdiction Extreme Heat Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Extreme Heat EAL
Dorris	06093000200	Relatively Low	35.1	\$3,200
Dunsmuir	06093001100	Relatively Low	20.9	\$713
Etna	06093000800	Relatively Low	45.7	\$189
Fort Jones	06093000701	Relatively Low	43.4	\$5,500
Happy Camp CSD	06093001300	Relatively Low	28.0	\$1,700
Lake Shastina CSD	06093000902	Relatively Low	37.1	\$3,600
McCloud CSD	06093001200	Relatively Low	18.9	\$423
Montague	06093000300	Relatively Moderate	49.2	\$7,800
Mt. Shasta	06093001003	Relatively Low	19.8	\$562
Tulelake	06093000100	Relatively Low	27.6	\$1,600
Weed	06093000901	Relatively Low	33.0	\$2,700
Yreka	06093000703	Relatively Low	28.8	\$1,900

Source: FEMA NRI

Population

A primary concern with this hazard is human health safety issues, as extreme heat can be a direct cause of death. Specific at-risk groups include outdoor workers, farmers, young children, and senior citizens. Impacts on human health can include:

- **Heat Exhaustion and Heat Stroke:** Prolonged exposure to high temperatures can lead to heat exhaustion, characterized by heavy sweating, weakness, and dizziness. If untreated, it can escalate to heat stroke, a life-threatening condition with symptoms like confusion, high body temperature, and loss of consciousness.
- **Respiratory Issues:** High temperatures can worsen air quality, increasing levels of ozone and allergens, which can exacerbate asthma and other respiratory conditions.
- **Cardiovascular Strain:** Extreme heat can put additional stress on the heart, increasing the risk of heart attacks and other cardiovascular problems, particularly in older adults.
- **Dehydration:** Heat can lead to increased fluid loss through sweating, which can result in dehydration, affecting bodily functions and overall health.

The following table discusses potential impacts on human health related to excessive heat by temperature range.

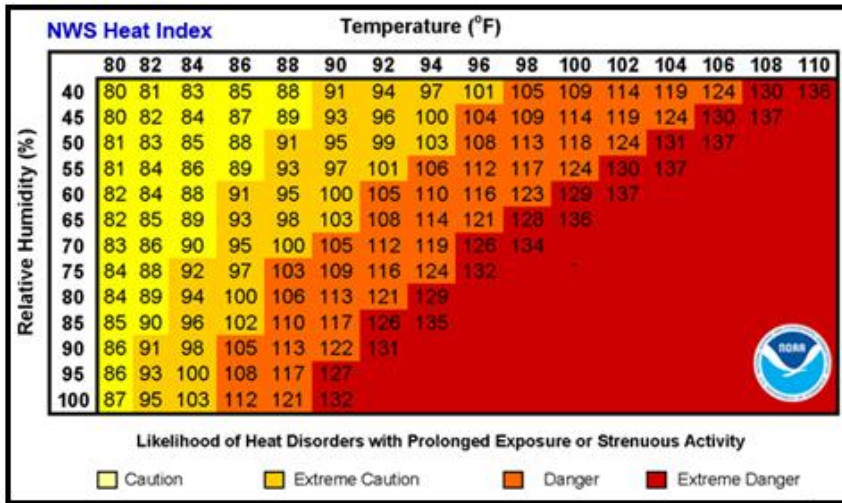
Table : Extreme Heat Impacts on Human Health

Heat Index Temperature	Potential Impact on Human Health
80-90° F	Fatigue possible with prolonged exposure and/or physical activity
90-105° F	Sunstroke, heat cramps, and heat exhaustion possible
105-130° F	Heatstroke/sunstroke is highly likely with continued exposure

Source: National Weather Service Heat Index Program

Exposure to direct sun can increase Heat Index values by as much as 15°F. The zone above 105°F corresponds to a Heat Index that may cause increasingly severe heat disorders with continued exposure and/or physical activity. The following graph, from the NWS, indicates Heat Index values.

Chart : Heat Index



Source: NWS

Extreme heat may disproportionately affect socially vulnerable populations, exacerbating pre-existing inequalities and making recovery more difficult for these groups. Extreme heat may disproportionately impact vulnerable populations in the following ways:

- **Elderly Individuals:** Older adults often have reduced physiological resilience to heat due to age-related factors and chronic health conditions, making them more susceptible to heat-related illnesses.
- **Children: Young** children are less able to regulate their body temperature and are at a higher risk for heat exhaustion and dehydration.
- **Low-Income Communities:** Those in low-income neighborhoods may lack access to air conditioning, adequate housing, or resources to stay cool, increasing their risk during heat events.
- **People with Chronic Health Conditions:** Individuals with cardiovascular, respiratory, or other chronic health issues may face heightened risks from extreme heat, as their bodies may struggle to cope with elevated temperatures.
- **Homeless Individuals:** People experiencing homelessness often have limited access to shelter and cooling facilities, making them particularly vulnerable during heat waves.

All Siskiyou County and participating jurisdictions are vulnerable to the impacts of extreme heat. Please see Section 3.3: Population Data and Section 3.4: Socially Vulnerable and At-Risk Populations for data concerning jurisdictional populations.

Buildings and Structures

In general, buildings and structures will not be impacted by short-term extreme heat events. It is possible that long-term heat events could cause impacts, including:

- **Thermal Expansion:** High temperatures can cause building materials, such as metal and concrete, to expand. This can lead to warping, cracking, and structural stress.
- **Roof Damage:** Prolonged exposure to extreme heat can deteriorate roofing materials, leading to leaks, reduced lifespan, and increased maintenance costs.
- **Foundation Issues:** Prolonged heat can affect the moisture content in the soil surrounding a building's foundation, potentially leading to shifting or settling.

Transportation and Electrical Infrastructure

Extreme heat can have numerous impacts on both transportation and electrical distribution systems, often leading to challenges that require proactive management. The impacts of extreme heat on transportation systems may include:

- **Road Surface Damage:** High temperatures can cause asphalt to soften, leading to ruts, cracks, and buckling. This can compromise road safety and require costly repairs.
- **Railway Tracks:** Steel tracks can expand in extreme heat, leading to potential warping or misalignment (known as "sun kinks"), which can disrupt train services and pose safety risks.
- **Bridges and Overpasses:** Expansion joints may be affected, and excessive heat can lead to structural stress, potentially compromising safety and necessitating inspections or repairs.
- **Traffic Signals and Signage:** Heat can affect the functionality of electronic traffic signals and signage, leading to malfunctions that could result in traffic disruptions or accidents.
- **Public Transit Systems:** Buses and trains may face increased operational challenges due to overheating engines and equipment failures, which can impact schedules and reliability.

Extreme heat can impact both the electrical generation capacity and transmission. The impacts of extreme heat on electrical systems may include:

- **Increased Demand:** High temperatures typically lead to increased use of air conditioning, resulting in a surge in electricity demand that can strain the grid.
- **Transformer Overheating:** Electrical transformers can overheat during extreme heat events, leading to failures or outages.
- **Power Lines:** Extreme heat can cause power lines to sag due to thermal expansion, increasing the risk of contact with trees or other objects, which can result in outages or fires.
- **Substation Performance:** High temperatures can impair the performance of substations, potentially leading to overloads and failures.
- **Energy Efficiency:** Excessive heat can reduce the efficiency of power generation, particularly for fossil fuel and nuclear plants, leading to decreased output during peak demand times.
- **Renewable Energy Impact:** While solar panels can generate more energy in high temperatures, their efficiency can drop significantly beyond certain heat thresholds.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

Water and wastewater utilities are vulnerable to extreme events due to the potential for plant damages and distribution system damages. Impacts may include:

- **Pipe bursts and leaks:** Heat can cause soil to dry and shift, leading to cracks or bursts in aging water distribution pipes. Temperature fluctuations also lead to expansion and contraction in pipes, potentially increasing the risk of failure.
- **Reduced efficiency of equipment:** Pumps, motors, and other mechanical systems in water treatment facilities may become less efficient or experience overheating during prolonged high temperatures.
- **Reduced water availability:** In open water storage or reservoirs, high temperatures lead to greater evaporation, reducing the overall available water supply. This may lead to restrictions or necessitate sourcing from alternative supplies.
- **Changes in treatment efficiency:** Biological treatment processes in wastewater treatment plants can be disrupted due to temperature, impacting the breakdown of organic matter and nutrient removal processes.

Information concerning the costs to repair or reconstruct water and wastewater infrastructure may be found in Section 5.8.6.

Medical, Education, and Response Facilities

While extreme temperatures may result in a temporary increase in patients, it is considered unlikely that any influx would overwhelm current medical capabilities. Depending on educational facility capability, extreme temperatures may necessitate the closure of the facility for the duration of the event. These closures are expected to have additional economic consequences as caregivers may be required to miss or modify work. First response facilities are expected to be unimpacted.

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Section 3: Valuation Data.

Communication Systems

Extreme heat can disrupt this vital communications system, affecting reliability and functionality. Extreme heat can lead to power outages due to down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.

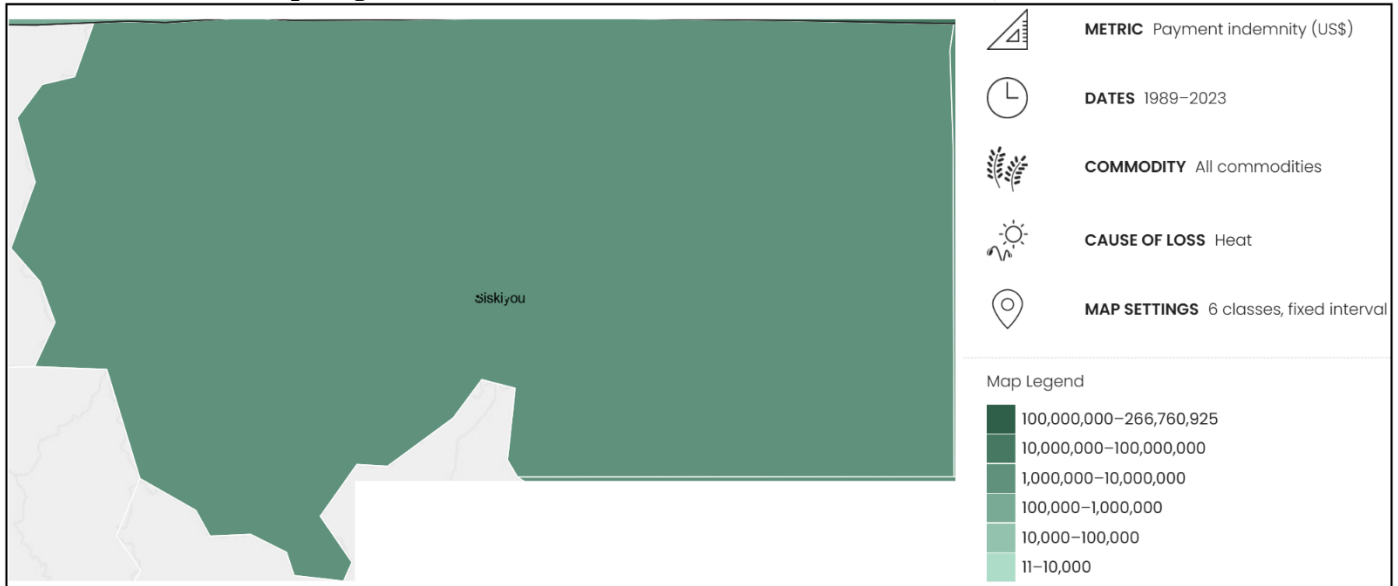
The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Extreme heat can cause significant damage to the local environment by dehydrating vegetation and wildlife, which may result in cascading effects to the surrounding environment, such as drought, wildfires, mudslides, or landslides. Extreme temperatures may severely decrease the yield of the agricultural sector. The yield of cash crops may be reduced, livestock may be adversely impacted by extreme heat, or grazing losses may be incurred by farmers or ranchers; potentially resulting in decreased food security. In the event of significant agricultural losses caused by extreme heat or drought, some assistance may be available to impacted farms or ranches.

Extreme heat conditions can cause significant agricultural impacts. The following map from the United States Department of Agriculture details total agricultural losses, by county, due to extreme heat conditions from 1989 - 2023:

Map : Agricultural Losses Due to Extreme Heat Conditions, 1989 - 2023



Source: United States Department of Agriculture

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with extreme may include:

- Fires from various causes, including downed power lines
- Drought conditions, or worsening of drought conditions
- Road and rail disruptions:
- Heat-related illnesses and mortality
- Power Outages
- Water shortage and/or diminished water quality
- Crop failure and reduced yields and livestock mortality
- Wildfires

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Extreme Temperature Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Extreme temperatures can have severe consequences for health, particularly for the elderly and young. Loss of electricity may impact heating or air conditioning leading to poorly tolerated indoor temperatures. Physical effects of extreme temperatures can cause major health problems and may lead to injury or death.
Impact on Responders	Without proper mitigation efforts, responders may be susceptible to temperature-related illness. Extreme temperatures may also damage instruments or equipment necessary for response activities. First responders may face dangerous road conditions leading to accidents and prolonged response times.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. This hazard may impact an agency’s ability to implement continuity

Table : Extreme Temperature Consequence Analysis

Subject	Potential Impacts
	operations due to power outages. If the activation of alternate facilities was required, continuity of operations may be difficult due to lack of computer/network access during power outages.
Delivery of Services	Extreme temperatures can impact efficient delivery or inability of goods or services due to potential health impacts on workers. Equipment and vehicles may be damaged, and the delivery of services may be delayed due to poor travel conditions
Property, Facilities, and Infrastructure	Facility integrity is at risk with regards to power cables and stations being overused and limiting operations. This could lead to limits on facility heating or cooling.
Impact on Environment	Extreme temperatures can cause significant damage to the local environment and result in habitat loss, invasive species, and changes in migration. Extreme temperatures may severely decrease the yield of cash crops. Livestock are adversely affected by extreme temperatures and may suffer medical problems or death. A significant impact on water supply caused by elevated temperatures is the increase in frequency and impact of harmful algal blooms and occurrence of cyanobacteria.
Economic Conditions	Extreme temperatures may drain local resources. Under some conditions, some of the costs can be recouped through federal grant reimbursements.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence.

5.11.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the extreme heat hazard.

Table : Example Extreme Heat Mitigation Actions

Category	Example Action
Planning and Regulation	Adopting and enforcing updated building code provisions to properly insulate structures.
	Supporting financial incentives, such as low interest loans or tax breaks, for home and business owners who retrofit their structures to mitigate heat.
	Developing an inventory of public and commercial buildings that may be used for cooling shelters.
Infrastructure	Encouraging installation of green roofs, which provide shade and remove heat from the roof surface and surrounding air.
	Using cool roofing products that reflect sunlight and heat away from a building.
Natural Systems Protection	Increasing tree plantings around buildings to shade parking lots and along public rights-of-way.
Education	Developing an outreach program about extreme heat risk and mitigation activities in homes, schools, and businesses.
	Educating homeowners about retrofitting homes and encouraging retrofit to mitigate heat.

5.12 Flood

5.12.1 Hazard Description

Flooding is the overflow or accumulation of water on normally dry land, often caused by heavy rainfall, snowmelt, or the failure of natural or artificial barriers. Flooding can lead to the inundation of homes, roads, farmland, and other areas, causing damage to property, disruption of daily life, and potential threats to human safety and the environment.

A floodplain is a flat or gently sloping area adjacent to a river, stream, or other water body. These areas act as a buffer during periods of heavy rainfall or snowmelt, absorbing excess water and preventing it from rushing downstream too quickly. In its common usage, a floodplain refers to areas inundated by the 100-year flood, the flood that has a 1% chance of being equaled or exceeded in any given year, and the 500-year flood, the flood that has a 0.2% chance of being equaled or exceeded in any given year. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the NFIP.



5.12.2 Location and Extent

A variety of factors affect the severity of flooding within Siskiyou County. These include topography, weather characteristics, development, and geology. Intense flooding may create extreme damage and disruption in any jurisdiction affected.

Flash Flooding

Flash flooding occurs during heavy or extended periods of rain, generally when the ground is unable to rapidly absorb the water. Most flash flooding in Siskiyou County is caused by intense and stationary storm events and atmospheric rivers. Heavy sustained rain can create rapid flooding very quickly, and flooding can occur miles away from where the rain fell. Factors that can contribute to the severity of flash flooding include rainfall intensity, duration, drainage condition, and ground conditions (paved or unpaved). Flash floods are particularly dangerous to people and property, as six inches of moving water can knock a person down and two feet can lift a vehicle. As there is often little warning of a flash flood event, they are the cause of most flood fatalities.

Riverine Flooding

Riverine flooding refers to the overflow of water from a river or a stream onto adjacent land areas. This type of flooding occurs when the water level in a river or stream rises significantly and exceeds its banks, inundating the surrounding areas. The severity of riverine flooding can be influenced by the amount and intensity of rainfall in the watershed, the size, shape, and slope of the river or stream channel, and the presence of dams on the river system.

Urban Flooding

FEMA defines urban flooding as “the inundation of property in a built environment, particularly in more densely populated areas, caused by rain falling on increased amounts of impervious surfaces and overwhelming the capacity of drainage systems.” In Siskiyou County, urban flooding has consistently increased due to a number of factors, including the filling for development of natural wetlands and waterways, the reduction of permeable surfaces, and the aging and insufficient capacity of stormwater systems.

To establish floodplains, FEMA adopted the Base Flood Elevation (BFE), which is the computed elevation that floodwater is anticipated to rise during a flood that has a 1% chance of occurring in any given year. The BFE establishes the regulatory requirement for the elevation or floodproofing of structures, and the relationship between the BFE and a given structure’s elevation determines the flood insurance premium through the NFIP.

FEMA, through the Risk Mapping, Assessment, and Planning (Risk MAP) program, works with partners to assess and map these flood risks producing Flood Insurance Rate Maps (FIRMs). As an additional benefit, the FIRMs serve as the basis for NFIP regulations and flood insurance purchase requirements.

SFHAs are defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance flood is also referred to as the base flood or 100-year flood. The FIRM depicts the SFHA, including the 1%-annual-chance flood. These areas are labeled on the map as zone, as explained in the following table:

The following table details FEMA’s FIRM flood zone classifications.

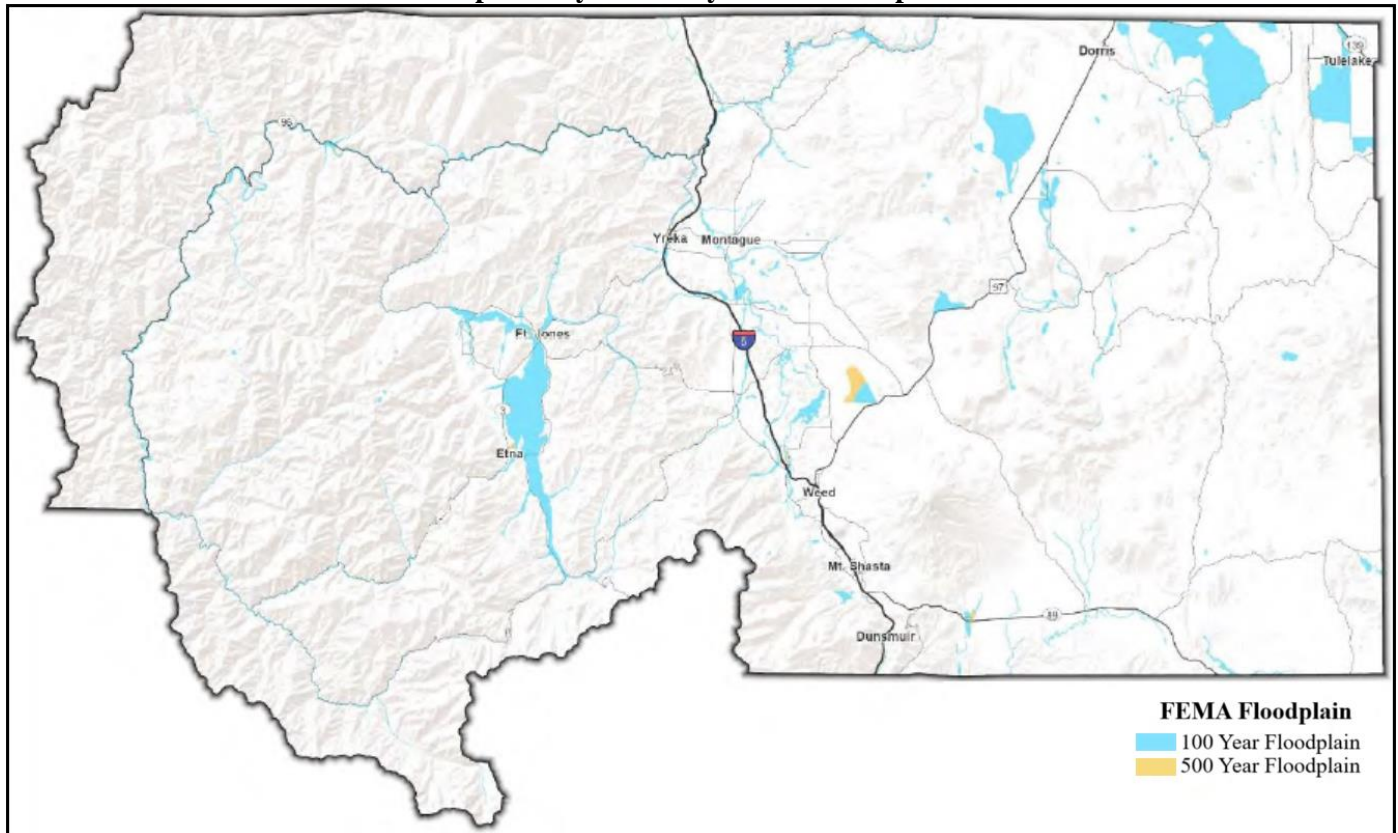
Table : Flood Zone Classifications

Zone	Description
A	The 1%-annual-chance or base floodplain. There are six (6) types of A Zones.
AE	The base floodplain where base flood elevations are provided.
AH	Shallow flooding base floodplain. BFEs are provided.
AO	The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
AR	The base floodplain that results from the decertification of a previously accredited flood protection system that is in the process of being restored to provide a 1%-annual-chance or greater level of flood protection.
A99	Area to be protected from base flood by levees or Federal Flood Protection Systems under construction. BFEs are not determined.
B or Shaded X	Areas between the limits of the base flood and the 0.2% annual-chance (or 500-year) flood.
C or Unshaded X	Areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2% annual-chance flood

Source: FEMA

The following maps use FEMA FIRM data to depict the location of identified flood zones within Siskiyou County.

Map : Siskiyou County FEMA Floodplains

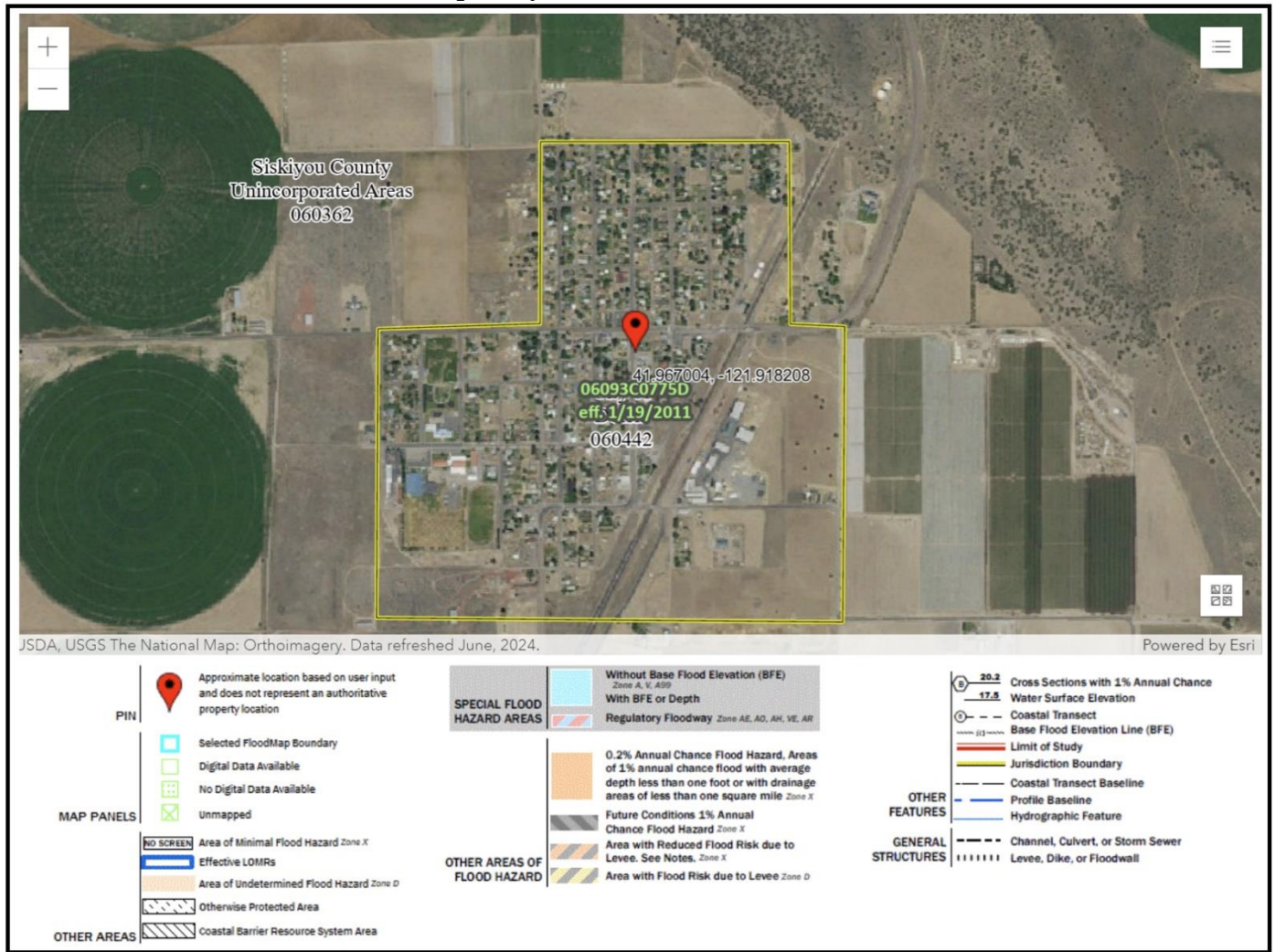


Source: FEMA

The following maps for all participating jurisdictions are FEMA FIRMettes, small, customized sections of a larger FIRM. FIRMettes are typically used to identify flood zones and assess flood risks for a specific area, and they offer:

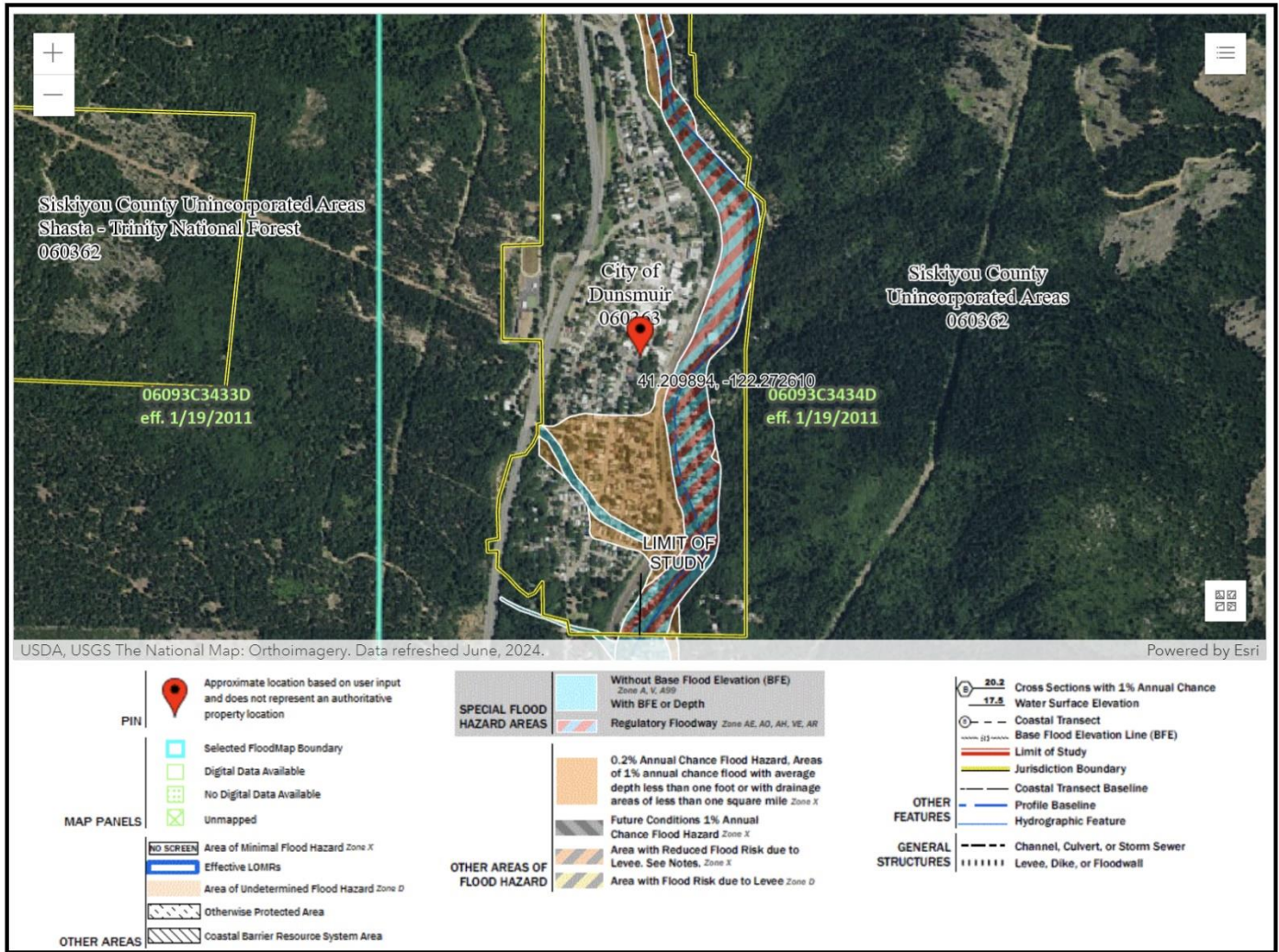
- **Customized Area:** Unlike full FIRMs, which cover large areas, a FIRMette is a focused, zoomed-in version of the map for a smaller, specific location.
- **Flood Zones:** It shows the flood zones for the selected area.
- **Elevation Information:** It may include BFEs, which help determine flood risks and insurance requirements.
- **Official Use:** FIRMettes are legally recognized and used in flood insurance determinations and community planning.

Map : City of Dorris FEMA FIRMette



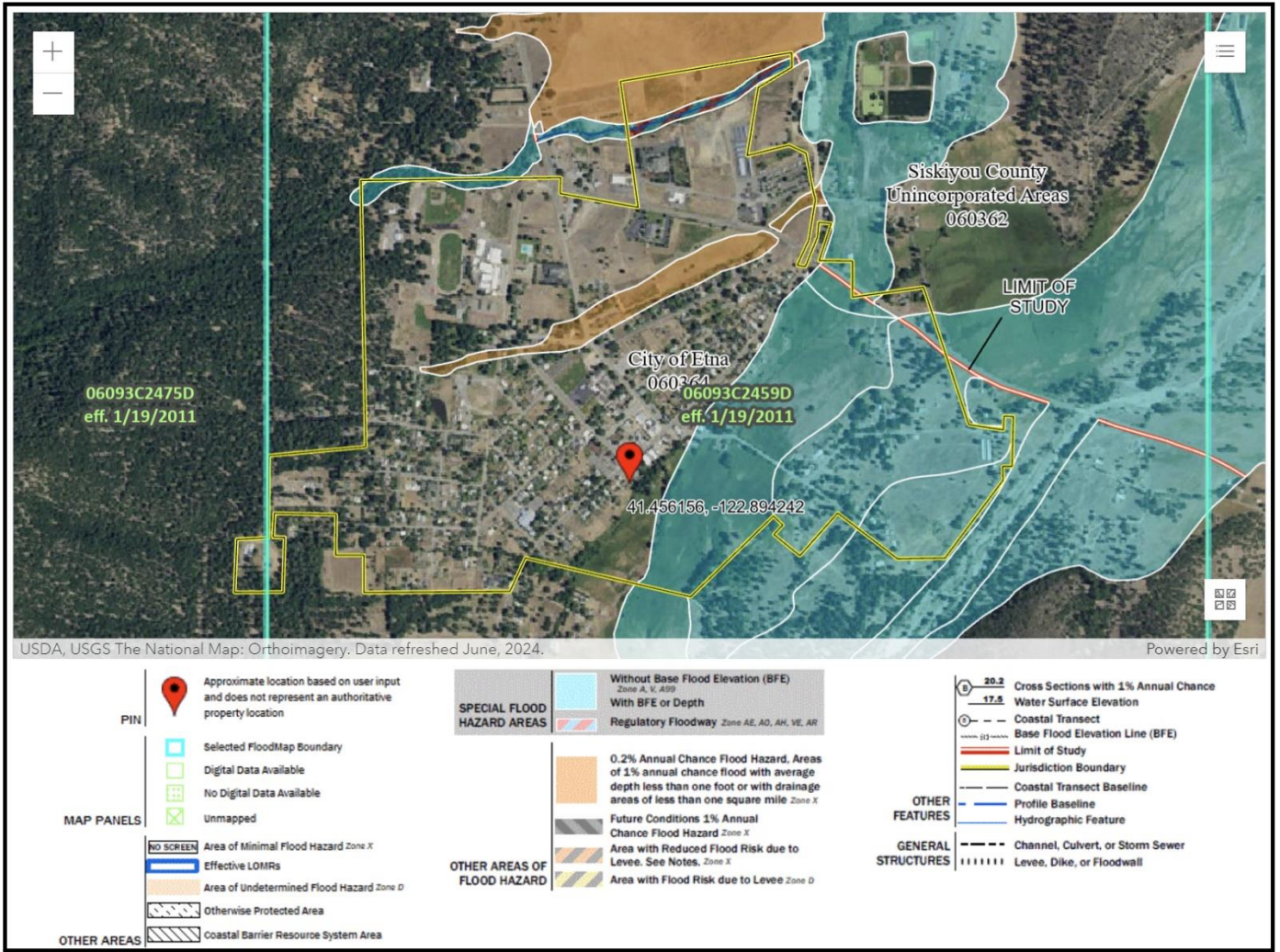
Source: FEMA

Map : City of Dunsmuir FEMA FIRMette



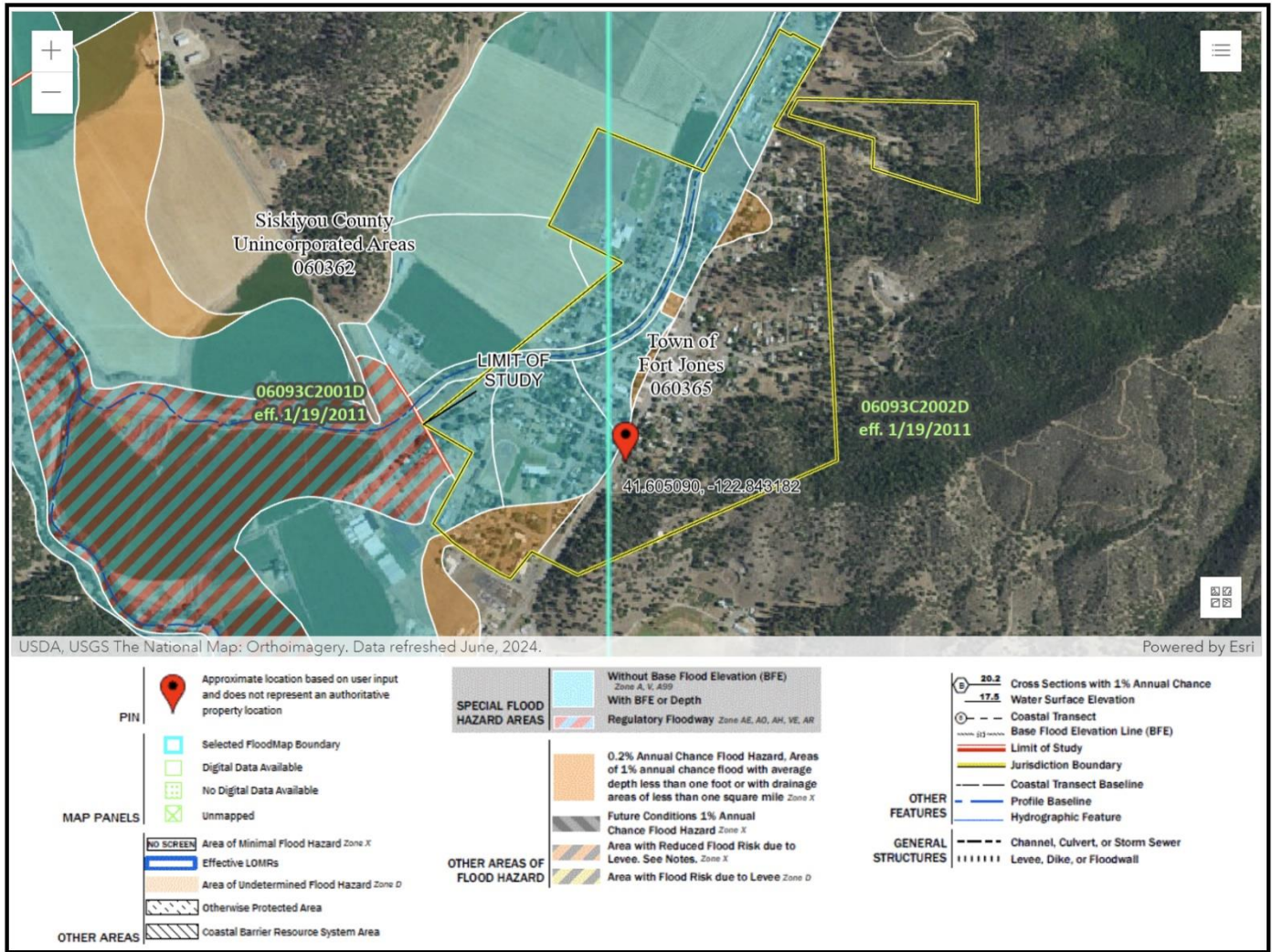
Source: FEMA

Map : City of Etna FEMA FIRMette



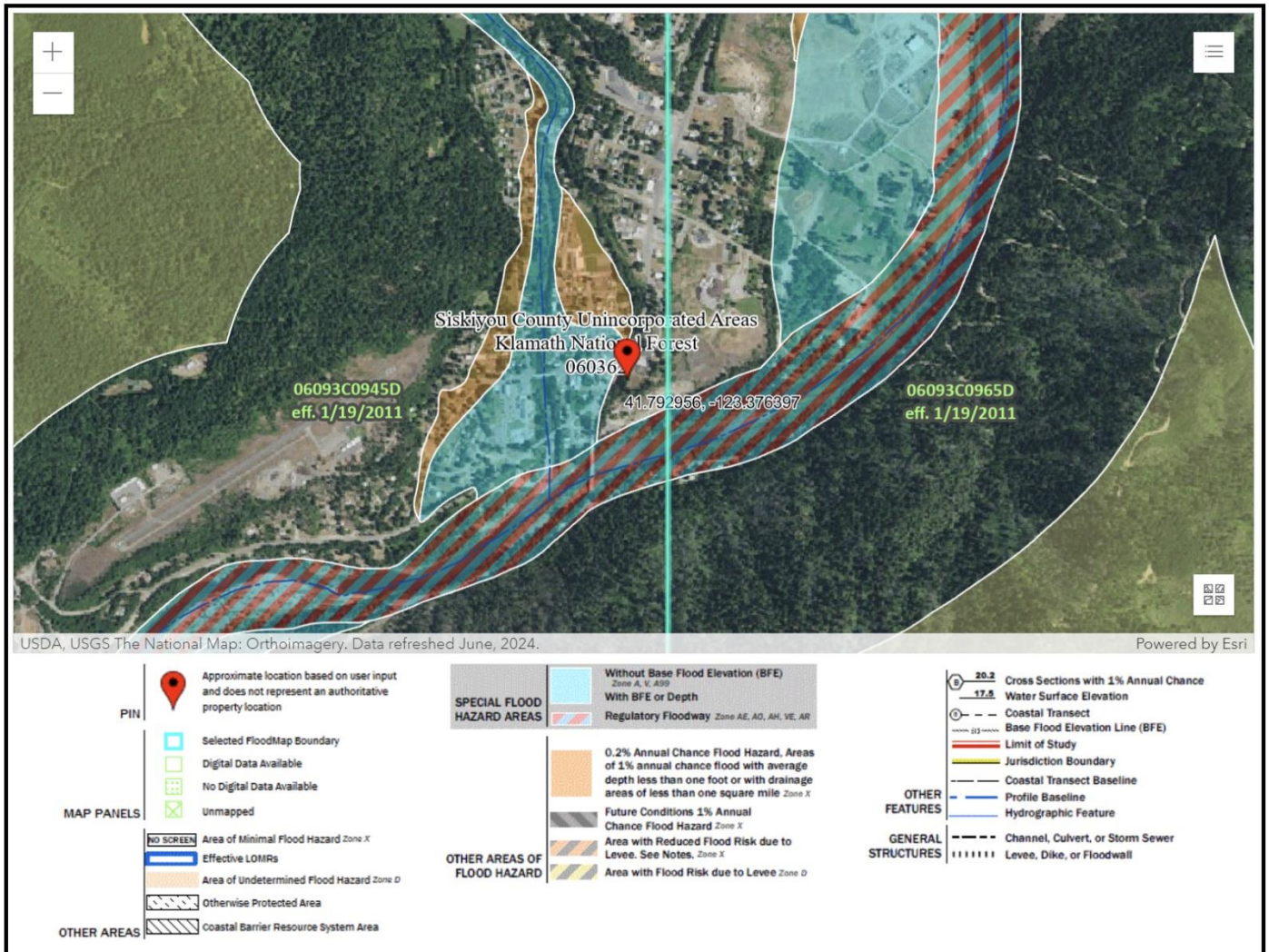
Source: FEMA

Map : Town of Fort Jones FEMA FIRMette



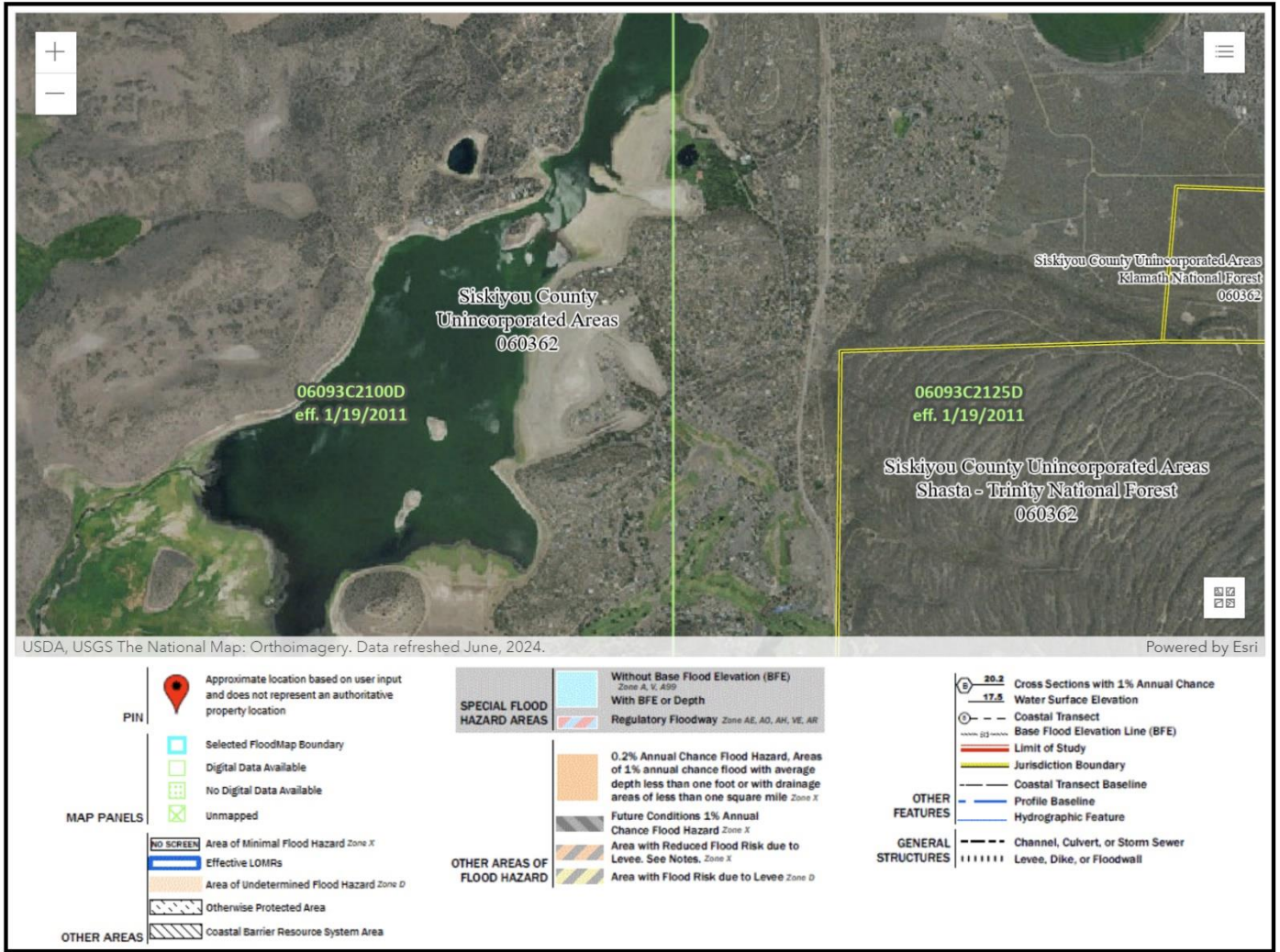
Source: FEMA

Map : Happy Camp Community Services District FEMA FIRMette



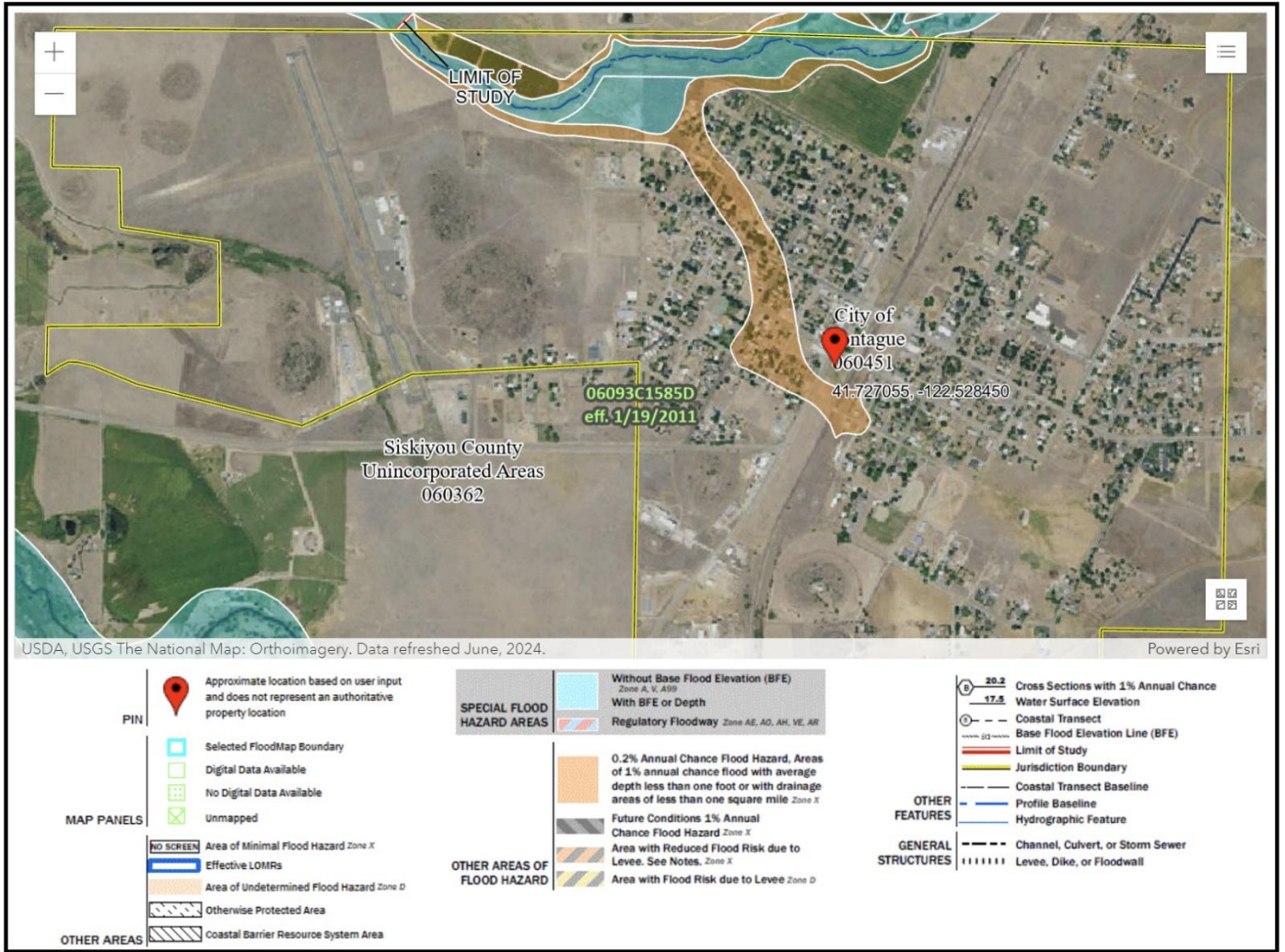
Source: FEMA

Map : Lake Shastina CSD FEMA FIRMette



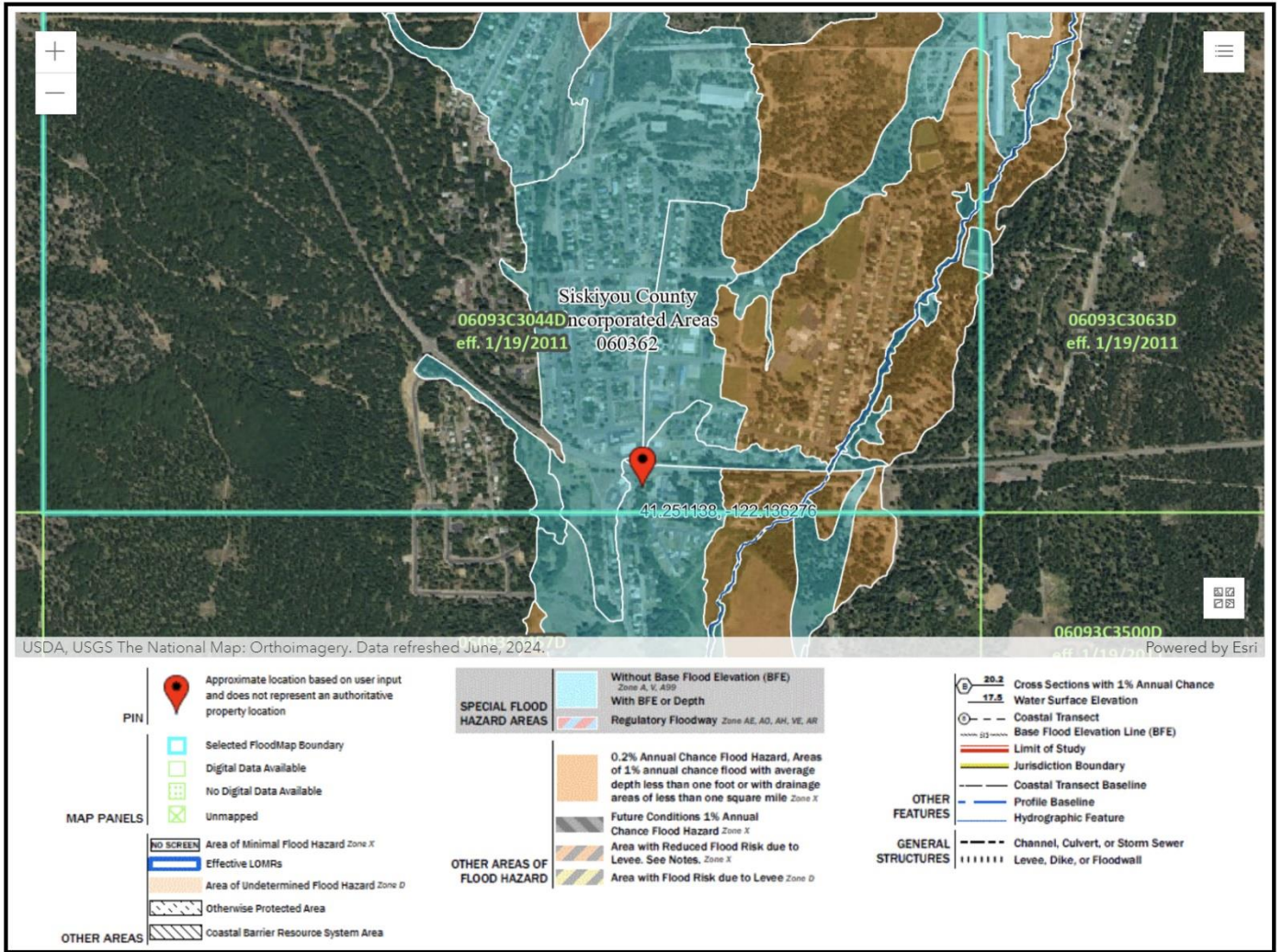
Source: FEMA

Map : City of Montague FEMA FIRMette



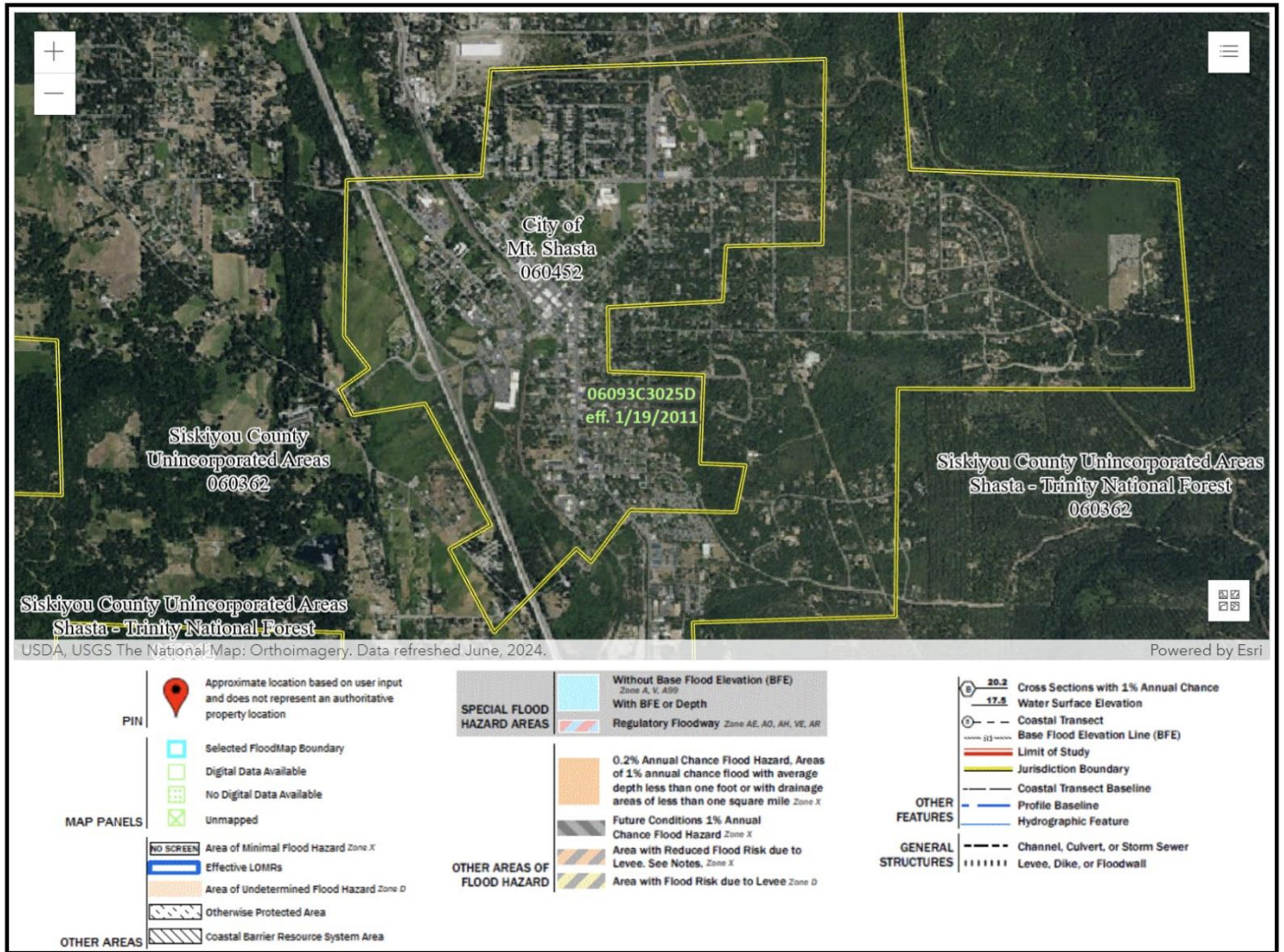
Source: FEMA

Map : McCloud Community Services District FEMA FIRMette



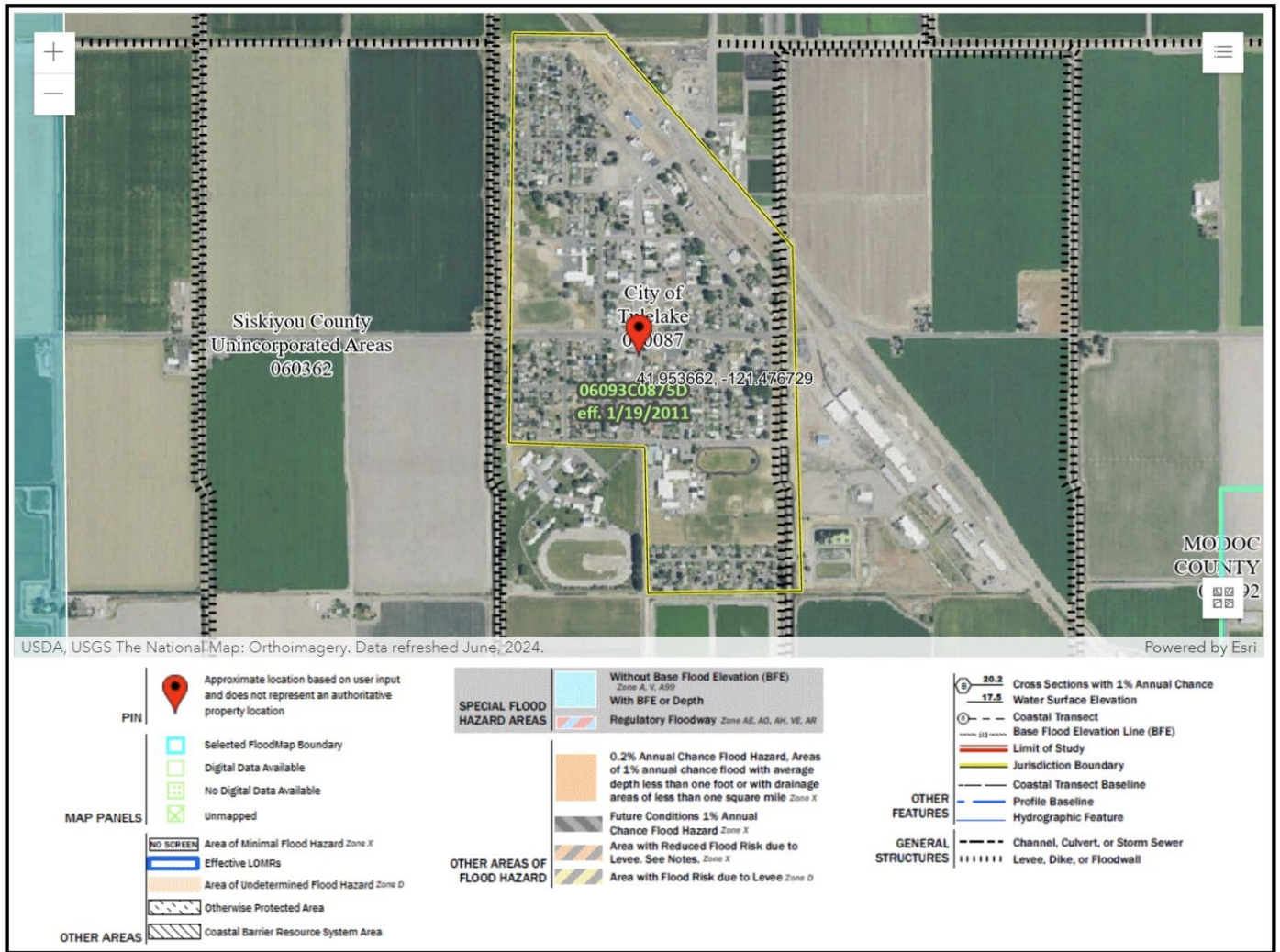
Source: FEMA

Map : City of Mt. Shasta FEMA FIRMette



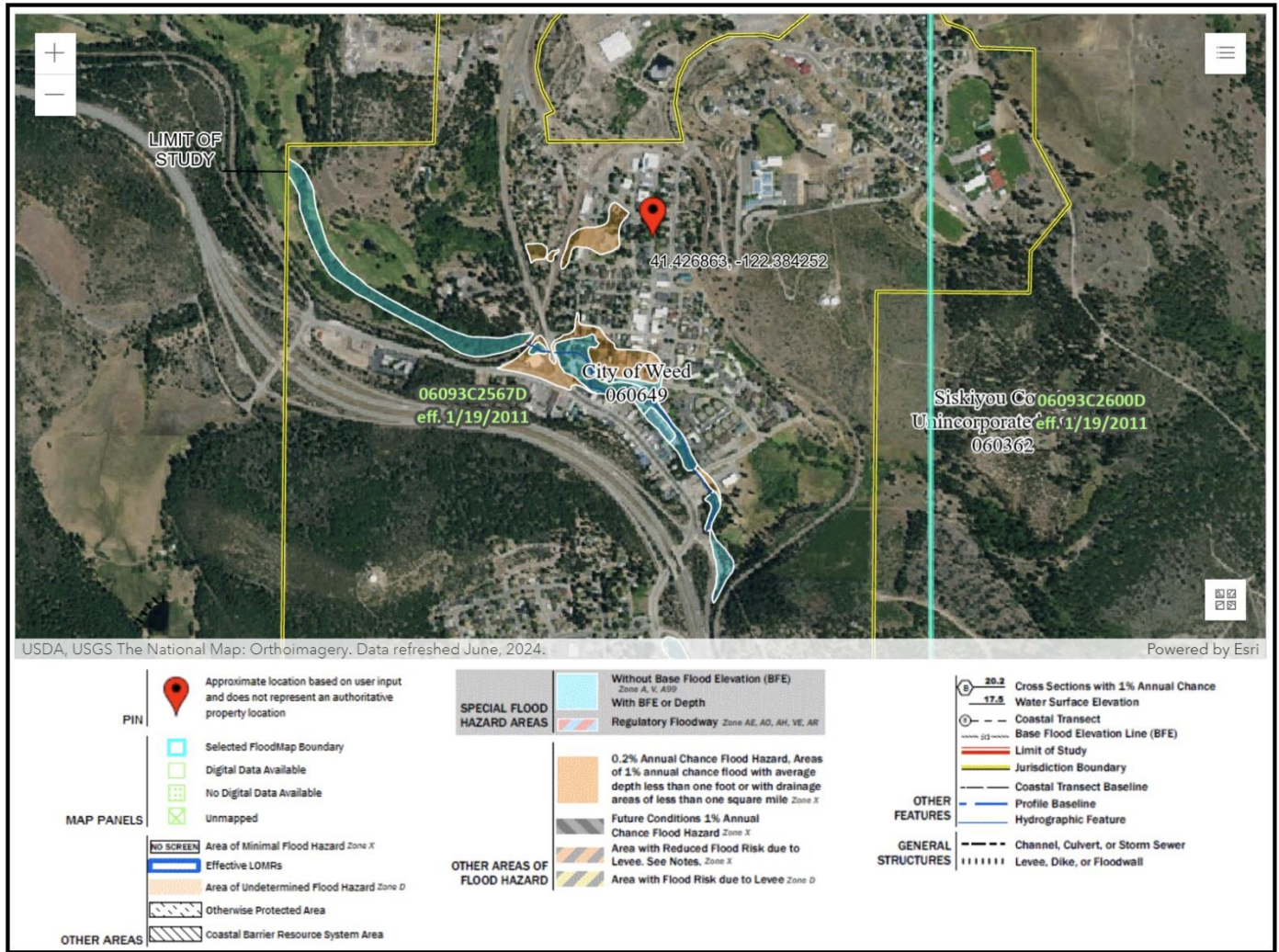
Source: FEMA

Map : City of Tulelake FEMA FIRMette



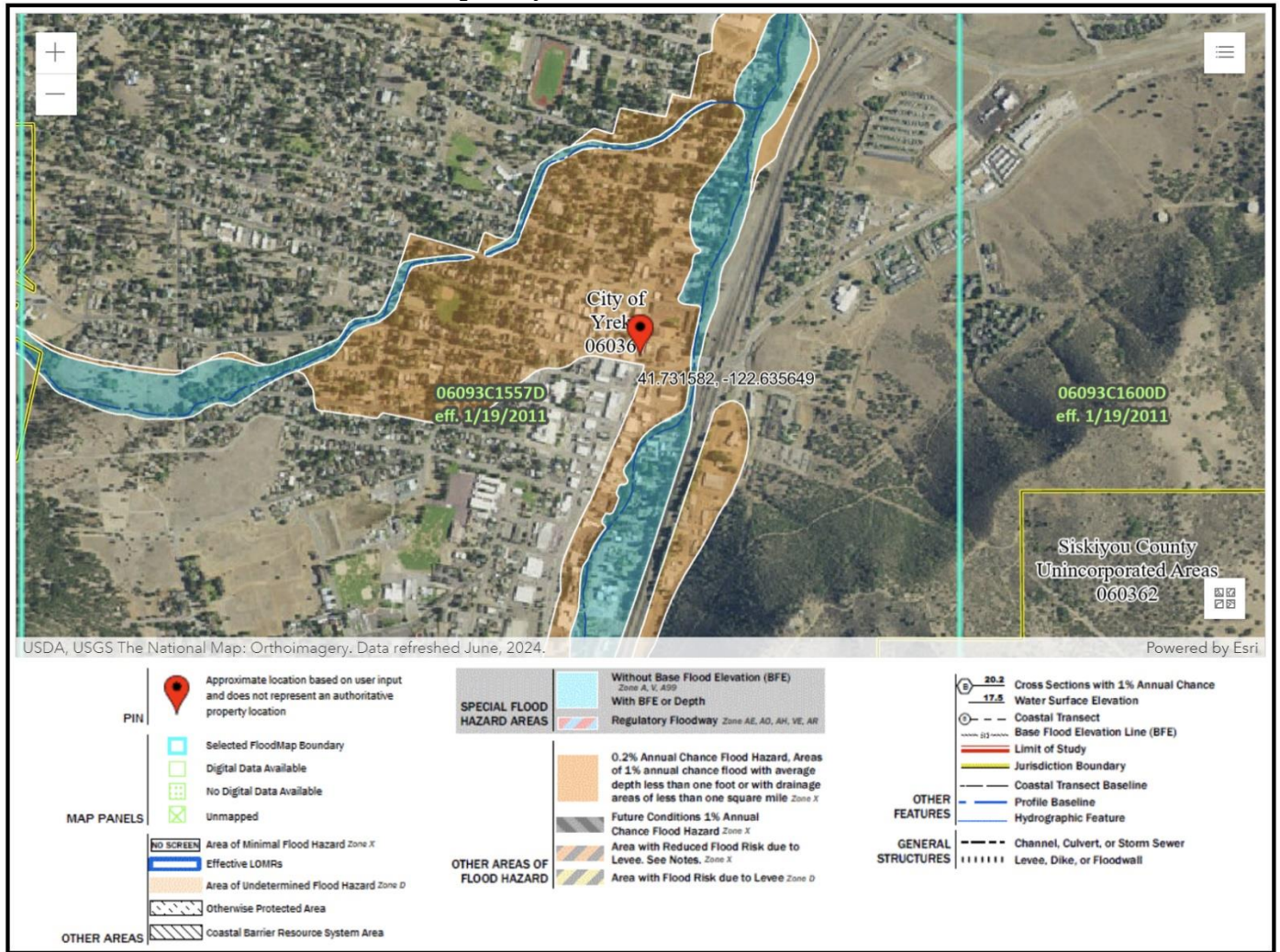
Source: FEMA

Map : City of Weed FEMA FIRMette



Source: FEMA

Map : City of Yreka FEMA FIRMette



Source: FEMA

Siskiyou County has several areas that are prone to flooding, primarily due to its complex topography, rivers, and seasonal weather patterns. Major flooding areas in the county include regions along the Klamath River, Shasta River, Sacramento River, and Scott River, as well as certain low-lying areas and valley regions. Key flood-prone areas include:

- Klamath River Basin:** Located in Northern Siskiyou County, along the Oregon border, this area is particularly prone to flooding during periods of heavy rain or rapid snowmelt in the mountains. Flooding along the Klamath River has affected communities such as Happy Camp, Horse Creek, and Seiad Valley.
- Shasta River Basin:** The Shasta River flows from Mount Shasta through the Shasta Valley, affecting towns such as Lake Shastina CSD, Weed, Yreka and Montague. This river is known to flood during heavy rain or rapid snowmelt events. The Shasta River basin is prone to overflow, particularly in low-lying areas and farmland.
- Scott River Basin:** The Scott River flow through the Scott Valley region, including the towns of Etna, Fort Jones, and surrounding agricultural lands. The Scott River can flood agricultural areas and communities during significant rain events. These floods can be destructive due to the valley's flat terrain, which leads to water pooling.
- Tulelake Valley Areas:** Located in the northeastern part of Siskiyou County near the Oregon border, and encompassing Tulelake and Butte Valley, these areas are susceptible to flooding from nearby water bodies and poorly draining agricultural lands.

- **Upper Sacramento River:** The river runs through Dunsmuir, and during times of extreme weather, can overflow its banks, impacting homes, roads, and businesses near the river.

5.12.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced 11 Presidential Disaster Declarations related to flooding, reflected in the following table.

Table : Siskiyou County Presidentially Declared Flood Disasters

Designation	Declaration Date	Incident Type	Individual and Public Assistance	Mitigation Dollars Obligated	Estimated Damage, Siskiyou County
DR-4570-CA	11/21/2023	Hurricanes (Tropical Storm Hilary)	\$5,891,570	\$72,286	
DR-4683-CA	1/14/2023	Severe Winter Storms, Flooding , Landslides, and Mudslides	\$152,481,240	\$11,290,426	-
DR-4308-CA	4/1/2017	Severe Winter Storms, Flooding , Mudslides	\$427,999,655	\$15,012,050	-
DR-4301-CA	2/14/2017	Severe Winter Storms, Flooding , and Mudslides	\$130,483,948	\$22,708,200	-
DR-1884-CA	3/8/2010	Severe Winter Storms, Flooding , and Debris and Mud Flows	\$28,353,445		-
DR-1628-CA	2/3/2006	Severe Storms, Flooding , Mudslides, and Landslides	\$163,229,337		\$7,000,000
DR-1155-CA	1/4/1997	Severe Storms, Flooding	-	-	\$5,500,000
DR-1046-CA	3/12/1995	California Severe Winter Storms, Flooding , Landslides, Mud Flows	-	-	\$11,241,379
DR-979-CA	2/3/1993	California Severe Storm, Winter Storm, Mud & Landslides, Flooding	-	-	-
DR-412-CA	1/25/1974	California Severe Storms, Flooding	-	-	-
DR-283-CA	2/16/1970	California Severe Storms, Flooding	-	-	-
DR-183-CA	12/24/1964	California Heavy Rains, Flooding	-	-	\$1,785,714

Source: FEMA and Siskiyou County

-: Not reported

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to flooding.

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. The following table details flood proclamations for Siskiyou County:

Table : Siskiyou County California Proclamations of State of Emergency

Designation	Declaration Date	Incident Type	Damages*
2007-01	12/29/2007	Flood	-

Source: Cal OES

*: Damages reported for all impacted counties, tribal reservations, and cities

-: Not reported

In addition to the above, the following table presents NCEI identified flood events in Siskiyou County from 1950 to 2023:

Event Type	Number of Days with Events	Property Damage	Deaths and Injuries
Flood	12	\$7,000,000	1
Flash Flood	17	\$0	1

Source: NCEI

Recent events of note include:

- **August 19, 2023:** Tropical Storm Hilary had a notable impact on Siskiyou County. Heavy rain from the storm caused localized flash flooding, mudslides, and landslides. Critical infrastructure, such as Everitt Memorial Highway, roads, storm drains, and culverts, suffered damage. The heavy rains Aug. 19 also caused flooding and mudslides that damaged roads in the area of several fires burning this summer in the western part of the county along the Highway 96 and Klamath River corridor, according to the county's emergency proclamation. Debris flows exacerbated the situation, particularly in areas with burn scars from previous wildfires. Power outages, road closures, and evacuation orders were also issued in some parts of the county due to the storm's severity.
- **June 8, 2023:** Downpours from a slow-moving thunderstorm created flash flooding on Humbug Creek Road in north central Siskiyou County. This area is part of the McKinney burn scar.
- **August 2, 2022:** Thunderstorms with very heavy rain moved through an area near the McKinney wildfire in the evening. Rainfall was estimated to be between 1 and 3 inches in an hour. This created a debris flow down Humbug Creek, on the eastern edge of the fire. Four vehicles were reported swept off a culvert over Humbug Creek, and videos showed the swiftly rising water in the area. One person had to be rescued from a partially submerged vehicle. He sustained injuries, but survived.
- **December 31, 2005:** A 19-year-old woman drowned in Yreka Creek after being swept away during an attempted crossing on foot. Her body was discovered about a mile downstream the next day. Estimated total damage in Siskiyou County was \$7,000,000 with 79 homes and businesses damaged.

It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or NWS office. When reporting an event, the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages.

The following provide a brief synopsis of notable flood events and impacts for areas of the county:

- **Dunsmuir Area:** Dunsmuir has experienced the six large floods since 1911. These occurred, in decreasing order of magnitude, in January 1974, February 1940, January 1914, December 1964, March 1916 and December 1955. Discharge from the 1974 event was estimated to have a recurrence interval of approximately 50 years. The 1964 event was estimated to have a recurrence interval of 15 years. Damage from the 1974 flood in Dunsmuir was estimated to be \$4.2 million, with 25 homes destroyed. A bridge connecting downtown constricted flow from the Sacramento River, causing an increase in water surface elevation of approximately three feet upstream of the bridge. The backwater effect only extended a short distance upstream because of the steep channel slope. An unnamed creek that enters the City of Dunsmuir near Oak Street and Elinore Way has overflowed and caused widespread shallow flooding of city streets and street-level homes. Although this

unnamed creek has a small drainage area, the floodwaters have high velocities due to the steep slopes, and flow paths are unpredictable due to the street pattern and topography.

- **Etna Area:** In the City of Etna, flooding occurred along Etna Creek in 1955, 1964, and 1974. The largest flood occurred in December 1964, with a recurrence interval of 50 years. The January 1974 flood was estimated to have a recurrence interval of 30 years, based on flow records for the Scott River. The principal flood problem on Etna Creek is that the main channel capacity has been blocked by natural dams, shifting most of the flow out onto the floodplain. The dams are caused by debris lodging in the channel, followed by the buildup of cobbles and gravel. Etna Creek's main channel must be cleared of debris, gravel, rocks and vegetation after each major flood event. The overbank flow is mainly on the left-bank floodplain between the creek and the low bank where the majority of the city is located. The overflows vary due to the location of vegetation and obstructions. During past flood events, efforts have been made to divert the creek back into the main channel by building levees of river rock and gravel. These efforts have not been successful.
- **Fort Jones Area:** In the Fort Jones area, five substantial floods occurred between 1953 and 1974. The largest flood occurred in January 1974, with an estimated recurrence interval of 50 years. During large flood events, the channel capacity of Moffett Creek is exceeded in the vicinity of Marble View Avenue and the overflow spreads out onto the very flat floodplain and continues flowing as a broad, shallow sheet flow. Much of the residential area of Fort Jones is subject to this shallow flooding. Sheet flow tends to pond behind the Scott River Road embankment, where some overtop the road and returns to the channel.
- **McCloud Area:** A significant flood occurred in the unincorporated area of McCloud between December 1996 and January 1997. Over 11 inches of precipitation fell on a deep snowpack, triggering flooding of Panther and Squaw Valley Creeks. Anecdotal evidence suggests that flooding was the worst occurring in the area in over 50 years. Panther Creek experienced flows heavily laden with sediment, but Squaw Valley Creek experienced relatively clear flows carrying considerable woody debris.
- **Montague Area:** Historical flood data is lacking for Montague, but local residents report that a combination of culverts in place prior to a bridge built over the Oregon Slough in 1965 were inadequate to pass floodwaters. Water was observed ponding upstream until it ran over the road, causing road and embankment erosion. The current bridge is adequate to convey a 100-year flood event. Trees and debris collected behind the Yreka Western Railroad Bridge during the flood of 1964 and the culverts through the embankments could not carry the flow, which resulted in erosion of the embankment. The 1974 flood reached the level of the old sewage treatment pond, but bank erosion was not evident.
- **Weed Area:** According to local residents and city officials, the largest flood in Weed occurred in January 1974. Flooding also occurred in December 1964. Due to the lack of magnitude and duration data, no frequencies can be determined for these flood events. Overflow from Boles Creek and North Fork Boles Creek caused shallow flooding during the 1974 event as culvert capacities were exceeded. Water from this event also ponded upstream from the US Highway 97 embankment. Local runoff and stormwater issues have caused shallow flooding in the vicinity of the Weed Convalescent Hospital, but no major flooding has occurred from Beaughton Creek.
- **Yreka Area** Flood problems on Yreka Creek have historically consisted of damage to bridges and erosion of stream banks. The erosion has in turn caused problems with structures along the banks. Yreka Creek caused flooding of the buildings along Main Street in 1861 and in 1927 flooding damaged water mains, barns, garages, outbuildings and a newly constructed sewer line. Humbug Gulch has also contributed to flooding along the city streets and in 1964 the stream flooded several houses at Yama, North and Gold Streets.

5.12.4 Probability of Future Incidents

Based on historical occurrences, Siskiyou County will continue to experience flood events on an annual basis. The definition of each flood zone's classification is used for the purpose of calculating the yearly probability of a riverine flood. Jurisdictions with property in a 100-year floodplain can expect a 1% annual chance of flooding within the designated areas. Jurisdictions with property in a 500-year floodplain can expect a 0.2% annual chance of flooding within the designated areas. FEMA FIRMs can be consulted to provide assistance in determining flooding probability for jurisdictions within Siskiyou County.

The following tables, using data from the NCEI, indicate the yearly probability of a flood or flash flood event, the number of deaths or injuries, and estimated property damage for Siskiyou County based on 75 years' worth of reporting data:

Table : Siskiyou County NCEI Flood and Flash Flood Event Probability Summary,

Event Type	Days with Event	Average Events per Year	Deaths / Injuries	Average Deaths / Injuries per Year	Property Damage	Average Property Damage per Year
Flash Flood	12	<1	1	<1	\$7,000,000	\$93,333
Flood	17	<1	1	<1	\$0	\$0

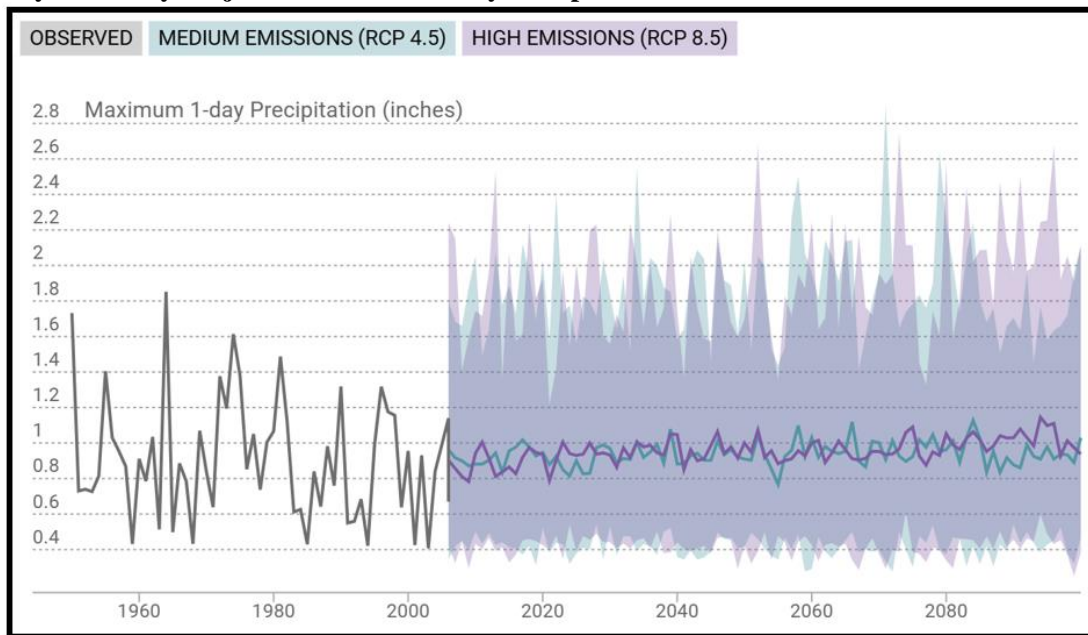
Source: NCEI

5.12.5 Projected Changes in Location, Intensity, Frequency, and Duration

The location, intensity, frequency, and duration of flooding are influenced by a combination of natural and human-induced factors. Continued urbanization, deforestation, and changes in land use can alter natural drainage patterns along with burn scars from wildfires. The conversion of natural landscapes to impervious surfaces, such as roads and buildings, reduces the ability of the land to absorb water, leading to increased runoff and the potential for urban flooding. Alterations to river channels, including channelization and dam construction, can influence the flow of water. Modifications may lead to changes in river behavior, affecting the potential for both upstream and downstream flooding. Poorly planned infrastructure, inadequate stormwater management, and the lack of effective drainage systems in urban areas can contribute to localized flooding. The increase in impervious surfaces reduces natural infiltration, leading to more runoff during rainfall events.

The following climate model, from the Cal-Adapt Local Climate Change Snapshot for Siskiyou County make predictions for the period of 2006 to 2100. Two future climate projections using medium and high greenhouse gas and aerosol emissions scenarios are presented. These scenarios are known as Representative Concentration Pathways, with each representing a standardized set of assumptions about emissions trajectory in the coming years. The Medium Emissions Scenario represents a mitigation scenario where global CO2 emissions peak by 2040 and then decline. The High Emissions Scenario represents a scenario where CO2 emissions continue to rise throughout the 21st century.

Chart : Siskiyou County Projected Maximum 1-day Precipitation Based on Greenhouse Gas Emission Scenarios

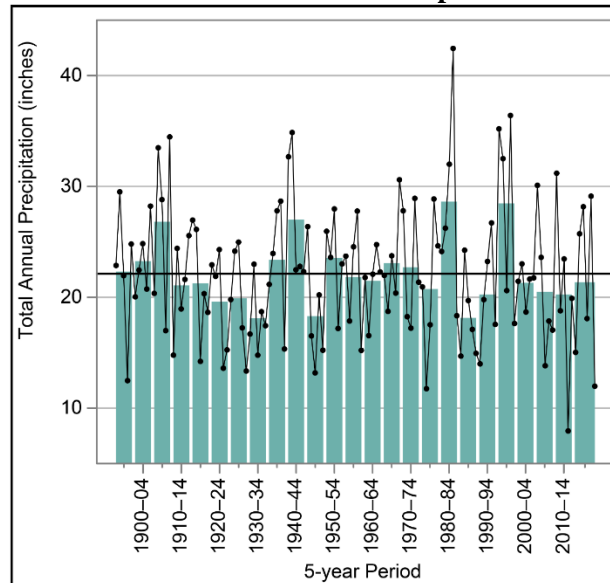


Source: Cal-Adapt Local Climate Change Snapshot for Siskiyou County

While Siskiyou County does not see the average annual precipitation changing significantly in the next 50-75 years, precipitation will likely be delivered in more intense storms and within a shorter wet season

Additionally, the NOAA NCEI State Climate Summary 2022 for California indicates that total annual precipitation varies but has been below average since 2000. There is no long-term trend in winter precipitation or extreme precipitation events.

Chart : Total Annual Precipitation



Source: NOAA NCEI Summary 2022 for Nevada

5.12.6 Vulnerability and Impact

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from riverine flooding. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Riverine Flood Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Relatively Moderate	88.6	1.1
Dorris	06093000200	Relatively High	91.4	1.1
Dunsmuir	06093001100	Relatively Moderate	90.2	1.1
Etna	06093000800	Relatively High	96.6	1.1
Fort Jones	06093000701	Relatively Moderate	89.1	1.1
Happy Camp CSD	06093001300	Relatively High	97.2	1.1
Lake Shastina CSD	06093000902	Relatively Moderate	77.7	1.1
McCloud CSD	06093001200	Relatively High	97.2	1.1
Montague	06093000300	Relatively High	92.5	1.1
Mt. Shasta	06093001003	Very Low	32.0	1.1
Tulelake	06093000100	Relatively Moderate	76.6	1.1
Weed	06093000901	Relatively Moderate	88.6	1.1
Yreka	06093000703	Relatively Low	61.6	1.1

Source: FEMA NRI

Table : Participating Jurisdiction Riverine Flood Expected Annual Loss

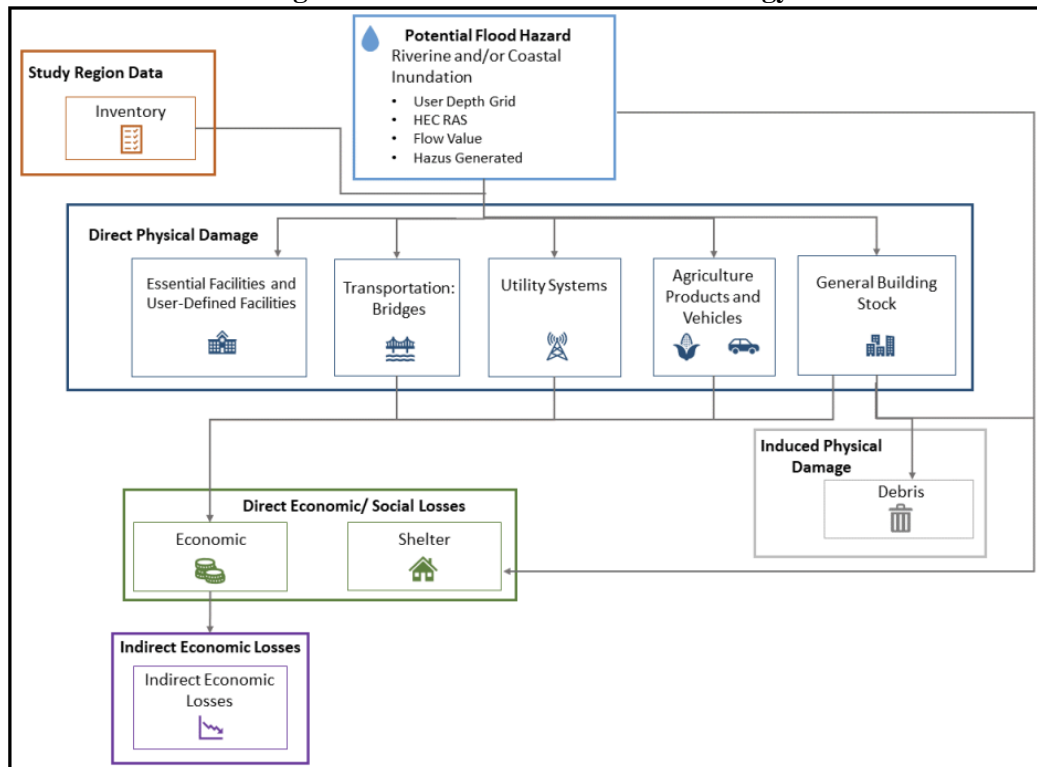
Jurisdiction	Census Tract	EAL	National Percentile	Riverine Flood EAL
Siskiyou County	All	Relatively Moderate	87.7	\$2,700,000
Dorris	06093000200	Relatively Moderate	88.8	\$128,000
Dunsmuir	06093001100	Relatively Moderate	88.1	\$119,000
Etna	06093000800	Relatively High	96.4	\$411,000
Fort Jones	06093000701	Relatively Moderate	88.8	\$128,000
Happy Camp CSD	06093001300	Relatively High	96.2	\$394,000
Lake Shastina CSD	06093000902	Relatively Moderate	78.4	\$51,000
McCloud CSD	06093001200	Relatively High	97.3	\$546,000
Montague	06093000300	Relatively High	91.4	\$173,000
Mt. Shasta	06093001003	Very Low	34.4	\$1,200
Tulelake	06093000100	Relatively Moderate	71.4	\$32,000
Weed	06093000901	Relatively Moderate	84.6	\$85,000
Yreka	06093000703	Relatively Low	57.9	\$13,000

Source: FEMA NRI

FEMA Hazus

For purposes of this plan, a Hazus Flood Model was generated to provide an estimate of the consequences to a flood. The resulting loss estimate generally describes the scale and extent of damage and disruption that may result from the modeled flood event. The Hazus software uses GIS technologies for performing analyses with inventory data and displaying losses and consequences on applicable tables and maps. The following figure provides a graphic representation of the modules that the Hazus Flood Model Methodology is comprised of, and their interrelation in deriving estimates.

Figure : Hazus Flood Model Methodology



Source: FEMA

The results of the Hazus analysis were utilized to estimate potential losses for flooding. The intent of this analysis was to enable Siskiyou County to estimate where flood losses could occur and the degree of severity using a consistent methodology. The Hazus model helps quantify risk along known flood-hazard corridors as well as lesser streams and rivers that have a drainage area of ten square miles or more.

Hazus determines the displaced population based on the inundation area, not necessarily impacted buildings. As a result, there may be a population vulnerable to displacement even if the structure is not vulnerable to damage. Individuals and households will be displaced from their homes even when the home has suffered little or no damage either because they were evacuated or there was no physical access to the property because of flooded roadways.

Flood sheltering needs are based on the displaced population, not the damage level of the structure. Hazus determines the number of individuals likely to use government-provided short-term shelters through determining the number of displaced households as a result of the flooding. To determine how many of those households and the corresponding number of individuals will seek shelter in government-provided shelters, the number is modified by factors accounting for income and age. Displaced people using shelters will most likely be individuals with lower incomes and those who do not have family or friends within the immediate area. Since the income and age factors are taken into account, the proportion of displaced population and those seeking shelter will vary from county to county.

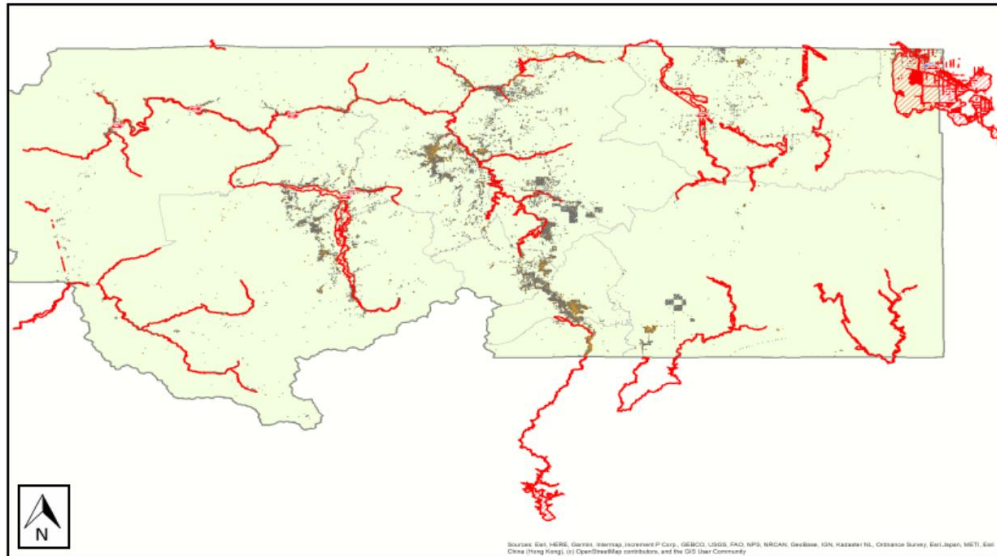
Additionally, Hazus takes into account flood depth when modeling damage (based on FEMA's depth-damage functions). Generated reports capture damage by occupancy class (in terms of square footage impacted) by damage percent classes. Occupancy classes include agriculture, commercial, education, government, industrial, religion, and residential. Damage percentage classes are grouped by 10% increments up to 50%. Buildings that sustain more than 50% damage are considered to be substantially damaged.

The Hazus analysis also provides an estimate of the repair costs for impacted buildings as well as the associated loss of building contents and business inventory. Building damage can also cause additional losses to a community by restricting a building's ability to function properly. Income loss data accounts for losses such as business interruption and rental income losses as well as the resources associated with damage repair and job and housing losses. These losses are calculated by Hazus using a methodology based on the building damage estimates.

The damaged building counts generated by Hazus are susceptible to rounding errors and are likely the weakest output of the model due to the use of census blocks for analysis. Generated reports include this disclaimer: "Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results." Additionally, losses are not calculated for individual buildings, but instead are based on the performances of entire classes of buildings obtained from the general building stock data. In the flood model, the number of grid cells (pixels) at each flood depth value is divided by the total number of grid cells in the census block. The result is used to weigh the flood depths applied to each specific occupancy type in the general building stock. First floor heights are then applied to determine the damage depths to analyze damages and losses.

The following map illustrates the extent of the Hazus scenario:

Map: Hazus Flood Scenario Extent



Source: FEMA Hazus

The following table provides the HAZUS results for damaged buildings, destroyed buildings, and total economic loss for Siskiyou County:

Table : Siskiyou County Hazus Flood Scenario Economic Impacts

Damaged Buildings	Destroyed Buildings	Total Economic Loss	Debris Generation
363	223	\$672,930,000	\$672,930,000

Source: FEMA Hazus

The following table provides the HAZUS results for displaced households, damaged buildings, destroyed buildings, and total economic loss for Siskiyou County:

Table : Siskiyou County Hazus Flood Scenario Displaced Population

Displaced Households	Persons Seeking Shelter	Displaced Population
780	363	223

Source: FEMA Hazus

The Hazus model indicated that the following number of critical facilities are estimated to be damaged or suffer loss of use from the flood scenario.

Table : Siskiyou Hazus Flood Scenario Number of Critical Facilities Damaged or Impacted

Emergency Operations Centers	Fire Stations	Hospitals	Police Stations	Schools
0	3	0	10	7

Source: FEMA Hazus

Population

A primary concern with this hazard is human health safety issues, as extreme heat can be a direct cause of death. Specific at-risk groups include outdoor workers, farmers, young children, and senior citizens. Impacts on human health can include:

- **Loss of Life:** Flooding is one of the leading causes of weather-related fatalities worldwide. Fast-rising floodwaters can lead to drowning and other water-related accidents, resulting in the tragic loss of lives.
- **Injuries:** Floods can cause injuries due to waterborne diseases, contaminated floodwaters, debris, and accidents during evacuation or rescue operations.

- **Displacement:** Many people may be forced to evacuate their homes during floods and will require emergency shelter or temporary housing. Prolonged displacement can be emotionally and economically challenging.
- **Health Risks:** Floodwaters often contain pollutants, sewage, and hazardous materials. Exposure to contaminated water can lead to waterborne diseases, infections, and other health risks.
- **Mental Health Effects:** Survivors of floods may experience a range of emotional and psychological challenges, including post-traumatic stress disorder, anxiety, depression, and grief.
- **Food and Water Shortages:** Floods can contaminate water supplies and disrupt the distribution of food. This can lead to shortages of clean drinking water and essential food items.
- **Impact on Vulnerable Populations:** Vulnerable populations, including the elderly, children, people with disabilities, and those living in poverty, are often disproportionately affected by floods due to limited resources and mobility challenges.

Especially critical is timely evacuation orders, and adherence to those orders. If evacuation is not heeded, or flood waters rise quickly enough, citizens could drown or become trapped for extended periods of time with no access to services or medical care. Of special concern are long-term care and medical facilities where it can take longer to evacuate, or evacuation may be impossible. Additionally, lower income citizens may not have the means to relocate, whether it be lack of transportation or lack of resources to afford temporary shelter.

To provide an estimate of the number of people living in both 100-year and 500-year floodplains, GIS data concerning the number of identified structures with these floodplains and the average household size was utilized. An estimate of population was calculated by multiplying the number of structures by the Siskiyou County average household size of 2.24 persons from the U.S. Census Bureau. The following table provides an estimated population exposed to flooding for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Population Exposure to 100-Year and 500-Year Floodplains

Jurisdiction	Structures in 100 Year Floodplain	Population in 100 Year Floodplain	Percent of Total Population	Structures in 500 Year Floodplain	Population in 500 Year Floodplain	Percent of Total Population
Siskiyou County	1,492	3,342	7.7%	1,720	3,853	8.9%
Dorris	0	0	0.0%	0	0	0.0%
Dunsmuir	67	150	8.0%	165	370	19.8%
Etna	42	94	12.5%	53	119	15.7%
Fort Jones	168	376	65.1%	228	511	88.4%
Lake Shastina CSD	0	0	0.0%	0	0	0.0%
Montague	188	421	28.4%	40	90	6.0%
Mt. Shasta	0	0	0.0%	0	0	0.0%
Tulelake	0	0	0.0%	0	0	0.0%
Weed	10	22	0.8%	33	74	2.8%
Yreka	109	244	3.2%	549	1,230	16.2%

Source: Siskiyou County and U.S. Census Bureau

Buildings and Structures

Floods can have significant and often costly impacts on buildings and structures. These impacts can disrupt essential services, damage infrastructure, and pose safety risks. The extent of the impact depends on factors such as the severity of the flood, the preparedness of the infrastructure, and the effectiveness of flood management measures. Here are some of the common impacts of floods on facilities and critical infrastructure:

- **Foundation Damage:** Floodwaters can erode the soil supporting the foundation, leading to settling, cracks, or even collapse. Scouring and soil liquefaction during floods may undermine the stability of buildings, especially those on weak soils.

- **Wall and Floor Damage:** High water pressure, especially from fast-moving floods, can crack walls, warp floors, and cause floors to collapse.
- **Building Collapse:** If the foundation is significantly compromised, or if water levels rise too quickly, entire buildings may collapse, especially older structures or those not designed for flood resilience.
- **Water Seepage:** Even shallow flooding can cause water to seep into the building’s structure, leading to rotting of wooden frames, mold growth, and damage to insulation and electrical systems.
- **Interior Damage:** Drywall, carpets, furniture, and appliances may all be ruined by prolonged exposure to floodwater, which often carries contaminants like sewage and chemicals.
- **Electrical Short Circuits and Fire:** Floodwaters can cause electrical systems to short-circuit, posing risks of fire or electrocution.
- **HVAC and Plumbing System Damage:** Heating, ventilation, and air conditioning systems, as well as plumbing systems, are vulnerable to water damage, potentially leading to the loss of potable water and proper sanitation in the building.
- **Mold:** After the floodwaters recede, mold and mildew can quickly develop in damp environments. This can lead to respiratory problems for occupants and further deterioration of the building materials.
- **Wood Rot and Corrosion:** Prolonged exposure to water can cause wooden materials to rot and metal components, like steel reinforcements, to corrode, weakening the building over time.

To provide an estimate of the number of structures in both 100-year and 500-year floodplains, GIS data concerning the structures and the median value was utilized. An estimate of the value of structures was determined using the Siskiyou County median household value of \$231,100 from the U.S. Census Bureau. The following table provides an estimated structures exposed to flooding for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Structures Exposure to 100-Year and 500-Year Floodplains

Jurisdiction	Structures in 100 Year Floodplain	Structure Valuation	Structures in 500 Year Floodplain	Structure Valuation
Siskiyou County	1,492	\$344,801,200	1,720	\$397,492,000
Dorris	0	\$0	0	\$0
Dunsmuir	67	\$15,483,700	165	\$38,131,500
Etna	42	\$9,706,200	53	\$12,248,300
Fort Jones	168	\$38,824,800	228	\$52,690,800
Lake Shastina CSD	0	\$0	0	\$0
Montague	188	\$43,446,800	40	\$9,244,000
Mt. Shasta	0	\$0	0	\$0
Tulelake	0	\$0	0	\$0
Weed	10	\$2,311,000	33	\$7,626,300
Yreka	109	\$25,189,900	549	\$126,873,900

Source: Siskiyou County and U.S. Census Bureau

Transportation and Electrical Infrastructure

Flooding can have numerous impacts on both transportation and electrical distribution systems. The impacts of flooding on transportation systems may include:

- **Scour and Erosion:** Floodwaters can wash away the supporting soil around and beneath roads, a process known as scour. This can lead to the collapse of the roadbed and destabilization of bridges and overpasses.
- **Undermining of Pavement:** Prolonged exposure to floodwaters can weaken the pavement structure, leading to cracks, potholes, and eventual failure of the roadway. Roads not designed for water drainage are especially susceptible to being washed out.
- **Potholes and Cracks:** Water penetrates cracks in the pavement, weakening the sublayers. Once the floodwaters recede and the weight of vehicles passes over, potholes can quickly form, creating hazards for drivers.

- **Surface Damage:** Asphalt roads, in particular, can become brittle after repeated water exposure, resulting in chunks of road surface breaking off.
- **Bridge Collapse:** Flooding can damage the support structures of bridges, particularly if water levels rise to exert pressure on the bridge's piers. Debris carried by floodwaters can accumulate around bridge structures, further stressing them.
- **Blocked or Collapsed Culverts:** Culverts, which allow water to pass beneath roads, can become blocked by flood debris, leading to water pooling on roads or forcing water to erode the roadbed around the culvert.
- **Road Inundation:** Flash floods or slow-rising waters can make roads impassable, either because of deep standing water or swift currents.
- **Landslides:** In hilly or mountainous regions, flooding increases the risk of mudslides and landslides, which can bury roads and highways under tons of debris, blocking transportation routes and requiring significant cleanup.
- **Debris Flows:** Heavy rains can wash debris, rocks, and soil onto roads, making them impassable and causing further damage to the road surface.
- **Foundation Weakening:** Repeated flooding over time can weaken the structural foundation of roads, even if the damage isn't immediately apparent. This could lead to long-term deterioration of highways and bridges, requiring expensive repairs or reconstruction.

A GIS review indicates the following major roads and interstates pass through 100-year floodplains:

- Interstate 5
- Highway 3
- Highway 89
- Highway 96
- Highway 97
- Highway 139
- Highway 161
- Highway 263
- Highway 139

Flooding can impact both the electrical generation capacity and transmission. The impacts of extreme heat on electrical systems may include:

- **Flooding of Substations:** Electrical substations, particularly those located in low-lying or flood-prone areas, are vulnerable to flooding. Water ingress into substations can cause short circuits and failures of critical equipment such as transformers, circuit breakers, and switchgear. If a substation is taken offline, large areas could lose power.
- **Transformer Damage:** Floodwaters can compromise oil-insulated transformers by causing leaks or mixing with the oil, which is essential for cooling and insulation. This can lead to transformer failures and extended outages.
- **Downed Power Lines:** Strong flood currents, debris, or trees falling due to saturated soil can bring down power lines, leading to localized or widespread outages.
- **Foundation Erosion:** Transmission towers and utility poles are susceptible to soil erosion during floods, which can undermine their foundations and cause structural instability or collapse.
- **Corrosion of Equipment:** Prolonged exposure to floodwaters can lead to the corrosion of metal components in transmission and distribution systems, shortening the lifespan of equipment and increasing the risk of failure.
- **Water Infiltration:** Electrical equipment, including power meters, transformers, and underground cabling, can experience short circuits if water infiltrates, leading to power outages and potential safety hazards. For example,

underground electrical vaults can flood, damaging cables and transformers, and posing fire and electrocution risks.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

- **Water and Wastewater Utilities:** Water and wastewater utilities are vulnerable to flood events due to the potential for plant damages and distribution system damages. Impacts may include:
- **Damage to Water Treatment Plants:** Floodwaters can inundate water treatment plants, damaging pumps, electrical systems, and filtration equipment. This can prevent the proper treatment of drinking water, leading to unsafe water supplies.
- **Damage to Wastewater Treatment Plants:** Wastewater facilities may experience flooding that overwhelms the capacity to treat sewage, leading to raw or partially treated sewage being discharged into nearby water bodies, contaminating them.
- **Damage to Pumping Stations:** Flooded pumping stations can fail, leading to service interruptions in both water distribution and sewage removal. These failures may require costly repairs or replacements.
- **Drinking Water Contamination:** Floodwaters often carry contaminants such as chemicals, sewage, and industrial waste. If this water infiltrates drinking water systems through broken pipes or overwhelmed treatment systems, it can lead to widespread contamination.
- **Backflow of Sewage:** In severe flooding, sewage can backflow into homes, streets, and businesses through overwhelmed or broken sewer systems. This not only poses health risks but also results in costly cleanup.
- **Increased Flow in Sewer Systems:** During floods, combined sewer systems (which handle both stormwater and sewage) can be overwhelmed by the sheer volume of water. This leads to combined sewer overflows where untreated sewage is discharged directly into rivers, harming the environment and public health.
- **Overwhelmed Stormwater Systems:** Flooding can overwhelm stormwater management systems, causing backups that flood streets and neighborhoods. In older urban areas, this may also overwhelm the sewer system, as stormwater and sewage often share the same infrastructure.

Information concerning the costs to repair or reconstruct water and wastewater infrastructure may be found in Section 5.8.6.

Medical, Education, and Response Facilities

A GIS analysis of medical, educational, and response facilities within the 100-year floodplain indicates the following:

Table : Participating Jurisdiction Medical, Fire, and Response Facilities in 100-Year Floodplain

Jurisdiction	Medical Facilities	Educational Facilities	Fire Facilities	Police Facilities
Siskiyou County	0	7	3	0
Dorris	0	0	0	0
Dunsmuir	0	0	0	0
Etna	0	0	0	0
Fort Jones	0	2	0	0
Happy Camp CSD	0	0	0	0
Lake Shastina CSD	0	0	0	0
McCloud CSD	0	0	0	0
Montague	0	0	0	0
Mt. Shasta	0	0	0	0

Table : Participating Jurisdiction Medical, Fire, and Response Facilities in 100-Year Floodplain

Jurisdiction	Medical Facilities	Educational Facilities	Fire Facilities	Police Facilities
Tulelake	0	0	0	0
Weed	0	0	0	0
Yreka	0	2	0	0

Source: Siskiyou County and U.S. Census Bureau

While flooding may result in a temporary increase in patients, it is considered unlikely that any influx would overwhelm current medical capabilities.

Depending on the educational facility capability and location, flooding may necessitate the closure of the facility for the duration of the event due to damages or lack of access. These closures are expected to have additional economic consequences as caregivers may be required to miss or modify work.

Depending on response facility capability and location, flooding may necessitate the closure of the facility for the duration of the event due to damage or lack of access. These closures are expected to have additional consequences through the disruption of emergency response capabilities.

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Appendix C.

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Section 3: Valuation Data.

Communication Systems

No comprehensive mapping of communications systems was available for review to compare against known flood hazard areas. However, it is assumed that communications lines and towers are in known hazard areas. Flooding can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Damage to Infrastructure:** Flood waters can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- **Power Outages:** Flood waters can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.
- **Structural Instability:** Flood waters can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.

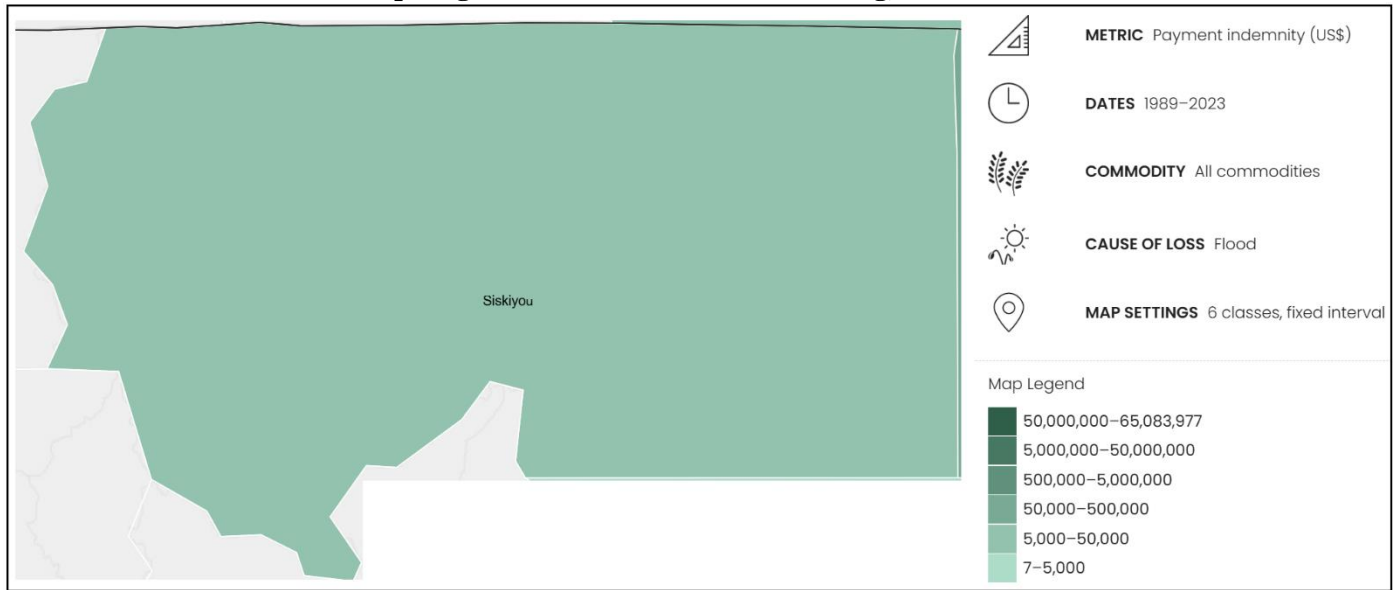
The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Environmental impacts from flooding can be far reaching. Of particular concern is flood related runoff, potentially carrying sewage, pesticides, or hazardous chemicals, which can cause long lasting environmental harm. Expected negative outcomes could include changes in habitat, a decrease of available food, and an increase in the spread of vector-associated disease due to standing water.

Flooding can cause significant agricultural impacts. The following map from the United States Department of Agriculture details total agricultural losses, by county, due to flooding from 1989 - 2023:

Map : Agricultural Losses Due to Flooding, 1989 - 2023



Source: United States Department of Agriculture

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with extreme may include:

- Infrastructure and utility failure
- Economic disruption
- Flood related illnesses and mortality
- Power outages
- Population displacement
- Environmental degradation

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Flood Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Significant flooding events can lead to the damage and loss of homes, property, and businesses. Flash flooding and excessive rainfall may lead to dangerous conditions on roadways. Closures of medical facilities is a major public health concern if flooding damages those facilities. Water sources may become contaminated, and water or sewer systems may be disrupted. Vector-associated disease may increase.
Impact on Responders	Fire, police, and emergency responders may be called on to evacuate people from impacted areas, as well as close roads, attend to the injured, and direct traffic away from the flooded area and roads. First responders may face challenges with transportation and

Table : Flood Consequence Analysis

Subject	Potential Impacts
	access to a location. Flash floods and mudslides due to heavy rainfall can also injure first responders, as well as delay response operations.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Floods which create power outages, debris damage, and road closures are not uncommon. This threat may impact an agency’s ability to maintain continuity of operations based on the incidents impact on power, communications and the potential to damage equipment and records within primary and alternate facilities.
Delivery of Services	Flooding can cause road and bridge closures, as well as disrupt transit services, impacting the ability to deliver goods and services. Exposure to flood waters may also damage or destroy physical goods such as food, clothing, and hygiene products.
Property, Facilities, and Infrastructure	Flooding can cause significant property destruction. Floods can disrupt normal daily activities due to the potential impact on schools, hospitals, and other public infrastructure. Transportation infrastructure can be damaged which could impact the freedom of movement or provision of utilities. Water sources can become contaminated. Water and sewer systems may be disrupted. Solid-waste collection and disposal may also be impacted, causing dangerous public health risks.
Impact on Environment	Rising waters from flooding impact the environment by spreading pollution, inundating water and wastewater treatment plants, and disrupting wildlife. Standing water following a flood event can facilitate the spread of vector-associated diseases.
Economic Conditions	Significant and repeated flooding can lower property value throughout the state, which can have a deleterious effect on the tax base. Furthermore, flooding drains response resources, which can be costly during a large flooding event for disaster reimbursement
Public Confidence in Governance	Ineffective flooding response can decrease the public’s confidence in the ability to respond and govern. Multi-level government response requires direct actions that must be immediate and effective to maintain public confidence. Efficiency in response and recovery operations is critical in keeping public confidence high.

5.12.7 National Flood Insurance Program Communities

The NFIP is a federal program, managed by FEMA, which exists to provide flood insurance for property owners in participating communities, to improve floodplain management practices, and to develop maps of flood hazard areas. The following table presents NFIP participating communities.

Table : Siskiyou County NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
Siskiyou County	11/15/1977	5/17/1982	1/19/2011
Dunsmuir	5/24/1974	12/4/1979	1/19/2011
Etna	2/22/1974	3/4/1980	1/19/2011
Fort Jones	4/5/1974	4/15/1980	1/19/2011
Montague	3/26/1976	9/17/1980	1/19/2011
Weed	1/20/1981	1/20/1982	1/19/2011
Yreka	3/22/1974	11/18/1981	1/19/2011

Source: FEMA NFIP

The Community Rating System (CRS) is a voluntary program within the NFIP that provides insurance premium discounts to policy holders based on a jurisdiction’s adherence to floodplain management activities that exceed minimum NFIP requirements. As of this plan, no participating jurisdictions within Siskiyou County are CRS participants.

5.12.8 FEMA Flood Policy and Loss Data

Siskiyou County flood policy information was sourced from FEMA’s Flood Insurance Data and Analytics. The number of flood insurance policies in effect may not include all structures at risk of flooding, and it is likely that some properties are under-insured. The flood insurance purchase requirement is for flood insurance in the amount of federally backed mortgages, not the entire value of the structure. Additionally, contents coverage is not required. The following table shows the details of NFIP policy statistics for Siskiyou County:

Table : Siskiyou County NFIP Coverage

Jurisdiction	Number of Policies in Force	Total Coverage
Siskiyou County	195	\$49,029,300
Dunsmuir	14	\$2,896,200
Etna	15	\$2,807,100
Fort Jones	38	\$6,855,400
Weed	3	\$1,250,000
Yreka	31	\$8,059,000

Source: FEMA Flood Insurance Data and Analytics

The following table details the change in NFIP coverage from 2019 to 2024 for Siskiyou County:

Table : Siskiyou County NFIP Coverage Changes

Jurisdiction	Policies in Force 2019	Policies in Force 2024	Change in Policies, 2019 - 2024	Total Coverage 2019	Total Coverage 2024	Change in Coverage, 2019 - 2024
Siskiyou County	336	195	-141	\$65,070,700	\$49,029,300	-\$16,041,400
Dunsmuir	33	14	-19	\$5,860,100	\$2,896,200	-\$2,963,900
Etna	17	15	-2	\$3,230,200	\$2,807,100	-\$423,100
Fort Jones	71	38	-33	\$11,446,600	\$6,855,400	-\$4,591,200
Weed	4	3	-1	\$686,500	\$1,250,000	\$563,500
Yreka	64	31	-33	\$13,376,200	\$8,059,000	-\$5,317,200

Source: FEMA

5.12.9 Repetitive Loss Structures

The NFIP defines a Repetitive Loss property as:

- Any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. At least two of the claims must be more than 10 days apart.

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended, 42 U.S.C. 4102a. A Severe Repetitive Loss property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both of the above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than ten days apart. The following table details repetitive loss properties for Siskiyou County:

Table : Siskiyou County Repetitive Loss Properties

Jurisdiction	Number of Repetitive Loss Properties	Property Type	Mitigated	NFIP Insured	Number of Losses	Loss Amount
Siskiyou County	2	Residential	0	0	4	\$9,299

No Severe Repetitive Loss properties were noted in Siskiyou County.

5.12.10 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the flood hazard.

Table : Example Flood Mitigation Actions

Category	Example Action
Planning and Regulation	Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in flood hazard areas. Floodplain and coastal zone management can be included in comprehensive planning.
	Developing a floodplain management plan and updating it regularly.
	Establishing a green infrastructure program to link, manage, and expand existing parks, preserves, greenways, etc.
	Prohibiting or limiting floodplain development through regulatory and/or incentive-based measures.
	Limiting the percentage of allowable impervious surface within developed parcels.
	Encouraging the use of porous pavement, vegetative buffers, and islands in large parking areas.
	Completing a stormwater drainage study for known problem areas.
	Developing engineering guidelines for drainage from new development.
	Designing a “natural runoff” or “zero discharge” policy for stormwater in subdivision design.
	Regularly calculating and documenting the amount of flood-prone property preserved as open space.
	Conducting NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.
	Revising the floodplain ordinance to incorporate cumulative substantial damage requirements.
Infrastructure	Installing, re-routing, or increasing the capacity of a storm drainage system.
	Increasing capacity of stormwater detention and retention basins.
	Requiring developers to construct on-site retention basins for excessive stormwater and as a firefighting water source.
	Routinely cleaning debris from support bracing underneath low-lying bridges.
	Elevating structures so that the lowest floor, including the basement, is raised above the base flood elevation.
	Raising utilities or other mechanical devices above expected flood levels.
	Elevating roads and bridges above the base flood elevation to maintain dry access.
	Floodproofing water and wastewater treatment facilities located in flood hazard areas.
Natural Systems	Establishing and managing riparian buffers along rivers and streams.
	Protecting and preserving wetlands to help prevent flooding in other areas.
	Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
	Protecting and enhancing landforms that serve as natural mitigation features
Education	Encouraging homeowners to purchase flood insurance.
	Annually distribute flood protection safety pamphlets or brochures to the owners of flood-prone property.
	Educating citizens about safety during flood conditions, including the dangers of driving on flooded roads.
	Encouraging homeowners to install backflow valves to prevent reverse-flow flood damages.

5.13 Landslide

5.13.1 Hazard Description

A landslide is the movement of rock, soil, and debris down a slope due to gravity. It occurs when the stability of a slope changes from a stable to an unstable condition, often triggered by natural events such as heavy rain, earthquakes, volcanic activity, or human activities like deforestation or construction. Landslides can vary in speed and the materials involved, ranging from slow-moving soil shifts to fast and destructive flows of debris and rock. Types of landslides include:



- **Flows:** Flows occur when materials, like soil, rock, or debris, behave more like a fluid due to the addition of water. These can range from slow to extremely rapid.
 - **Debris Flow:** Fast-moving flow composed of a mix of water, soil, and debris. These are common in mountainous areas after heavy rains.
 - **Mudflow:** A specific type of debris flow that contains a large amount of fine materials like silt and clay, often occurring in areas with little vegetation.
 - **Earthflow:** A slower-moving flow made mostly of fine-grained materials such as clay or silt.
- **Slides:** Slides involve the downward movement of soil or rock along a defined surface or plane, like a layer of weak material.
 - **Rotational Slide (Slump):** The material moves along a concave surface, creating a backward rotation of the slope. This type is more common in softer, clay-rich soils.
 - **Translational Slide:** Material moves along a relatively flat or slightly inclined surface. These slides can be shallow or deep and tend to be faster than rotational slides.
- **Falls:** Falls occur when rock or debris becomes detached from a steep slope or cliff and free-falls due to gravity.
- **Lateral Spreads:** Lateral spreads occur when loose, water-saturated soil spreads horizontally due to liquefaction, often triggered by earthquakes.
- **Avalanches (Snow or Debris):** Avalanches are rapid flows of snow, ice, or debris down a mountainside. While snow avalanches are common in winter, debris avalanches involve loose rocks and dirt mixed with water.

In general, landslides may be characterized as shallow or deep-seated. The difference between shallow and deep-seated landslides lies primarily in their depth, causes, speed, and the type of materials involved. Each type presents unique challenges in terms of risk, behavior, and mitigation strategies. General differences are as follows:

Table : Comparison of Shallow and Deep-Seated Landslides

Factor	Shallow Landslides	Deep-Seated Landslides
Depth	Less than 10 meters (33 feet).	Greater than 10 meters (33 feet).
Material	Loose soil, debris, weathered rock.	Bedrock or consolidated materials.
Speed	Often fast-moving, can happen suddenly.	Slower movement, can happen over longer periods.
Triggers	Intense rainfall, snowmelt, or earthquakes.	Geological processes, erosion, tectonic activity.
Types	Debris flows, soil slides.	Rotational slides, translational slides.
Impacts	Immediate, localized damage to surface infrastructure.	Large-scale damage over time to deeper and larger areas.

Source: United States Geological Survey and California Department of Conservation

Common triggers of landslides may include:

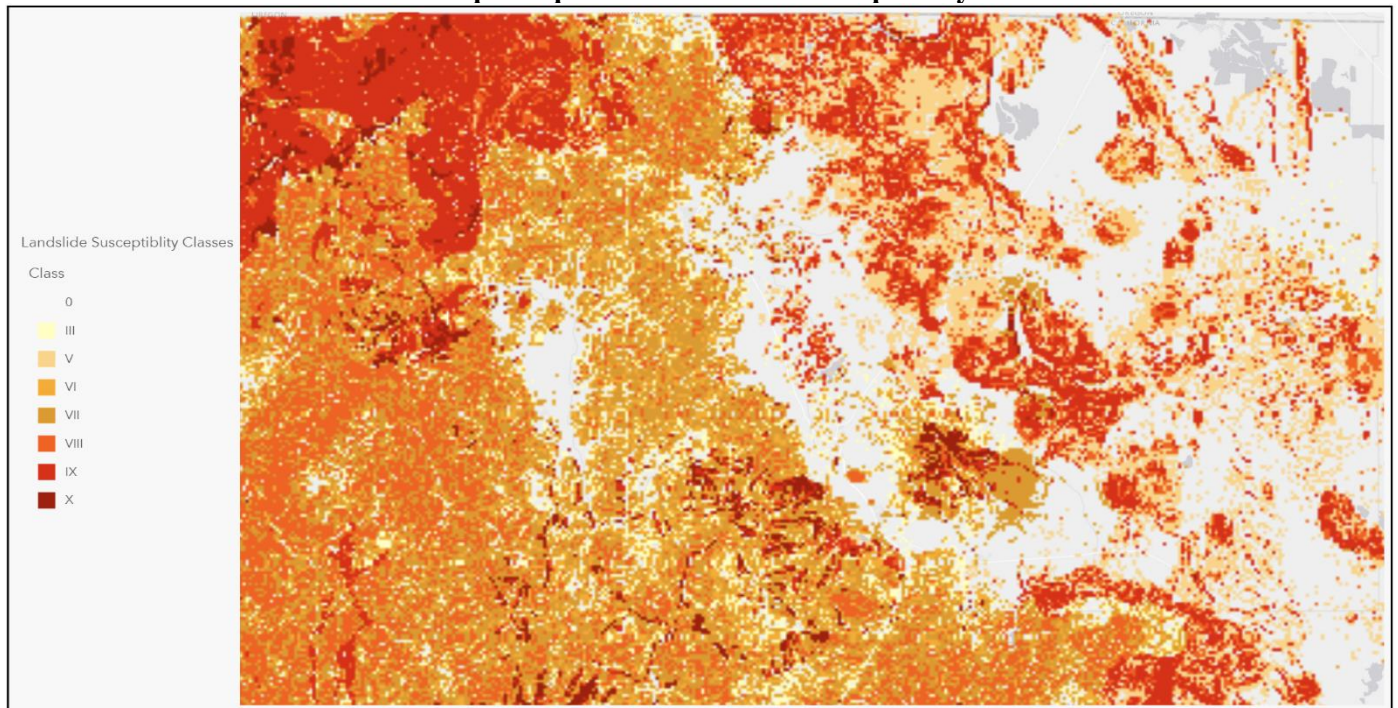
- **Heavy Rainfall:** Prolonged or intense rain saturates the ground, reducing the stability of slopes and leading to slides or flows.
- **Earthquakes:** The shaking from an earthquake can dislodge unstable soil or rock, triggering landslides.

- **Wildfires:** Wildfires make the landscape more susceptible to landslides. When rainstorms pass through, the water liquefies unstable, dry soil and burned vegetation.
- **Volcanic Activity:** Eruptions can cause the collapse of volcanic slopes or trigger lahars (volcanic mudflows).
- **Human Activities:** Deforestation, mining, construction, and the alteration of natural landscapes can destabilize slopes, increasing the likelihood of landslides.

5.13.2 – Location and Extent

The following map, from the California Department of Conservation, shows the relative likelihood of deep-seated landsliding based on estimates of rock strength and steepness of slopes within Siskiyou County. This landslide susceptibility map is intended to provide a general overview of where landslides are more likely to occur and is not appropriate for evaluation of landslide potential at any specific site. The map creates classes of landslide susceptibility (0 to 10, low to high). These classes express the generalization that on very low slopes, landslide susceptibility is low even in weak materials, and that landslide susceptibility increases with slope and in weak rocks.:

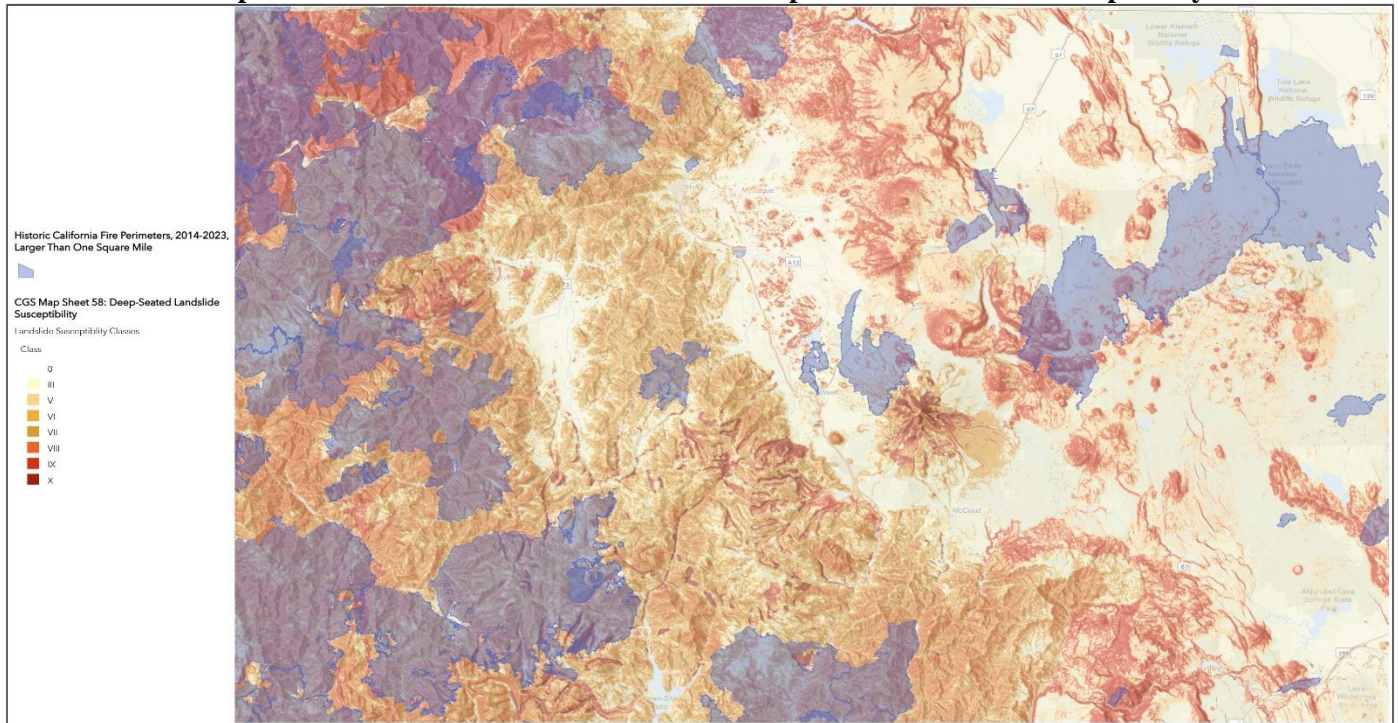
Map: Deep-Seated Landslide Susceptibility



Source: California Department of Conservation

Wildfire impacted areas may be particularly susceptible to deep-seated landslides, typically in the first decade following a fire. The following map shows the past ten years of large wildfires (area at least one square mile) with an overlay of the Susceptibility to Deep-Seated Landslides map for Siskiyou County. This map does not include information on landslide triggering events nor does it address susceptibility to shallow landslides such as debris flows. This map is not appropriate for evaluation of landslide potential at any specific site:

Map: Historic Wildfire Areas as Related to Deep-Seated Landslide Susceptibility



Source: California Department of Conservation






The extent of a landslide is typically measured by determining its length, width, and depth using surveying techniques like GPS, terrestrial laser scanning, aerial photography, and satellite imagery, which allows for mapping the landslide's overall area and volume.

Although avalanches can occur on any steep slope given the right conditions, certain types of locations are naturally more dangerous. Some key characteristics of avalanche prone areas include:

- **Slope Angle:** Slopes between 30° to 45° degrees are most prone to avalanches. However, under the correct conditions avalanches can occur on slopes as shallow as 25° or as steep as 60° degrees.
- **Slope Direction:** The direction a slope faces can impact snowpack stability, with certain aspects more likely to accumulate unstable layers of snow.
- **Terrain Features:** Some terrain features can channel the force of an avalanche (chutes, bowls) increasing the risk for anyone caught in its path.
- **Lack of Vegetation:** A lack of vegetation can indicate an area prone to avalanches.

The North American Public Avalanche Danger Scale is a system that rates avalanche danger and provides general travel advice based on the likelihood, size, and distribution of expected avalanches. It consists of five levels, from least to highest amount of danger. Although the danger ratings are assigned numerical levels, the danger increases exponentially between levels.

Figure : North American Public Avalanche Danger Scale

North American Public Avalanche Danger Scale <i>Avalanche danger is determined by the likelihood, size, and distribution of avalanches. Safe backcountry travel requires training and experience. You control your risk by choosing when, where, and how you travel.</i>				
Danger Level		Travel Advice	Likelihood	Size and Distribution
5 - Extreme		Extraordinarily dangerous avalanche conditions. Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Very large avalanches in many areas.
4 - High		Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 - Considerable		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding, and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 - Moderate		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 - Low		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Source: Avalanche.org

5.13.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced seven Presidential Disaster Declarations related to landslides, reflected in the following table.

Table : Siskiyou County Presidentially Declared Disasters

Designation	Declaration Date	Incident Type	Individual and Public Assistance	Mitigation Dollars Obligated
DR-4683-CA	1/14/2023	Severe Winter Storms, Flooding, Landslides, and Mudslides	\$152,481,240	\$11,290,426
DR-4308-CA	4/1/2017	Severe Winter Storms, Flooding, Mudslides	\$427,999,655	\$15,012,050
DR-4301-CA	2/14/2017	Severe Winter Storms, Flooding, and Mudslides	\$130,483,948	\$22,708,200
DR-1884-CA	3/8/2010	Severe Winter Storms, Flooding, and Debris and Mud Flows	\$28,353,445	-
DR-1628-CA	2/3/2006	Severe Storms, Flooding, Mudslides, and Landslides	\$163,229,337	-
DR-1046-CA	3/12/1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	-	-

Table : Siskiyou County Presidentially Declared Disasters

Designation	Declaration Date	Incident Type	Individual and Public Assistance	Mitigation Dollars Obligated
DR-979-CA	2/3/1993	California Severe Storm, Winter Storm, Mud and Landslides, Flooding	-	-

Source: FEMA

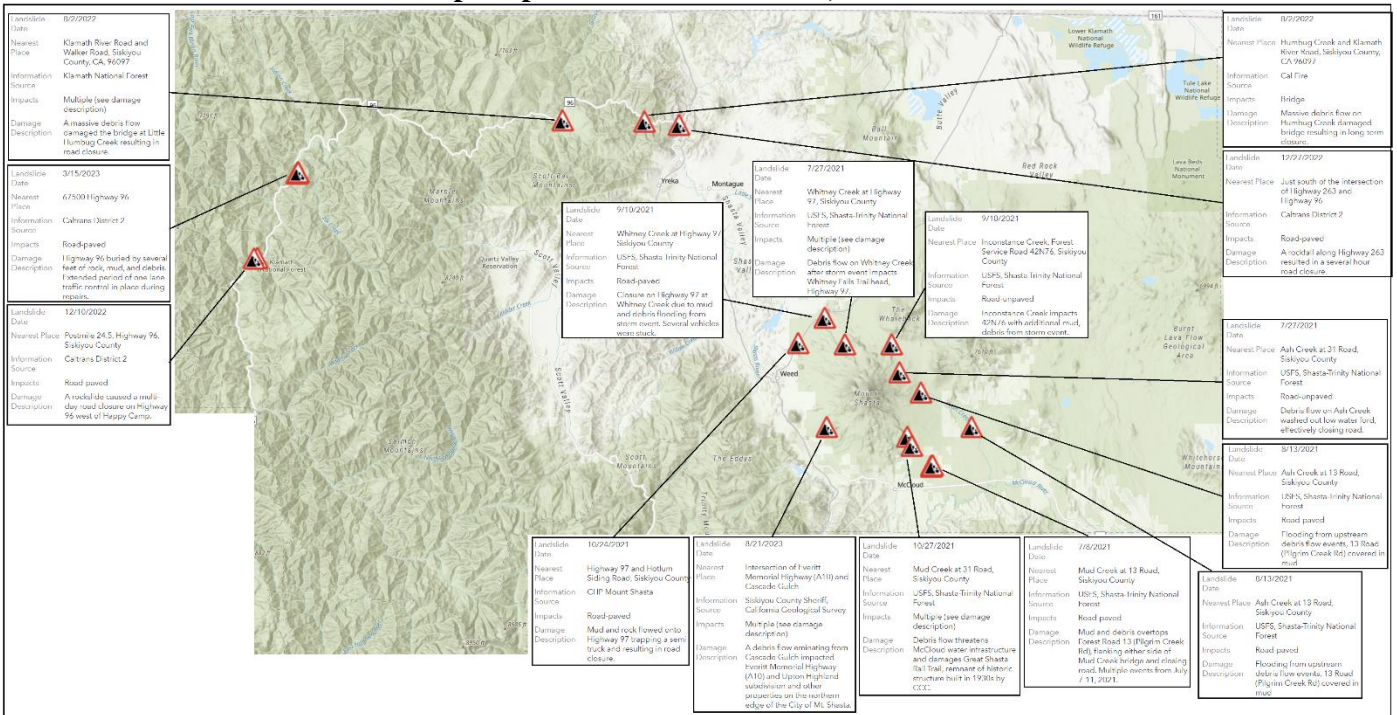
:- Not reported

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to landslides.

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. Siskiyou County has experienced no proclamations of a State of Emergency related to landslides.

The following map, from the California Department of Conservation, details the location and impacts of recent reported landslide events in Siskiyou County from 2021 to 2024:

Map: Reported Landslide Events, 2021 - 2024



Source: California Department of Conservation

Events of note include:

- **April 30, 2024:** An avalanche at 13,000 feet on Mount Shasta resulted in the rescue of two climbers/skiers.
- **August 2023:** Heavy rain caused debris flows that resulted in substantial damage and unparalleled ecological destruction across the Shasta and Klamath watershed, ultimately impacting the river, tributaries, and Mount Shasta's alluvial plain. Mudslides damaged roads in the area of several fires burning this summer in the western part of the county along the Highway 96 and Klamath River corridor
- **January 11, 2023:** State Route 96 was closed roughly four miles west of Happy Camp due to a slide.
- **February 3, 2021:** An avalanche near Etna Summit buried two skiers, killing one of them.
- **December 13, 2022:** A portion of State Route 96 was covered by an active rockslide near Happy Camp.

- **December 25, 2019:** A landslide impacted a stretch of State Route 96, resulting in intermittent road closure. Boulders and other debris were spotted rolling down the hill next to the highway about four miles west of Happy Camp.

5.13.4 Probability of Future Events

Predicting the probability of landslide occurrence is tremendously challenging due to the large number of factors involved. Based on available data from the California Geological Survey, Siskiyou County has had 15 reported landslide events from 2021 – 2024, equating to an average of four events per year. However, it is important to note that many landslides go unreported, and thus the number of actual events is likely higher.

The Mount Shasta Avalanche Center reported 22 avalanches for the 2023 -2024 season, with no data available for earlier seasons. This equates to an average of 22 events per year. However, it is important to note that many avalanches go unreported, and thus the number of actual events is likely higher.

5.13.5 Projected Changes in Location, Intensity, Frequency, and Duration

Climate change is expected to significantly influence the occurrence and intensity of landslides. One of the primary drivers of landslides is water saturation, particularly during or after intense rainfall. Climate change is expected to lead to more extreme weather events and including heavy rainstorms, which can trigger both shallow and deep-seated landslides. Increased rainfall, especially over short periods, can saturate soil, reduce slope stability, and increase landslide susceptibility. As precipitation patterns become more erratic, flash floods can also trigger debris flows or rapid shallow landslides, particularly in areas with steep terrain or previous wildfire scars.

Warmer temperatures can cause snow to melt faster in mountainous regions. Rapid snowmelt saturates the soil quickly, increasing the risk of landslides. This effect is often observed during springtime when large volumes of melting snow combine with rain. As temperatures rise and precipitation patterns shift, some areas may experience changes in vegetation cover. In regions where vegetation cover decreases, slopes become less stable, increasing landslide risk.

Climate change has contributed to longer and more intense wildfire seasons. Wildfires remove vegetation that stabilizes slopes and helps absorb rainwater. Without this vegetation, the exposed soil is more prone to erosion and landslides, particularly during subsequent heavy rainfalls. Burned areas are especially vulnerable to debris flows and landslides for several years after a fire, as the land recovers and vegetation regrows. The loose, ashy soil in these areas is highly unstable when exposed to rain.

5.13.6 Vulnerability and Impact

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from landslides. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Landslide Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Frequency (per year)
Siskiyou County	All	Relatively Moderate	92.1	0.1
Dorris	06093000200	Relatively Moderate	87.3	0
Dunsmuir	06093001100	Relatively High	98.2	0
Etna	06093000800	Relatively High	96.0	0
Fort Jones	06093000701	Relatively High	96.3	0
Happy Camp CSD	06093001300	Relatively High	98.6	0
Lake Shastina CSD	06093000902	Relatively High	96.3	0

Table : Participating Jurisdiction Landslide Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Frequency (per year)
McCloud CSD	06093001200	Relatively High	98.8	0
Montague	06093000300	Relatively High	97.1	0
Mt. Shasta	06093001003	Relatively Moderate	83.8	0
Tulelake	06093000100	Relatively Low	66.0	0
Weed	06093000901	Relatively High	99.0	0
Yreka	06093000703	Relatively Low	45.6	0

Source: FEMA NRI

Table : Participating Jurisdiction Landslide Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Landslide EAL
Siskiyou County	All	Relatively Moderate	88.7	\$147,000
Dorris	06093000200	Relatively Moderate	81.4	\$2,600
Dunsmuir	06093001100	Relatively High	97.6	\$13,000
Etna	06093000800	Relatively High	95.3	\$7,900
Fort Jones	06093000701	Relatively High	96.1	\$9,000
Happy Camp CSD	06093001300	Relatively High	98.1	\$15,000
Lake Shastina CSD	06093000902	Relatively High	96.7	\$10,000
McCloud CSD	06093001200	Relatively High	98.9	\$26,000
Montague	06093000300	Relatively High	96.5	\$9,700
Mt. Shasta	06093001003	Relatively Moderate	83.7	\$3,000
Tulelake	06093000100	Relatively Low	59.9	\$686
Weed	06093000901	Relatively High	98.6	\$21,000
Yreka	06093000703	Relatively Low	44.5	\$89

Source: FEMA NRI

Table : Participating Jurisdiction Avalanche Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Frequency (per year)
Siskiyou County	All	Very Low	10.1	0
Dorris	06093000200	Very Low	9.8	0
Dunsmuir	06093001100	Very Low	12.0	0
Etna	06093000800	Very Low	8.3	0
Fort Jones	06093000701	Very Low	6.6	0
Happy Camp CSD	06093001300	Very Low	13.7	0
Lake Shastina CSD	06093000902	Very Low	4.7	0
McCloud CSD	06093001200	Very Low	4.7	0
Montague	06093000300	Very Low	11.0	0
Mt. Shasta	06093001003	Very Low	9.7	0
Tulelake	06093000100	Not Applicable	0	0
Weed	06093000901	Very Low	19.0	0
Yreka	06093000703	Not Applicable	0	0

Source: FEMA NRI

Table : Participating Jurisdiction Avalanche Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Avalanche EAL
Siskiyou County	All	Very Low	12.0	\$37,000
Dorris	06093000200	Very Low	11.0	\$37,000

Table : Participating Jurisdiction Avalanche Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Avalanche EAL
Dunsmuir	06093001100	Very Low	11.0	\$37,000
Etna	06093000800	Very Low	11.0	\$37,000
Fort Jones	06093000701	Very Low	11.0	\$37,000
Happy Camp CSD	06093001300	Very Low	11.0	\$37,000
Lake Shastina CSD	06093000902	Not Applicable	0	\$0
McCloud CSD	06093001200	Very Low	11.0	\$37,000
Montague	06093000300	Very Low	11.0	\$37,000
Mt. Shasta	06093001003	Very Low	11.0	\$37,000
Tulelake	06093000100	Not Applicable	0	\$0
Weed	06093000901	Very Low	11.0	\$37,000
Yreka	06093000703	Not Applicable	0	\$0

Source: FEMA NRI

Population

Although major landslides occur infrequently in Siskiyou County, a large landslide could have profound impacts on people, affecting their physical, emotional, and social well-being. The impacts can be broken down into the following categories:

- **Physical Impact:** Landslides can cause injuries and deaths, usually caused by falling debris striking a structure or vehicle. The extent of these injuries depends on the size of the landslide, building standards, and preparedness in the affected area. Access to Medical Services: Impacted persons may be cut off from medical care access due to road damage.
- **Emotional and Psychological Impact:** Survivors often experience psychological stress, anxiety, and trauma from the sudden and unpredictable nature of landslides can cause long-lasting fear, especially in areas where movement can continue for days or weeks.
- **Social and Economic Impact:** Economic losses can be devastating, especially for people whose businesses, jobs, or properties are destroyed or cut off due to road closures. The destruction of infrastructure such as transportation and utilities (electricity, water, gas) can disrupt daily life for extended periods.

Landslides may disproportionately affect socially vulnerable populations, exacerbating pre-existing inequalities and making recovery more difficult for these groups. Landslides may disproportionately impact these groups in the following ways:

- **Increased Risk of Injury and Death:** Many low-income communities are located in areas with higher landslide risk due to lower land prices. Vulnerable populations, especially in under-resourced areas, may live in buildings not built to modern safety standards, increasing their risk during seismic events.
- **Delayed or Inadequate Emergency Response:** Socially vulnerable populations may experience delayed access to rescue efforts, medical care, and emergency shelters due to geographic isolation, discrimination, or lack of resources like transportation. Rural, low-income, or marginalized communities may not receive the same level of emergency response as wealthier urban areas.
- **Economic Impact and Prolonged Recovery:** Landslides can disrupt working conditions, particularly for those in informal employment such as day laborers or small business owners. Socially vulnerable populations often lack savings or insurance to cushion the economic blow of losing their homes or jobs.

The loss of utility and communications services can also have a large impact on individuals. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values:

Table : Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	\$199
Loss of Wastewater Services	\$66
Loss of Water Services	\$138
Loss of Communications/Information Technology Services	\$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

To provide an estimate of the number of people living in potential landslide areas, GIS data concerning the number of identified structures with these areas and the average household size was utilized. An estimate of population was calculated by multiplying the number of structures by the Siskiyou County average household size of 2.24 persons from the U.S. Census Bureau. The following table provides an estimated population exposed to potential landslide areas for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Population Exposure to Potential Landslide Event

Jurisdiction	Structures in Potential Slide Area	Population in Potential Slide Area	Percent of Total Population
Siskiyou County	106	237	0.5%
Dorris	0	0	0%
Dunsmuir	12	27	1.4%
Etna	0	0	0%
Fort Jones	0	0	0%
Lake Shastina CSD	0	0	0%
Montague	0	0	0%
Mt. Shasta	0	0	0%
Tulelake	0	0	0%
Weed	0	0	0%
Yreka	0	0	0%

Source: Siskiyou County and U.S. Census Bureau

Buildings and Structures

Buildings and structures can be damaged during landslides due to the intense ground movement. The severity of the damage depends on factors such as the size, distance from the landslide, local soil conditions, and the building's design, materials, and age. Soil movement can cause rigid components such as walls, beams, and foundations can crack or split. In severe cases, load-bearing walls may fail, leading to partial or complete building collapse. The vertical supports (columns) and horizontal supports (beams) may fail due to excessive forces, leading to the collapse of floors or entire sections of buildings.

Of particular concern to all jurisdictions are unreinforced masonry buildings. An unreinforced masonry building is constructed of brick or masonry with no steel reinforcing bars. Because these buildings were not built using modern building codes, they are much more likely to experience damage or collapse during a landslide. As of this plan, no survey has been conducted to determine the number of unreinforced masonry buildings in Siskiyou County or participating jurisdictions.

To provide an estimate of the number of structures in potential landslide areas, GIS data concerning the structures and the median value was utilized. An estimate of the value of structures was determined using the Siskiyou County median household value of \$231,100 from the U.S. Census Bureau. The following table provides an estimated structures exposed to flooding for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Structural Exposure to Potential Landslide Events

Jurisdiction	Structures in Potential Slide Area	Structure Valuation
Siskiyou County	106	\$24,496,600
Dorris	0	0
Dunsmuir	12	\$2,773,200
Etna	0	0
Fort Jones	0	0
Lake Shastina CSD	0	0
Montague	0	0
Mt. Shasta	0	0
Tulelake	0	0
Weed	0	0
Yreka	0	0

Source: Siskiyou County and U.S. Census Bureau

Governmental Operations

Large scale impacts would not be expected on continued government operations, aside from transportation system disruptions impacting commutes to facilities.

Transportation and Electrical Infrastructure

Landslides can have numerous impacts on both transportation and electrical distribution systems. The impacts of landslides on transportation systems may include:

- **Roads and Highways:** Landslides can cause cracking, buckling, and collapse of roads, highways, and bridges. In severe cases, transportation networks are cut off, hindering emergency response, evacuation, and the transportation of goods.
- **Bridges and Tunnels:** Bridges are especially vulnerable to collapse during landslides due to the extreme forces exerted on their structures. Older bridges not built to modern codes are at higher risk of failure. Tunnels can also collapse or become blocked by debris, cutting off access to critical routes.
- **Railways:** Rail systems can be severely impacted by landslides, as tracks may buckle or become misaligned, leading to derailments.

A landslide can impact both the electrical generation capacity and transmission. The impacts of a landslide on electrical systems may include:

- **Power Plants:** Landslides can damage power generation facilities causing a cessation of services and costly repairs.
- **Transmission Lines:** Power transmission lines and substations can be damaged by extensive soil movement. This can result in prolonged power outages, which disrupt communication, emergency services, and basic living conditions.
- **Grid Instability:** Damage to power infrastructure can lead to cascading failures within the electrical grid. Substations, transformers, and electrical distribution networks can be knocked offline.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

Water and wastewater utilities are vulnerable to landslide events due to the potential for plant damages and distribution system damages. Impacts may include:

- **Water Supply:** Landslides can rupture water pipes and damage water treatment facilities, leading to water shortages or contamination. In many cases, people are left without clean drinking water, and authorities must rely on temporary solutions like bottled water or emergency water delivery.
- **Wastewater Systems:** Sewer lines and wastewater treatment plants are particularly vulnerable to ground movement. Ruptured sewer lines can lead to sewage leaks, contaminating groundwater and local water sources. Damage to wastewater treatment plants can lead to untreated sewage being released into waterways, causing public health hazards.

Mapping and details concerning operators of water and wastewater utility providers may be found in Section 5.9.6.

Medical, Education, and Response Facilities

A landslide could significantly disrupt medical, education, and response facilities and operations at various levels. These impacts are especially pronounced in the immediate aftermath, where response efforts, infrastructure damage, and communication breakdowns can severely hamper functions. Impacts may include:

- **Damage to Facility:** Landslides can damage or destroy facilities, causing a significant drop or cessation of services.
- **Response Disruptions:** Emergency response, including search and rescue operations and medical assistance may be severely impacted due to the road closures.
- **Communication Breakdowns:** Landslides can damage communication networks, including internet and phone services, preventing effective communication and hindering the dissemination of critical information.
- **Budget Strains:** The cost of responding to and recovering from a landslide can put significant pressure on budgets.

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Section 3: Valuation Data.

Communication Systems

No comprehensive mapping of communications systems was available for review to compare against known landslide hazard areas. However, it is assumed that communications lines and towers are in known hazard areas. Landslides can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Damage to Infrastructure:** Soil movement can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- **Power Outages:** Soil movement can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.
- **Structural Instability:** Soil movement can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Landslides in Siskiyou County are anticipated to have a limited impact on the agricultural community. However, a disruption in transportation networks could hamper the ability to transport commodities in a timely manner.

Although difficult to quantify, the potential environmental impacts can include habitat damage and degradation of water quality from an influx of soils or debris.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with earthquakes may include:

- Fires from various causes, including downed power lines and broken gas pipelines
- Infrastructure failure
- Dam failure
- Power outages
- Hazardous materials release

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Landslide Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Landslides may cause injury or death to people from vehicle accidents, falling objects, or structural failure. Ground movement may result in broken service lines or pipelines, triggering the release of hazardous materials or waste materials.
Impact on Responders	The extent of the damage to infrastructure such as roads and bridges and communications can greatly impact first responders’ ability to access or transport victims. Equipment, facilities, or other assets may be damaged and restrict first responders’ capacity to respond to calls for assistance.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Landslides could potentially impact critical infrastructure resulting in power outages, access to roadways or public transportation, damage to facilities or infrastructure, including alternate locations.
Delivery of Services	Delivery of services may be impacted by dangerous transportation conditions, causing food, water, and resource systems to be delayed or halted.
Property, Facilities, and Infrastructure	Unreinforced masonry structures are inherently vulnerable to external forces. All critical facilities and transportation corridors and pipelines can be impacted. Ground movement can lead to the collapse of buildings and bridges, and disrupt utility services.
Impact on Environment	Landslides have the potential to trigger secondary hazards such as fire, hazardous material release, or dam failures. These secondary hazards can destroy habitats and environments, cause significant injury to animals or livestock, or contaminate certain components of the environment.
Economic Conditions	Landslides pose a fiscal impact on the local and county governments, even if some of those costs can be recouped through federal grant reimbursements. Local, county, and state resources may be drained by response and recovery efforts. Additionally, a severe landslide would affect the ability of businesses to maintain operations. If the private sector is not able to re-establish operations this would also impact the local economy.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence. If local government takes a long time to begin

Table : Landslide Consequence Analysis

Subject	Potential Impacts
	recovery operations, or for the public to see recovery operations, this will have a negative impact on the public’s confidence in governance.

5.13.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the landslide hazard.

Table : Example Landslide Mitigation Actions

Category	Example Action
Planning and Regulation	Use GIS to identify and map landslide hazard areas.
	Develop and maintain a database to track community vulnerability to landslides.
	Locate utilities and critical facilities outside of areas susceptible to slides to decrease the risk of service disruption.
	Develop and implement a landslide management plan.
Infrastructure	Prevent landslides with proper bank stabilization, sloping or grading techniques, planting vegetation on slopes, terracing hillsides, or installing riprap boulders or geotextile fabric.
	Use bioengineered bank stabilization techniques.
Natural Systems	Plant native vegetation on slopes to enhance stability.
	Stabilize cliffs with terracing or plantings of grasses or other plants to hold soil together.
Education	Notify property owners located in high-risk areas.
	Offer GIS hazard mapping online for residents and design professionals
	Disclose the location of high-risk areas to buyers.

5.14 Severe Weather

5.14.1 Hazard Description

Severe weather comprises the hazardous and damaging weather effects often found in violent storm fronts and severe winter storms. They can occur together or separate, they are common and usually not hazardous, but on occasion they can pose a threat to life and property.

This plan defines severe weather as a combination of the following as defined by the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service (NWS):



- **Hail:** Precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud.
- **Lightning:** A visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground or between the ground and a cloud.
- **Thunderstorm Winds:** The same classification as high or strong winds but accompanies a thunderstorm. It is also referred to as a straight-line wind to differentiate from rotating or tornado associated wind. Additionally, these winds can rapidly create dust storms that severely impact visibility.

Severe weather has been so consistent throughout modern history that much of the vulnerability is mitigated. However, this section is not concerned with everyday wind, lightning, or mild precipitation. This section is concerned with common storm elements when they behave such that they pose a threat to property and life.

Severe winter weather encompasses multiple effects caused by winter storms and conditions. Included are strong winds, ice storms, heavy or prolonged snow, sleet, and extreme temperatures. Winter storms can be increasingly hazardous in areas and regions that only see winter storms intermittently.

This plan defines severe winter weather as a combination of the following effects as defined by NOAA and the NWS.

- **Ice Storm:** An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication, and can make travel extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater.
- **Heavy Snow:** This generally means snowfall accumulating to 4" or more in depth in 12 hours or less; or snowfall accumulating to 6" or more in depth in 24 hours or less.
- **Winter Storm:** Hazardous winter weather in the form of heavy snow, freezing rain, or heavy sleet. It may also include extremely low temperatures and increased wind.
- **Cold Wave/Extreme Cold:** As described by NWS, a cold wave is a rapid fall in temperature within a 24-hour period requiring substantially increased protection to agriculture, industry, commerce, and social activities. As evidenced by past incidents across the U.S., extreme cold can cause impact to human life and property.

5.14.2 – Location and Extent

Severe weather can rapidly descend on an area, but in many cases is predictable. Most weather forecasts focus on changing conditions that may lead to the onset of severe storms. All of Siskiyou County is susceptible to severe weather in the form of thunderstorm events, but occurrence is infrequent.

The NWS classifies thunderstorms, often the generator of hail, lightning and high winds, using the following categories.

- **Marginal:** Isolated severe weather, limited in duration and/or coverage and/or intensity
- **Slight:** Scattered severe storms possible, short-lived and/or not widespread, isolated intense storms possible

- **Enhanced:** Numerous severe storms possible, more persistent and/or widespread, a few intense
- **Moderate:** Widespread severe storms likely, long-lived, widespread and intense
- **High:** Widespread severe storms expected, long-lived, very widespread and particularly intense

In the United States, hail causes billions of dollars in damage to property each year. Vehicles, roofs of buildings and homes, and landscaping are most commonly damaged by hail. Hail has been known to cause injury and the occasional fatality to humans, often associated with traffic accidents.

Based on information provided by the National Weather Service concerning size, the following table describes potential damage impacts of the various sizes of hail.

Table : Hail Size Comparison and Damage Descriptions

Diameter (inches)	Size Description	Potential Damage Impacts
1/4	Pea Size	No damage
1/2	Mothball, peanut, USB Plug	Slight damage to vegetation
3/4	Penny Size	Increased damage to crops and vegetation
7/8	Nickel Size	Severe damage to crops and vegetation, damage begins to glass and plastic
1	Quarter Size	Increased glass damage, damage begins to bodies of vehicles
1 1/4	Half Dollar Size	Large scale glass damage, begin roof damage, risk of injury to exposed persons
1 1/2	Ping Pong Ball Size	Large scale glass damage, begin roof damage, increased risk of injury to exposed persons
1 3/4	Golf Ball Size	Severe roof damage, risk of serious injuries to exposed persons
2	Lime or Medium Sized Hen Egg	Potential structural damage, risk of very severe injuries to exposed persons
2 1/2	Tennis Ball Size	Extensive structural damage, risk of very severe injuries or death to exposed persons

Source: National Weather Service

A recent report by the Insurance Information Institute says lightning strikes caused \$1,300,000,000 in damage across the United States in 2021. There is currently no scale to indicate the severity of a lightning strike, but data from NOAA indicates that there approximately 25,000,000 cloud-to-ground lightning strikes per year in the United States.

To measure wind speed and its correlating potential for damage, experts use the Beaufort scale as shown below.

Table : Beaufort Scale

Beaufort Number	Wind Speed (mph)	Effects on Land
0	Under 1	Calm, smoke rises vertically
1	1-3	Smoke drift indicates wind direction, vanes do not move
2	4-7	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Leaves, small twigs in constant motion. Light flags extended.
4	13-18	Dust, leaves and loose paper raised up; small branches move
5	19-24	Small trees begin to sway
6	25-31	Large branches of trees in motion, whistling heard in wires
7	32-38	While trees in motion, resistance felt in walking against the wind
8	39-46	Twigs and small branches broken off trees
9	47-54	Slight structural damage occurs, slate blown from roofs
10	55-63	Seldom experienced on land, trees broken, structural damage occurs

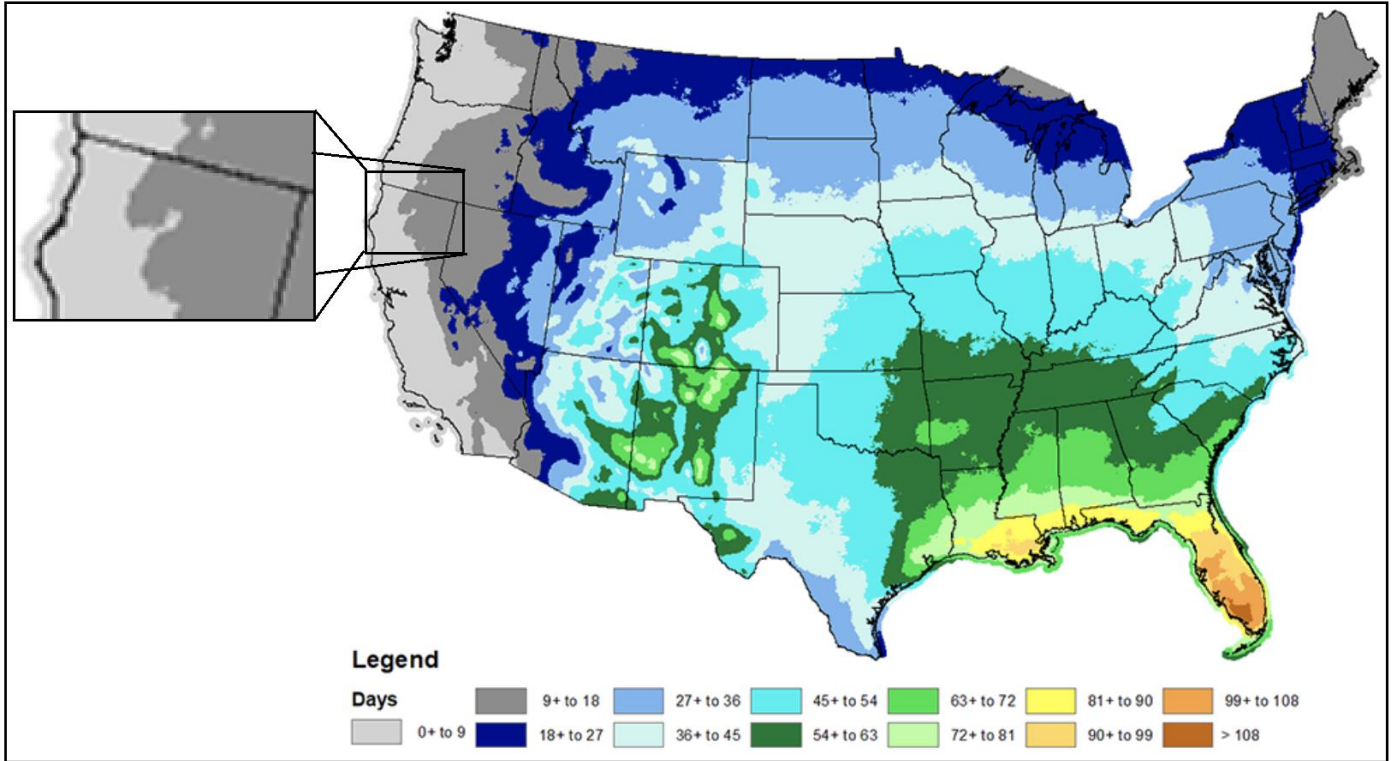
Table : Beaufort Scale

Beaufort Number	Wind Speed (mph)	Effects on Land
11	64-72	Very rarely experienced on land, usually with widespread damage
12	73 or higher	Violence and destruction

Source: NOAA

The infrequent nature of thunderstorms makes hail, lightning, and high wind a relatively uncommon occurrence for Siskiyou County. The following map, from NOAA, indicates annual mean thunderstorm days from 1993 to 2018.

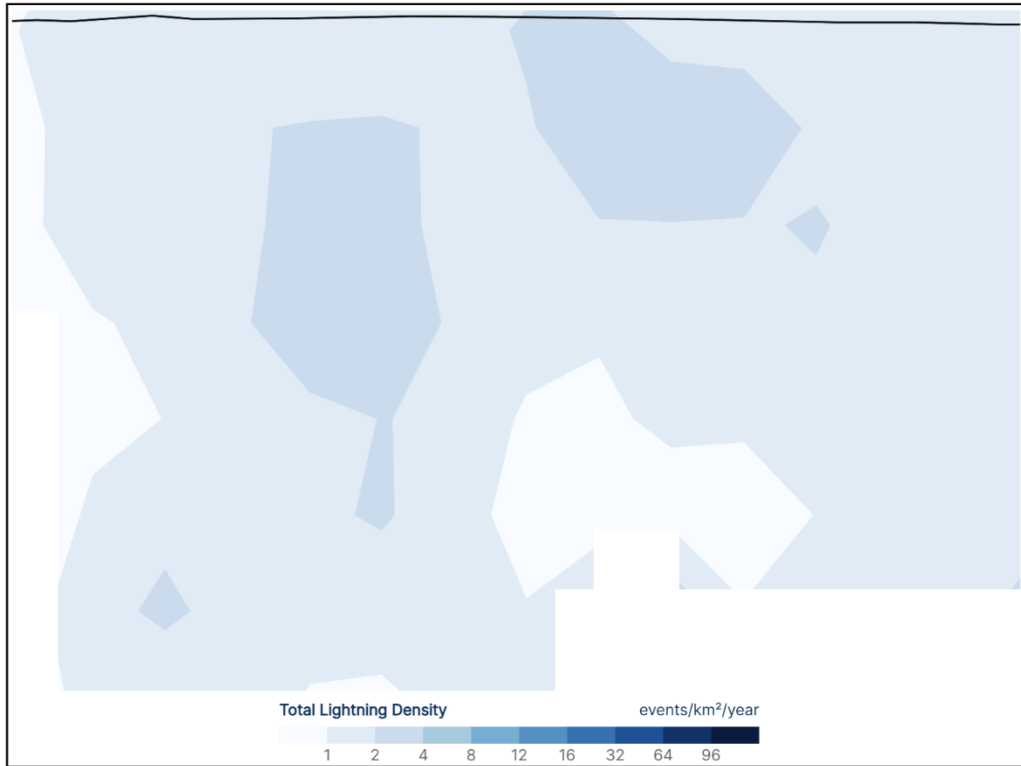
Map : Annual Mean Thunderstorm Days, 1993-2018



Source: NOAA

The following map, from Vaisala, indicates the average annual light events per square kilometer per year for Siskiyou County:

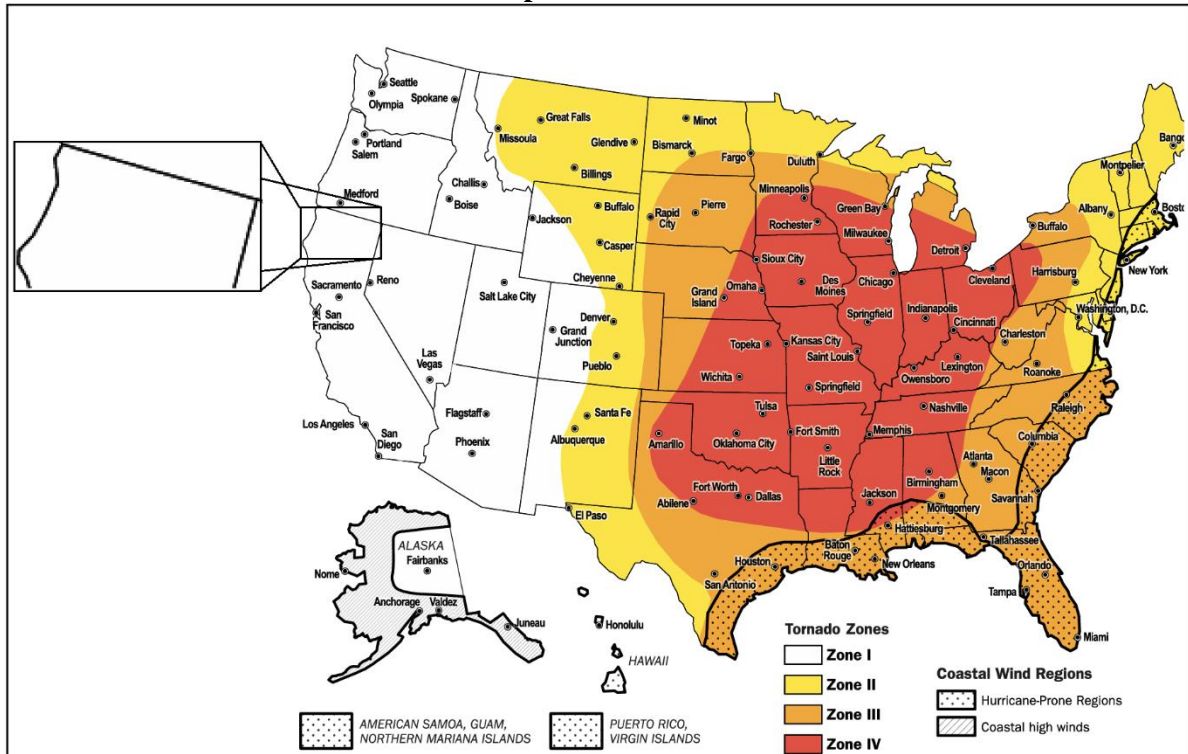
Map : Average Annual Lightning Events per Square Kilometer per Year, 2016 - 2023



Source: Vaisala

The following maps from FEMA indicate the highest possible expected wind speeds for Siskiyou County.

Map : Wind Zones



Source: FEMA

Severe winter weather occurs regularly throughout Siskiyou County. These events occur on a large geographic scale, often affecting multiple counties, regions, and states. Winter storms typically form with some warning and are often anticipated. Like other large storm fronts, the severity of a storm is not as easily predicted due to myriad factors that can influence its impact. Although meteorologists estimate the amount of snowfall a winter storm will drop, it is not known exactly how much snow will fall, whether or not it will form an ice storm, or how powerful the winds will be until the storm is already affecting a community.

The Northeast Snowfall Impact Scale is a scale used to assess and rank the impact of snowfall events in the northeastern United States, but allows for an idea of intensity for Siskiyou County. It was developed by NOAA to provide a standardized way of measuring the societal and economic impacts of snowstorms. The scale takes into account factors such as snowfall amount, population density, and the area affected by the storm to determine its impact. The scale has five categories, each with its own associated impacts:

Table : Snowfall Impact Scale

Category	Description	Impacts
1	Notable	Light to moderate snowfall. Limited impacts on transportation and daily life. Typically localized to small areas.
2	Significant	Moderate to heavy snowfall. Widespread impacts on transportation, including delays and disruptions. Some school and business closures. Widespread power outages are rare.
3	Major	Heavy snowfall, often exceeding one foot or more. Significant transportation disruptions, including major highway closures. Widespread school and business closures. Power outages may occur, especially in areas with wet, heavy snow.
4	Crippling	Extreme snowfall, often exceeding two feet or more. Severe and prolonged transportation disruptions, including highway closures. Widespread school and business closures for an extended period. Widespread and prolonged power outages, especially in areas with ice accumulation.
5	Extreme	Exceptional snowfall, often exceeding three feet or more. Complete paralysis of transportation systems, including major highways and airports. Extended school and business closures. Widespread and prolonged power outages with significant damage to the electrical infrastructure.

Source: NOAA

The scale provides information for emergency management, public safety agencies, and the public to understand the potential impacts of a snowstorm and to prepare accordingly. It helps to quantify and communicate the severity of winter weather events, especially where snowfall can have a major impact on daily life and the economy.

Ice storms are characterized by the accumulation of freezing rain or freezing drizzle, which coats surfaces with a layer of ice. These storms can have significant impacts on transportation, infrastructure, and the environment. Ice storms occur when there's a layer of warm air above a layer of cold air near the surface. Precipitation falls as rain in the warm layer and then freezes upon contact with surfaces at or below freezing temperatures in the cold layer. The most common type of precipitation during an ice storm is freezing rain. This is rain that falls as a liquid but freezes upon contact with cold surfaces, forming a layer of ice.

The Sperry–Piltz Ice Accumulation Index is an ice accumulation and ice damage prediction index that, when combined with NWS data, predicts the projected footprint, total ice accumulation, and resulting potential damage from approaching ice storms.

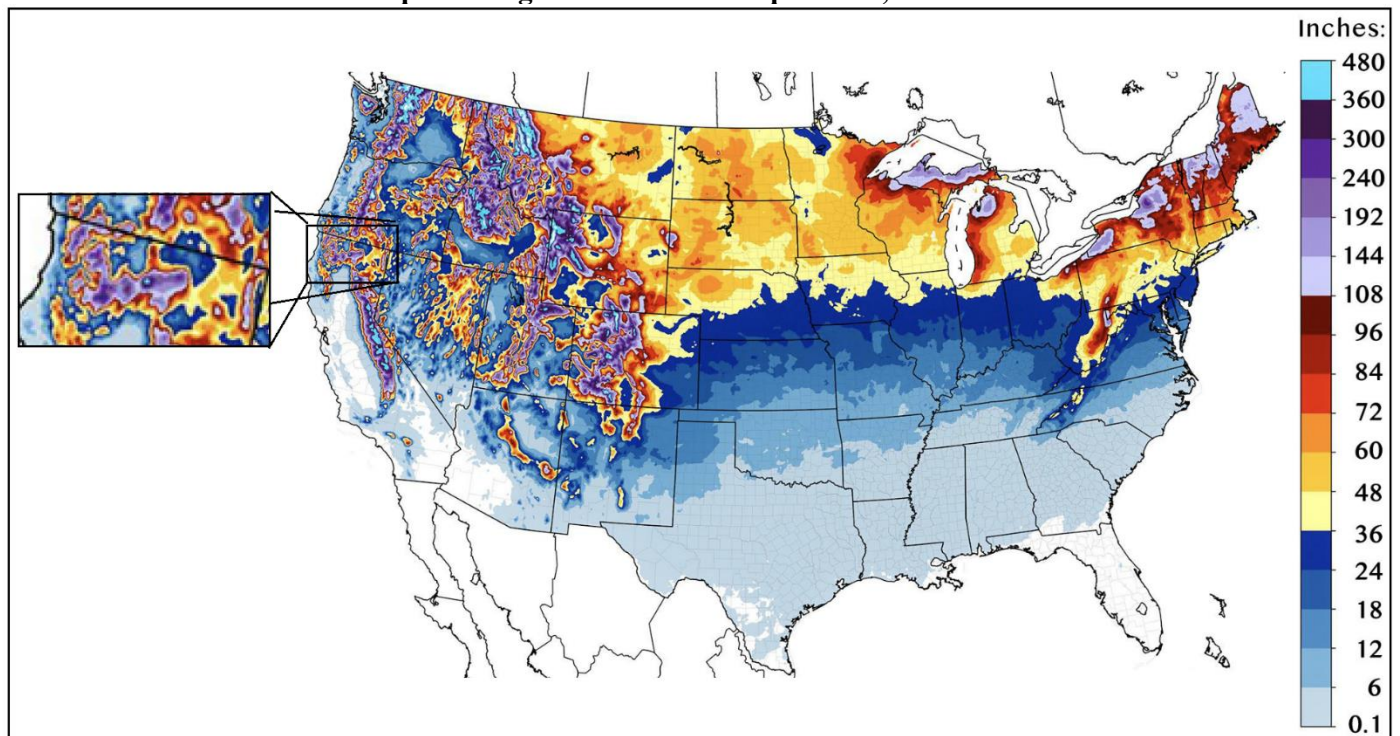
Figure : Sperry–Piltz Ice Accumulation Index

ICE DAMAGE INDEX	DAMAGE AND IMPACT DESCRIPTIONS
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
4	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

Source: Sperry–Piltz Ice Accumulation Index

The following map from the NOAA National Operational Hydrologic Remote Sensing Center indicates the average annual snowfall for Siskiyou County from 2010 - 2019:

Map : Average Annual Snowfall per Year, 2010 - 2019



Source: NOAA National Operational Hydrologic Remote Sensing Center

5.14.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced 11 Presidential Disaster Declarations related to severe weather and severe winter weather events reflected in the following table:

Table : Siskiyou County Presidentially Declared Disasters

Designation	Declaration Date	Incident Type	Individual and Public Assistance	Mitigation Dollars Obligated
DR-4570-CA	11/21/2023	Hurricanes (Tropical Storm Hilary)	\$5,891,570	\$72,286
DR-4683-CA	1/14/2023	Severe Winter Storms, Flooding, Landslides, and Mudslides	\$152,481,240	\$11,290,426
DR-4308-CA	4/1/2017	Severe Winter Storms, Flooding, Mudslides	\$427,999,655	\$15,012,050
DR-4301-CA	2/14/2017	Severe Winter Storms, Flooding, and Mudslides	\$130,483,948	\$22,708,200
DR-1884-CA	3/8/2010	Severe Winter Storms, Flooding, and Debris and Mud Flows	\$28,353,445	
DR-1628-CA	2/3/2006	Severe Storms, Flooding, Mudslides, and Landslides	\$163,229,337	
DR-1155-CA	1/4/1997	Severe Storms, Flooding	-	-
DR-1046-CA	3/12/1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	-	-
DR-979-CA	2/3/1993	California Severe Storm, Winter Storm, Mud and Landslides, Flooding	-	-
DR-412-CA	1/25/1974	California Severe Storms, Flooding	-	-
DR-283-CA	2/16/1970	California Severe Storms, Flooding	-	-

Source: FEMA

-: Not reported

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to severe weather or severe winter weather events.

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. The following table details severe weather and severe winter weather event proclamations for Siskiyou County:

Table : Siskiyou County California Proclamations of State of Emergency

Designation	Declaration Date	Incident Type	Damages*
2023-09	09/12/2023	Tropical Storm Hilary	-
2023-01	01/04/2023	Winter Storm	\$1,234,636,773
2017-03	03/07/2017	Severe Storms	\$1,038,319,506
2017-01	01/23/2017	Severe Storms	\$186,874,243
2007-02	01/12/2007	Freeze	\$2,700,400
97-01	01/02/1997	Winter Storm	-

Table : Siskiyou County California Proclamations of State of Emergency

Designation	Declaration Date	Incident Type	Damages*
-	04/17/1972	Freeze	\$111,517,260

Source: Cal OES

*: Damages reported for all impacted counties, tribal reservations, and cities

-: Not reported

Additionally, the following table presents NCEI identifies severe weather and severe winter weather events and the resulting damage totals in Siskiyou County from 1950 to 2024:

Table : NCEI Siskiyou County Severe Weather Events

County	Event Type	Number of Days with Events	Property Damage	Deaths and Injuries
Siskiyou	Hail	20	\$300,000 (crop)	0
	Lightning	2	\$0	1
	Thunderstorm Winds	16	\$200,000	0
	Blizzard	9	\$0	0
	Extreme Cold	29	\$0	0
	Ice Storm	2	\$0	0

Source: NCEI

It is worth noting that damage estimates indicated by the NCEI are often artificially low. This underreporting is a result of the way the events are reported to the NCEI, often by the local and/or NWS office. When reporting an event, the NWS office does not have access to the actual damage assessment resulting from that event. As such, the report often details a very low amount or zero-dollar amount for damages. Additionally, deaths and injuries may be underreported as they may be a result of a concurrent event, such as a person driving unsafely during heavy rain and passing away.

Recent notable events include:

- **March 10, 2023:** A major winter storm led to the closure of Interstate 5 in Yreka.
- **February 24, 2023:** A major winter storm led to the closure of Interstate 5 from Ashland to the Oregon border. Some areas received over three feet of snow, closing other parts of the interstate near Weed. Mount Shasta, Weed and Dunsmuir saw up to 24 to 36 inches in some areas
- **July 23, 2003:** A thunderstorm developed over the Scott Valley around this time. While radar reports did not indicate that this storm was severe, a wet microburst propagated from it, bringing estimated 80+ mph winds to the area near the Greenview airport. A subsequent NWS Storm Survey discovered damaged structures and trees, the largest of which were compromised by wood rot. Greenview airport recorded a peak gust of 54 mph with the event. Interviews with residents yielded numerous reports of golf ball sized hail and hourly rainfall totals exceeding 1.50 inches. No spotter reports were reported to Medford during this event, and no warning was issued.
- **May 23, 2018:** A man working in a bucket truck was struck by lightning on this day. He was around 20 feet above the ground next to a 45-foot-tall tree when the tree was struck. The lightning arced from the tree and hit him in the head and shoulder area. He was severely injured but survived.

5.14.4 Probability of Future Events

Predicting the probability of severe weather occurrences is tremendously changing due to the large number of factors involved and the random nature of formation. Data and mapping from NOAA indicate that Siskiyou County can expect between 0 - 18 severe weather events per year. Additionally, Siskiyou County can expect, depending on location within the county, 18” – 240” of snow per year.

Based on historical occurrences, Siskiyou County will continue to experience severe weather events on an annual basis. The following tables, using data from the NCEI, indicate the yearly probability of a severe weather component events, the number of deaths or injuries, and estimated property damage :

Table : Siskiyou County NCEI Severe Weather Event Probability Summary

Event	Days with Event	Average Events per Year	Deaths / Injuries	Average Deaths / Injuries per Year	Property Damage	Average Property Damage per Year
Hail	20	<1	0	0	\$300,000 (crop)	\$2,500
Lightning	2	<1	1	<1	\$0	\$4,000
Thunderstorm Winds	16	<1	0	0	\$200,000	\$2,667
Blizzard	9	<1	0	0	\$0	\$0
Extreme Cold	29	<1	0	0	\$0	\$0
Ice Storm	2	<1	0	0	\$0	\$0

Source: NCEI

5.14.5 Projected Changes in Location, Intensity, Frequency, and Duration

Climate change can have several impacts on severe weather, although the precise details can vary depending on regional climate patterns and other factors. In general, it is believed that climate change can alter the timing and seasonality of Severe Weather. In some cases, this may mean more severe weather events occurring earlier or later in the year.

Climate change can lead to increased temperatures and moisture levels in the atmosphere, which can provide favorable conditions for the development of severe weather. This can result in a higher frequency of severe weather events and an increase in their intensity. As a result of increased temperatures, warmer air can hold more moisture, leading to increased rainfall during severe weather. This can elevate the risk of flash flooding, particularly in areas prone to heavy precipitation. Changes in atmospheric circulation patterns associated with climate change can lead to stronger winds within thunderstorms. This can result in more powerful wind gusts, increasing the risk of wind damage and downed trees and power lines.

Climate change can influence the conditions necessary for hail formation. Warmer temperatures at the surface and greater instability in the atmosphere can contribute to larger and more damaging hailstones. Additionally, changes in atmospheric conditions can affect the frequency and distribution of lightning strikes. More lightning can increase the risk of wildfires in dry regions.

It is important to note that while there is evidence linking climate change to changes in weather patterns that can influence severe weather, predicting specific events remains changing. Climate models provide valuable insights into long-term trends, but individual severe weather events are influenced by a complex interplay of factors.

5.14.6 Vulnerability and Impact

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from severe weather. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Hail Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Very Low	3.9	0.1
Dorris	06093000200	Very Low	32.3	0.1
Dunsmuir	06093001100	Very Low	13.0	0.1
Etna	06093000800	Very Low	24.9	0.1
Fort Jones	06093000701	Very Low	24.6	0.2
Happy Camp CSD	06093001300	Very Low	17.7	0.1
Lake Shastina CSD	06093000902	Very Low	19.8	0.2
McCloud CSD	06093001200	Very Low	7.5	0.1
Montague	06093000300	Very Low	29.3	0.2
Mt. Shasta	06093001003	Very Low	15.8	0.1
Tulelake	06093000100	Very Low	22.0	0.1
Weed	06093000901	Very Low	22.1	0.1
Yreka	06093000703	Very Low	19.3	0.2

Source: FEMA NRI

Table : Participating Jurisdiction Hail Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Hail EAL
Siskiyou County	All	Very Low	5.6	\$2,000
Dorris	06093000200	Very Low	29.6	\$283
Dunsmuir	06093001100	Very Low	11.3	\$51
Etna	06093000800	Very Low	24.9	\$189
Fort Jones	06093000701	Very Low	25.2	\$195
Happy Camp CSD	06093001300	Very Low	15.5	\$79
Lake Shastina CSD	06093000902	Very Low	21.5	\$141
McCloud CSD	06093001200	Very Low	8.2	\$35
Montague	06093000300	Very Low	28.6	\$258
Mt. Shasta	06093001003	Very Low	17.2	\$94
Tulelake	06093000100	Very Low	19.4	\$116
Weed	06093000901	Very Low	18.8	\$109
Yreka	06093000703	Very Low	18.2	\$103

Source: FEMA NRI

Table : Participating Jurisdiction Lightning Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Relatively Low	31.7	3.2
Dorris	06093000200	Relatively Low	31.3	3.9
Dunsmuir	06093001100	Relatively Low	26.8	2.8
Etna	06093000800	Relatively Low	39.2	3
Fort Jones	06093000701	Relatively Moderate	54.3	5.6
Happy Camp CSD	06093001300	Relatively Low	32.1	2.4
Lake Shastina CSD	06093000902	Relatively Low	27.6	2.9
McCloud CSD	06093001200	Very Low	13.5	3
Montague	06093000300	Relatively Low	47.2	3.8
Mt. Shasta	06093001003	Relatively Low	31.3	3.4
Tulelake	06093000100	Relatively Low	20.4	3
Weed	06093000901	Relatively Moderate	51.5	4.1
Yreka	06093000703	Relatively Moderate	52.8	5.2

Source: FEMA NRI

Table : Participating Jurisdiction Lightning Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Lightning EAL
Siskiyou County	All	Relatively Low	28.1	\$44,000
Dorris	06093000200	Relatively Low	24.6	\$1,800
Dunsmuir	06093001100	Relatively Low	22.2	\$1,500
Etna	06093000800	Relatively Low	35.4	\$3,100
Fort Jones	06093000701	Relatively Moderate	50.3	\$5,700
Happy Camp CSD	06093001300	Relatively Low	25.6	\$1,900
Lake Shastina CSD	06093000902	Relatively Low	28.1	\$2,200
McCloud CSD	06093001200	Very Low	14.0	\$723
Montague	06093000300	Relatively Low	41.4	\$4,100
Mt. Shasta	06093001003	Relatively Low	31.4	\$2,600
Tulelake	06093000100	Very Low	16.5	\$940
Weed	06093000901	Relatively Low	39.2	\$3,700
Yreka	06093000703	Relatively Moderate	45.8	\$4,800

Source: FEMA NRI

Table : Participating Jurisdiction Strong Wind Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Very Low	4.0	0
Dorris	06093000200	Very Low	18.7	0.1
Dunsmuir	06093001100	Very Low	9.8	0
Etna	06093000800	Very Low	19.9	0
Fort Jones	06093000701	Very Low	20.8	0.1
Happy Camp CSD	06093001300	Very Low	20.6	0.1
Lake Shastina CSD	06093000902	Very Low	17.8	0.1
McCloud CSD	06093001200	Very Low	10.4	0
Montague	06093000300	Very Low	22.4	0.1
Mt. Shasta	06093001003	Very Low	13.0	0
Tulelake	06093000100	Very Low	14.1	0
Weed	06093000901	Very Low	17.2	0
Yreka	06093000703	Very Low	19.7	0.1

Source: FEMA NRI

Table : Participating Jurisdiction Strong Wind Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Strong Wind EAL
Siskiyou County	All	Very Low	6.1	\$9,400
Dorris	06093000200	Very Low	18.0	\$565
Dunsmuir	06093001100	Very Low	9.4	\$196
Etna	06093000800	Very Low	20.4	\$848
Fort Jones	06093000701	Very Low	21.4	\$1,000
Happy Camp CSD	06093001300	Very Low	19.9	\$778
Lake Shastina CSD	06093000902	Very Low	19.6	\$730
McCloud CSD	06093001200	Very Low	12.3	\$279
Montague	06093000300	Very Low	22.1	\$1,200
Mt. Shasta	06093001003	Very Low	15.2	\$396
Tulelake	06093000100	Very Low	13.1	\$306

Table : Participating Jurisdiction Strong Wind Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Strong Wind EAL
Weed	06093000901	Very Low	15.8	\$423
Yreka	06093000703	Very Low	19.7	\$751

Source: FEMA NRI

Table : Participating Jurisdiction Cold Wave Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Relatively Low	55.2	0
Dorris	06093000200	Relatively High	95.6	0
Dunsmuir	06093001100	No Rating	0	0
Etna	06093000800	No Rating	0	0
Fort Jones	06093000701	No Rating	0	0
Happy Camp CSD	06093001300	No Rating	0	0
Lake Shastina CSD	06093000902	No Rating	0	0
McCloud CSD	06093001200	No Rating	0	0
Montague	06093000300	No Rating	0	0
Mt. Shasta	06093001003	No Rating	0	0
Tulelake	06093000100	Relatively High	90.8	0
Weed	06093000901	No Rating	0	0
Yreka	06093000703	No Rating	0	0

Source: FEMA NRI

Table : Participating Jurisdiction Cold Wave Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Cold Wave EAL
Siskiyou County	All	Relatively Low	52.1	\$59,000
Dorris	06093000200	Relatively High	93.3	\$39,000
Dunsmuir	06093001100	No Rating	0	\$0
Etna	06093000800	No Rating	0	\$0
Fort Jones	06093000701	No Rating	0	\$0
Happy Camp CSD	06093001300	No Rating	0	\$0
Lake Shastina CSD	06093000902	No Rating	0	\$0
McCloud CSD	06093001200	No Rating	0	\$0
Montague	06093000300	No Rating	0	\$0
Mt. Shasta	06093001003	No Rating	0	\$0
Tulelake	06093000100	Relatively Moderate	87.2	\$20,000
Weed	06093000901	No Rating	0	\$0
Yreka	06093000703	No Rating	0	0

Source: FEMA NRI

Table : Participating Jurisdiction Ice Storm Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Not Applicable	Not Applicable	0
Dorris	06093000200	Not Applicable	Not Applicable	0
Dunsmuir	06093001100	Not Applicable	Not Applicable	0
Etna	06093000800	Not Applicable	Not Applicable	0
Fort Jones	06093000701	Not Applicable	Not Applicable	0
Happy Camp CSD	06093001300	Not Applicable	Not Applicable	0
Lake Shastina CSD	06093000902	Not Applicable	Not Applicable	0

Table : Participating Jurisdiction Ice Storm Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
McCloud CSD	06093001200	Not Applicable	Not Applicable	0
Montague	06093000300	Not Applicable	Not Applicable	0
Mt. Shasta	06093001003	Not Applicable	Not Applicable	0
Tulelake	06093000100	Not Applicable	Not Applicable	0
Weed	06093000901	Not Applicable	Not Applicable	0
Yreka	06093000703	Not Applicable	Not Applicable	0

Source: FEMA NRI

Table : Participating Jurisdiction Ice Storm Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Ice Storm EAL
Siskiyou County	All	Not Applicable	Not Applicable	\$0
Dorris	06093000200	Not Applicable	Not Applicable	\$0
Dunsmuir	06093001100	Not Applicable	Not Applicable	\$0
Etna	06093000800	Not Applicable	Not Applicable	\$0
Fort Jones	06093000701	Not Applicable	Not Applicable	\$0
Happy Camp CSD	06093001300	Not Applicable	Not Applicable	\$0
Lake Shastina CSD	06093000902	Not Applicable	Not Applicable	\$0
McCloud CSD	06093001200	Not Applicable	Not Applicable	\$0
Montague	06093000300	Not Applicable	Not Applicable	\$0
Mt. Shasta	06093001003	Not Applicable	Not Applicable	\$0
Tulelake	06093000100	Not Applicable	Not Applicable	\$0
Weed	06093000901	Not Applicable	Not Applicable	\$0
Yreka	06093000703	Not Applicable	Not Applicable	\$0

Source: FEMA NRI

Table : Participating Jurisdiction Winter Weather Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Relatively Low	35.6	11
Dorris	06093000200	Relatively Low	28.8	3.4
Dunsmuir	06093001100	Relatively Moderate	68.2	15.2
Etna	06093000800	Relatively Moderate	71.4	13.4
Fort Jones	06093000701	Relatively Low	49.3	4.4
Happy Camp CSD	06093001300	Relatively Moderate	65.2	12
Lake Shastina CSD	06093000902	Relatively Moderate	73.5	6
McCloud CSD	06093001200	Relatively Low	51.8	14.2
Montague	06093000300	Relatively Low	53.0	9.6
Mt. Shasta	06093001003	Relatively Moderate	73.5	14.7
Tulelake	06093000100	Relatively Low	25.7	5.4
Weed	06093000901	Relatively Moderate	60.1	6.5
Yreka	06093000703	Relatively Low	46.4	3.6

Source: FEMA NRI

Table : Participating Jurisdiction Winter Weather Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Winter Weather EAL
Siskiyou County	All	Relatively Low	36.5	\$27,000
Dorris	06093000200	Relatively Low	27.2	\$208
Dunsmuir	06093001100	Relatively Moderate	62.7	\$2,500
Etna	06093000800	Relatively Moderate	68.9	\$3,400

Table : Participating Jurisdiction Winter Weather Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Winter Weather EAL
Fort Jones	06093000701	Relatively Low	48.1	\$1,200
Happy Camp CSD	06093001300	Relatively Low	58.4	\$2,000
Lake Shastina CSD	06093000902	Relatively Low	45.4	\$1,000
McCloud CSD	06093001200	Relatively Low	51.9	\$1,500
Montague	06093000300	Relatively Low	49.5	\$1,300
Mt. Shasta	06093001003	Relatively Moderate	74.1	\$4,500
Tulelake	06093000100	Very Low	24.6	\$130
Weed	06093000901	Relatively Low	51.7	\$1,500
Yreka	06093000703	Relatively Low	43.1	\$899

Source: FEMA NRI

Population

Severe weather can have a wide range of effects on people, often posing significant risks to life, property, and general well-being. In the absence of proper shelter, hail, lightning, and high winds can cause serious injury. In general, if potentially exposed persons take shelter in a solid, well-constructed structure protection from these severe weather components would be provided. However, old or poorly constructed facilities may be more prone to damage, potentially increasing the impact on economically disadvantaged populations. Some of the potential effects of severe weather on people may include:

- **Death and Injury:** Severe weather can produce lightning and strong winds driving debris. Both of these elements can cause injuries or fatalities.
- **Power Outages:** Lightning strikes, strong winds, and falling trees can lead to power outages, disrupting daily life, and potentially affecting essential services, such as medical equipment and refrigeration.
- **Mental Health Impact:** Severe weather can be frightening and stressful, leading to anxiety and post-traumatic stress disorder in some individuals. The emotional toll of property damage and loss can also be significant.
- **Displacement:** People may need to evacuate their homes or be temporarily displaced due to storm damage, requiring emergency shelter and support.
- **Economic Costs:** Severe weather results in economic costs, including repair and recovery expenses, insurance claims, and potential loss of income due to property damage or work disruptions.
- **Public Safety Response:** Severe weather can strain public safety resources, including emergency services, law enforcement, and medical facilities.

At greater risk may be the vulnerable populations and equity priority communities, including the especially young, the elderly, and those below the poverty level. Hazard occurrences can exacerbate existing vulnerabilities and create new challenges.

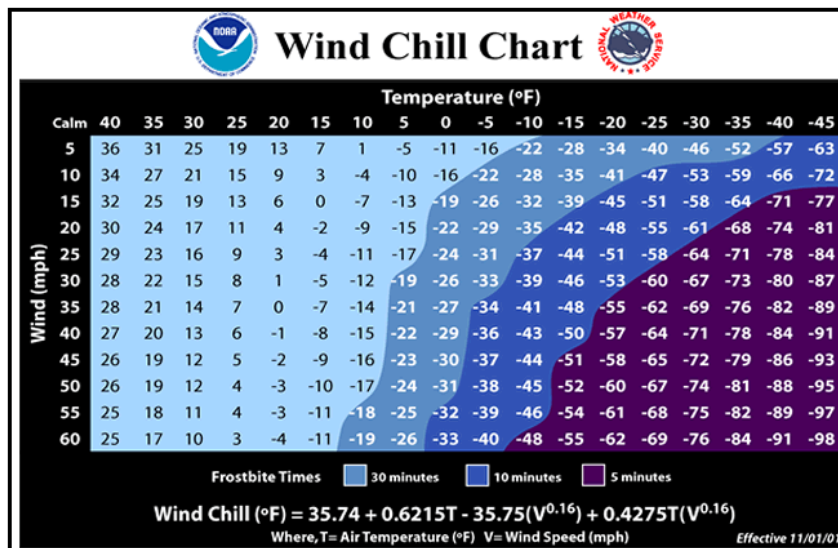
Winter weather, and the extremely cold temperatures that often accompany it, is a threat to anyone exposed to them. Extreme cold can cause frostbite and hypothermia. Bitterly cold temperatures can also burst water and create an excessive demand on providers to deliver energy for household heating. There are also fire dangers associated with home heating. Heavy snow and/or ice can paralyze communities. Roads can become hazardous which may cause accidents, disrupted flow of supplies, and challenges in the delivery of emergency and medical services. Additional impacts on people and the community may include:

- **Injuries and Fatalities:** Slippery sidewalks, roads, and driveways can lead to slip and fall accidents, vehicle crashes, and pedestrian injuries. Exposure to extreme cold temperatures can cause frostbite, hypothermia, and cold-related illnesses, which can be life-threatening.

- **Power Outages:** Heavy snow, ice, and freezing rain can bring down power lines and disrupt electricity supply. Power outages can lead to heating and lighting challenges, particularly in extreme cold conditions.
- **Transportation Disruptions:** Winter storms can make roads and highways treacherous, leading to travel delays, accidents, and stranded motorists. Public transportation services may be disrupted, affecting commuters and essential travel.
- **Stranded or Isolated Communities:** Severe winter weather can leave communities isolated and cut off from emergency services and supplies. Residents may need to shelter in place or rely on local resources until conditions improve.
- **Health Risks:** Exposure to extreme cold can lead to a range of health risks, including frostbite, hypothermia, and cold-related illnesses. Individuals with pre-existing health conditions may face exacerbated risks.
- **Increased Heating Costs:** Cold weather can result in higher heating costs, which can be a financial burden for many households. Low-income individuals and families may struggle to afford adequate heating.
- **Disruption of Essential Services:** Severe winter weather can disrupt essential services such as healthcare, emergency response, and utilities. Hospitals may face increased patient volumes due to weather-related injuries and illnesses.

When extremely cold temperatures are accompanied by strong winds the result can be potentially lethal wind chills. Wind chill is the temperature your body feels when the air temperature is combined with the wind speed and is based on the rate of heat loss from exposed skin caused by the effects of wind and cold. As the speed of the wind increases, it can carry heat away from your body much more quickly, causing skin temperature to drop. The wind chill chart shows the difference between the actual air temperature and the perceived temperature due to wind, and amount of time until frostbite occurs.

Chart : Wind Chill Chart



Source: NOAA

All Siskiyou County and participating jurisdiction populations are vulnerable to the impacts of severe weather. Please see Section 3.3: Population Data and Section 3.4: Socially Vulnerable and At-Risk Populations for data concerning jurisdictional populations.

Buildings and Structures

All buildings and structures within Siskiyou County and participating jurisdictions can be impacted by severe weather and severe winter weather. However, the location and construction of the facility will have a significant impact on the vulnerability. In general, older structures would be at higher risk of negative impacts. Some of the potential impacts include:

- **Electrical Infrastructure Damage:** Severe weather can damage electrical infrastructure, including power lines, transformers, and substations. This can result in widespread power outages, affecting homes, businesses, hospitals, and other critical facilities.
- **Communication Disruptions:** Severe weather can disrupt telecommunications infrastructure, including cell towers, data centers, and communication networks. This can impact emergency communication and coordination efforts.
- **Safety Risks:** Damage to infrastructure can pose safety risks to workers and the public. Fallen power lines, damaged buildings, and debris can be hazardous.
- **Building Damage:** Heavy snow or ice loads can cause damage to the building.

Governmental Operations

Severe weather and severe winter weather can pose various risks to government operations. These risks can have significant economic and operational consequences, and can include:

- **Power Outages:** Severe weather can lead to power outages by damaging electrical infrastructure such as power lines and substations. Government buildings may lose power, affecting critical operations and services.
- **Flooding:** Heavy rainfall during severe weather or rapid melting of snow during severe winter weather can lead to flooding, which can damage government buildings and disrupt operations. Flood damage may require extensive repairs and cleanup.
- **Communication Disruptions:** Severe weather can damage communication equipment, including telephone lines and computer systems. This can hinder communication between government agencies and the public.
- **Transportation Disruptions:** Severe weather can make roads impassable due to flooding, snow, or ice. This can impact the ability of government employees to commute to work.
- **Budgetary Impact:** The costs associated with repairing and restoring government buildings and infrastructure after severe weather can strain budgets.

Transportation and Electrical Infrastructure

In general, severe weather components do not have a large impact on transportation infrastructure, with the exception of power loss disrupting signaling and poor conditions impacting driving conditions.

Severe weather can have significant impacts on electrical utilities, leading to disruptions in power supply and potential damage to infrastructure. Severe weather can affect electrical utilities in the following ways:

- **Lightning Strikes:** Lightning is a common occurrence during severe weather and poses a substantial risk to electrical infrastructure. Lightning strikes can damage power lines, transformers, substations, and other critical components, leading to power outages.
- **Wind Damage:** High winds associated with severe weather can cause trees, branches, and other debris to fall onto power lines. This can result in downed power lines, structural damage to utility poles, and disruptions in electrical service.
- **Hailstorms:** Severe weather may produce hail, which can damage power lines, transformers, and other equipment. Hailstones can also lead to short circuits and insulation damage on electrical components.
- **Power Surges:** Lightning strikes, strong winds, and other storm-related events can lead to power surges in the electrical grid. These surges can damage electronic devices, appliances, and utility equipment connected to the power supply.

Winter weather can have significant impacts on road infrastructure, creating changing conditions for transportation and necessitating proactive measures for maintenance and safety. Winter storms can impact road infrastructure:

- **Snow Accumulation:** Snowfall can accumulate on road surfaces, creating slippery and hazardous conditions for drivers. Accumulated snow can reduce road visibility and make travel difficult.

- **Ice Formation:** Freezing temperatures can lead to the formation of ice on roadways, increasing the risk of accidents and making roads slippery. Black ice, which is nearly invisible, poses a particular hazard.
- **Snowdrifts:** Strong winds during winter storms can lead to the formation of snowdrifts on roads, especially in open areas. These drifts can obstruct visibility and impede traffic flow.
- **Road Surface Damage:** The freeze-thaw cycle, where melted snow refreezes, can lead to the formation of ice patches and potholes on road surfaces. This cycle can contribute to the deterioration of road infrastructure over time.
- **Freeze-Thaw Cycling:** Alternating freezing and thawing can cause the expansion and contraction of water within pavement cracks, leading to the formation and enlargement of potholes.
- **Snowplow and Deicing Operations:** Snowplows and deicing operations are necessary to clear roads and improve driving conditions. However, the use of salt and chemicals for deicing can contribute to corrosion and deterioration of road surfaces and infrastructure.
- **Infrastructure Stress:** Bridges and overpasses are particularly susceptible to ice formation due to the lack of ground contact. Winter storms can stress these structures, potentially leading to structural issues over time.

Significant cost can be incurred for snow removal from transportation routes. In smaller jurisdictions with fewer resources and equipment, the cost may be on the lower end of the spectrum, ranging from a few thousand dollars to around \$10,000 per snow event. In larger counties or urban areas with extensive road networks and higher population densities, the cost can be much higher, potentially ranging from \$10,000 to \$50,000 or more per snow event.

In general, the priority for snow removal is based on traffic volume, speed limits and road surface types. Preference is generally given in the following order:

- State trunklines
- Primary roads
- Major local roads
- Residential / subdivision streets

Severe weather can have significant impacts on electrical utilities, leading to disruptions in power supply and potential damage to infrastructure. Severe weather can affect electrical utilities in the following ways:

- **Lightning Strikes:** Lightning is a common occurrence during severe weather and poses a substantial risk to electrical infrastructure. Lightning strikes can damage power lines, transformers, substations, and other critical components, leading to power outages.
- **Wind Damage:** High winds associated with severe weather can cause trees, branches, and other debris to fall onto power lines. This can result in downed power lines, structural damage to utility poles, and disruptions in electrical service.
- **Hailstorms:** Severe weather may produce hail, which can damage power lines, transformers, and other equipment. Hailstones can also lead to short circuits and insulation damage on electrical components.
- **Power Surges:** Lightning strikes, strong winds, and other storm-related events can lead to power surges in the electrical grid. These surges can damage electronic devices, appliances, and utility equipment connected to the power supply.

Severe winter weather can impact electrical utilities in various ways, potentially leading to disruptions in service. These impacts include:

- **Power Outages:** Low temperatures can strain electrical systems, leading to increased demand for heating systems. This heightened demand can overload power grids, resulting in power outages.
- **Equipment Failure:** Electrical equipment, such as cables and switches, may experience higher stress during extremely cold weather, increasing the likelihood of equipment failures.

- **Icing on Power Lines:** Ice accumulation on power lines can lead to increased weight, potentially causing lines to sag or break. This can result in power outages and safety hazards.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

In general, severe weather and severe winter weather components do not have a large impact on water and wastewater infrastructure and operations. However, the cascading impacts from an event such as power loss disrupting pumping and treatment capabilities, localized flooding from heavy overwhelming drainage systems, or frozen pipes in water distribution systems, causing water outages and expensive repairs when pipes burst.

Medical, Education, and Response Facilities

Severe weather and severe winter weather can significantly impact emergency response infrastructure, creating challenges for first responders and organizations involved in managing and mitigating the effects of severe weather events. Winter storms can impact emergency response through:

- **Transportation Disruptions:** Debris on roads or Snow and ice accumulation on roads can hinder the ability of emergency vehicles to navigate and reach affected areas promptly. Hazardous road conditions may result in delays in response times.
- **School Closures:** Severe weather can lead to the closure of schools due to hazardous conditions. This can strain caregivers and result in lower work attendance.
- **Communication Disruptions:** Severe weather can disrupt communication networks, affecting the ability of emergency responders to coordinate and communicate effectively. Downed power lines and damage to communication infrastructure contribute to these disruptions.
- **Power Outages:** Severe weather, including high winter and ice storms, can lead to power outages. Emergency response facilities, such as command centers and fire stations, may lose power, affecting their operational capabilities.
- **Exposure:** Emergency responders face increased health and safety risks in severe weather conditions. Exposure to hail, high winds, extreme cold, snow, and ice can impact the well-being of responders and affect their ability to provide effective assistance.
- **Resource Allocation Challenges:** Severe weather often requires the allocation of additional resources, including personnel, equipment, and supplies, to address immediate needs. This can strain emergency response organizations and impact their ability to respond to other concurrent incidents.
- **Increased Demand for Services:** Severe weather can result in an increased demand for emergency services, including medical assistance, search and rescue operations, and responses to accidents. Emergency response organizations may need to manage a higher volume of incidents simultaneously. Severe winter weather can increase the demand for emergency shelters, particularly in cases of widespread power outages. Setting up and managing these shelters can strain resources.

Communication Systems

All communication systems within Siskiyou County are at risk to severe weather and severe winter weather. Severe storms and winter weather can disrupt vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

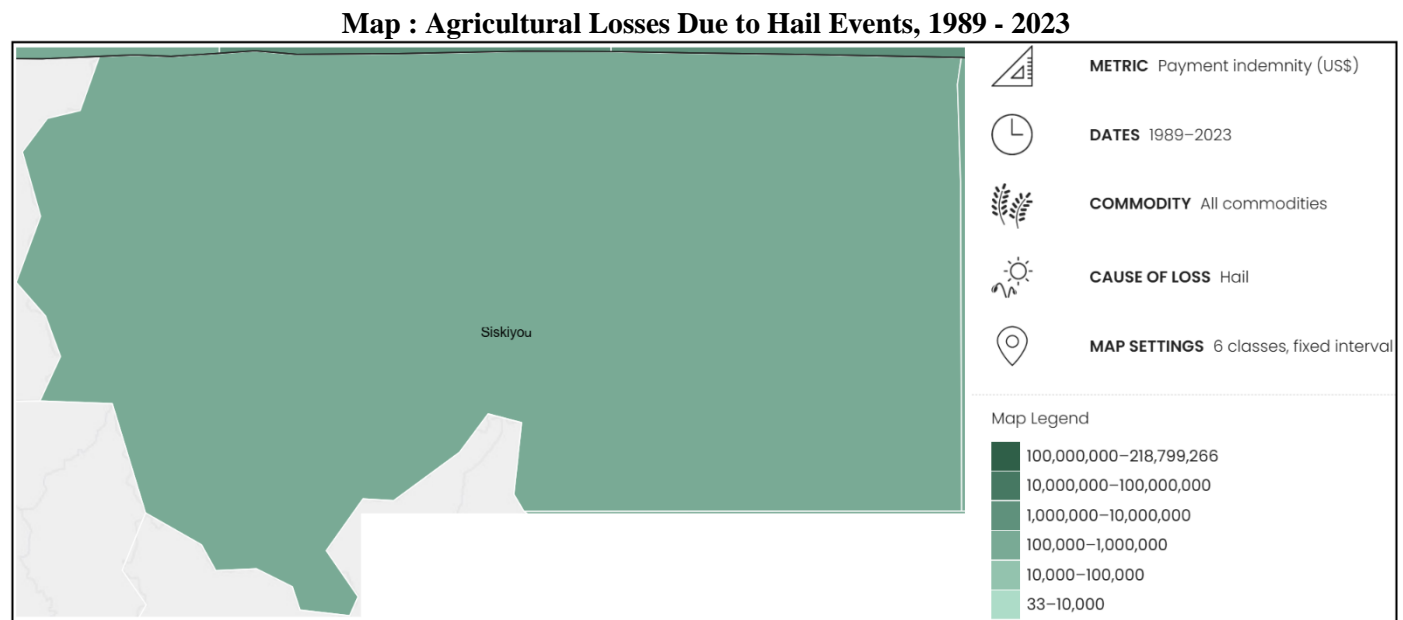
- **Physical Infrastructure Damage:** High winds, heavy rainfall, and other severe weather conditions can cause physical damage to communication infrastructure such as cell towers, antennas, cables, and data centers. This damage can result in network outages and disruptions.

- **Power Outages:** Severe storms often lead to power outages, which can affect the operation of communication networks. Without a stable power supply, cell towers, data centers, and other critical components may become non-functional, leading to service interruptions.
- **Lightning Strikes:** Lightning poses a threat to communication infrastructure. Direct strikes or induced surges can damage electronic equipment, leading to the need for repairs or replacements and causing downtime.
- **Signal Interference:** Severe storms can create electromagnetic interference that disrupts radio signals used in wireless communication. This interference can lead to poor signal quality, dropped calls, and slower data speeds.
- **Loss of Backhaul Connectivity:** Severe weather events can damage the backhaul infrastructure that connects various communication nodes. This backbone infrastructure is crucial for transmitting data between local and regional networks, and any disruption can impact overall network performance.
- **Communication Tower Instability:** High winds and extreme weather conditions can compromise the stability of communication towers. If towers are not designed to withstand severe weather, they may collapse, leading to network outages.
- **Network Congestion:** In the event of a disaster, communication networks may experience a surge in usage as people attempt to contact emergency services, friends, and family. This increased demand can lead to network congestion, making it difficult for users to connect.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Hail events can cause significant agricultural impacts. The following map from the United States Department of Agriculture details total agricultural losses, by county, due to hail events from 1989 - 2023:



Source: USDA

Severe winter weather conditions can cause significant agricultural impacts. The following map from the United States Department of Agriculture details total agricultural losses, by county, due to freeze events from 1989 - 2023:

Map : Agricultural Losses Due to Freeze Events, 1989 - 2023



Source: USDA

Severe weather can pose various risks to the environment. These risks can have both short-term and long-term impacts on natural ecosystems. Severe weather can produce heavy rainfall over a short period of time, leading to flash floods and riverine flooding. This can result in soil erosion, damage to aquatic habitats, and the displacement of aquatic organisms. Large hailstones can damage crops, vegetation, and natural habitats. Hail can strip leaves from trees and plants, reducing their ability to photosynthesize and grow. It can also damage wildlife habitats. Severe weather often produces strong straight-line winds. These winds can uproot trees, damage forests, and disrupt animal habitats. They can also scatter debris and cause structural damage to buildings, which can lead to further environmental issues if hazardous materials are released. Lightning is a common occurrence during severe weather and can spark wildfires. These wildfires can have significant ecological impacts, including habitat destruction, loss of wildlife, and changes in the local ecosystem.

Severe winter weather can have various impacts on the environment, particularly in regions prone to cold and snowy winters. These impacts can affect ecosystems, wildlife, and natural resources and can include habitat disruption, reduction of food sources, changes in migration patterns, and damage to foliage (especially if a spring storm). Additionally, the use of salt and de-icing chemicals on roads and sidewalks can have negative environmental impacts. These chemicals can find their way into nearby water bodies, leading to water pollution and harm to aquatic ecosystems. Snowmelt can also introduce pollutants from roadways and urban areas into rivers and streams, leading to reduced water quality. Elevated sediment levels and changes in water temperature can also affect aquatic life.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with severe weather may include:

- Direct physical damage to buildings and structures:
- Transportation infrastructure disruption
- Power outages and electrical grid disruption
- Communication system disruption
- Transportation and supply chain disruptions
- Environmental and ecological damage
- Economic impacts and business closures
- Emergency services overload

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Severe Weather Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Severe weather can cause extensive property damage, loss of utility service, and injury to the public. Those most at-risk are low-income and homeless individuals without proper shelter.
Impact on Responders	First responders may be unable to access roadways due to flooding, trees, or debris. Exposure to lightning, flooding, and high winds may cause injuries to first responders. Vehicles and resources may be damaged, leading to impaired response activities. In addition, road conditions may become hazardous as a result of the by-products
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Severe Weather may impact an agency’s ability to maintain continuity of operations due to power outages, flooding, and wind damage. If the activation of alternate facilities was required, travel may be difficult as well as computer/network access due to long-term power outages caused by severe weather.
Delivery of Services	Delivery of services may be impaired by flooding, obstruction, and damage to roadways and resources. The ability to deliver goods and services will be impacted locally, regionally, or statewide depending on the magnitude of the event. Goods, equipment, and vehicles may become damaged during transport.
Property, Facilities, and Infrastructure	Power lines and power generators are most at risk from severe weather and impacts could result in isolated power outages or full-scale blackouts. Building and vehicle damage can occur from hail and other debris created by severe weather. Properties and critical facilities also may face foundational and physical damage due to flooding, lightning strike, or excessive winds, delaying response and recovery operations.
Impact on Environment	Waste and debris from damaged treatment infrastructure or hazardous materials facilities could contaminate sources of water and food. Debris can impact and contaminate wildlife and natural areas. Lightning strikes may also ignite fires, leading to destruction of agricultural crops, critical ecosystems, and natural habitats.
Economic Conditions	Flooding, high winds, lightning, and hail can stress local resources. Even if some of the costs can be recouped through federal reimbursements (federal disaster declaration), there is a fiscal impact on the local government.
Public Confidence in Governance	Ineffective response can decrease the public’s confidence in the ability to respond and govern. Governmental response across local, state, regional, and federal levels require direct actions that must be immediate and effective to maintain public confidence.

Table : Severe Winter Weather Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Freezing temperatures coupled with heavy snow accumulation can cause dangerous travel conditions, leading to accidents and road closures. Downed power lines can lead to a loss of electricity and heat, with the young and the elderly especially vulnerable. Extremely cold temperatures may lead to hypothermia and death.
Impact on Responders	Dangerous road conditions create a transportation challenges for first responders. First responders will need to control their own exposure to the elements for prolonged periods of time and will need to continuously seek heat and shelter to stay warm. Equipment may also be damaged or destroyed due to cold temperatures, heavy wind, ice, and heavy snowfall, which may lead to a decrease in response capabilities.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary. Severe winter weather may impact an agency’s ability to maintain operations due to

Table : Severe Winter Weather Consequence Analysis

Subject	Potential Impacts
	power outages and transportation difficulties. If the activation of alternate facilities was required, travel may be difficult. Additionally, computer/network and other communication access may be impacted due to power outages.
Delivery of Services	The ability to deliver services can be impacted locally, regionally, or statewide depending on the severity of the severe winter weather event. Dangerous road conditions may lead to roadway and bridge closures, as well as transit service disruptions. Businesses and places of commerce may completely shut down, which leads to the disruption of goods and services.
Property, Facilities, and Infrastructure	Transportation, governmental operations, and communications may be heavily disrupted. Roads and bridges may be heavily impacted by severe winter weather, and may be completely obstructed by downed trees, powerlines, and snow accumulation. Snow and ice can impact access to homes and critical facilities such as hospitals, schools, and supermarkets. Power loss can lead to disruption of critical infrastructure and technology.
Impact on Environment	Heavy snow and ice accumulation can weigh down and damage vegetation, tree limbs, and power lines. Flooding may also occur after the rapid melting of a heavy snowfall, causing bodies of water to flood, damaging the surrounding areas. Exposure to extreme winter weather may result in animal death. Chemicals used to treat roadways may contaminate natural environments and water reservoirs if used in large quantities.
Economic Conditions	Severe winter weather poses a fiscal impact on the governments, even if some of those costs can be recouped through federal grant reimbursements. Local, county, and state resources may be drained by a severe winter weather event.
Public Confidence in Governance	The public’s confidence in governance is affected by immediate local and state response through direct and effective actions. Efficiency in response and recovery operations is critical in keeping public confidence high.

5.14.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the extreme heat hazard.

Table : Example Severe Weather Mitigation Actions

Category	Example Action
Planning and Regulation	Reviewing building codes and structural policies to ensure they are adequate to protect older structures from wind damage.
	Requiring tie-downs with anchors and ground anchors appropriate for the soil type for manufactured homes.
	Incorporating passive ventilation in the site design. Passive ventilation systems use a series of vents in exterior walls or at exterior windows to allow outdoor air to enter the home in a controlled way.
	Establishing standards for all utilities regarding tree pruning around lines.
	Inspecting utility poles to ensure they meet specifications and are wind resistant. Ensuring the development and enforcement of building codes for roof snow loads.
Infrastructure	Installing lightning protection devices and methods, such as lightning rods and grounding, on communications infrastructure and other critical facilities.
	Installing and maintaining surge protection on critical electronic equipment.
	Retrofitting buildings with load-path connectors to strengthen the structural frames.
	Avoiding placing flag poles or antennas near buildings.
	Protecting traffic lights and other traffic controls from high winds.
Natural Systems	Property maintain stream and river channels to ensure flow.

Table : Example Severe Weather Mitigation Actions

	Using snow fences or “living snow fences” (e.g., rows of trees or other vegetation) to limit blowing and drifting of snow over critical roadway segments.
Education	Developing a lightning brochure for distribution by recreation equipment retailers or outfitters in mountainous areas.
	Educating design professionals to include wind mitigation during building design.
	Instructing property owners on how to properly install temporary window coverings before a storm.
	Producing and distributing family and traveler emergency preparedness information about severe winter weather hazards.
	Organizing outreach to vulnerable populations, including establishing and promoting accessible heating centers in the community.

5.15 Subsidence

5.15.1 Hazard Description

Land subsidence is the gradual sinking or sudden lowering of the Earth's surface due to the loss of support beneath the ground. It is typically caused by natural processes or human activities, such as groundwater extraction, mining, oil and gas extraction, and the collapse of underground cavities. It leads to a change in elevation and slope of the land, which can result in significant environmental and structural damage. Causes of land subsidence include:



- **Groundwater Extraction:** The most common cause of subsidence, especially in agricultural regions. When large amounts of groundwater are pumped out, the land above the depleted aquifer compacts and lowers.
- **Mining:** Underground mining removes material that supports the overlying layers of earth. When the support is removed, the ground may collapse, causing subsidence.
- **Oil and gas extraction:** Similar to groundwater extraction, removing oil and gas can lead to a drop in pressure underground, causing the surface to sink.
- **Karst topography:** In areas where the bedrock is limestone, gypsum, or salt, natural dissolution of these minerals by water can create sinkholes or underground voids, leading to localized land subsidence.
- **Tectonic activity:** Earthquakes or slow tectonic shifts can cause subsidence in some regions.

Subsidence may manifest in many ways, including:

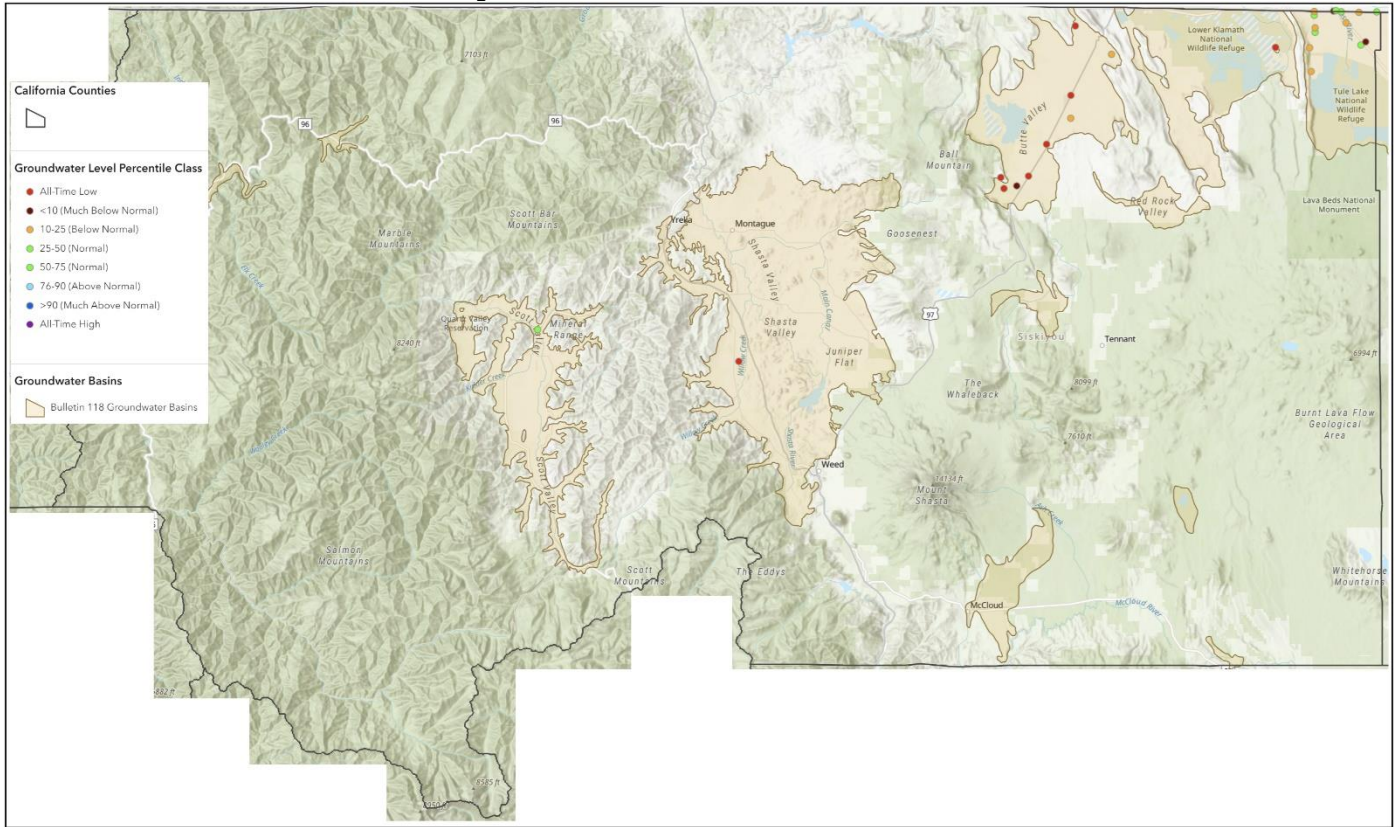
- **Regional Subsidence:** Subsidence over a wide area, such as an entire city or agricultural region, often as a result of extensive groundwater extraction or oil and gas withdrawal.
- **Sinkholes:** These form when the ground collapses into a subterranean cavity or void. These are common in areas with karst geology, where limestone or other soluble rocks dissolve over time.
 - **Cover-Collapse Sinkhole:** A sudden collapse of the surface, usually in areas with unstable bedrock or where water has eroded underground spaces.
 - **Cover-Subsidence Sinkhole:** A more gradual process, where loose material on the surface falls into voids in the bedrock, causing a slow sink.
- **Tectonic Subsidence:** This form of subsidence occurs as a result of geological or tectonic movements, such as earthquakes or volcanic activity, leading to a lowering of the ground.

5.15.2 – Location and Extent

Measurements of land-surface elevations, aquifer-system compaction, and water levels are used to determine changes in surface elevation. Elevation change measurements are fundamental to monitoring land subsidence, and conducted using radar, GPS measurements, or surveying, while aquifer-system compaction is measured by using extensometers

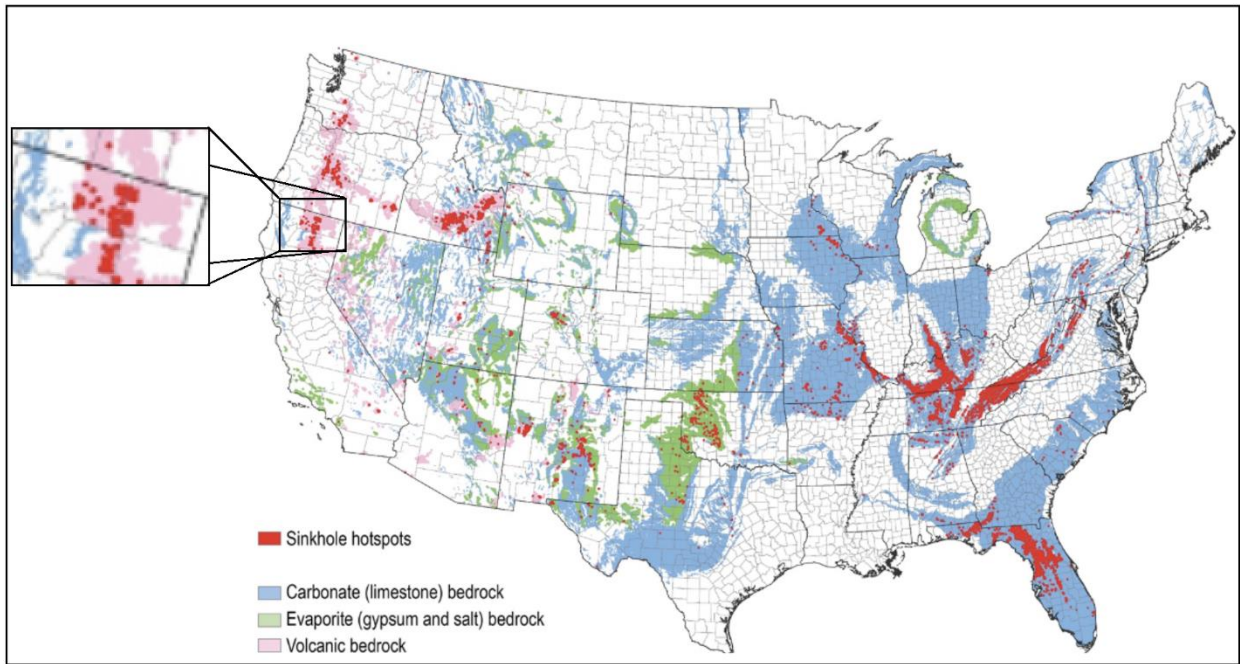
Groundwater over extraction is a leading cause of subsidence in Siskiyou County, especially in the areas surrounding Tulelake. The following map, from the California Natural Resources Agency, shows the current groundwater level percentile class for Siskiyou County. Of concern are the areas in and around Tulelake, which are indicated to be at an all-time low:

Map: Groundwater Level Percentile Class



Source: California Natural Resources Agency

The following map shows karst areas of the continental United States having sinkholes in soluble rocks (carbonates and evaporites), as well as insoluble volcanic rocks that contain sinkholes. The volcanic bedrock areas contain lava tubes that are voids left behind by the subsurface flow of lava, rather than from the dissolution of the bedrock. Hot spots of sinkhole activity are also shown in areas of greater susceptibility:

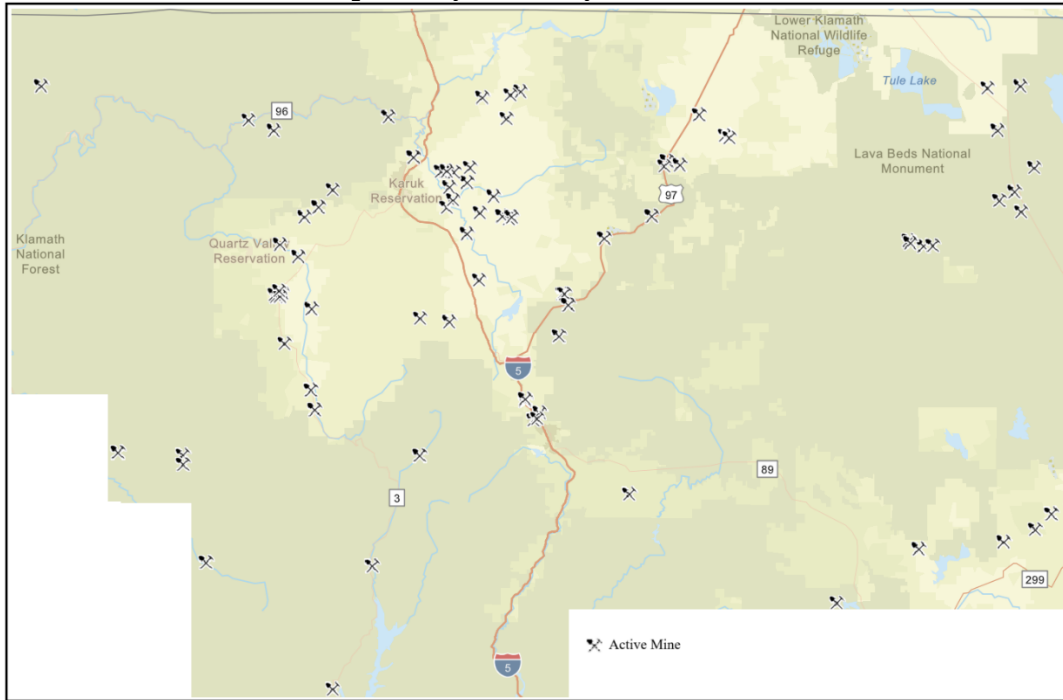


Source: USGS

Mines, both active and abandoned, have a significant relationship with land subsidence due to the removal of materials from underground, which reduces the structural integrity of the land above. This relationship can cause the surface to sink or collapse, leading to various environmental and infrastructural impacts.

In active mining operations, land subsidence occurs when underground material, such as coal, minerals, or metals, is extracted, creating voids beneath the surface. The land above these voids may gradually or suddenly collapse as it loses support, leading to the following forms of subsidence. The California Department of Conservation's Division of Mine Reclamation compiles data on the current status of mines. The following map details the location of all active mines within Siskiyou County:

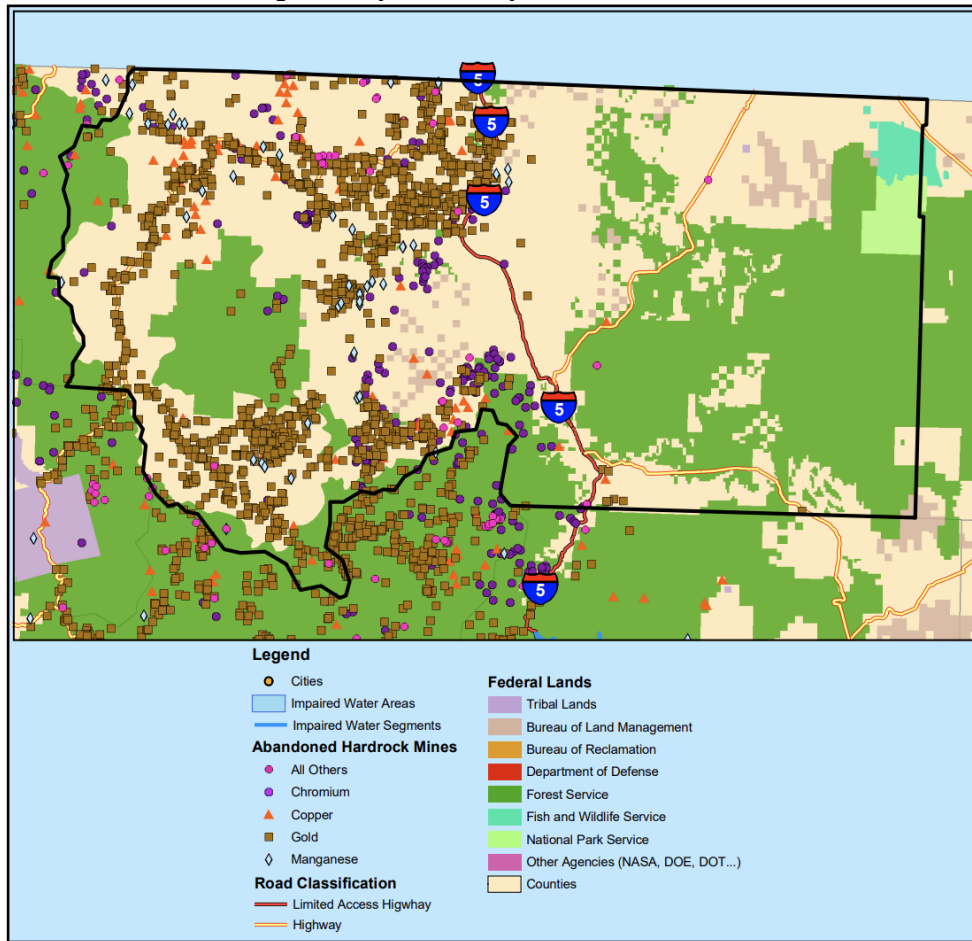
Map : Siskiyou County Active Mines



Source: California Department of Conservation

Abandoned mines pose a unique risk for subsidence, as they often go unmonitored once operations cease. Over time, as the supports within the mine (such as wooden pillars or natural supports) degrade, the ground above may collapse without warning. The Mineral Policy Center compiles data on abandoned and closed mines. The following map details the location of abandoned and closed mines within Siskiyou County:

Map : Siskiyou County Abandoned Mines



Source: Mineral Policy Center

5.15.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced no Presidential Disaster Declarations related to subsidence.

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to subsidence.

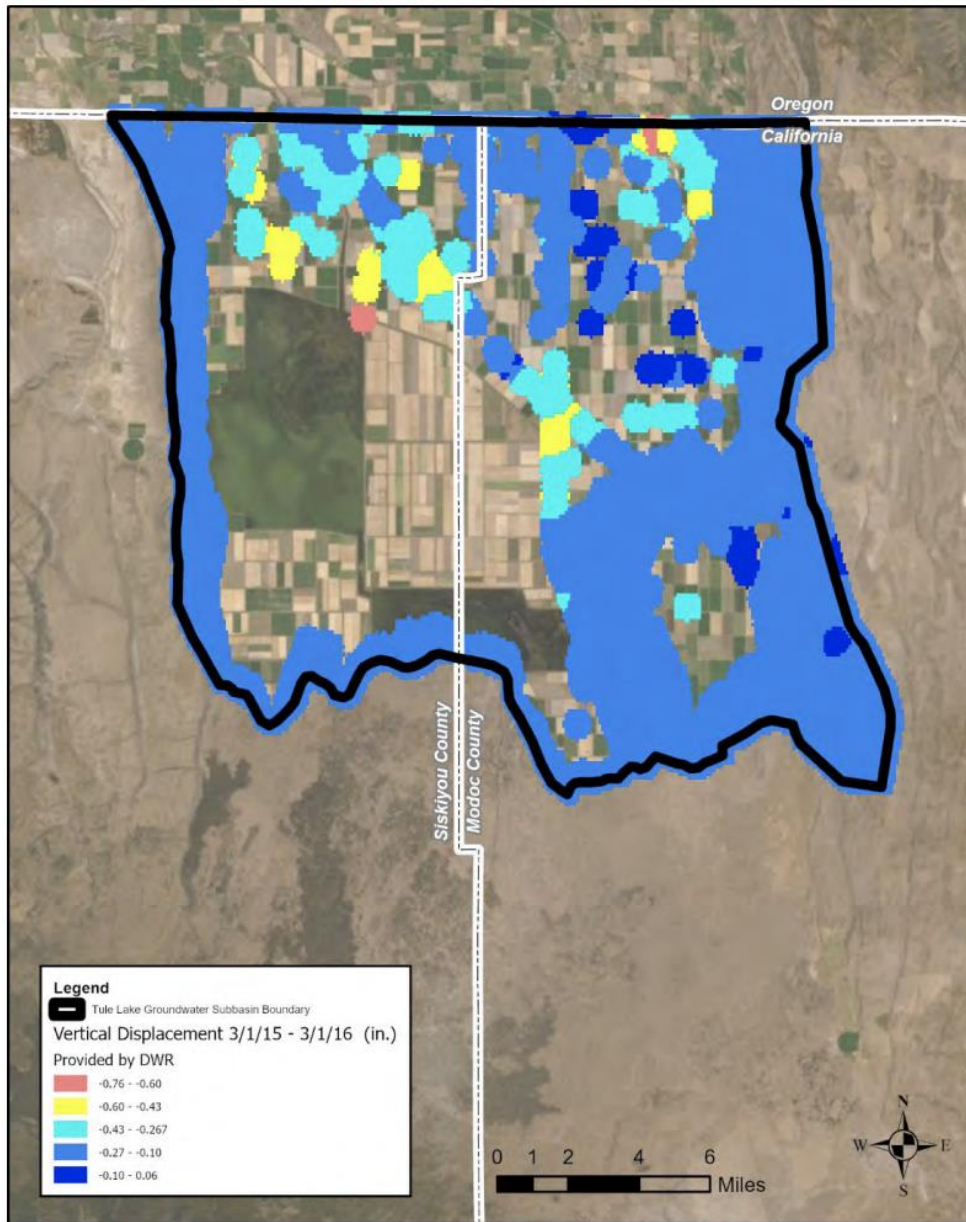
The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. Siskiyou County has experienced no proclamations of a State of Emergency related to subsidence.

The State of California currently does not keep a comprehensive database of subsidence events, including the occurrences of sinkholes. Additionally, mapping of land subsidence due to groundwater over-drafting is generally confined to the agricultural regions of central California.

The NCEI does not track subsidence events.

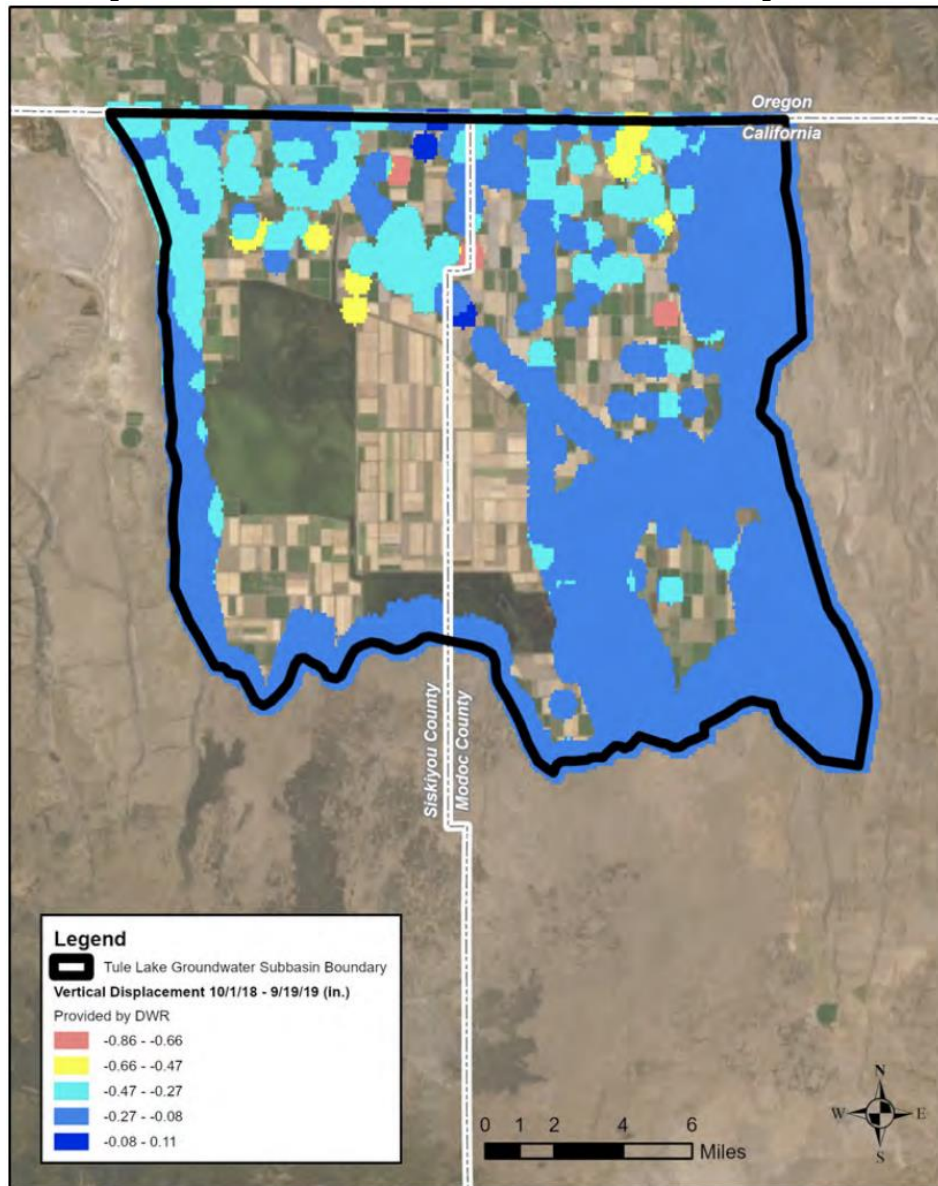
The following maps, from the Division of Water Resources, show land surface displacement for the area around Tulelake for 2015 to 2016 and 2018 to 2019, generally caused by groundwater over extraction:

Map : Tule Lake Subbasin 2015-2016 Land Surface Displacement



Source: 2012 Tule Lake Groundwater Sustainability Plan

Map : Tule Lake Subbasin 2018-2019 Land Surface Displacement

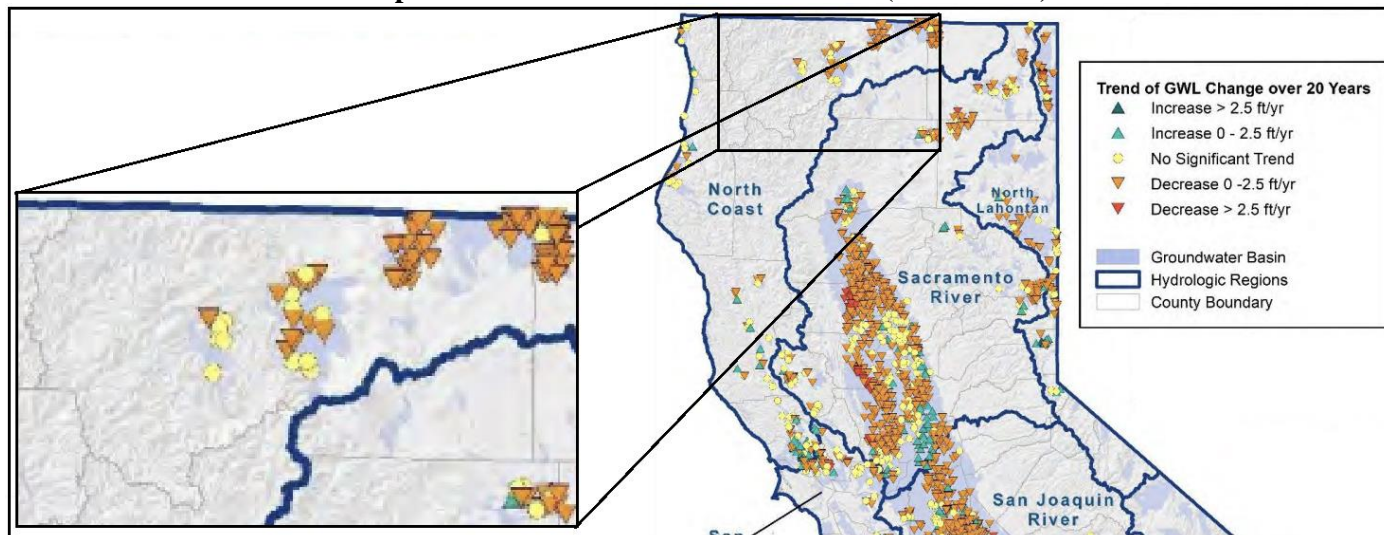


Source: 2012 Tule Lake Groundwater Sustainability Plan

5.15.4 Probability of Future Events

Predicting the probability of subsidence occurrences is tremendously challenging due to the large number of factors involved and the oftentimes random nature of occurrence. Continued over-reliance on groundwater for domestic and agricultural uses would continue to exacerbate future subsidence occurrences. The following map from the Division of Water Resources shows the 20-year groundwater level trend (2000 – 2020) for Siskiyou County:

Map : 20-Year Groundwater Level Trend (2000 – 2020)



Source: Division of Water Resources

However, in September 2014, Governor Jerry Brown signed legislation requiring that California's critical groundwater resources be sustainably managed by local agencies, through the Sustainable Groundwater Management Act. In Siskiyou County there are four basins that fall under the requirements of act, the Shasta, Scott and Butte Valley Basins and the Tulelake Subbasin. To carry out the requirements of act, the Siskiyou County Flood Control and Water Conservation District serves as the Groundwater Sustainability Agency for the three basins, and the Siskiyou County Board of Supervisors serves as the member the Tulelake Subbasin, alongside Tulelake Irrigation District, Modoc County and the City of Tulelake. These agencies were required to develop Groundwater Sustainability Plans for each of the basins that assessed the current and projected future conditions of the basins, and established management and monitoring activities and long-term goals. The Scott Valley and Shasta Valley plan have been approved, while Butte Valley and Tulelake are still awaiting a determination. The implementation of these plans is expected to have a net benefit impact on future groundwater extraction.

The continued presence of abandoned and active subsurface mines also poses an on-going concern for subsidence events, especially as these sites continue to age and degrade. However, no survey of the condition of these mines is available to provide reliable data of future conditions.

The continued presence of volcanic bedrock areas containing lava tubes also poses an on-going concern for subsidence events, especially as these areas continue to age and degrade. However, no survey of the condition of these subsurface voids is available to provide reliable data of future conditions.

Based on current conditions and historical events, Siskiyou County will continue to experience subsidence events. However, current data makes predicting the number and nature of these event beyond the scope of this plan.

5.15.5 Projected Changes in Location, Intensity, Frequency, and Duration

The continued growth of agriculture can be linked to increased occurrence of subsidence. The relationship between agriculture and land subsidence is primarily linked to the heavy reliance on groundwater extraction for irrigation. This dependence can lead to significant land subsidence over time as aquifers are drained faster than they can be naturally replenished. Continued agricultural demands for increased crop yields can place more pressure on water resources, particularly during drought periods, when surface water is unavailable. This leads to over-extraction of groundwater, accelerating subsidence. In some cases, land subsidence due to excessive groundwater pumping can permanently reduce the storage capacity of an aquifer, making it impossible to fully replenish. This exacerbates the long-term water scarcity problem in agricultural regions.

Climate change has the potential to significantly impact land subsidence. As climate change contributes to more severe and prolonged droughts, communities may rely more heavily on groundwater to meet water demands. This over-extraction can exacerbate land subsidence in regions where groundwater is already being depleted.

Climate change is expected to cause more extreme and variable precipitation. While overall rainfall may decrease, intense storms may become more frequent. These rapid influxes of water could cause surface erosion and exacerbate conditions that lead to subsidence in areas where the soil is already vulnerable due to over-pumping or mining activities. As temperatures rise, snowpack levels are declining, and more precipitation is falling as rain rather than snow. This change can reduce natural groundwater recharge rates, leading to greater reliance on artificial water storage and extraction methods that can promote subsidence.

5.15.6 Vulnerability and Impact

FEMA NRI

The National Risk Index does not provide rankings for the subsidence hazard.

Population

Subsidence events are rarely a direct cause of death, with the exception of rapidly occurring sinkholes. However, they can cause emotional and economic impacts in people in the impacted areas.

- **Physical Impact:** Sinkholes can cause injuries and deaths, usually caused by the opening swallowing a structure or vehicle. The extent of these injuries depends on the size of the sinkhole, building standards, and preparedness in the affected area.
- **Access to Medical Services:** Impacted persons may be cut off from medical care access due to road damage.
- **Emotional and Psychological Impact:** Survivors often experience psychological stress, anxiety, and trauma from the sudden and unpredictable nature of landslides can cause long-lasting fear, especially in areas where movement can continue for days or weeks.
- **Social and Economic Impact:** Economic losses can be devastating, especially for people whose businesses, jobs, or properties are destroyed or cut off due to road closures. The destruction of infrastructure such as transportation and utilities (electricity, water, gas) can disrupt daily life for extended periods.

Subsidence may disproportionately affect socially vulnerable populations, exacerbating pre-existing inequalities and making recovery more difficult for these groups. Subsidence may disproportionately impact these groups in the following ways:

- **Increased Risk of Injury and Death:** Many low-income communities are located in areas with higher subsidence risk due to lower land prices. Vulnerable populations, especially in under-resourced areas, may live in buildings not built to modern safety standards, increasing their risk during seismic events.
- **Delayed or Inadequate Emergency Response:** Socially vulnerable populations may experience delayed access to rescue efforts, medical care, and emergency shelters due to geographic isolation, discrimination, or lack of resources like transportation. Rural, low-income, or marginalized communities may not receive the same level of emergency response as wealthier urban areas.
- **Economic Impact and Prolonged Recovery:** Subsidence can disrupt working conditions, particularly for those in informal employment such as day laborers or small business owners. Socially vulnerable populations often lack savings or insurance to cushion the economic blow of losing their homes or jobs.

The loss of utility and communications services can also have a large impact on individuals. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values:

Table : Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	\$199
Loss of Wastewater Services	\$66
Loss of Water Services	\$138
Loss of Communications/Information Technology Services	\$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology

As no comprehensive mapping of potential subsidence areas has been completed for Siskiyou County, an estimate of populations that could be impacted is not possible at this time.

Buildings and Structures

Buildings and structures can be damaged during subsidence events due to the intense ground movement. The severity of the damage depends on factors such as the size, local soil conditions, and the building's design, materials, and age. Soil movement can cause rigid components such as walls, beams, and foundations can crack or split. In severe cases, load-bearing walls may fail, leading to partial or complete building collapse. The vertical supports (columns) and horizontal supports (beams) may fail due to excessive forces, leading to the collapse of floors or entire sections of buildings.

Of particular concern to all jurisdictions are unreinforced masonry buildings. An unreinforced masonry building is constructed of brick or masonry with no steel reinforcing bars. Because these buildings were not built using modern building codes, they are much more likely to experience damage or collapse during a subsidence event. As of this plan, no survey has been conducted to determine the number of unreinforced masonry buildings in Siskiyou County or participating jurisdictions.

As no comprehensive mapping of potential subsidence areas has been completed for Siskiyou County, an estimate of populations that could be impacted is not possible at this time.

Governmental Operations

Large scale impacts would not be expected on continued government operations, aside from transportation system disruptions impacting commutes to facilities.

Transportation and Electrical Infrastructure

Subsidence events can have numerous impacts on both transportation and electrical distribution systems. The impacts of subsidence events on transportation systems may include:

- **Roads and Highways:** Subsidence events can cause cracking, buckling, and collapse of roads, highways, and bridges. In severe cases, transportation networks are cut off, hindering emergency response, evacuation, and the transportation of goods.
- **Bridges and Tunnels:** Bridges are especially vulnerable to collapse during subsidence events due to the extreme forces exerted on their structures. Older bridges not built to modern codes are at higher risk of failure. Tunnels can also collapse or become blocked by debris, cutting off access to critical routes.
- **Railways:** Rail systems can be severely impacted by subsidence events, as tracks may buckle or become misaligned, leading to derailments.

A subsidence event can impact both the electrical generation capacity and transmission. The impacts of a subsidence event on electrical systems may include:

- **Power Plants:** A subsidence event can damage power generation facilities causing a cessation of services and costly repairs.

- **Transmission Lines:** Power transmission lines and substations can be damaged by extensive soil movement. This can result in prolonged power outages, which disrupt communication, emergency services, and basic living conditions.
- **Grid Instability:** Damage to power infrastructure can lead to cascading failures within the electrical grid. Substations, transformers, and electrical distribution networks can be knocked offline.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

Water and wastewater utilities are vulnerable to subsidence events due to the potential for plant damage and distribution system damages. Impacts may include:

- **Water Supply:** Subsidence events can rupture water pipes and damage water treatment facilities, leading to water shortages or contamination. In many cases, people are left without clean drinking water, and authorities must rely on temporary solutions like bottled water or emergency water delivery.
- **Wastewater Systems:** Sewer lines and wastewater treatment plants are particularly vulnerable to ground movement. Ruptured sewer lines can lead to sewage leaks, contaminating groundwater and local water sources. Damage to wastewater treatment plants can lead to untreated sewage being released into waterways, causing public health hazards.

Mapping and details concerning operators of water and wastewater utility providers may be found in Section 5.9.6.

Medical, Education, and Response Facilities

A subsidence event could significantly disrupt medical, education, and response facilities and operations at various levels. These impacts are especially pronounced in the immediate aftermath, where response efforts, infrastructure damage, and communication breakdowns can severely hamper functions. Impacts may include:

- **Damage to Facility:** Subsidence events can damage or destroy facilities, causing a significant drop or cessation of services.
- **Response Disruptions:** Emergency response, including search and rescue operations and medical assistance may be severely impacted due to the road closures.
- **Communication Breakdowns:** Subsidence events can damage communication networks, including internet and phone services, preventing effective communication and hindering the dissemination of critical information.
- **Budget Strains:** The cost of responding to and recovering from a subsidence event can put significant pressure on budgets.

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Section 3: Valuation Data.

Communication Systems

No comprehensive mapping of communications systems was available for review to compare against known subsidence hazard areas. However, it is assumed that communications lines and towers are in known hazard areas. Subsidence events can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Damage to Infrastructure:** Soil movement can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- **Power Outages:** Soil movement can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.
- **Structural Instability:** Soil movement can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Subsidence events in Siskiyou County are anticipated to have a limited impact on the agricultural community. However, a disruption in transportation networks could hamper the ability to transport commodities in a timely manner. Additionally, subsidence often occurs due to excessive groundwater extraction. As aquifers are depleted and the ground sinks, the capacity of these aquifers to store water is permanently reduced.

Although difficult to quantify, the potential environmental impacts can include habitat damage. The lowering of the ground level can also increase flood risk, especially in low-lying areas, causing potential environmental damage and long-term habitat changes.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with earthquakes may include:

- Fires from various causes, including downed power lines and broken gas pipelines
- Infrastructure failure
- Dam failure
- Power outages

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Subsidence Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Subsidence events may cause injury or death to people from vehicle accidents, falling objects, or structural failure. Ground movement may result in broken service lines or pipelines, triggering the release of hazardous materials or waste materials.
Impact on Responders	The extent of the damage to infrastructure such as roads and bridges and communications can greatly impact first responders’ ability to access or transport victims. Equipment, facilities, or other assets may be damaged and restrict first responders’ capacity to respond to calls for assistance.

Table : Subsidence Consequence Analysis

Subject	Potential Impacts
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Subsidence events could potentially impact critical infrastructure resulting in power outages, access to roadways or public transportation, damage to facilities or infrastructure, including alternate locations.
Delivery of Services	Delivery of services may be impacted by dangerous transportation conditions, causing food, water, and resource systems to be delayed or halted.
Property, Facilities, and Infrastructure	Unreinforced masonry structures are inherently vulnerable to external forces. All critical facilities and transportation corridors and pipelines can be impacted. Ground movement can lead to the collapse of buildings and bridges, and disrupt utility service.
Impact on Environment	Subsidence events have the potential to trigger secondary hazards such as fire, hazardous material release, or dam failures. These secondary hazards can destroy habitats and environments, cause significant injury to animals or livestock, or contaminate certain components of the environment.
Economic Conditions	Subsidence events pose a fiscal impact on the local and county governments, even if some of those costs can be recouped through federal grant reimbursements. Local, county, and state resources may be drained by response and recovery efforts. Additionally, a severe event could affect the ability of businesses to maintain operations. If the private sector is not able to re-establish operations this would also impact the local economy.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence. If local government takes a long time to begin recovery operations, or for the public to see recovery operations, this will have a negative impact on the public’s confidence in governance.

5.15.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the extreme heat hazard.

Table : Example Subsidence Mitigation Actions

Category	Example Action
Planning and Regulation	Use GIS to map areas that are susceptible to subsidence.
	Use ground-penetrating radar to detect lava tubes and map their location.
	Prohibit the development in areas that have been identified as at-risk to subsidence.
	Monitor areas at risk to subsidence by remaining aware of changes in groundwater levels.
	Implement regulations and practices to limit excessive groundwater extraction
Infrastructure	Update building codes to require subsidence-resistant construction techniques.
	Acquire and demolish or relocate buildings and infrastructure in high-risk areas.
	Replace impermeable surfaces with permeable surfaces that allow water to infiltrate the ground naturally, reducing soil compaction and subsidence.
	Incorporate structural designs that can resist loading associated with subsidence.
	Fill or buttress subterranean open spaces (abandoned mines) to prevent or alleviate collapse.
Natural Systems	In subsidence-prone areas, use deeper foundations that reach stable layers of bedrock to reduce the risk of structural damage.
	Encourage the restoration of natural wetlands to aid in groundwater replenishment and prevent subsidence.
Education	In regions prone to soil erosion or compaction, plant vegetation with deep roots to help stabilize the soil and prevent subsidence.
	Promote community awareness of subsidence risks and impacts.
	Offer GIS hazard mapping online for residents and design professionals.

5.16 Volcanic Activity

5.16.1 Hazard Description

A volcanic hazard refers to the dangers posed by volcanic activity, which can have severe and widespread impacts on human life, infrastructure, and the environment. These hazards arise from different types of volcanic phenomena, including eruptions, ashfall, lava flows, pyroclastic flows, and more. Volcanic hazards are typically divided into primary and secondary hazards:



Primary Volcanic Hazards:

- **Lava Flows:** Streams of molten rock (lava) that flow from a volcanic vent during an eruption. Lava flows can destroy everything in their path but generally move slowly enough that people can evacuate. However, property damage can be extensive.
- **Ashfall (Tephra):** Fine particles of volcanic ash ejected into the atmosphere can travel vast distances. Ashfall can cause respiratory issues, contaminate water supplies, damage agriculture, and cause structural damage when it accumulates on buildings. Ash can also disrupt air travel, as it can damage aircraft engines.
- **Pyroclastic Flows:** Fast-moving, hot clouds of gas, ash, and volcanic debris that flow down the sides of a volcano. Pyroclastic flows are highly destructive and deadly, with temperatures reaching over 1,000°C. They can incinerate anything in their path and cover large areas in volcanic material.
- **Volcanic Gas Emissions:** Volcanic eruptions release gases like sulfur dioxide, carbon dioxide, and water vapor. These gases can be hazardous to health, causing respiratory problems, and can contribute to environmental issues like acid rain.

Secondary Volcanic Hazards:

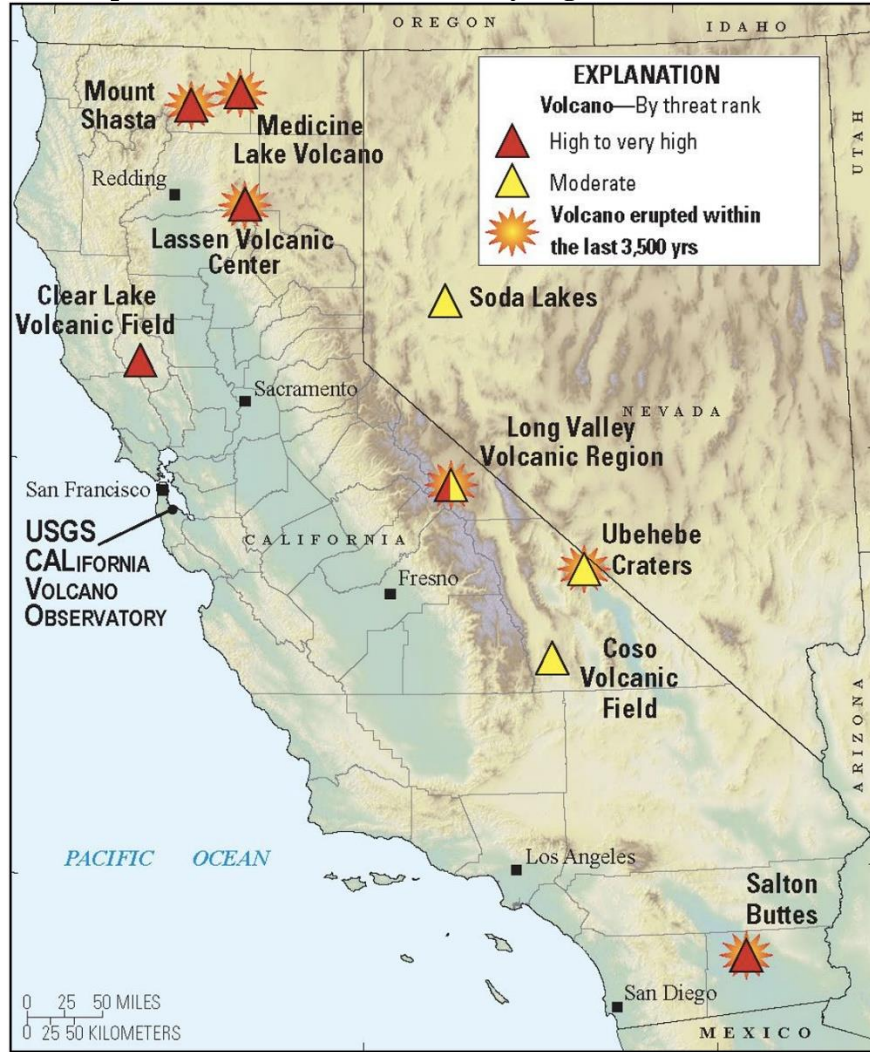
- **Lahars:** Volcanic mudflows or debris flows that occur when volcanic ash and debris mix with water from rainfall, melting snow, or ice. Lahars can travel rapidly down river valleys, destroying infrastructure, homes, and crops. They can occur long after an eruption, posing an ongoing threat.
- **Volcanic Landslides:** The sudden collapse of part of a volcano's slope, which can trigger debris avalanches. These can be triggered by volcanic eruptions, earthquakes, or heavy rainfall and can cause significant destruction.

5.16.2 – Location and Extent

Mount Shasta is a prominent stratovolcano located in Siskiyou County, and it rises to an elevation of 14,179 feet (4,322 meters), making it the second-highest peak in the Cascade Range and the fifth highest in California. Mount Shasta is a classic example of a stratovolcano, characterized by its steep, conical shape and built up from alternating layers of lava, volcanic ash, and other volcanic materials. Mount Shasta is a complex volcano consisting of four overlapping volcanic cones, with the main summit and several subsidiary peaks, including Shastina, which has its own crater. This type of volcano is known for explosive eruptions.

Threat rankings issued by the USGS identify volcanoes of concern in California, including Mt. Shasta in Siskiyou County. These volcanoes are assigned a risk value, from moderate to high and very high. The following map, from the USGS, indicates the location and threat level of these volcanoes, with starbursts indicating volcanoes that have erupted in the last 3,500 years:

Map : Location of Moderate to Very High Threat Volcanoes



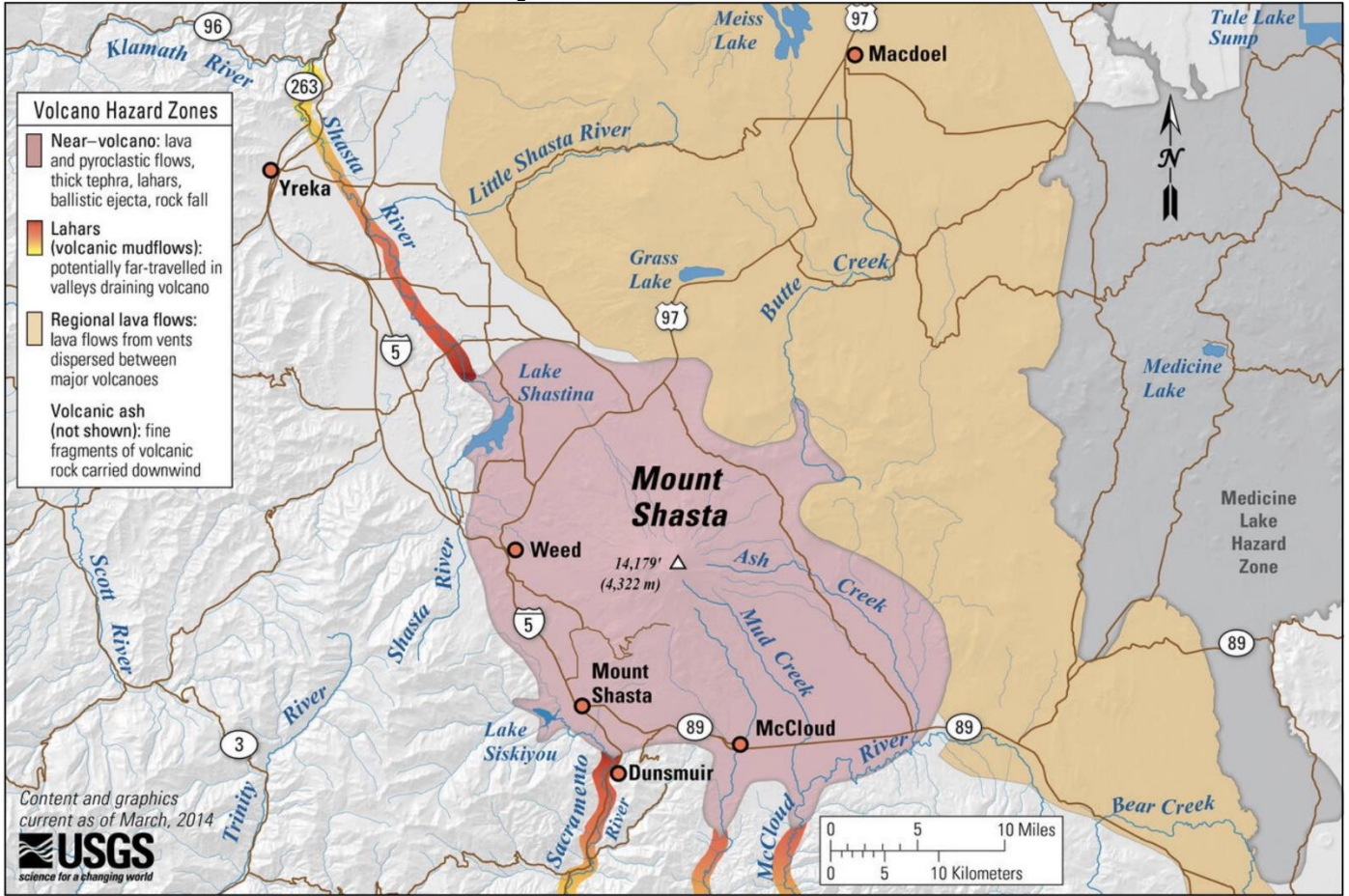
Source: USGS

Mount Shasta is not considered to be a large tephra producer like Mount St. Helens. Probabilistic tephra productions maps are not available for Mount Shasta, so analysis of this risk exposure was not performed. It should be assumed that volcanic activity could produce some degree of tephra accumulation within Siskiyou County. However, since the degree of that potential is not currently known, this risk assessment focuses on exposure to the lahars, debris avalanches, and pyroclastic flows.

Lahars, debris avalanches, and pyroclastic flows from an eruption could impact areas surrounding Mount Shasta. These volcanic flows could travel down any of the creeks or valleys that drain Mount Shasta or any suitable slope. Anything and anyone in the path of these volcanic flows is potentially exposed to damage, injury, or death.

The following map, from the USGS, illustrates the expected extent of pyroclastic flows and lahars from a Mount Shasta eruption.

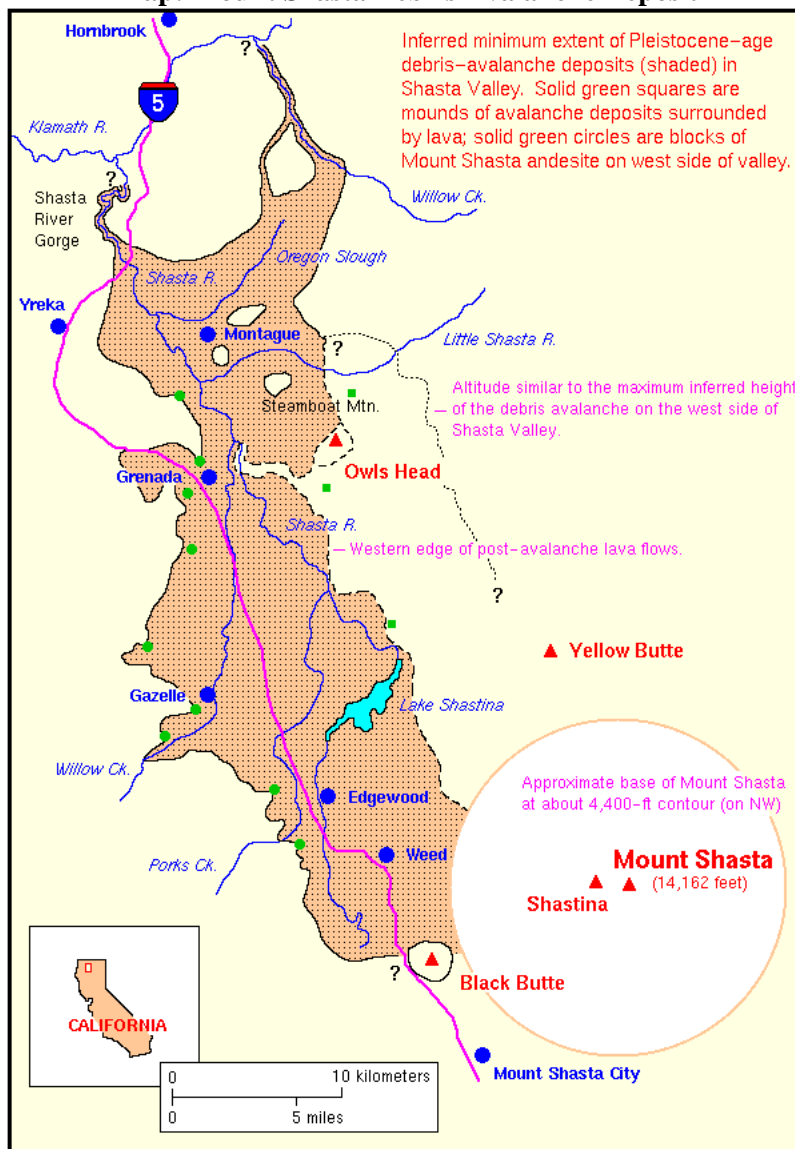
Map : Mt. Shasta Hazard Zones



Source: USGS

According to the USGS, a very large debris avalanche occurred 300,000 to 380,000 years ago. The deposits of a large debris avalanche extend northward from the base of Mount Shasta across the floor of Shasta Valley. The northern extent of the deposit is near Montague, about 30 miles from the summit. The deposits cover about 261 square miles, and their estimated volume is 11 cubic miles, according to the Cascades Volcano Observatory. The following map, from the USGS, shows the extent of this debris avalanche:

Map: Mount Shasta Debris Avalanche Deposit



5.16.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced no Presidential Disaster Declarations related to volcanic activity.

The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Siskiyou County has experienced no Emergency Declarations related to volcanic activity.

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. Siskiyou County has experienced no proclamations of a State of Emergency related to volcanic activity.

The following detail recent regional volcanic eruptions:

- **May 18, 1980:** The Mount St. Helens eruption released 23 square miles of volcanic material that buried the North Fork of the Toutle River. There were 57 human fatalities.
- **May 22, 1915:** An explosive eruption at Lassen Peak produced a pyroclastic flow that devastated an area as far as four miles northeast of the summit. The eruption also generated lahars that traveled more than 12 miles

5.16.4 Probability of Future Events

According to the USGS, activity for Mt. Shasta over the last 300,000 years includes long intervals of quiet interrupted by shorter spans of frequent eruptions. In the last few millennia, smaller eruptions have broken out at the volcano’s summit and from vents on its upper east flank. The most recent full eruption occurred about 3,200 years ago, producing block and ash flows on the volcano's north flank. However, in the last 1,000 years, more than 70 mudflows have inundated stream channels. The record of eruptions over the last 10,000 years suggests that, on average, at least one eruption occurs every 600 to 800 years at Mt Shasta.

5.16.5 Projected Changes in Location, Intensity, Frequency, and Duration

Due to the very long-term nature of geological process, including volcanic activity, the volcanic activity hazard for Siskiyou County is not expected to change during the life of this plan.

5.16.6 Vulnerability and Impact

FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating jurisdictions from volcanic activity. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Volcanic Activity Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Events per Year
Siskiyou County	All	Relatively Moderate	78.7	0
Dorris	06093000200	Relatively Moderate	67.4	0
Dunsmuir	06093001100	Relatively Moderate	67.2	0
Etna	06093000800	Relatively Moderate	71.8	0
Fort Jones	06093000701	Relatively Moderate	72.9	0
Happy Camp CSD	06093001300	Relatively Moderate	62.7	0
Lake Shastina CSD	06093000902	Relatively Moderate	63.7	0
McCloud CSD	06093001200	Relatively Moderate	62.5	0
Montague	06093000300	Relatively Moderate	76.9	0
Mt. Shasta	06093001003	Relatively Moderate	80.27	0
Tulelake	06093000100	Relatively Moderate	63.2	0
Weed	06093000901	Relatively High	87.3	0
Yreka	06093000703	Relatively Moderate	67.9	0

Source: FEMA NRI

Table : Participating Jurisdiction Volcanic Activity Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Volcanic Activity EAL
Siskiyou County	All	Relatively Moderate	81.1	\$1,100,000
Dorris	06093000200	Relatively Moderate	67.0	\$55,000
Dunsmuir	06093001100	Relatively Moderate	67.6	\$58,000
Etna	06093000800	Relatively High	72.2	\$86,000
Fort Jones	06093000701	Relatively High	74.3	\$98,000
Happy Camp CSD	06093001300	Relatively Moderate	62.4	\$41,000
Lake Shastina CSD	06093000902	Relatively Moderate	68.9	\$64,000
McCloud CSD	06093001200	Relatively Moderate	66.9	\$54,000

Table : Participating Jurisdiction Volcanic Activity Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Volcanic Activity EAL
Montague	06093000300	Relatively High	75.0	\$102,000
Mt. Shasta	06093001003	Relatively High	79.3	\$125,000
Tulelake	06093000100	Relatively Moderate	62.5	\$41,000
Weed	06093000901	Relatively High	79.1	\$124,000
Yreka	06093000703	Relatively Moderate	68.9	\$64,000

Source: FEMA NRI

Population

Although volcanic activity, notably eruptions, happen very infrequently in Siskiyou County, a large eruption could have profound impacts on people, affecting their physical, emotional, and social well-being. The impacts can be broken down into the following categories:

- **Physical Impact**
 - Injuries and Fatalities: Volcanic activity often lead to serious injuries and deaths, usually caused by collapsing buildings, falling debris, or fires triggered by broken gas lines. The extent of these injuries depends on the magnitude of the quake, building standards, and preparedness in the affected area.
 - Access to Medical Services: Hospitals and emergency services can become overwhelmed by the sudden influx of injured people. In some cases, healthcare facilities may also be damaged, reducing their capacity to provide care.
- **Emotional and Psychological Impact**
 - Trauma and Anxiety: Survivors often experience psychological stress, anxiety, and trauma from the event. The sudden and unpredictable nature of volcanic activity can cause long-lasting fear, especially in areas where aftershocks continue for days or weeks.
 - Post-Traumatic Stress Disorder: People who have lost loved ones, their homes, or have experienced life-threatening situations may develop Post-Traumatic Stress Disorder, affecting their long-term mental health.
- **Social and Economic Impact**
 - Displacement: Many people may be left homeless after major volcanic activity due to the destruction of homes. Temporary shelters may be set up, but displaced families can experience difficult living conditions, lacking access to food, clean water, and sanitation.
 - Loss of Livelihood: Economic losses can be devastating, especially for people whose businesses, jobs, or properties are destroyed. In regions where many rely on agriculture or small businesses, the economic recovery can take years.
 - Community Disruption: The destruction of infrastructure such as schools, transportation, and utilities (electricity, water, gas) can disrupt daily life for extended periods. Recovery efforts can take months or even years, affecting education, jobs, and community cohesion.

Volcanic activity may disproportionately affect socially vulnerable populations, exacerbating pre-existing inequalities and making recovery more difficult for these groups. Volcanic activity may disproportionately impact these groups in the following ways:

- **Increased Risk of Injury and Death**
 - Housing in Unsafe Areas: Socially vulnerable groups are more likely to live in poorly constructed housing, which is more prone to damage during volcanic activity.
 - Lack of Access to Resistant Infrastructure: Vulnerable populations, especially in under-resourced areas, may live in buildings not built to modern safety standards, increasing their risk during volcanic events.
- **Delayed or Inadequate Emergency Response**

- Limited Access to Emergency Services: Socially vulnerable populations may experience delayed access to rescue efforts, medical care, and emergency shelters due to geographic isolation, discrimination, or lack of resources like transportation. Rural, low-income, or marginalized communities may not receive the same level of emergency response as wealthier urban areas.
- Language Barriers: Non-English-speaking populations or those with limited literacy may struggle to receive or understand emergency alerts, evacuation instructions, or recovery information, increasing their vulnerability during and after volcanic activity.
- **Economic Impact and Prolonged Recovery**
 - Loss of Livelihoods: Volcanic activity can disrupt working conditions, particularly for those in informal employment such as day laborers or small business owners. Socially vulnerable populations often lack savings or insurance to cushion the economic blow of losing their homes or jobs.
 - Housing and Relocation Issues: Low-income households are less likely to have insurance or the financial means to repair or rebuild their homes. As a result, they may face prolonged displacement and be forced to live in overcrowded or substandard shelters for extended periods.
- **Mental Health and Social Support Challenges**
 - Psychological Impact: Vulnerable populations may have less access to mental health care and social services to help them cope with the trauma.
 - Weakened Social Networks: Socially vulnerable populations often rely on tight-knit community networks for support. Volcanic activity displacement can disrupt these networks, making recovery more difficult for individuals who lose access to family, friends, and community support systems.
- **Barriers to Recovery Resources**
 - Disparities in Aid Distribution: Vulnerable populations may face challenges accessing recovery assistance, such as government aid, housing assistance, and loans. Bureaucratic obstacles, discrimination, or lack of information can prevent marginalized groups from receiving the help they need.
 - Exclusion from Decision-Making: Marginalized groups are often excluded from post-disaster decision-making processes, meaning their specific needs and challenges may not be addressed in recovery planning. This can lead to inequitable rebuilding and recovery efforts, further disadvantaging these populations.

Additionally, older adults may have limited mobility, making it difficult for them to evacuate during volcanic activity or seek assistance afterward. They may also suffer more from disruptions to medical care or loss of essential services. Volcanic activity can severely impact people with disabilities who may need specialized evacuation assistance, accessible emergency shelters, and medical care. Often, emergency plans do not fully consider the needs of people with physical or cognitive disabilities. Children are particularly vulnerable during disasters because they rely on adults for safety and care. Displacement from homes, schools, and social networks can cause long-term developmental and psychological effects on children.

The loss of utility and communications services can also have a large impact on individuals. As an overview, the May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report indicates the following loss values:

Table : Economic Impacts of Loss of Service Per Capita Per Day (in 2022 dollars)

Category	Loss
Loss of Electrical Service	\$199
Loss of Wastewater Services	\$66
Loss of Water Services	\$138
Loss of Communications/Information Technology Services	\$141

Source: May 2023 FEMA Benefit-Cost Analysis Sustainment and Enhancements Standard Economic Value Methodology Report

To provide an estimate of the number of people at risk to volcanic activity, GIS data concerning the number of identified structures with these areas and the average household size was utilized. An estimate of population was calculated by multiplying the number of structures by the Siskiyou County average household size of 2.24 persons from the U.S. Census Bureau.

For population exposure development purposes, it was noted that Siskiyou County is most exposed to lahars, debris avalanches, and pyroclastic flows from a Mt. Shasta eruption. Anyone in the path of these flows is potentially exposed to injury or death. While most of the County would be exposed to ash fall and tephra accumulation in the event of a volcanic eruption, this vulnerability and impact analysis focuses on exposure to the lahar hazard and debris avalanche areas.

The following table provides an estimated population exposed to lahars, debris avalanche, and pyroclastic flow areas for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Population Exposure to Volcanic Flow Hazards

Jurisdiction	Estimated Population in Potential Volcanic Flow Areas	Percent of Total Population
Siskiyou County	2,800	6.4%
Dorris	0	0.0%
Dunsmuir	1,870	100.0%
Etna	0	0.0%
Fort Jones	0	0.0%
Happy Camp CSD	0	0.0%
Lake Shastina CSD	2,401	100.0%
McCloud CSD	1,279	100.0%
Montague	1,484	100.0%
Mt. Shasta	3,250	100.0%
Tulelake	0	0.0%
Weed	2,662	100.0%
Yreka	7,589	100.0%

Source: Siskiyou County and U.S. Census Bureau

Buildings and Structures

Buildings and structures can be damaged during a volcanic activity due to the lahars, debris avalanche, pyroclastic flow, intense ground shaking, and surface rupture. The severity of the damage depends on factors such as the volcanic activity's magnitude, distance from the eruption, and the building's design, materials, and age. Here are the main ways in which buildings and structures can be damaged and the types of damage that can occur:

- **Ashfall:** Fine volcanic ash can accumulate on rooftops and other structures, potentially causing roofs to collapse under the weight if the ash is wet or thick. Ash can clog ventilation systems, damage electrical components, and reduce air quality indoors. Even light ashfall can corrode metals, disrupt machinery, and necessitate costly cleaning and repairs.
- **Pyroclastic Flows:** These fast-moving, superheated clouds of gas and volcanic debris can destroy buildings instantly. Pyroclastic flows are extremely dangerous because they can travel at speeds of over 100 miles per hour, incinerating or burying structures in their path. Buildings made of wood, concrete, or steel are usually no match for the extreme temperatures and force of these flows.
- **Lava Flows:** While lava flows typically move slowly enough for evacuation, they can cause total destruction to anything in their path. Buildings in the direct path of lava flows will be completely consumed or encased by molten rock, leading to irreparable damage.
- **Volcanic Gases:** Buildings and their contents can suffer from corrosion due to exposure to volcanic gases, such as sulfur dioxide and hydrogen sulfide. Long-term exposure can degrade materials like metals and plastics.

- Lahars: The force of a lahar can erode soil and foundations, leading to building collapse. In areas prone to lahars, the heavy debris can destabilize the ground, increasing the risk of landslides and further structural failures.

To provide an estimate of the number of residential structures in areas of potential lahars, debris avalanche, pyroclastic flow, GIS data concerning the residential structures and the median value was utilized. An estimate of the value of residential structures was determined using the Siskiyou County median household value of \$231,100 from the U.S. Census Bureau. The following table provides an estimated structures exposed to volcanic flow for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Residential Structures Exposure to Volcanic Flow Hazards

Jurisdiction	Estimated Residential Structures in Potential Volcanic Flow Areas	Valuation
Siskiyou County	1,250	\$288,875,000
Dorris	0	\$0
Dunsmuir	1,091	\$252,130,100
Etna	0	\$0
Fort Jones	0	\$0
Happy Camp CSD	0	\$0
Lake Shastina CSD	569	\$131,495,900
McCloud CSD	574	\$132,594,000
Montague	1,906	\$440,476,600
Mt. Shasta	361	\$83,427,100
Tulelake	0	\$0
Weed	3,668	\$847,674,800
Yreka	0	\$0

Source: Siskiyou County and U.S. Census Bureau

Governmental Operations

Volcanic activity can significantly disrupt governmental operations at various levels. These impacts are especially pronounced in the immediate aftermath, where response efforts, infrastructure damage, and communication breakdowns can severely hamper government functions. Impacts to governmental operations may include:

- **Damage to Government Buildings:** Volcanic activity can damage or destroy government offices, courts, police stations, fire departments, and other essential facilities. This makes it difficult for public officials and emergency responders to coordinate disaster response efforts.
- **Emergency Management Strain:** Governments are responsible for coordinating emergency responses, including search and rescue operations, medical assistance, and evacuations. Volcanic activity can overwhelm local government capacities, particularly in communities that lack preparedness plans or resources. The scale of the disaster often requires the involvement of state or federal agencies, further complicating coordination.
- **Communication Breakdowns:** Volcanic activity can damage communication networks, including internet and phone services, preventing effective communication between government officials, emergency responders, and the public. This hinders the dissemination of critical information such as evacuation routes, safety guidelines, and status updates.
- **Budget Strains:** The cost of responding to and recovering from a volcanic event can put significant pressure on government budgets. Resources may need to be diverted from other programs to fund disaster relief, infrastructure repair, and rebuilding efforts. Governments often face additional costs for temporary housing, rebuilding public facilities, and providing social services to displaced populations.

- **Economic Disruption:** Volcanic activity can severely disrupt local and regional economies, affecting government revenues from taxes and fees. The temporary shutdown of businesses, loss of jobs, and damage to the tax base can lead to budget shortfalls, making it harder for governments to finance recovery efforts.
- **Accountability and Criticism:** The effectiveness of a government’s response to a volcanic event can impact public trust and confidence. If governments are perceived as slow or inadequate in their disaster response, they may face public criticism, protests, or political fallout. Conversely, a well-coordinated and effective response can strengthen public trust in leadership.
- **Education and Social Services:** Schools, which are often public institutions, may be destroyed or damaged, delaying the education of children. Government-run social services, including food distribution and welfare programs, may be strained or interrupted, especially as the need for these services often increases post-disaster.

Transportation and Electrical Infrastructure

Volcanic activity can have numerous impacts on both transportation and electrical distribution systems. The impacts of volcanic activity on transportation systems may include:

- **Roads and Highways:** Volcanic activity can cause cracking, buckling, and the collapse of roads, highways, and bridges. Debris and ash can make roads impassable. In severe cases, transportation networks are cut off, hindering emergency response, evacuation, and the transportation of goods.
- **Bridges and Tunnels:** Bridges are especially vulnerable to collapse during volcanic activity due to the potential force of lahars, debris avalanche, and pyroclastic flow exerted on their structures. Older bridges not built to modern codes are at higher risk of failure. Tunnels can also collapse or become blocked by debris, cutting off access to critical routes.
- **Railways:** Rail systems can be severely impacted by volcanic activity, as tracks may buckle or become misaligned, leading to derailments or become blocked due to debris and ash.

Volcanic activity can impact both the electrical generation capacity and transmission. The impacts of volcanic activity on electrical systems may include:

- **Power Plants:** Volcanic activity can damage power generation facilities causing a cessation of services and costly repairs. Solar generation plants may suffer drops in capacity due to ash on panels and in the air.
- **Transmission Lines:** Power transmission lines and substations can be damaged by ground shaking and debris flow, especially in areas with unstable soils. This can result in prolonged power outages, which disrupt communication, emergency services, and basic living conditions.
- **Grid Instability:** Damage to power infrastructure can lead to cascading failures within the electrical grid. Substations, transformers, and electrical distribution networks can be knocked offline.

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

Water and wastewater utilities are vulnerable to volcanic events due to the potential for plant damage and distribution system damages. Impacts may include:

- **Water Supply:** Volcanic activity can rupture underground water pipes and damage water treatment facilities, leading to water shortages or contamination. In many cases, people are left without clean drinking water, and authorities must rely on temporary solutions like bottled water or emergency water delivery.
- **Wastewater Systems:** Sewer lines and wastewater treatment plants are particularly vulnerable to ground movement. Ruptured sewer lines can lead to sewage leaks, contaminating groundwater and local water sources.

Damage to wastewater treatment plants can lead to untreated sewage being released into waterways, causing public health hazards.

Medical, Education, and Response Facilities

Volcanic activity can significantly disrupt medical, education, and response facilities and operations at various levels. These impacts are especially pronounced in the immediate aftermath, where response efforts, infrastructure damage, and communication breakdowns can severely hamper functions. Impacts may include:

- **Damage to Facility:** Volcanic activity can damage or destroy facilities, causing a significant drop or cessation of services.
- **Services Strain:** Emergency response, including search and rescue operations and medical assistance may be severely impacted due to the number of casualties.
- **Capacity Strain:** Volcanic activity can overwhelm capacities, particularly in communities that lack preparedness plans or resources. The scale of the disaster often requires the involvement of state or federal agencies, further complicating coordination.
- **Communication Breakdowns:** Volcanic activity can damage communication networks, including internet and phone services, preventing effective communication and hindering the dissemination of critical information.
- **Budget Strains:** The cost of responding to and recovering from a volcanic event can put significant pressure on budgets.
- **School Closure:** A volcanic event may result in long term school closures, straining the capacity of caregivers.

Mapping concerning medical, education, and response facilities may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Available insurance valuation data concerning identified jurisdictional medical, education, and response facilities may be found in Section 3: Valuation Data.

Communication Systems

No comprehensive mapping of communications systems was available for review to compare against known volcanic activity hazard areas. However, it is assumed that communications lines and towers are in known hazard areas. Volcanic activity can disrupt this vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Damage to Infrastructure:** Volcanic flow and shaking can cause physical damage to communication infrastructure such as cell towers, antennas, satellite dishes, and power lines. This damage can result in interruptions or complete failure of communication services.
- **Power Outages:** Volcanic flow and shaking can lead to power outages by knocking down power lines or damaging electrical substations. Communication systems that rely on electricity, such as landline phones, internet routers, and cellular towers, may cease to function during power outages.
- **Structural Instability:** Volcanic flow and shaking can cause structural instability in communication towers and buildings housing communication equipment. If these structures are not properly reinforced, they may collapse or sustain damage, disrupting communication services.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

A volcanic event can have severe and wide-ranging impacts on agriculture and the environment, often with both immediate and long-term consequences.

Volcanic ash can bury crops, suffocating plants and causing mechanical damage to leaves and stems. This can destroy entire fields, leading to immediate crop loss. Even light ashfall can block sunlight, reducing photosynthesis and stunting plant growth. Ash particles can also contaminate soil, lowering its fertility and damaging crops like rice, corn, and vegetables. Volcanic ash can introduce toxic elements, such as fluoride, into the soil, contaminating water sources and plants. High concentrations of these elements can poison livestock and render crops inedible. Ash-contaminated pastures may no longer be safe for grazing animals. Livestock may suffer from inhaling ash or consuming contaminated vegetation and water. Prolonged exposure to ashfall can cause respiratory problems, poisoning, and starvation, particularly when grazing areas are covered in ash.

Volcanic eruptions can decimate forests and vegetation. Hot gases, lava flows, and pyroclastic flows can incinerate entire ecosystems. The loss of vegetation can lead to increased soil erosion and reduced biodiversity. Volcanic gases such as sulfur dioxide (SO₂), carbon dioxide (CO₂), and hydrogen sulfide (H₂S) can lead to acid rain, which acidifies soil and water bodies. Acid rain damages ecosystems, killing plants, fish, and microorganisms critical for ecological balance. Additionally, large volcanic eruptions can inject ash and aerosols into the atmosphere, cooling the climate temporarily by blocking sunlight. This phenomenon, known as volcanic winter, can reduce crop yields over large areas and affect ecosystems globally. In some cases, volcanic events can benefit agriculture over the long term. Volcanic ash, after initial damage, can enhance soil fertility by adding nutrients like phosphorus, potassium, and trace minerals.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with volcanic activity may include:

- Mudflows and landslides
- Seismic activity
- Infrastructure failure
- Agricultural failure
- Long-term health impacts
- Water quality issues
- Long-term economic impacts

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Volcanic Activity Consequence Analysis

Subject	Potential Impacts
Impact on the Public	Volcanic activity may cause injury or death to people from volcanic flows, ash inhalation, ejected debris, or structural failure. There may be a large number of people seeking treatment for traumatic injuries. Ground shaking may result in broken service lines or pipelines, triggering the release of hazardous materials or waste materials.
Impact on Responders	The extent of the damage to infrastructure such as roads and bridges and communications can greatly impact first responders' ability to access or transport victims. Equipment, facilities, or other assets may be damaged and restrict first responders' capacity to respond to calls for assistance.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Earthquakes could potentially impact critical infrastructure resulting in

Table : Volcanic Activity Consequence Analysis

Subject	Potential Impacts
	power outages, access to roadways or public transportation, damage to facilities or infrastructure, including alternate locations.
Delivery of Services	Delivery of services may be impacted by dangerous transportation conditions, causing food, water, and resource systems to be delayed or halted.
Property, Facilities, and Infrastructure	All critical facilities and transportation corridors and pipelines can be impacted. Debris and volcanic flow and round shaking can lead to the collapse of buildings and bridges, and disrupt utility service.
Impact on Environment	Volcanic events have the potential to trigger secondary hazards such as fire, landslides, hazardous materials release, slope failure, and dam failures, all potentially devastating to the environment. These secondary hazards can completely wipe out habitats and environments, cause significant injury to animals or livestock, or contaminate certain components of the environment.
Economic Conditions	Volcanic activity can pose a fiscal impact on the local and county governments, even if some of those costs can be recouped through federal grant reimbursements. Local, county, and state resources may be drained by response and recovery efforts. Additionally, a severe activity would affect the ability of businesses to maintain operations. If the private sector is not able to re-establish operations this would also impact the local economy.
Public Confidence in Governance	Governmental response, on all levels, requires direct actions that must be immediate and effective to maintain public confidence. If local government takes a long time to begin recovery operations, or for the public to see recovery operations, this will have a negative impact on the public’s confidence in governance.

5.16.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the volcanic activity hazard.

Table : Example Volcanic Activity Mitigation Actions

Category	Example Action
Planning and Regulation	Develop and distribute guidelines or passing ordinances that require developers and building owners to locate lifelines, buildings, critical facilities, and hazardous materials out of areas subject to significant volcanic hazards.
	Develop an inventory all buildings that are in potential volcanic flow areas.
	Using GIS to map hazard areas, at-risk structures, and associated to assess high-risk areas.
	Create a volcanic eruption scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop mitigation priorities.
Infrastructure	Using flexible piping when extending water, sewer, or natural gas service.
	Install shutoff valves and emergency connector hoses for water mains in hazard areas.
	Install window film to prevent injuries from shattered glass.
Education	Develop an outreach program about volcanic activity risk and mitigation activities in homes, schools, and businesses.
	Offering GIS hazard mapping online for residents and design professionals

5.17 Wildfires

5.17.1 Hazard Description

The National Weather Service defines a wildfire as any free burning uncontrollable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. They can occur naturally and through human action. Population de-concentration in the U.S. has resulted in rapid development in the outlying fringe of urban areas and in rural areas with attractive recreational and aesthetic amenities, especially forests. This expansion has increased the likelihood that wildfires will threaten life and property.



According to the National Park Service there are three classifications of wildfires:

- **Surface Fire:** Burning which may spread rapidly and ignite leaf litter, fallen branches and other fuels located at ground level.
- **Ground Fire:** Burning of organic matter in the soil beneath the surface.
- **Crown Fire:** Burning through the top layer (canopy) of trees. Crown fires, which can be very intense and difficult to contain, require strong winds, steep slopes, and large amounts of fuel to burn.

Wildfires are strongly influenced by multiple factors, including:

- **Weather:** Factors such as relative humidity, wind speed, ambient temperature and precipitation all influence the formation and growth of wildfires.
- **Topography:** Natural features, such as canyons or ridges, can increase the spread rate of a fire by funneling or drawing heated air and fire.
- **Fuel Type, Distribution and Moisture:** Available fuels, the spacing and density of available fuels, and fuel moisture content can determine spread rates and intensity of wildfires.
- **Drought Conditions:** Drought tends to increase both the likelihood and severity of wildfires.

Fire science distinguishes between wildland fires wildland urban interface (WUI) fires. The primary difference between a wildland fire and a WUI fire lies in their location and the type of areas they impact:

- **Wildland Fire:**
 - **Definition:** A wildland fire occurs in undeveloped, natural areas such as forests, grasslands, and shrublands. It is driven by natural fuels like trees, grass, brush, and dead vegetation.
 - **Characteristics:** These fires are often started by natural causes (lightning) or human activity (campfires, equipment use). They can spread rapidly depending on fuel, weather conditions (wind and temperature), and topography.
 - **Impact Area:** Wildland fires primarily affect forests and other natural ecosystems, causing habitat loss, ecosystem changes, and environmental damage, though they can also impact air quality over a large region.
- **WUI Fire:**
 - **Definition:** A WUI fire occurs where wildland areas meet or intermingle with human development. It involves not only natural vegetation but also structures (homes, businesses, infrastructure).
 - **Characteristics:** These fires are especially dangerous because they can ignite homes, buildings, and other man-made structures, often in suburban or rural areas where homes are built near forests or brush.
 - **Impact Area:** WUI fires are particularly destructive to property and can result in large-scale evacuations and property loss. They are challenging for firefighters because of the dual threat to both natural landscapes and human communities.

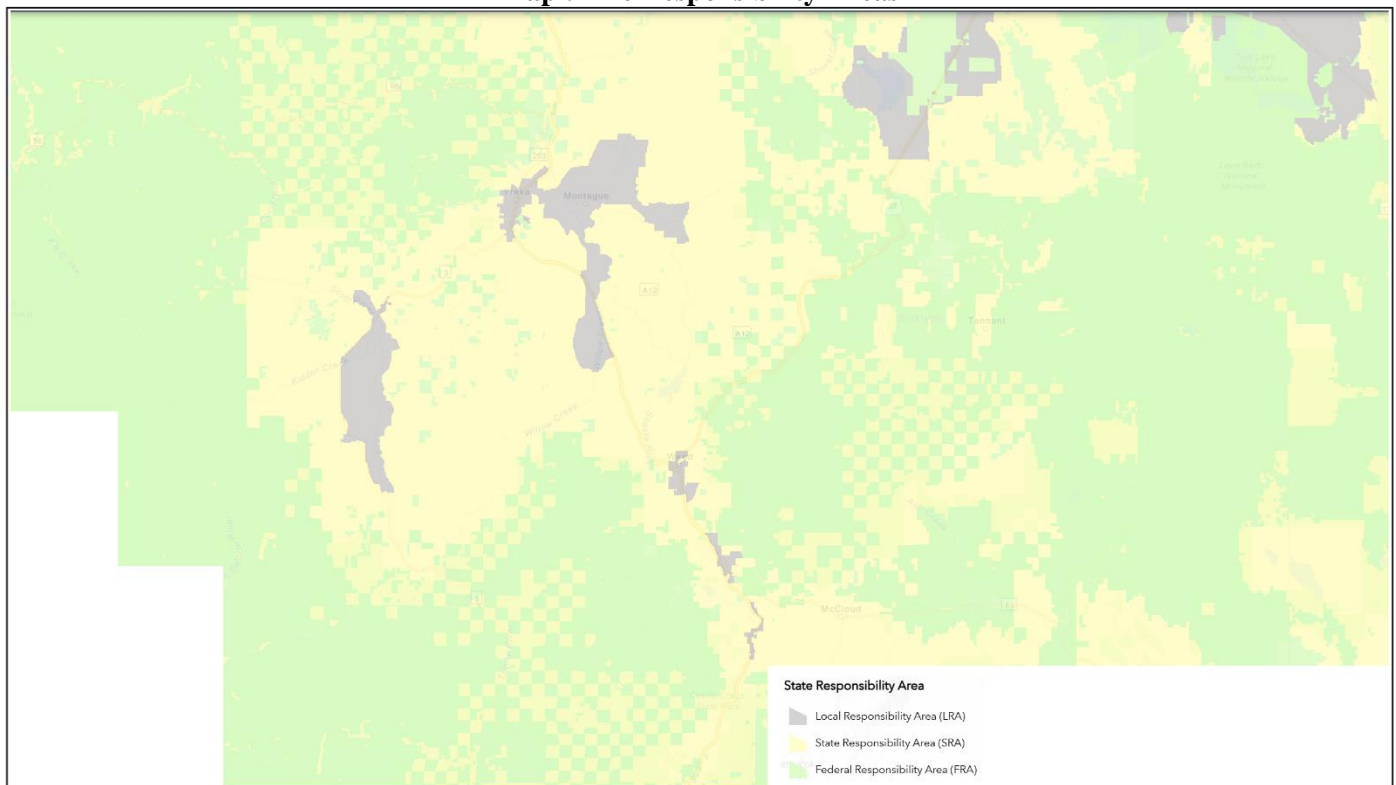
5.17.2 – Location and Extent

For fire response local, state, tribal, and federal organizations have primary legal (and financial) responsibility for wildland fire protection. In many instances, two fire organizations have dual primary responsibility on the same parcel of land, one for wildland fire protection and the other for structural or improvement fire protection. This layering of responsibility and resulting dual policies, rules, practices has been addressed by California state legislature who in 1981 adopted Public Resource Code Section 4291.5 and Health and Safety Code Section 13108.5 establishing the following responsibility areas:

- **Local Responsibility Area:** Primarily the responsibility of the local jurisdiction such as local fire departments and districts or by CAL FIRE under contract to local governments. These areas can include land in cities, cultivated agriculture land, and WUI areas where the financial and jurisdictional responsibility for improvement and wildland fire protection is that of a local government agency.
- **State Responsibility Area:** Primarily the responsibility of CAL FIRE, these areas are defined as lands that are in county unincorporated areas, are not federally owned, have wildland vegetation cover rather than agricultural uses, have watershed and/or range/forage value, and have housing densities not exceeding three units per acre.
- **Federal Responsibility Area:** Primarily the responsibility of a federal government agency such as the U.S. Forest Service or Bureau of Land Management. These areas are fire-prone wildland areas that are owned or managed by a federal agency where primary financial and rule-making jurisdictional authority rests with the federal land agency. In many instances, these areas are interspersed with private landownership or lease where fire protection for is usually not the responsibility of the federal land management agency but rather a local agency.

The following map, from the CAL FIRE State Responsibility Area Viewer, details areas of responsibility within Siskiyou County:

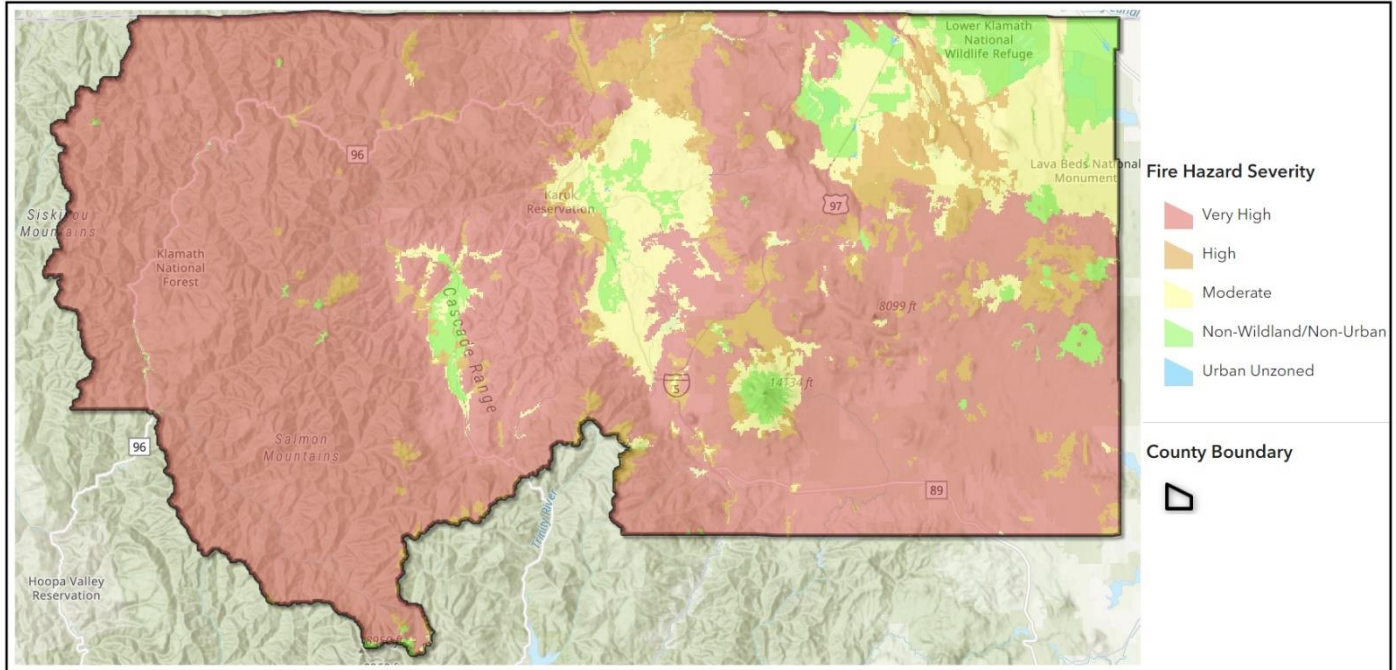
Map : Fire Responsibility Areas



Source: CAL FIRE State Responsibility Area Viewer

In an effort to codify wildfire risk, CAL FIRE is required to classify the severity of fire hazard in areas. The Fire Hazard Severity Zone maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior. Many factors are considered such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area. There are three levels of hazard, moderate, high, and very high. The following map, from Siskiyou County, details current severity zones:

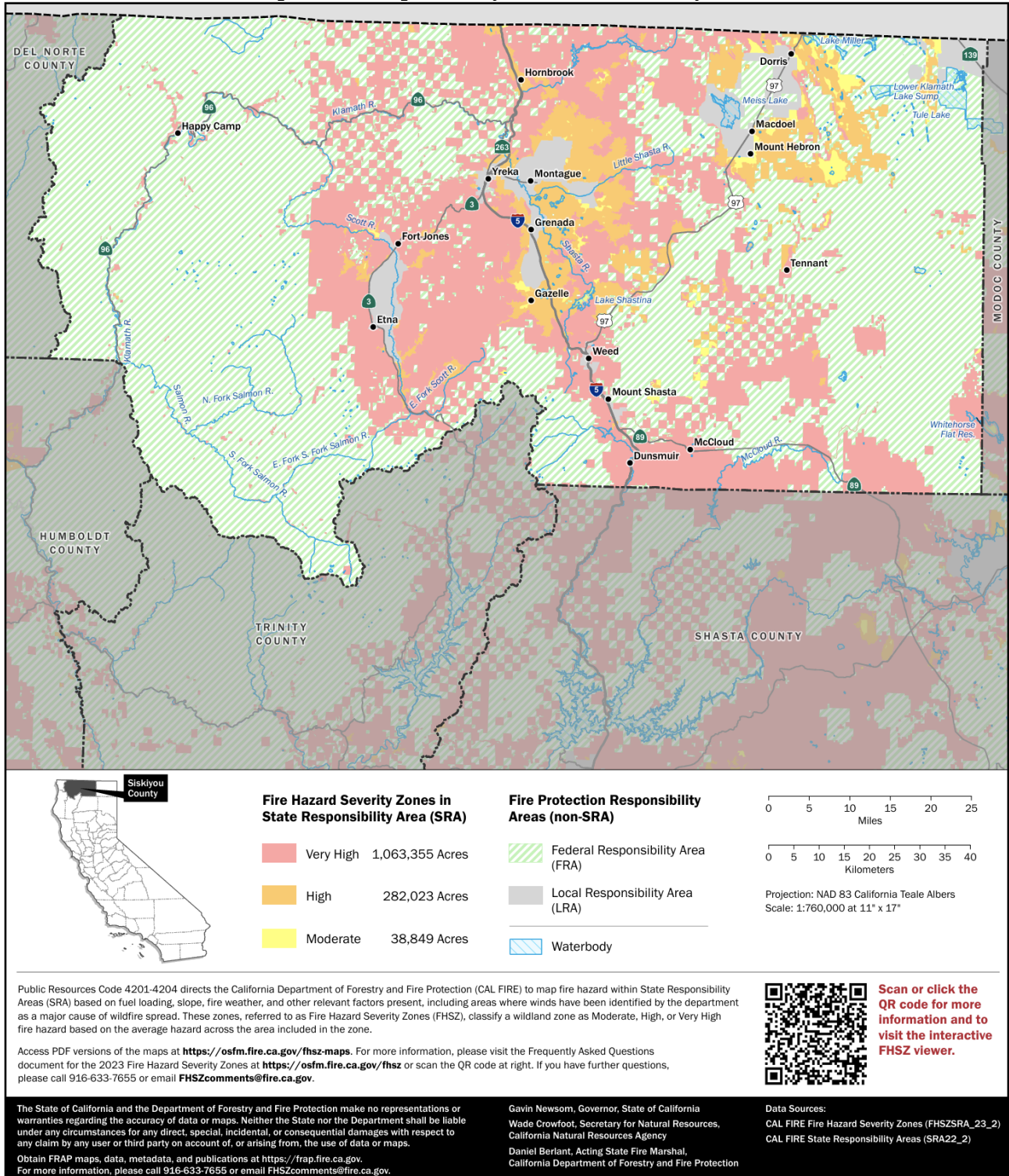
Map : Siskiyou County Fire Hazard Severity Zones



Source: Siskiyou County

The following map, from CAL FIRE, details the current severity zones in State Responsibility Areas:

Map : State Responsibility Fire Hazard Severity Zones

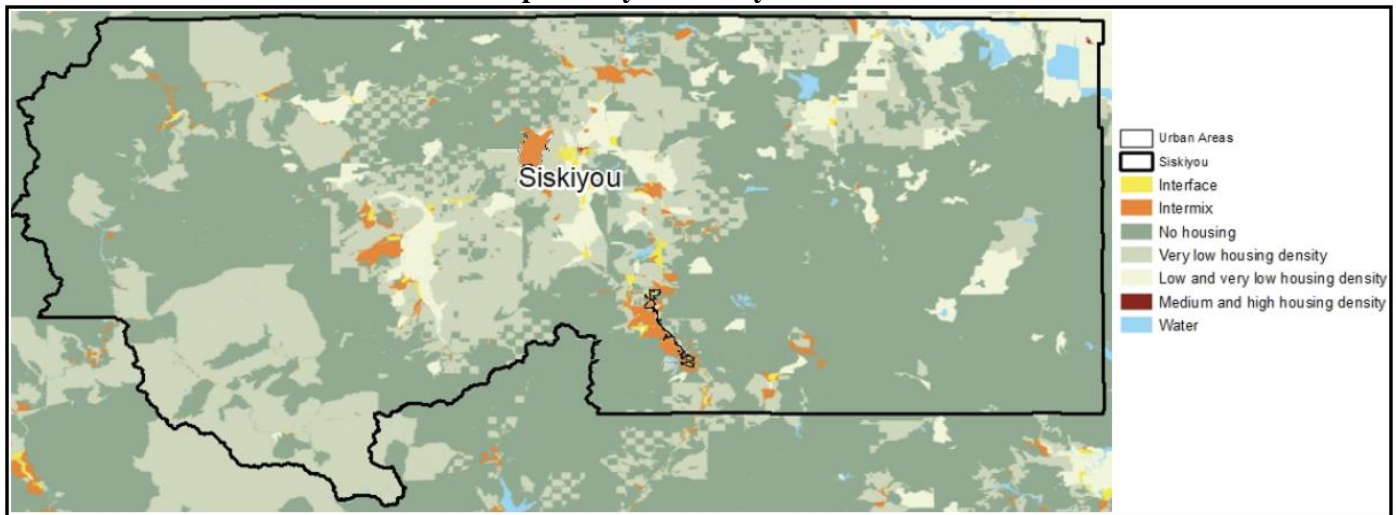


Source:

The WUI is the area where human improvements such as homes, ranches and farms come in contact with the wildlands. The WUI creates an environment in which fire can move readily between structure and vegetation fuels, often resulting in massive fires, or conflagrations, that may lead to widespread evacuations. The expansion of the WUI in recent decades has significant implications for wildfire management and its impact. There are two types of WUI, intermixed and interface. Intermix WUI are areas where housing and vegetation intermingle, and interface WUI are areas with housing

in the vicinity of dense, contiguous wildland vegetation. The following map illustrates WUI areas throughout the Siskiyou County:

Map : Siskiyou County WUI Areas



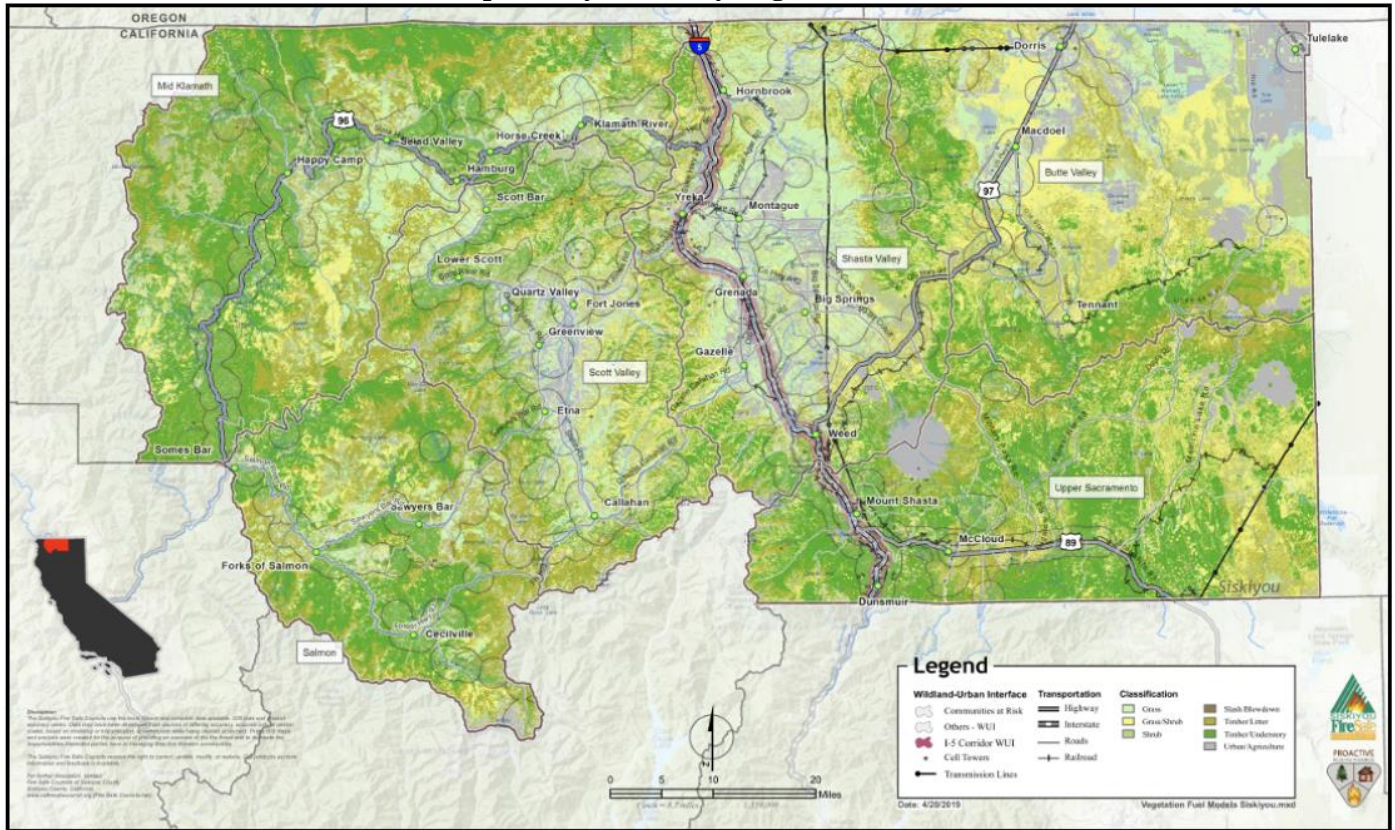
Source: Siskiyou County, CAL FIRE

Vegetation types are closely related to wildfire occurrence because they directly influence the availability of fuel, the intensity of the fire, and its potential spread. Different vegetation types have distinct characteristics in terms of flammability, moisture content, and fuel load, all of which determine how easily they can catch fire and how a wildfire behaves. The following provides an overview of how specific vegetation types impact wildfire occurrence:

- **Grasslands:** Dominated by fine, fast-drying fuels like grasses, they have a relatively low fuel load but dry out quickly and ignite easily. Fires in grasslands tend to spread rapidly but burn with lower intensity because the available fuel is less dense. The fast-moving nature of grass fires can make them dangerous, especially in windy conditions.
- **Shrublands:** These areas consist of dense shrubs, small trees, and brush with a high content of oils and resins, which are highly flammable. Chaparral is particularly common in California and other Mediterranean climates. Fires in chaparral ecosystems are intense, producing extreme heat and flames that can rapidly spread. These fires often exhibit "crown fire" behavior, where the fire moves through the canopy, jumping from shrub to shrub.
- **Forests:** Forests provide heavy fuel loads in the form of trees, dead wood, leaf litter, and underbrush. The type of forest plays a significant role in fire behavior. Coniferous Forests, particularly with species like pines and firs, tend to have higher resin content, making them highly flammable. They also shed needles that dry out and accumulate on the forest floor, increasing fire risk. Deciduous Forests typically have lower flammability due to higher moisture content in leaves and less resin. However, during dry seasons, they can still support wildfires, especially if there's significant leaf litter. Forest fires can vary from low-intensity surface fires that burn ground-level fuels to high-intensity crown fires that spread through the tree canopy.
- **Dry Forests:** These ecosystems, such as pinyon-juniper woodlands or oak woodlands, are characterized by low-density tree cover, and can have significant understory fuels, especially in drought conditions. Fires in these areas are moderate to high intensity and can spread quickly if the understory is dense or dry.
- **Urban and Agricultural Areas:** While urban areas are not typically thought of as wildland, many are located near or within WUI zones, where wildfires from surrounding natural vegetation can spread into developed areas. Fires in these areas can spread from wildlands into structures, significantly increasing the damage potential. Vegetation in agricultural lands can also burn, especially during dry periods.

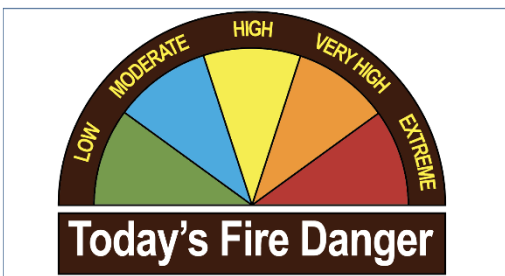
The following map, from the Siskiyou County Community Wildfire Protection Plan, details vegetation cover throughout the county:

Map : Siskiyou County Vegetation Cover



Source: Siskiyou County Community Wildfire Protection Plan

The duration of a wildfire depends on the weather conditions, how dry it is, the availability of fuel to spread, and the ability of responders to contain and extinguish the fire. Historically, some wildfires have lasted only hours, while other fires have continued to spread and grow for an entire season. They spread quickly and often begin unnoticed until they have grown large enough to signal by dense smoke. If fuel is available, and high wind speeds hit, a wildfire can spread over a large area in a very short amount of time. These factors make the difference between small upstart fires easily controlled by local fire services to fires destroying thousands of acres requiring multiple state and federal assets for containment and suppression.



The National Fire Danger Rating System allows fire managers to estimate today's or tomorrow's fire danger for a given area. It combines the effects of existing and expected states of selected fire danger factors into one or more qualitative or numeric indices that reflect an area's fire protection needs. It links an organization's readiness level (or pre-planned fire suppression actions) to the potential fire problems of the day. The following is a brief explanation of the different fire danger levels based on criteria established by the National Fire Danger Rating System.

Table : National Fire Danger Rating System

Rating	Description
Low	Fuels do not ignite easily from small embers, but a more intense heat source, such as lightning, may start fires in duff or dry rotten wood. Fires in open, dry grasslands may burn easily a few hours after a rain, but most wood fires will spread slowly, creeping or smoldering. Control of fires is generally easy.

Table : National Fire Danger Rating System

Rating	Description
Moderate	Fires can start from most accidental causes, but the number of fire starts is usually pretty low. If a fire does start in an open, dry grassland, it will burn and spread quickly on windy days. Most wood fires will spread slowly to moderately. Average fire intensity will be moderate except in heavy concentrations of fuel, which may burn hot. Fires are still not likely to become serious and are often easy to control.
High	Fires can start easily from most causes and small fuels (such as grasses and needles) will ignite readily. Unattended campfires and brush fires are likely to escape. Fires will spread easily, with some areas of high intensity burning on slopes or concentrated fuels. Fires can become serious and difficult to control unless they are put out while they are still small.
Very High	Fires will start easily from most causes. The fires will spread rapidly and have a quick increase in intensity, right after ignition. Small fires can quickly become large fires and exhibit extreme fire intensity, such as long-distance spotting and fire whirls. These fires can be difficult to control and will often become much larger and longer-lasting fires.
Extreme	Fires of all types start quickly and burn intensely. All fires are potentially serious and can spread very quickly with intense burning. Small fires become big fires much faster than at the "very high" level. Spot fires are probable, with long-distance spotting likely. These fires are very difficult to fight and may become very dangerous and often last for several days.

Source: Wildfire Fire Assessment System

The severity of wildfire depends on several quickly changing environmental factors. It is impossible to strategically estimate the severity of a wildfire as these factors, including drought conditions and wind speed, have such a great influence on the wildfire conditions. The Characteristic Fire Intensity Scale within the Southern Wildfire Risk Assessment Summary Report specially identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on a weighted average of four percentile weather categories.

The following table details the range of wildfire intensity:

Table : Characteristic Fire Intensity Scale

Class	Description
Class 1- Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
Class 2- Low	Small flames, usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 3- Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
Class 4 - High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers are generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property
Class 5- Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Source: Southern Wildfire Risk Assessment Summary Report

A Red Flag Warning is an alert issued by the National Weather Service to indicate that critical fire weather conditions are either occurring or expected shortly. A Red Flag Warning is typically issued when the following conditions are met:

- **Low relative humidity (often below 15%):** Dry air makes vegetation more likely to ignite and sustain fire.

- **High winds (usually sustained winds above 25 mph):** Winds can quickly spread embers and flames, helping fires move faster and become more intense.
- **Dry vegetation:** Vegetation such as grass, shrubs, and trees become highly flammable when moisture levels are low, creating ideal conditions for fires to ignite and spread.
- **High temperatures:** Hot weather exacerbates dryness and lowers fuel moisture, increasing fire potential.

When a Red Flag Warning is issued, it means that the potential for wildfire ignition and rapid spread is extremely high. The warning often leads to heightened preparedness among firefighting agencies and advisories for the public to avoid activities that could spark fires, such as outdoor burning or using machinery that could create sparks.

5.17.3 Previous Occurrences

Historical events of significant magnitude or impact can result in a Presidential Disaster Declaration. Siskiyou County has experienced two Presidential Disaster Declarations related to wildfire events reflected in the following table.

Table : Siskiyou County Presidentially Declared Disasters

Designation	Declaration Date	Incident Type	Individual and Public Assistance	Mitigation Dollars Obligated
DR-4569-CA	10/16/2020	California Wildfires	\$207,894,170	\$33,655,435
DR-4142-CA	08/29/2013	Wildfire (Karuk Reservation)	\$444,517	-

Source: FEMA

-: Not reported

The Governor, or the Governor's Authorized Representative, may submit a request for a fire management assistance declaration as required. FEMA will approve declarations for fire management assistance when it is determined that a fire or fire complex on public or private forest land or grassland threatens such destruction as would constitute a major disaster. Research indicates that there have been six fire management declarations for Siskiyou County since 1953:

Table : Siskiyou County Fire Management Declarations

Designation	Declaration Date	Incident Name	Public Assistance	Emergency Work
FM-5450-CA	9/2/2022	California Mill Fire	\$8,303,965	\$253,281
FM-5393-CA	6/29/2021	California Lava Fire	\$3,697,476	\$503,088
FM-5361-CA	9/9/2020	California Slater Fire	-	-
FM-5250-CA	9/5/2018	California Klamathon Fire	\$18,158,242	\$585,590
FM-5079-CA	9/15/2014	California Boles Fire	\$5,294,855	\$165,882
FM-5068-CA	8/2/2014	California Oregon Gulch Fire	\$1,134,200	\$22,006

Source: FEMA

The Governor of the State of California, in accordance with the authority vested by the State Constitution and statutes, including the California Emergency Services Act Government Code section 8625, can declare a proclamation of a State of Emergency. The following table details wildfire proclamations for Siskiyou County:

Table : Siskiyou County California Proclamations of State of Emergency

Designation	Declaration Date	Incident Type	Damages*
2023-08	08/29/2023	Happy Camp Fire	-
2022-08	09/02/2022	Mill Fire	\$84,513,380
2022-07	07/30/2022	McKinney Fire	\$15,061,500
2021-04	07/16/2021	Lava Fire	\$9,310,474
2020-07	09/10/2020	Wildfire	\$245,298,163
2018-04	07/05/2018	Wildfire	\$32,808,626
-	09/10/1987	Wildfire	\$18,000,000

Source: Cal OES

*: Damages reported for all impacted counties, tribal reservations, and cities

The following table, using data from CAL FIRE, details the occurrence of wildfires for Siskiyou County from 2016 – 2024, along with the administrative unit providing fire management oversight, the location of the event, and the number of acres burned:

Table : CAL FIRE Recorded Wildfire, 2016 - 2024

Incident Name	Date	Administrative Unit	Location	Acres Burned
Hambone Fire	2024-10-06	CAL FIRE Siskiyou Unit	North Fork of the Salmon River, West of Sawyers Bar, Klamath National Forest	14,754
Shelly Fire	2024-07-03	Klamath National Forest	Cottonwood Creek Rd., 2 miles north of Hornbrook	50
Harry Fire	2024-07-23	CAL FIRE Siskiyou Unit	Community of Copco, South of Oregon Border	35,302
Donomore Fire	2024-07-16	Rogue River-Siskiyou National Forest	near Little Deer Mountain along Highway 97	5,503
Dewey Fire	2024-07-14	CAL FIRE Siskiyou Unit	in the Happy Camp area	0
Paradise Fire	2024-07-15	CAL FIRE Siskiyou Unit	Approx. 18 miles northeast of McCloud, just south of Horse Peak	200
Bogus Fire	2024-07-08	CAL FIRE Siskiyou Unit	City of Weed	516
Springs Fire	2024-06-07	CAL FIRE Siskiyou Unit	5 miles North of the community of Montague on Cooley Rd	181
Cod Fire	2024-06-10	CAL FIRE Siskiyou Unit	Off Hwy 161 & Hwy 97, northeast of Dorris	24
SKU August Lightning Complex	2023-08-15	CAL FIRE Siskiyou Unit	15 miles SW of Happy Camp (Siskiyou County)	2,860
Happy Camp Complex	2023-08-16	Klamath National Forest Service	Hwy 5 at Bailey Hill, 2 mi southeast of Hilt	26
Mill Fire	2022-09-02	CAL FIRE Siskiyou Unit	Table Rock Rd & Harry Cash Rd, Montague	23
Mountain Fire	2022-09-02	CAL FIRE Siskiyou	off Seiad Creek Rd, 5 miles northeast of Seiad Valley	33,867
McKinney Fire	2022-07-29	Klamath National Forest	off Hwy 263, 2 miles north of Yreka	710
Eliza Fire	2022-09-08	Klamath National Forest	off of Moffett Creek Rd and Luce Gulch Rd, northeast of Fort Jones	32
Yeti and Alex Fire	2022-07-29	Klamath National Forest	Whitepine Road and Blue Heron Place, 10 miles east of Hornbrook	46
Grade Fire	2016-08-24	CAL FIRE Siskiyou Unit	Ager Beswick Rd. and Crest Ln. south of Copco Lake	56
Fay Fire	2017-07-05	CAL FIRE Siskiyou Unit	off Campus Dr. and Moonlit Oaks Ave. in Yreka	19
River Complex	2021-07-30	Klamath National Forest	Off Hwy 96 & Dutch Creek Rd, east of Oak Knoll	0
Antelope Fire	2021-08-01	Klamath National Forest	Highway 3 & Fay Lane, south of Etna	496
Refuge Fire	2021-03-27	CAL FIRE/Siskiyou unit	14 miles west of Etna, California in the Marble Mountain Wilderness	0
97 Fire	2022-09-27	CAL FIRE Siskiyou Unit	About 18 miles northwest of Orleans, California in Siskiyou County.	27,276
Coyote Fire	2022-09-07	CAL FIRE Siskiyou Unit	Clear Creek Drainage, 7 miles southwest of Happy Camp (Siskiyou County)	0

Table : CAL FIRE Recorded Wildfire, 2016 - 2024

Incident Name	Date	Administrative Unit	Location	Acres Burned
Kelsey Fire	2022-07-30	Klamath National Forest	Lakeview Dr. at Lake Ridge Rd., Pleasant Valley, 3 miles west of Dorris	155
Smokey Fire	2022-08-04	Klamath National Forest	Wards Fork south of Donomore Meadows near the Oregon border.	41
Meamber Fire	2022-07-31	CAL FIRE Siskiyou Unit	5 miles W of Happy Camp, CA	78,698
Shackleford Fire	2022-07-30	CAL FIRE Siskiyou Unit	Siskiyou Wilderness, Six Rivers NF	3,142
Ridge Fire	2022-06-26	Unified Command: CAL FIRE Siskiyou and United States Forest Service	Bradley Ridge, City of Dunsmuir	54
Whitlow Fire	2022-03-25	CAL FIRE Siskiyou Unit	off of Owens Rd and Hwy 97, northeast of Dorris	55
Gulch Fire	2022-03-12	CAL FIRE Siskiyou	West of Dunsmuir	54
Evergreen Fire	2022-03-12	CAL FIRE Siskiyou	17 miles east of Cave Junction, Oregon	39,715
McCash Fire	2021-08-18	Six Rivers National Forest	West of Rancho Hills, community of Lake Shastina, north of Weed	127
Lava Fire	2021-06-24	Shasta-Trinity National Forest	off Ager Road, northeast of Montague	27
Hambone Fire	2021-08-06	Shasta-Trinity National Forest	Martin Dr. and Stanton Drive, NE of Lake Shastina	37
Tennant Fire	2021-06-28	Klamath National Forest	Meamber Creek Road, 8 miles west of Fort Jones	12
Bradley Fire	2021-07-11	Shasta Trinity National Forest	Cherry Maple Road Klamath River, NW of Yreka, Klamath National Forest	63
Beswick Fire	2021-06-28	CAL FIRE Siskiyou Unit	Petersburg and Caribou Creek Rd 3 MI SW of Cecilville	215
July Complex	2020-07-24	Modoc National Forest	off Klamathon Road and Copco Road, south of Hornbrook	38,008
Fox Fire	2020-09-16	Klamath National Forest	Shasta Valley Wildlife Area, 4 miles southeast of Montague	224
Shackleford Fire	2020-09-11	CAL FIRE Siskiyou Unit	off Lott Rd and Bunny Ln, 15 miles north of Weed	10
Schoolhouse Fire	2020-09-09	CAL FIRE Siskiyou Unit	1 mile northwest of Iron Gate Dam	15
Badger Fire	2020-07-18	CAL FIRE Siskiyou	Rocky Rd and Harry Cash Rd, 9 miles east of Grenada	17
Klamathon Fire	2018-07-05	CAL FIRE Siskiyou Unit	Deer Run Road, east of Iron Gate Reservoir	10
Lime Fire	2019-09-07	Klamath National Forest	off Highway 96 and Lumgrey Road, West of Gottsville	207
Kidder 2 Fire	2019-09-07	Klamath National Forest	Tree of Heaven Campground, east of Gottsville	83
Tree Fire	2019-07-27	Klamath National Forest	Hwy 96 near the Klamath River Community Hall	35
Community Fire	2019-07-27	Klamath National Forest	Ash Creek and Highway 96, Southwest of Hornbrook	1,872
Bar Fire	2019-09-15	Klamath National Forest	Marble Mountain Wilderness and Kidder Creek, Northwest of Etna	227

Table : CAL FIRE Recorded Wildfire, 2016 - 2024

Incident Name	Date	Administrative Unit	Location	Acres Burned
Duzel Fire	2019-09-07	CAL FIRE Siskiyou unit	Near Duzel Rock Lookout, northeast of Etna	15
IronGate Fire	2019-06-16	CAL FIRE Siskiyou Unit	Southwest of Bald Mountain and Klamath Bar, Klamath National Forest	91
Ward Fire	2017-08-13	Rogue-River-Siskiyou National Forest	Badger Mountain Road and Hawkinsville Humbug Road	557
Lumgreys Fire	2019-06-17	USFS Klamath National Forest	Schoolhouse Gap Rd And McAdams Creek Rd	45
Rocky Fire	2019-06-14	CAL FIRE Siskiyou	Shackleford Rd, southwest of Quartz Valley Reservation	50
Shastina Fire	2018-05-09	CAL FIRE Siskiyou Unit	Fox Creek, Southwest of Callahan	2,188
Ager Fire	2018-05-19	CAL FIRE Siskiyou Unit	Lower Klamath Lake Rd and Dorris Brownell Rd	873
Martin Fire	2018-06-03	CAL FIRE Siskiyou Unit	Hotlum Rd and Lumm Rd	26,409
Meamber Fire	2018-06-04	CAL FIRE Siskiyou Unit	Tennant Road and Pengrass Road, South of Mount Hebron	10,580
Cherry Fire	2018-06-27	Klamath National Forest	Ager-Beswick Road and Desavado Road, North of Montague	118
Petersburg Fire	2018-07-01	Klamath National Forest	Highway 89 and Harris Spring Road, east of McCloud in Siskiyou County.	357
Steamboat Fire	2018-07-15	CAL FIRE Siskiyou Unit	Antelope Creek and Forest Road 41N28, south of Tennant	145,632
Lott Fire	2018-07-17	CAL FIRE Siskiyou Unit	Lave Spur and Hambone Island	55
Iron Gate Fire	2018-10-10	CAL FIRE Siskiyou Unit	Ten Bear Mtn McCash Creek	94,962
Owens Fire	2017-08-29	CAL FIRE Siskiyou Unit	Dorris Brownell Road and East Butte Valley Road, southeast of Dorris	113
Bradley Fire	2017-08-28	Shasta-Trinity National Forest	Evergreen Lane & Hwy 97, northeast of Weed.	12
Bradley Fire	2017-08-28	Shasta-Trinity National Forest	East Bear and Bear Lake Rd, northwest of Pondosa	10
Eclipse Complex	2017-08-15	Klamath National Forest	Rainbow ridge , West of Mount Shasta in Siskiyou County.	12
Miller Complex	2017-08-14	Rogue River-Siskiyou National Forest	Hwy 96 and McKinney Creed Road, southwest of Klamath River	60,138
Young Fire	2017-08-07	Six Rivers National Forest	Shackleford Road and Big Meadows Creek, West of Fort Jones	31
Hill Fire	2017-07-29	CAL FIRE Siskiyou Unit	Buker Rd and Punkin Rd, Southwest of Scott Bar	85
Orleans Complex	2017-07-26	Six Rivers National Forest	Meamber Creek Road and Scott River Road, Northwest of Fort Jones	63
Clear Complex (merged into Eclipse Complex)	2017-07-25	Klamath National Forest	Beaver Creek and Forest Road 48N01, west of Hilt	34
Klamath Fire	2017-07-04	Klamath National Forest	Seiad south of HWY 96 and south of the Klamath River	-
King Fire	2017-06-26	CAL FIRE Siskiyou Unit	Woodridge Court and Woodridge Way, City of Weed	3,939

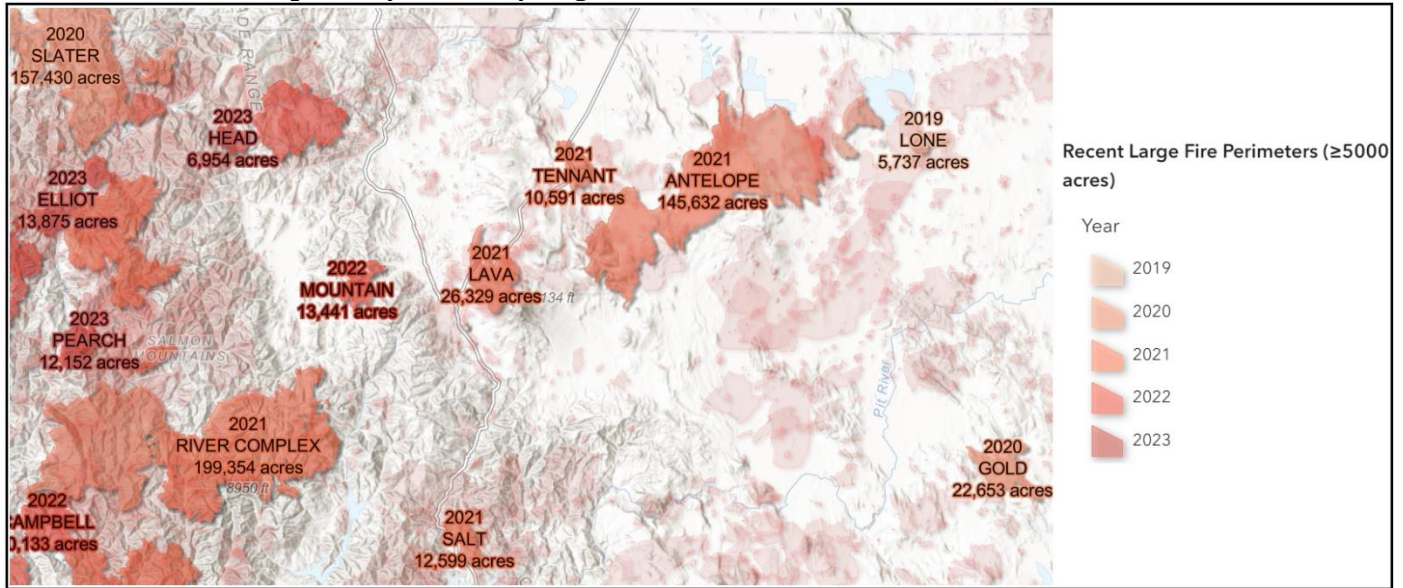
Table : CAL FIRE Recorded Wildfire, 2016 - 2024

Incident Name	Date	Administrative Unit	Location	Acres Burned
Salmon-August Complex	2017-06-25 T17:00:00Z	CAL FIRE Siskiyou Unit / Klamath National Forest	Gazelle-Callahan Road, east of Gazelle Mountain , southeast of Gazelle	13,440
Bogus Fire	2017-06-18	CAL FIRE Siskiyou Unit	Coyote Ridge, west of Red Rock Lakes, southeast of Dorris	297
Whitepine Fire	2017-06-06	CAL FIRE Siskiyou Unit	Hawkinsville Humbug Rd and Humbug Creek Rd west of Yreka	-
Pony Fire	2016-06-07	USFS Klamath National Forest	Quarry Road and Quarry Lance, Lake Shastina	30
Moffett Fire	2016-09-12	CAL FIRE Siskiyou Unit	Siskiyou County	838
Gap Fire	2016-08-27	USFS Klamath National Forest	Klamath National Forest and Happy Camp Ranger District near Scott Bar	21,725
Table Fire	2016-07-21	CAL FIRE Siskiyou Unit	West of Gazelle	11
Bailey Fire	2016-07-19	CAL FIRE Siskiyou Unit	Cod Drive, Hornbrook	28
Dorris Fire	2015-07-21	CAL FIRE Siskiyou Unit	Greenview	15,520
Cooley Fire	2015-07-13	CAL FIRE Siskiyou Unit	East of Ager	411
Stephens Fire	2015-02-24	Shasta-Trinity National Forest	North of Little Shasta	109
Boles Fire	2014-09-15	CAL FIRE Siskiyou Unit	4500 Block of Ager Road, West of Siskiyou County Airport, Montague	101
Little Deer Fire	2014-07-31	CAL FIRE Siskiyou Unit / USFS-Klamath National Forest	South/East of Donomore Peak, near the California/Oregon border	35
Oregon Gulch Fire (part of the Beaver Complex)	2014-07-30	CAL FIRE Siskiyou Unit / Oregon Dept. of Forestry / Oregon Office of The State Fire Marshal	Harry Cash Road, near Montague.	10
Happy Camp Complex	2014-08-11	US Forest Service - Klamath National Forest	Forest Road 24 and Forest Road 40N57 in the Pondosa and Hambone area	-
Salmon River Complex	2013-07-31	Klamath National Forest	Caldwell Trail and Hill Road, Northwest of Tionesta	83,261
Cottonwood Fire	2013-08-15	CAL FIRE Siskiyou Unit	Scott Salmon Ranger District, west of Callahan	199,359

Source: CAL FIRE
 -: Data not reported

Augmenting this data, the CAL FIRE Fire and Resource Assessment Program annually maintains and distributes an historical fire perimeter maps. The GIS data is jointly developed with the cooperation of the United States Forest Service Region 5, the Bureau of Land Management, the National Park Service and the Fish and Wildlife Service. Although the database represents the most complete digital record of fire perimeters, it is still incomplete, and users should be cautious when drawing conclusions based on the data. The following map details historic wildfire peimeters for Siskiyou County from 2019 – 2023:

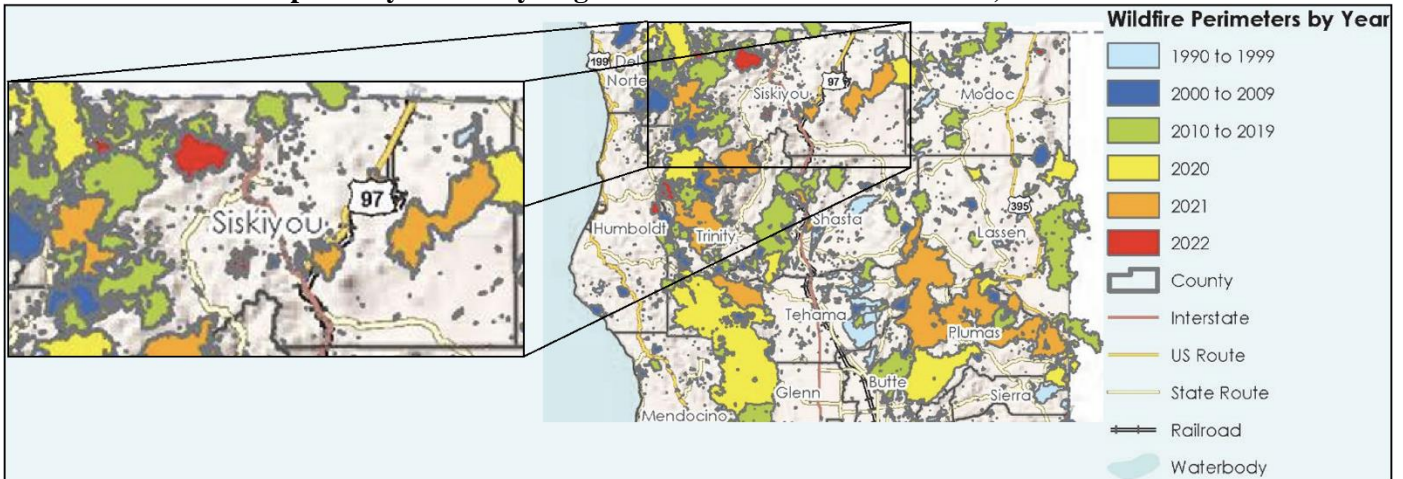
Map : Siskiyou County Region Historic Wildfire Perimeters, 2019 - 2023



Source: CAL FIRE Fire and Resource Assessment Program

For longer term perspective, the following map sourced from the 2024 State of California Hazard Mitigation Plan detail historic wildfire boundaries for the Siskiyou County region from 1990 – 2022:

Map : Siskiyou County Region Historic Wildfire Perimeters, 1990 - 2022



Source: 2024 State of California hazard Mitigation Plan

Over the past ten years, large fires have caused significant damage to millions of acres of wildland and several Siskiyou County communities. Two of the twenty largest fires in California fire history have occurred in Siskiyou County. In 2008, the Klamath Theater Complex Fire burned 192,038 acres and caused two fatalities. In 2014, the Happy Camp Complex Fire burned 134,056 acres. The following list details some of the recent larger wildfires within Siskiyou County:

- **July 3, 2024, Shelley Fire:** The Shelley Fire in Klamath National Forest burned 15,520 acres.
- **August 15, 2023, Smith River Complex:** The Smith River Complex in northern Siskiyou County burned over 95,000 acres.
- **September 2, 2022, Mill Fire:** The Mill Fire burned over 3,900 acres in rural Siskiyou County and including the unincorporated community of Lake Shastina as well as the incorporated City of Weed. Over 5,500 people were evacuated and over 100 structures were lost in the fire along with two reported casualties. The wildfire

significantly damaged the community of Lincoln Heights in Weed, which was a historically Black, working-class community

- **July 29, 2022, McKinney Fire:** The McKinney Fire burned 60,392 acres in the unincorporated community of Klamath River and surrounding areas. According to CAL Fire reports, the McKinney Fire destroyed 185 structures, 118 of which were residential houses and caused four casualties.
- **August 1, 2021, Antelope Fire:** The Antelope Fire burned 145,632 acres in the Klamath National Forest. According to CAL Fire reports, the Antelope Fire destroyed 18 residential houses.
- **June 30, 2021, River Complex Fire:** The River Complex 2021 burned over 199,343 acres in Klamath National Forest
- **June 28, 2021, Tennant Fire:** The Tennant fire burned 10,580 acres, destroyed five structures, and caused evacuations in Macdoel.
- **June 24, 2021, Lava Fire:** The Lava Fire burned 26,409 acres over the course of 70 days. The fire, which was started by lightning, burned unincorporated areas northeast of the city of Weed. According to CAL Fire reports, the Lava Fire destroyed 144 homes, which included 15 residential houses and 129 parcels that contained small structures and trailers. At the time of the fire, mandatory evacuations were in place for about 10,000 people.
- **September 8, 2020, Slater Fire:** The Slater Fire burned over 150,000 acres in Happy Camp and surrounding areas. According to CAL Fire reports, the Slater Fire destroyed over 224 homes, many of which consisted of single-family houses, mobile homes, and small outbuildings and detached garages that functioned as living places. The community of Happy Camp lost 40% of its housing stock
-
- **October 11, 2014, Boles Fire:** The Boles Fire started on October 11, 2014, and burned over 516 acres over the course of 26 days. The fire began just outside the city of Weed and 40 mph winds pushed the flames into the city. The destructive, fast-moving fire forced the evacuation of about 2,000 from the communities of Weed, Carrick, Angel Valley, and Lake Shastina.

5.17.4 Probability of Future Events

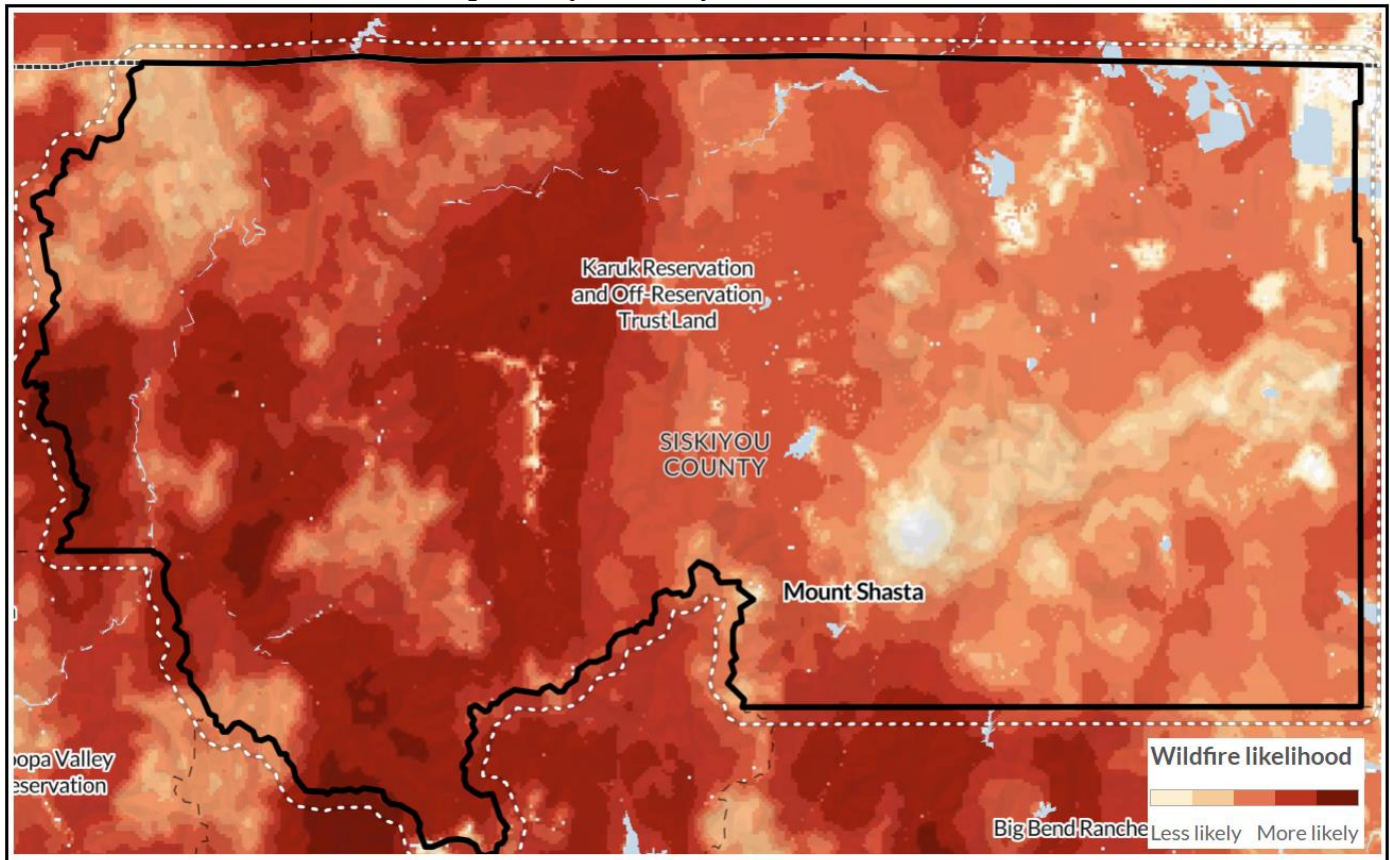
Predicting the probability of wildfire occurrences is tremendously challenging due to the large number of factors involved and the random nature of formation. Available data from CAL FIRE indicates that Siskiyou County has had 71 reported wildfire events burning 872,419 acres during the period 2013 to 2024. This equates to an average of six wildfires per year burning 72,702 acres per year.

NOAA's Wildfire Risk to Communities mapping, which uses the best available science to identify risk, was used to help determine the probability of future wildfires within Siskiyou County. Wildfire likelihood is the probability of a wildfire occurring based on fire behavior modeling across thousands of simulations of possible fire seasons. In each simulation, factors contributing to the probability of a fire occurring, including weather, topography, and ignitions, are varied based on patterns derived from observations in recent decades. Wildfire likelihood is not predictive and does not reflect any currently forecasted weather or fire danger conditions. For communities, tribal areas, and counties, Wildfire Likelihood is summarized and ranked for the risk calculation area. This includes a 2.4 km buffer around populated areas to incorporate the risk of embers. Wildfire likelihood classification is based on the following national percentile rank:

- **Low:** <40th percentile
- **Medium:** >40th and <70th percentile
- **High:** >70th and <90th percentile
- **Very High:** >90th percentile

According to NOAA's Wildfire Risk to Communities Siskiyou County has, on average, greater wildfire likelihood than 97% of counties in the US. The following map indicates the likelihood of a wildfire within Siskiyou County:

Map : Siskiyou County Wildfire Likelihood



Source: NOAA's Wildfire Risk to Communities

5.17.5 Projected Changes in Location, Intensity, Frequency, and Duration

Climate change can result in a significant increase in the likelihood and severity of wildfires. The occurrence of more frequent and longer lasting droughts due to climate change can increase the availability of fuels for wildfires through the drying of vegetation. Additionally, both the increased occurrence and continued decline of native species due to lack of precipitation can cause the proliferation of invasive species which can provide quick-burning fuels that contribute to the start and spread of fire.

Climate change may impact the frequency and magnitude of wildfire in the following ways:

- **Increased Frequency:** Warmer temperatures and prolonged periods of drought associated with climate change create conditions that favor more frequent wildfires. Extended fire seasons are becoming the new norm in many regions.
- **Greater Intensity:** Higher temperatures and drier conditions can lead to more intense wildfires. These fires burn hotter and spread more rapidly, making them more challenging to control and extinguish.
- **Longer Fire Seasons:** Climate change is extending the length of fire seasons, leading to earlier starts and later endings. This puts additional stress on firefighting resources and increases the risk of wildfires overlapping with other disasters.
- **Altered Precipitation Patterns:** Changes in precipitation patterns, including more intense rainfall events followed by extended dry periods, can promote the growth of vegetation, which can then become fuel for wildfires during subsequent dry periods.
- **Drought Conditions:** Prolonged droughts associated with climate change reduce soil moisture levels and the availability of water sources. Dry conditions increase the susceptibility of vegetation to ignition.
- **Vegetation Changes:** Climate change can alter the distribution and composition of vegetation, such as the expansion of drought-tolerant species. This can change fuel availability and make ecosystems more fire prone.

- **Insect Infestations:** Warmer temperatures can lead to increased insect infestations in forests. Infested and dead trees provide additional fuel for wildfires.
- **Wildfire Behavior:** Climate change can lead to changes in wildfire behavior, including the development of fire whirls, more extreme fire behavior events, and increased spotting (the spread of embers ahead of the main fire).

While both population and housing levels have remained static, or slightly decreased, in Siskiyou County any continued expansion into WUI areas significantly increases the risk and potential damage from wildfires for several reasons, including:

- **Proximity to Natural Fuels:** As development spreads into previously undeveloped wildland areas, homes and infrastructure are built in close proximity to natural fuels which can ignite during a wildfire. Natural landscapes in WUI zones are often dense with vegetation, providing a continuous fuel source that allows fires to spread quickly from wildland areas to residential zones. This increases the likelihood of structure ignition, as homes are surrounded by flammable vegetation.
- **Increased Human Activity:** Human activities, such as outdoor recreation, construction, and the use of equipment, are more common in WUI areas, and these activities can inadvertently start fires
- **Difficulty in Fire Suppression:** WUI fires are harder to control because firefighting efforts must focus on both the natural landscape and protecting homes and infrastructure. Firefighters face the dual challenge of containing the wildfire and defending structures, which can divert resources and increase the complexity of suppression efforts. Narrow or inaccessible roads in WUI areas can make it difficult for firefighting equipment and personnel to reach homes at risk, delaying response times.

In Siskiyou County, various forest management projects are being implemented to help mitigate the future risk and severity of wildfires. These projects combine techniques such as prescribed burns, thinning of dense forests, and the development of defensible space around communities. The following are some of the key forest management strategies and projects being used:

- **Prescribed Burns:** Controlled burns, or prescribed fires, are intentionally set under specific weather conditions to reduce excess vegetation that can fuel larger wildfires. These burns help mimic the natural fire cycles that were historically suppressed, leading to less fuel buildup. Both Cal Fire and the U.S. Forest Service have expanded the use of prescribed burns, targeting areas that have accumulated significant fuel loads.
- **Forest Thinning:** Thinning involves the removal of smaller trees, deadwood, and brush to reduce the density of forests. By decreasing the amount of available fuel, thinning can lower the intensity of potential fires. Thinning projects are particularly common in the WUI areas, where dense vegetation near communities poses a significant fire risk. Currently, the California Vegetation Treatment Program is working with homeowners in Yreka on fuel thinning projects.
- **Mechanical Fuel Reduction:** In some areas where prescribed burns are not feasible, mechanical methods such as cutting and removing dead or overgrown vegetation are employed. This includes removing hazardous trees, logging dead trees, and clearing brush. This strategy is particularly effective in northern California and areas with large tree populations, where mechanical fuel reduction projects can make a substantial difference in decreasing fire intensity.
- **Collaborative Forest Management Programs:** Public and private agencies work together on collaborative forest management programs to share resources and implement broader fire mitigation strategies. An example is the Fire Safe Council Siskiyou County, a coalition of public and private sector organizations that share a common, vested interest in wildfire prevention and loss mitigation.

5.17.6 Vulnerability and Impact FEMA NRI

Using the FEMA NRI, and consisting of three input components (expected annual loss, social vulnerability, and community resilience), the first table was created indicating the potential risk to Siskiyou County and all participating

jurisdictions from wildfire. In order to gain an understanding of vulnerability, the second table details the estimated annual loss data for Siskiyou County and participating jurisdictions. To help understand the risk and vulnerability participating jurisdictions data from the FEMA NRI was run on a census tract level. As the NRI does not generate data for individual jurisdictions, census tract analysis is the closest analogue available to understand individual jurisdiction conditions.

Table : Participating Jurisdiction Wildfire Risk Index

Jurisdiction	Census Tract	Risk Index	National Percentile	Chance per Year
Siskiyou County	All	Relatively High	98.1	0.589%
Dorris	06093000200	Relatively Moderate	90.7	0.182%
Dunsmuir	06093001100	Relatively High	96.7	0.747%
Etna	06093000800	Very High	99.6	1.23%
Fort Jones	06093000701	Very High	99.4	0.900%
Happy Camp CSD	06093001300	Very High	99.5	1.2%
Lake Shastina CSD	06093000902	Relatively High	98.1	0.233%
McCloud CSD	06093001200	Relatively High	97.4	0.498%
Montague	06093000300	Relatively High	98.3	0.370%
Mt. Shasta	06093001003	Relatively High	98.1	0.484%
Tulelake	06093000100	Relatively Moderate	89.8	0.094%
Weed	06093000901	Very High	99.3	0.711%
Yreka	06093000703	Relatively High	96.1	1.66%

Source: FEMA NRI

Table : Participating Jurisdiction Wildfire Expected Annual Loss

Jurisdiction	Census Tract	EAL	National Percentile	Wildfire EAL
Siskiyou County	All	Relatively High	97.9	\$8,900,000
Dorris	06093000200	Relatively Moderate	89.2	\$29,000
Dunsmuir	06093001100	Relatively High	95.9	\$174,000
Etna	06093000800	Very High	99.5	\$1,700,000
Fort Jones	06093000701	Very High	99.3	\$1,100,000
Happy Camp CSD	06093001300	Very High	99.3	\$1,100,000
Lake Shastina CSD	06093000902	Relatively Moderate	94.1	\$97,000
McCloud CSD	06093001200	Relatively High	97.3	\$305,000
Montague	06093000300	Relatively High	97.9	\$403,000
Mt. Shasta	06093001003	Relatively High	98.1	\$453,000
Tulelake	06093000100	Relatively Moderate	88.1	\$22,000
Weed	06093000901	Relatively High	98.9	\$772,000
Yreka	06093000703	Relatively High	95.4	\$147,000

Source: FEMA NRI

Population

Wildfires have profound and far-reaching impacts on people, affecting physical health, mental well-being, and socio-economic conditions. These impacts can vary depending on the severity, location, and preparedness of the communities affected. Key wildfire impacts include:

- **Health Impacts**

- **Smoke inhalation:** Wildfire smoke contains fine particulate matter that can penetrate deep into the lungs and exacerbate respiratory and cardiovascular problems. It is especially dangerous for people with pre-existing conditions like asthma, COPD, or heart disease. Exposure to smoke can cause short-term issues like coughing, throat irritation, and difficulty breathing, as well as long-term health effects from prolonged exposure.

- **Burn injuries:** Direct exposure to flames or heat during evacuations or firefighting efforts can result in serious burn injuries.
- **Mental health:** Survivors of wildfires often experience stress, anxiety, depression, and post-traumatic stress disorder, especially those who have lost homes, loved ones, or livelihoods.
- **Economic and Financial Impacts**
 - **Property damage:** Wildfires can destroy homes, businesses, and infrastructure, leading to significant financial losses. Insurance premiums in wildfire-prone areas often increase, and many homeowners struggle to rebuild after losing their property.
 - **Loss of livelihoods:** Wildfires can disrupt local economies, particularly in agricultural and forestry-based communities. Employment in affected areas may decline, and businesses may close either temporarily or permanently.
 - **Cost of relocation:** In cases of long-term displacement, families must bear the costs of relocation, housing, and rebuilding, which can be a financial burden, especially for low-income households.
- **Evacuations and Displacement**
 - **Evacuations:** Wildfires often force mass evacuations, leaving people displaced from their homes for extended periods. Evacuations can be stressful, especially if there is little warning, leading to rushed departures where families leave behind essential belongings or pets.
 - **Long-term displacement:** In severe cases, entire communities may be permanently displaced if homes are destroyed or if areas are deemed too hazardous to return to, leading to loss of community and social networks.
- **Social and Community Disruption**
 - **Community dislocation:** Wildfires can cause permanent damage to communities, forcing people to relocate and resulting in the breakdown of social networks and support systems.
 - **Loss of heritage:** In some cases, wildfires destroy culturally significant sites, landmarks, and natural heritage, such as forests and ecosystems that communities may depend on or cherish.

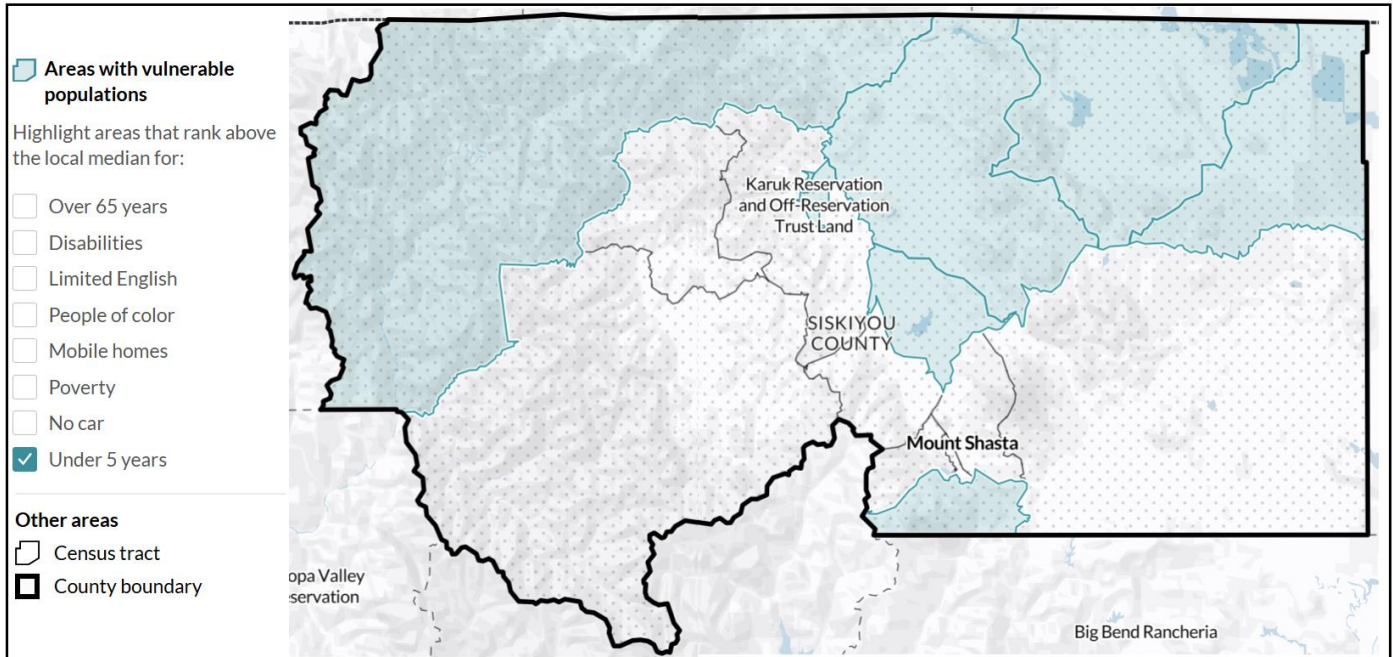
Wildfires can disproportionately affect vulnerable populations due to their limited resources, reduced mobility, and pre-existing health or socio-economic challenges. These groups often include the elderly, disabled individuals, low-income households, children, and those with chronic health conditions. Ways that wildfires may have a greater impact on these populations include:

- **Health Vulnerabilities**
 - **Respiratory and cardiovascular risks:** Vulnerable populations, such as the elderly, children, and those with pre-existing respiratory or heart conditions, are more susceptible to the harmful effects of wildfire smoke. The fine particulate matter from the smoke can exacerbate asthma, bronchitis, and heart disease, leading to increased hospitalizations and, in severe cases, mortality.
 - **Limited healthcare access:** Vulnerable groups often have less access to healthcare services, which can delay critical treatment during or after wildfire exposure. Health facilities may be overwhelmed during wildfire events, and transportation to care facilities may be hindered by road closures or evacuations.
- **Challenges with Evacuation**
 - **Mobility issues:** Elderly individuals, people with disabilities, and those without access to vehicles may struggle to evacuate quickly. They may depend on public transportation, community aid, or emergency services, which can be delayed or overburdened during a wildfire emergency.
 - **Language barriers:** Immigrant communities or non-English speakers may not fully understand emergency alerts or evacuation instructions, making it harder for them to react swiftly. This can increase the risk of delayed evacuation, which is particularly dangerous in fast-moving wildfires.
 - **Poverty and housing instability:** Low-income families are less likely to have the means to evacuate, such as access to a car or money for temporary shelter. They may also live in less resilient housing, which is more vulnerable to wildfire damage.

- **Economic Disparities**
 - **Loss of homes and belongings:** Vulnerable populations are often more likely to live in fire-prone or poorly constructed homes that are less resistant to wildfires. They may lack adequate insurance coverage to rebuild or replace what is lost, which can lead to long-term displacement and financial hardship.
 - **Job loss and economic disruption:** After a wildfire, vulnerable populations are more likely to experience prolonged economic disruption. Many people in low-wage jobs or agriculture may face unemployment if the local economy is disrupted, or if their place of work is destroyed. Recovery can take months or years, leaving them with few financial safety nets.
- **Increased Long-Term Vulnerability**
 - **Difficulty in recovery:** Vulnerable populations often face more significant challenges during the recovery phase of wildfires. They may lack insurance, savings, or government support to rebuild homes, replace belongings, or relocate. This can lead to prolonged displacement or homelessness, further exacerbating their vulnerabilities.
 - **Disruption of social networks:** Vulnerable groups rely heavily on community networks for support during and after disasters. Wildfires may displace communities, breaking apart these networks and leaving people isolated during their recovery process.
- **Disparities in Resource Allocation**
 - **Limited access to relief aid:** Vulnerable populations may struggle to access emergency relief services due to logistical, language, or bureaucratic barriers. They may not be prioritized for resource distribution, further exacerbating their difficulties in recovering from wildfire impacts.

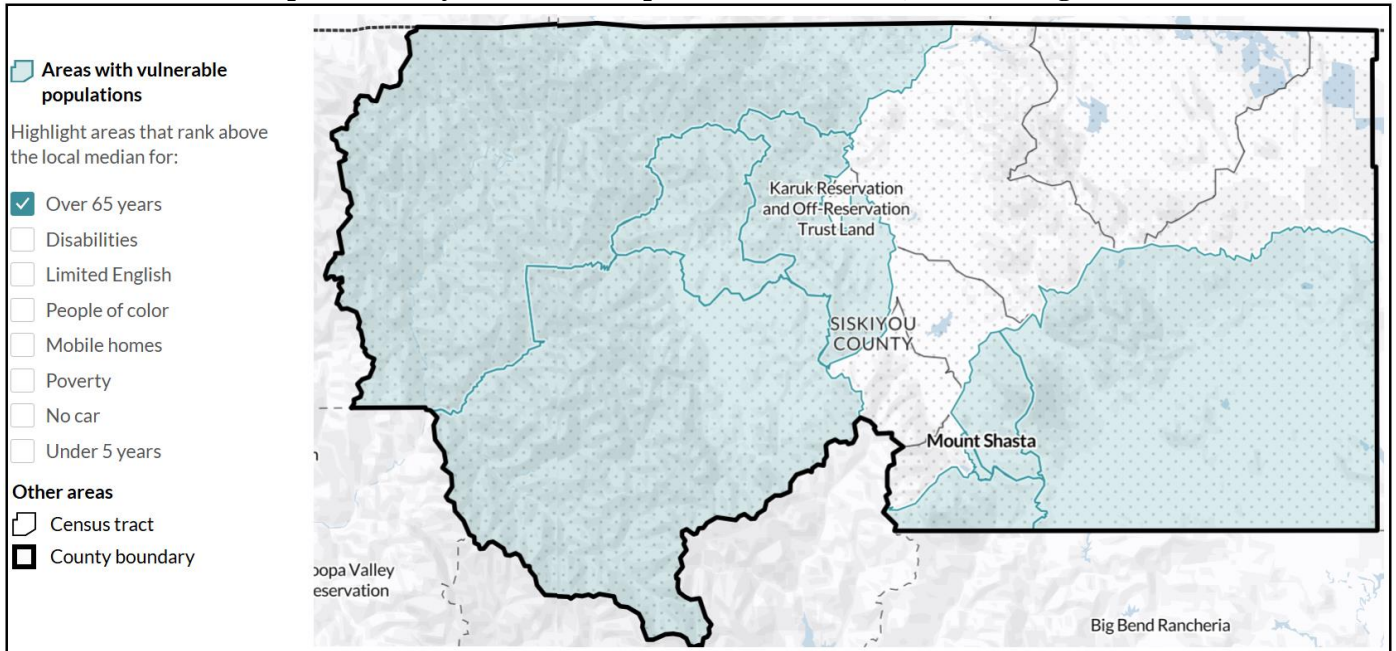
The following maps show the location of vulnerable populations compared to wildfire risk. Census tracts are highlighted that have values equal to or greater than the community median:

Map: Potentially Vulnerable Populations to Wildfire, Under the Age of Five



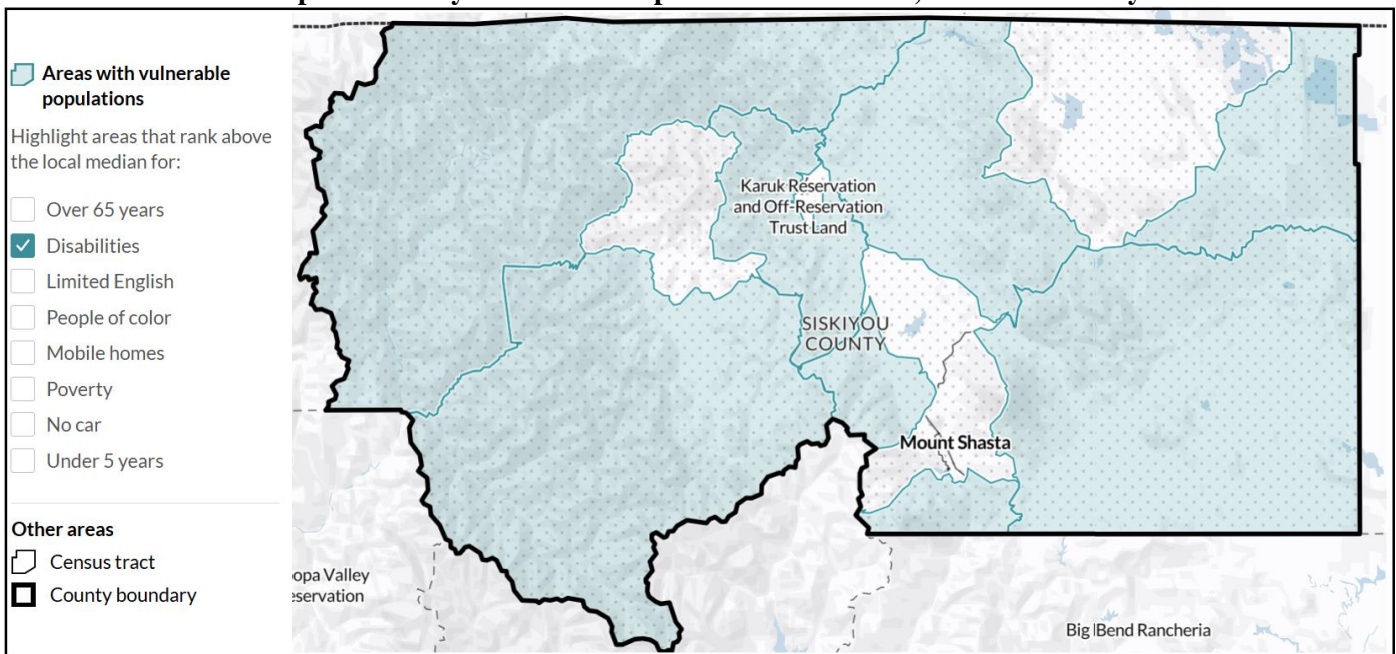
Source: NOAA's Wildfire Risk to Communities

Map: Potentially Vulnerable Populations to Wildfire, Over the Age of 65



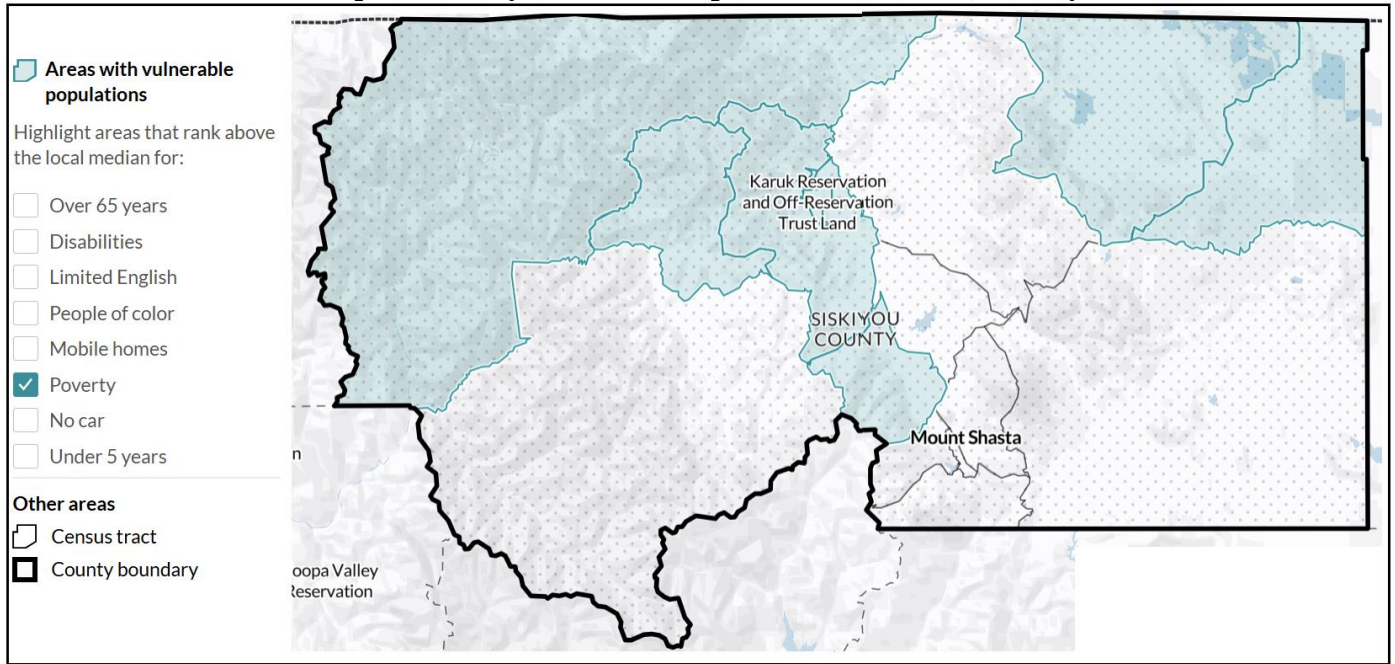
Source: NOAA's Wildfire Risk to Communities

Map: Potentially Vulnerable Populations to Wildfire, With a Disability



Source: NOAA's Wildfire Risk to Communities

Map: Potentially Vulnerable Populations to Wildfire, Poverty



Source: NOAA's Wildfire Risk to Communities

All Siskiyou County and participating jurisdiction populations are vulnerable to the impacts of wildfires. Please see Section 3.3: Population Data and Section 3.4: Socially Vulnerable and At-Risk Populations for data concerning jurisdictional populations.

Buildings and Structures

Buildings and structures are vulnerable to wildfires primarily due to their location, materials, and surrounding environment. These factors determine how easily a structure may ignite, sustain damage, or be destroyed by fire. Here's how these vulnerabilities manifest:

- **Proximity to Vegetation:** Homes located in the WUI are particularly vulnerable as they are closer to dense vegetation that serves as fuel for wildfires. If the vegetation (trees, shrubs, dry grasses) is not properly managed around the property, fire can easily spread to homes.
- **Flammable roofing materials:** Roofs made from materials like wood shingles are highly flammable and can easily ignite from embers. Non-flammable materials like metal, tile, or asphalt are more resistant to fire.
- **Siding and exterior walls:** Homes with wood siding or other combustible materials are more vulnerable to fire than homes built with fire-resistant materials like stucco, brick, or concrete.
- **Windows:** Single-pane windows are more likely to break during a wildfire due to heat exposure, allowing embers and flames to enter the building. Double-pane or tempered glass windows offer more protection.
- **Eaves and vents:** Eaves and vents can allow embers to enter the attic or other vulnerable spaces in the home. If they are not properly screened or fireproofed, they become entry points for embers to ignite the structure.
- **Decks and porches:** Wooden decks and porches are highly susceptible to wildfire if they are not made from fire-resistant materials or if they have combustible items stored underneath them.
- **Lack of defensible space:** Defensible space is the buffer zone between a building and surrounding vegetation. If this space is not cleared of flammable materials (like dry leaves, dead trees, or fire-prone plants), a wildfire can spread rapidly to a home. Homes without sufficient defensible space are much more likely to ignite during a fire.
- **Combustible materials near the home:** Storing firewood, propane tanks, or other flammable items near the structure increases vulnerability, as these materials can easily catch fire and ignite the building.

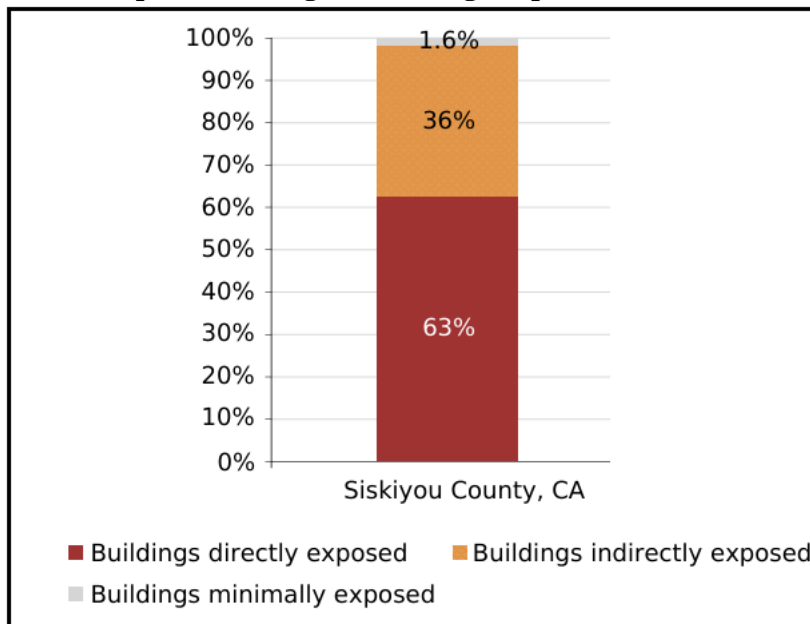
- **Distance from fire services:** Homes located far from fire stations or without adequate road access may experience delayed emergency response times, leaving them more vulnerable to destruction.
- **Neglected maintenance:** Homes that are not well-maintained, such as those with clogged gutters full of leaves or overgrown vegetation, are more likely to catch fire. Regular maintenance, such as clearing gutters and removing dead vegetation, is essential to reducing wildfire vulnerability.

When homes and buildings ignite in a wildfire, the damage can be severe. Wildfire impacts on structures typically include:

- **Complete destruction:** Buildings can be completely consumed by flames, leaving nothing but the foundation.
- **Partial damage:** Fire can damage parts of the building, such as roofs, walls, or outdoor structures, necessitating costly repairs.
- **Smoke damage:** Even if a structure does not burn down, smoke can infiltrate the building, causing significant damage to the interior, furniture, and electronics.
- **Water damage:** In the process of firefighting, water can cause additional damage to structures, particularly if fire suppression efforts are extensive.

According to NOAA’s Wildfire Risk to Communities 99% of Siskiyou County’s buildings are exposed to wildfires:

Graph : Percentage of Buildings Exposed to Wildfire



Source: NOAA’s Wildfire Risk to Communities

To provide an estimate of the number of residential structures at risk to wildfires, GIS data concerning the residential structures and the median value was utilized. An estimate of the value of residential structures was determined using the Siskiyou County median household value of \$231,100 from the U.S. Census Bureau. The following table provides an estimated structures exposed to wildfires for all participating jurisdictions:

Table : Participating Jurisdiction Estimated Residential Structures Exposure to Volcanic Flow Hazards

Jurisdiction	Estimated Residential Structures Vulnerable to Wildfires	Valuation
Siskiyou County	22,929	\$5,298,891,900

Table : Participating Jurisdiction Estimated Residential Structures Exposure to Volcanic Flow Hazards

Jurisdiction	Estimated Residential Structures Vulnerable to Wildfires	Valuation
Dorris	365	\$84,351,500
Dunsmuir	1,091	\$252,130,100
Etna	355	\$82,040,500
Fort Jones	330	\$76,263,000
Lake Shastina CSD	1,134	\$262,067,400
Montague	569	\$131,495,900
Mt. Shasta	1,906	\$440,476,600
Tulelake	361	\$83,427,100
Weed	1,281	\$296,039,100
Yreka	3,668	\$847,674,800

Source: Siskiyou County and U.S. Census Bureau

Governmental Operations

Wildfires can pose various risks to government operations. These risks can have significant economic and operational consequences, and can include:

- **Power Outages:** Severe weather can lead to power outages by damaging electrical infrastructure such as power lines and substations. Government buildings may lose power, affecting critical operations and services.
- **Flooding:** Heavy rainfall after a wildfire can lead to flooding, which can damage government buildings and disrupt operations. Flood damage may require extensive repairs and cleanup.
- **Communication Disruptions:** Wildfires can damage communication equipment, including telephone lines and computer systems. This can hinder communication between government agencies and the public.
- **Transportation Disruptions:** Wildfires can make roads impassable due to debris, smoke, heat, and potentially after event flooding or landslides. This can impact the ability of government employees to commute to work.
- **Budgetary Impact:** The costs associated with repairing and restoring government buildings and infrastructure after a wildfire can strain budgets.

Transportation and Electrical Infrastructure

In general, wildfires do not have a large impact on transportation infrastructure, with the exception of power loss disrupting signaling, road closures due to events, and poor conditions impacting driving conditions.

Wildfires can have severe and widespread impacts on electric infrastructure, disrupting power distribution and causing long-term damage. Here are some key ways wildfires affect electric infrastructure:

- **Damage to Transmission Lines and Power Poles**
 - **Direct fire damage:** Wildfires can burn through wooden power poles and even damage steel or aluminum transmission towers due to extreme heat. Transmission lines are especially vulnerable in heavily forested or remote areas where wildfires tend to occur.
 - **Melting of cables and equipment:** High temperatures can cause transmission lines and electrical equipment to melt or warp, leading to failures or shutdowns.
 - **Power outages:** Wildfires can lead to widespread power outages by directly damaging transmission lines or transformers. In some cases, utilities may also proactively shut off power (public safety power shutoffs, or PSPS) to prevent the ignition of fires by downed or sparking power lines.
- **Smoke and Soot Contamination**
 - **Conductivity of smoke:** Smoke and ash from wildfires can increase the conductivity of the air, leading to short circuits or arcing in power lines, especially in high-voltage systems.
 - **Soot buildup:** Wildfire soot can accumulate on insulators and electrical equipment, reducing efficiency and causing potential equipment failures if not cleaned.

- **Substation and Equipment Vulnerability**
 - **Heat and embers:** Substations, transformers, and electrical panels can be damaged by heat or flying embers. Damage to substations can have a particularly large impact since they are key distribution points for electricity.
 - **Component failures:** Equipment such as switches, transformers, and circuit breakers may suffer from thermal stress or fire-related damage, leading to breakdowns and costly repairs.
- **Challenges for Utility Workers**
 - **Delayed repairs:** Repair crews face significant challenges during and after wildfires. Access to damaged areas can be restricted due to ongoing fires, road closures, or unsafe conditions, delaying repairs.
 - **Safety hazards:** Workers may be exposed to unsafe conditions, including the risk of encountering smoldering areas or downed power lines.
- **Disruptions to Power Generation Facilities**
 - **Hydroelectric plants:** Wildfires in watersheds that supply hydroelectric plants can disrupt water flow, reducing power generation capacity.
 - **Thermal power plants:** Plants using coal, natural gas, or other fuel sources may also face interruptions if transportation of fuel is hindered due to wildfires or if nearby infrastructure is damaged.

In 2012 (and revised in 2021), the California Public Utilities Commission ruled that the California Public Utility Code gives electric utilities the authority to shut off electric power to protect public safety, since power supply systems have the potential to ignite wildfires (a public safety power shutoff). In general terms, these shutoffs are instituted to lower the potential of a downed electrical line sparked wildfire. Conditions that may trigger a shutoff include:

- Red flag warning from the National Weather Service
- Low humidity
- High winds
- Situational determination by on the ground crews

Mapping concerning transportation and electrical infrastructure may be found in Section 3.9: Community Lifelines and Critical Infrastructure. Information concerning the costs to repair or reconstruct transportation and electrical infrastructure may be found in Section 5.8.6.

Water and Wastewater Utilities

In general, severe weather and severe winter weather components do not have a large impact on water and wastewater infrastructure and operations. However, the cascading impacts from an event such as power loss disrupting pumping and treatment capabilities, localized flooding from heavy overwhelming drainage systems, or frozen pipes in water distribution systems, causing water outages and expensive repairs when pipes burst.

Medical, Education, and Response Facilities

Severe weather and severe winter weather can significantly impact emergency response infrastructure, creating challenges for first responders and organizations involved in managing and mitigating the effects of severe weather events. Winter storms can impact emergency response through:

- **Transportation Disruptions:** Debris on roads and road closures can hinder the ability of emergency vehicles to navigate and reach affected areas promptly. Hazardous road conditions may result in delays in response times.
- **School Closures:** Wildfires can lead to the closure of schools due to hazardous conditions. This can strain caregivers and result in lower work attendance.

- **Communication Disruptions:** Wildfires can disrupt communication networks, affecting the ability of emergency responders to coordinate and communicate effectively. Downed power lines and damage to communication infrastructure contribute to these disruptions.
- **Power Outages:** Wildfires can lead to power outages. Emergency response facilities, such as command centers and fire stations, may lose power, affecting their operational capabilities.
- **Exposure:** Emergency responders face increased health and safety risks during wildfire events. Exposure to fire, ash, particulate matter, and high temperatures can impact the well-being of responders and affect their ability to provide effective assistance.
- **Resource Allocation Challenges:** Wildfires often requires the allocation of additional resources, including personnel, equipment, and supplies, to address immediate needs. This can strain emergency response organizations and impact their ability to respond to other concurrent incidents.
- **Increased Demand for Services:** Wildfires can result in an increased demand for emergency services, including medical assistance, and search and rescue operations. Emergency response organizations may need to manage a higher volume of incidents simultaneously. Wildfires can also increase the demand for emergency shelters, particularly in cases of widespread evacuations.
-

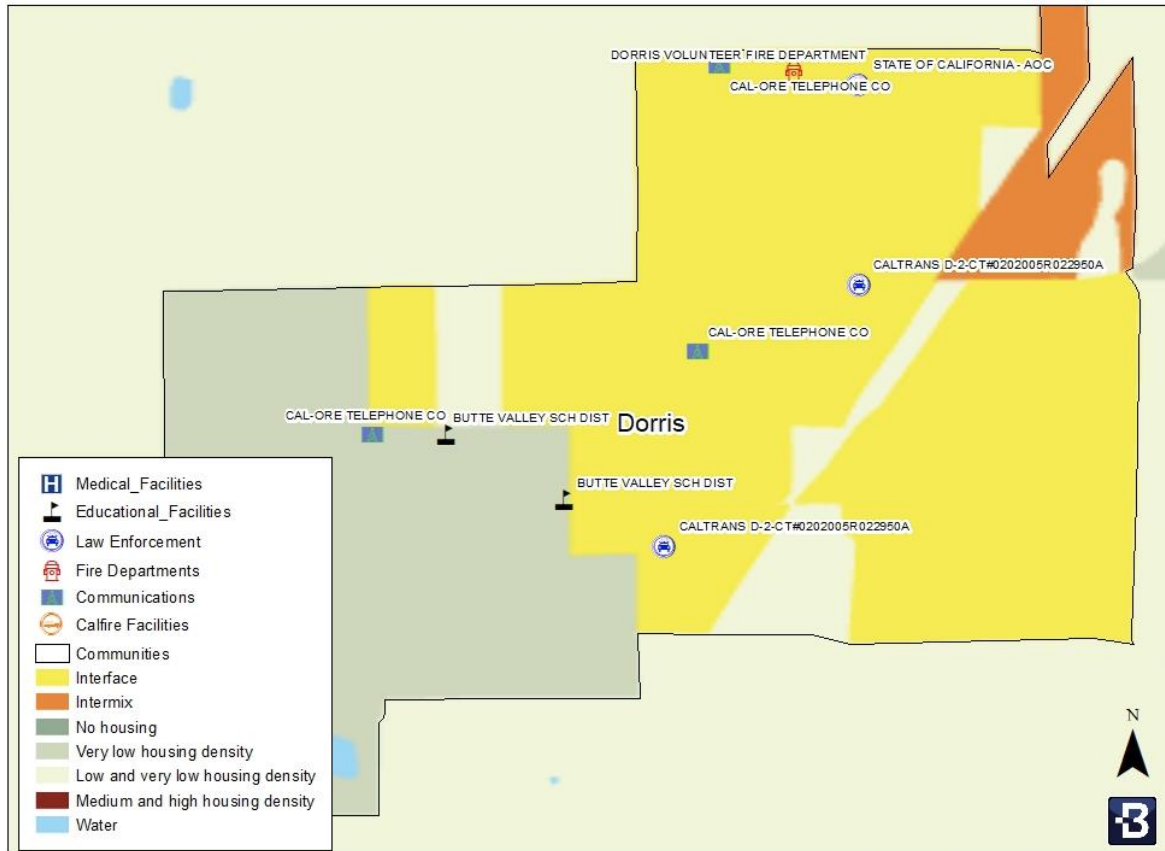
The following detail fire departments and districts throughout Siskiyou County:

- **CAL FIRE Siskiyou Unit:** Covering 1,400,000 acres of ecologically diverse State Responsibility Area wildlands, the Siskiyou Unit staffs approximately 70 career personnel and 120 seasonal personnel. The Siskiyou Unit is geographically divided into four fire battalions, which combined include seven fire stations, one conservation camp, and a headquarters facility. CAL FIRE has seven fire stations within Siskiyou County.
- **Dunsmuir-Castella Volunteer Fire District:** Comprised of three different governmental agencies, including the City of Dunsmuir, the Dunsmuir Fire Protection District, and the Castella Fire Protection District (in adjacent Shasta County).
- **Etna Fire Department:** Served by two stations, the Department has three full-time paid employees, including one fire chief, an assistant fire chief, and a secretary, as well as nine volunteer firefighters.
- **Fort Jones Volunteer Fire District:** Served by one station, the District is staffed by a full-time paid chief and two lieutenants and a team of 12 volunteer firefighters.
- **Gazelle Fire District:** Served by one station, the District is staffed by an assistant fire chief and five volunteer firefighters.
- **The Grenada Fire Protection District:** Served by one station, the District is staffed by eight volunteer firefighters, including one fire chief.
- **Hammond Ranch Fire Zone:** Served by one station, the District is staffed by a fire chief, para-career firefighters, some of whom live at the station, and eight citizen volunteer firefighters.
- **Lake Shastina Fire District:** Served by one station, the District is staffed by 15 trained volunteers.
- **Mayten Fire Protection District:** Served by one station in Montague, the District is staffed by volunteers, including a fire chief and four firefighters.
- **McCloud Community Service District and Fire Department:** Served by one station in Montague, the District is staffed by a part-time paid Fire Chief and a group of dedicated volunteers, including one assistant chief, one EMS chief, one training chief, two battalion chiefs, 22 firefighters, four of which are also EMTs, and five auxiliary/drivers.
- **Mount Shasta Fire:** Made up by a collaboration of two fire departments, Mount Shasta City Fire Department and Mount Shasta Fire Protection District, they operate out of four stations staffed by two full time chiefs, one of which works for the City and one for the District. They additionally employ five paid staff members and approximately 15 volunteers.
- **Mount Shasta Vista Fire Zone:** Served by two stations, the District is staffed by five volunteer firefighters.
- **Salmon River Fire and Rescue Company:** Served by one station, the Company is staffed by a fire chief, assistant fire chief, and four firefighters. \\

- **Scott Valley Fire Protection District:** Served by four stations, the District is staffed by one paid fire chief, two assistant chiefs, and 20 volunteer firefighters.
- **Weed Volunteer Fire District:** Served by one station, the District is staffed by a full-time fire chief, a full-time assistant fire chief, twelve volunteer company officers and firefighters, and supplemented by temporary firefighters participating in the College of the Siskiyous Emergency Response Technology Program.

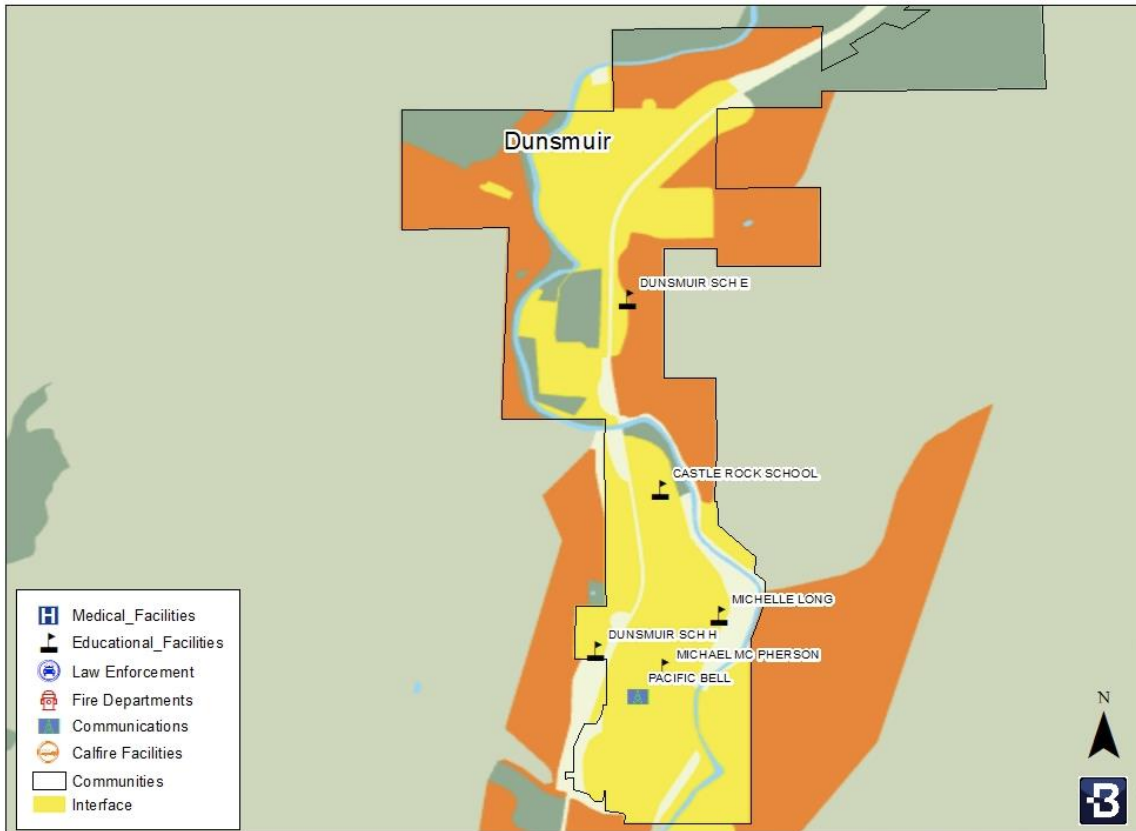
The following maps detail critical facility locations mapped to the FEMA mapped WUI areas:

Map: Dorris Critical Facilities In WUI Areas



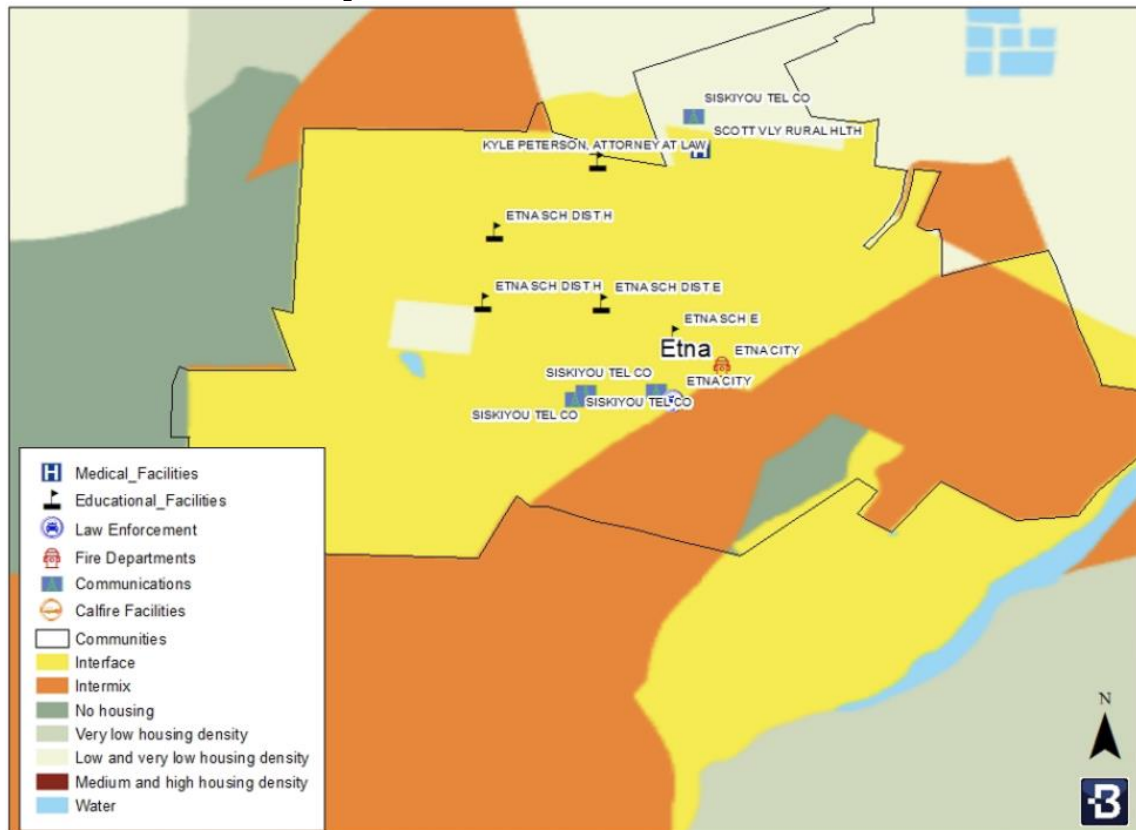
Source: Siskiyou County and BOLDplanning

Map: Dunsmuir Critical Facilities In WUI Areas



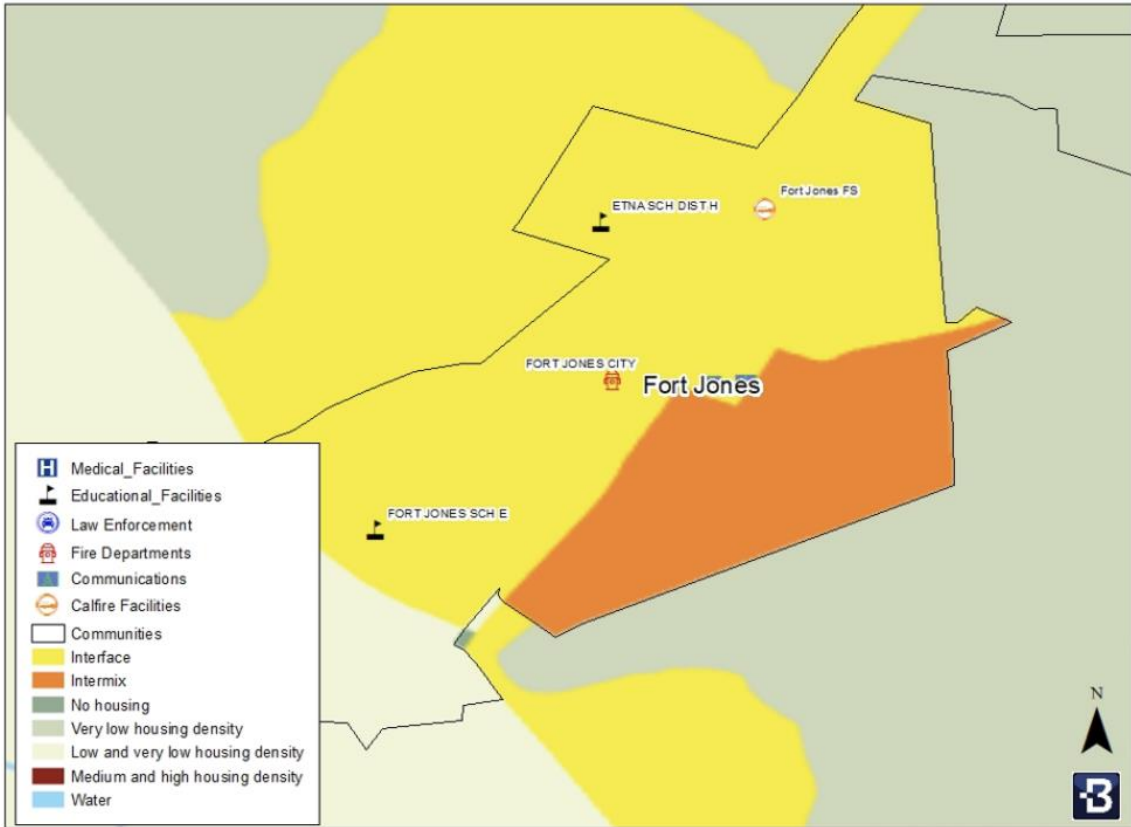
Source: Siskiyou County and BOLDplanning

Map: Etna Critical Facilities In WUI Areas



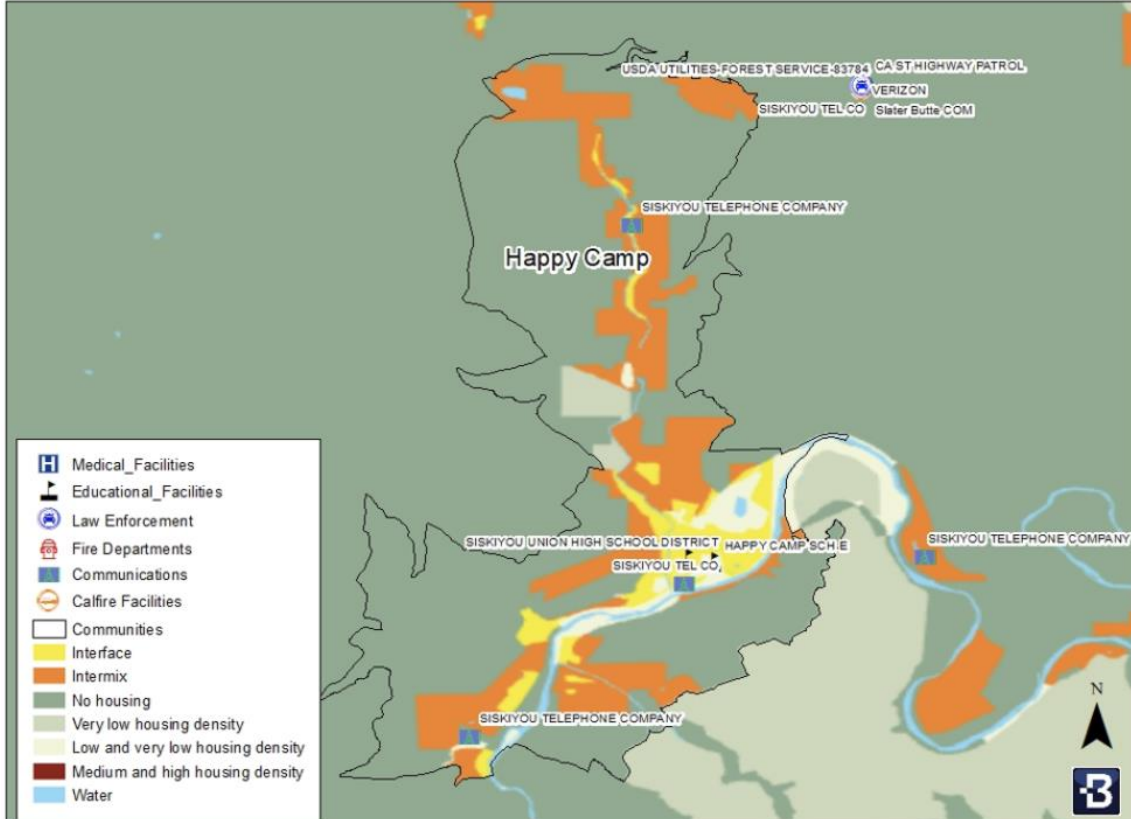
Source: Siskiyou County and BOLDplanning

Map: Fort Jones Critical Facilities In WUI Areas



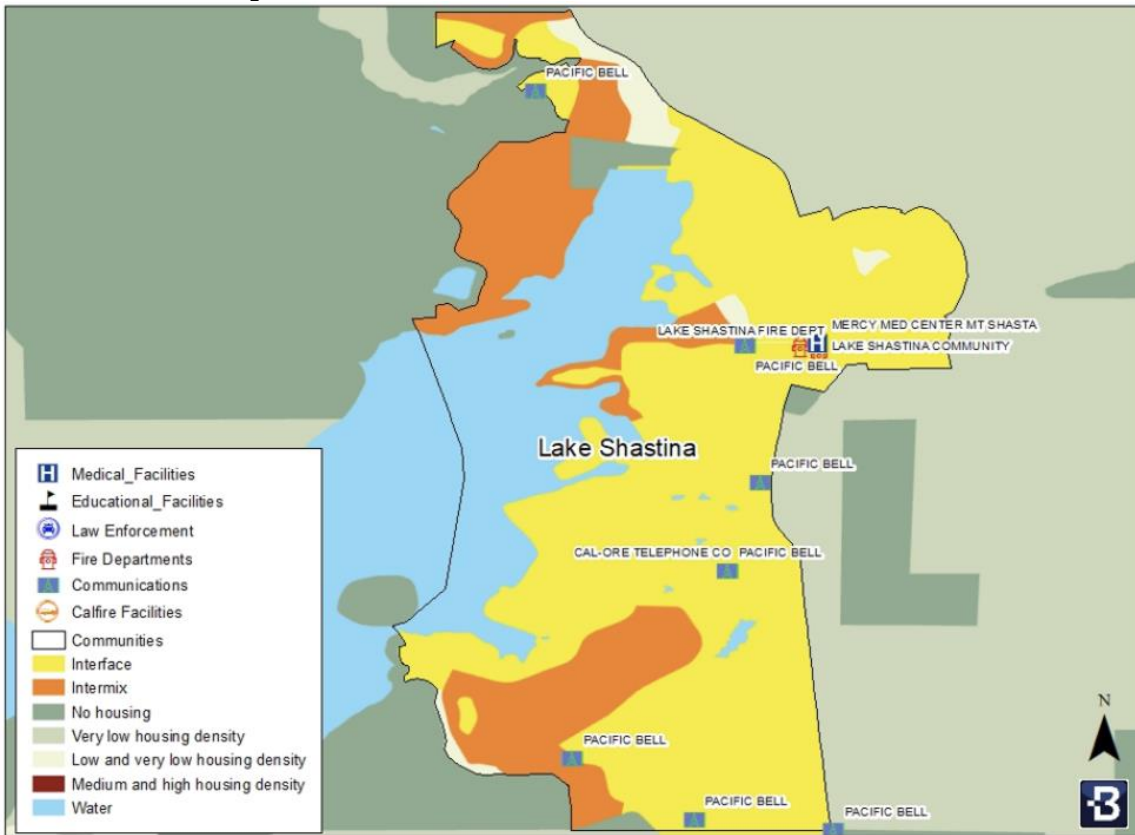
Source: Siskiyou County and BOLDplanning

Map: Happy Camp CSD Critical Facilities In WUI Areas



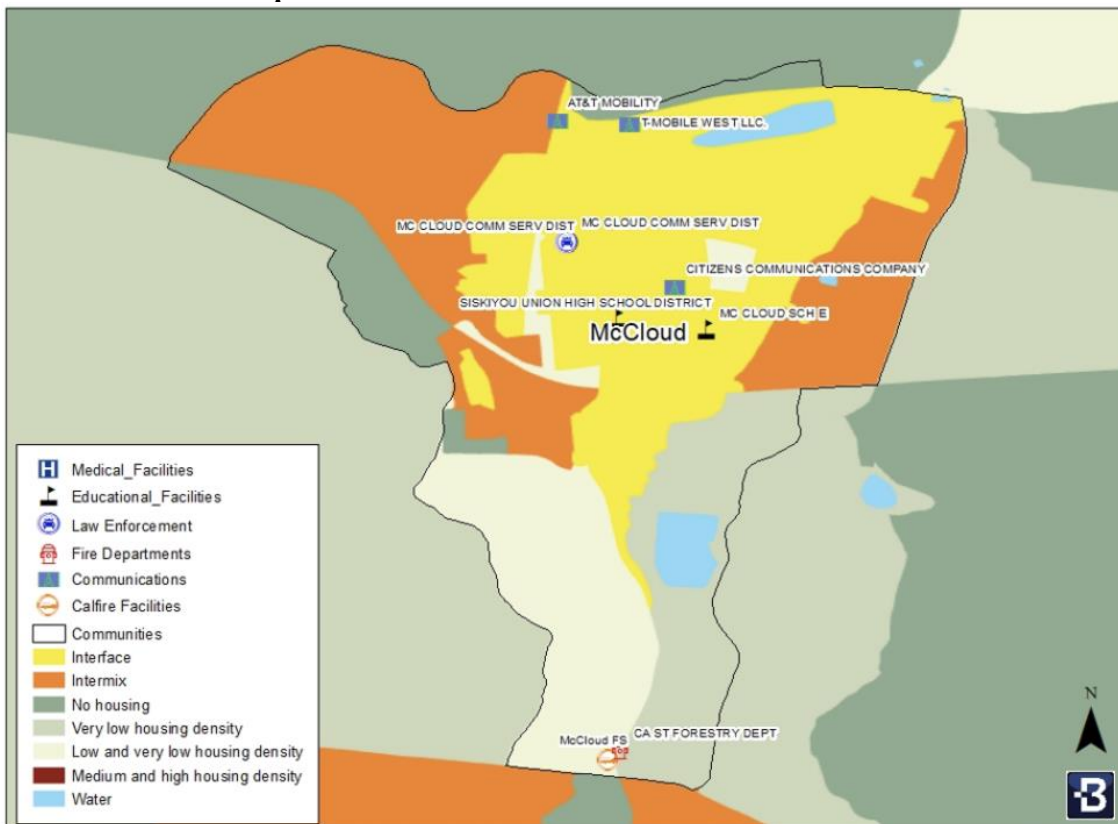
Source: Siskiyou County and BOLDplanning

Map: Lake Shastina CSD Critical Facilities In WUI Areas



Source: Siskiyou County and BOLDplanning

Map: McCloud CSD Critical Facilities In WUI Areas



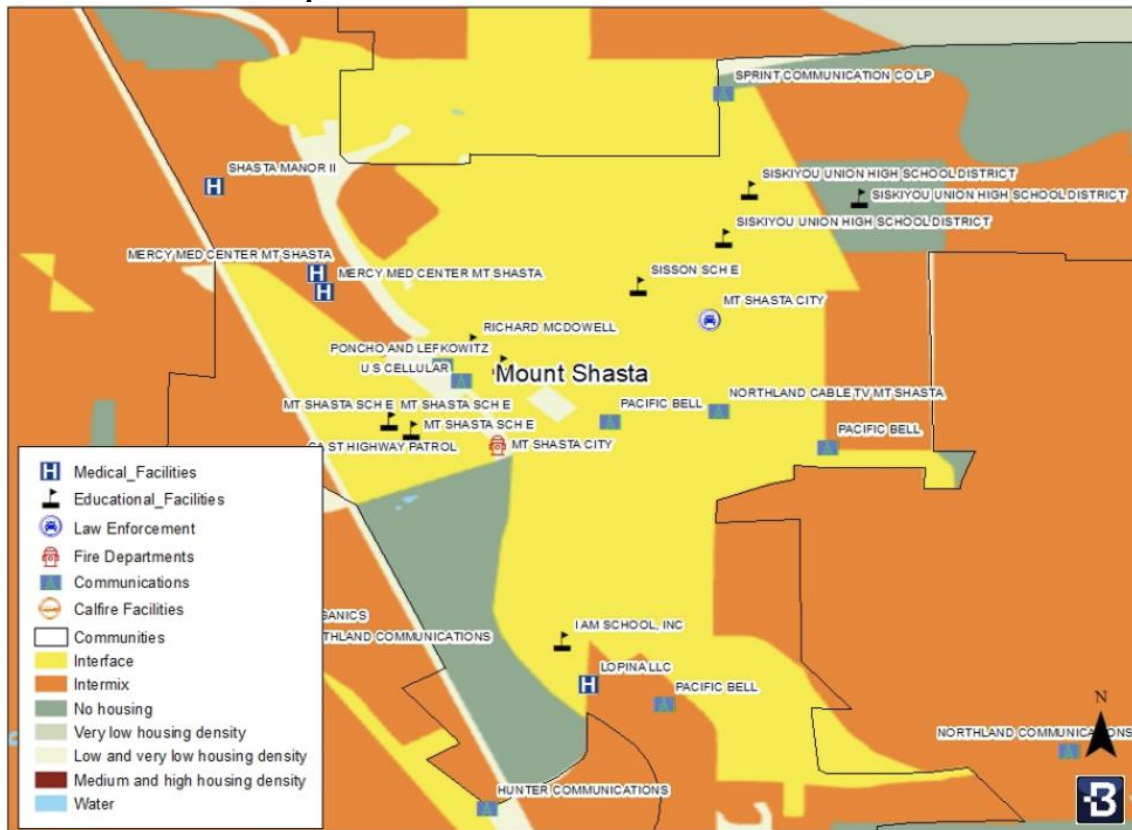
Source: Siskiyou County and BOLDplanning

Map: Montague Critical Facilities In WUI Areas



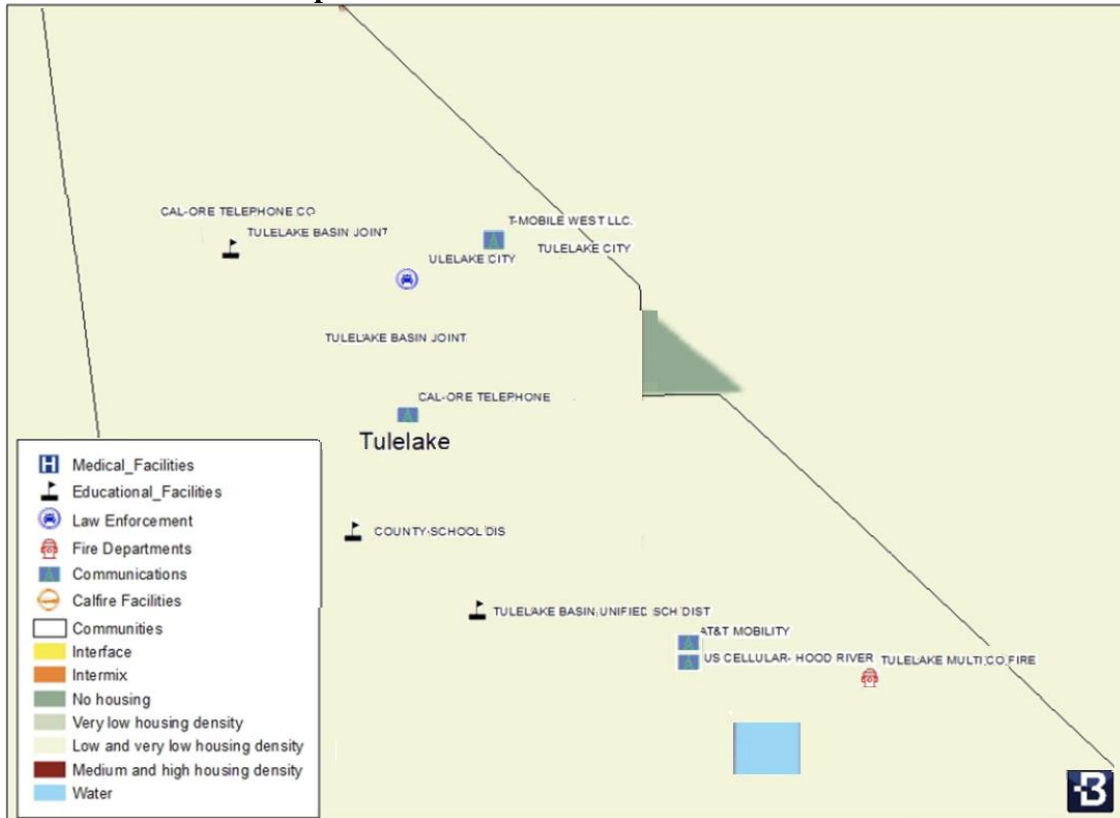
Source: Siskiyou County and BOLDplanning

Map: Mt. Shasta Critical Facilities In WUI Areas



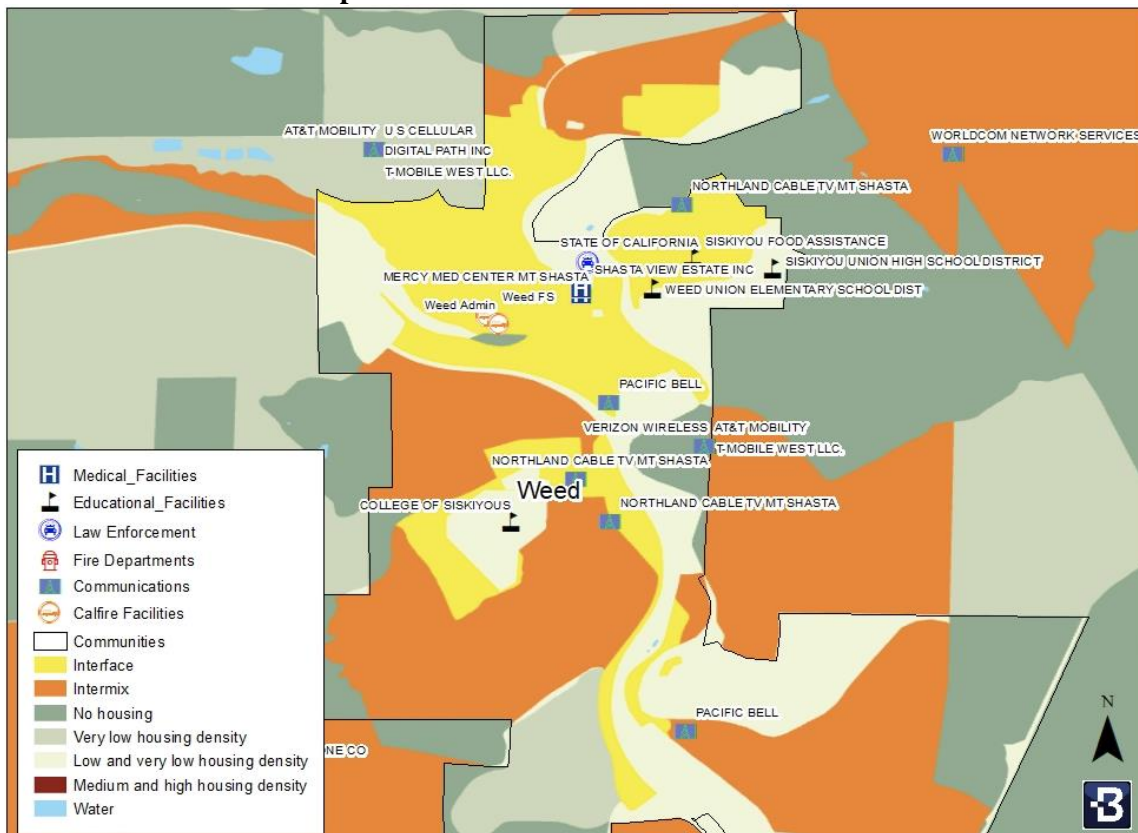
Source: Siskiyou County and BOLDplanning

Map: Tulelake Critical Facilities In WUI Areas



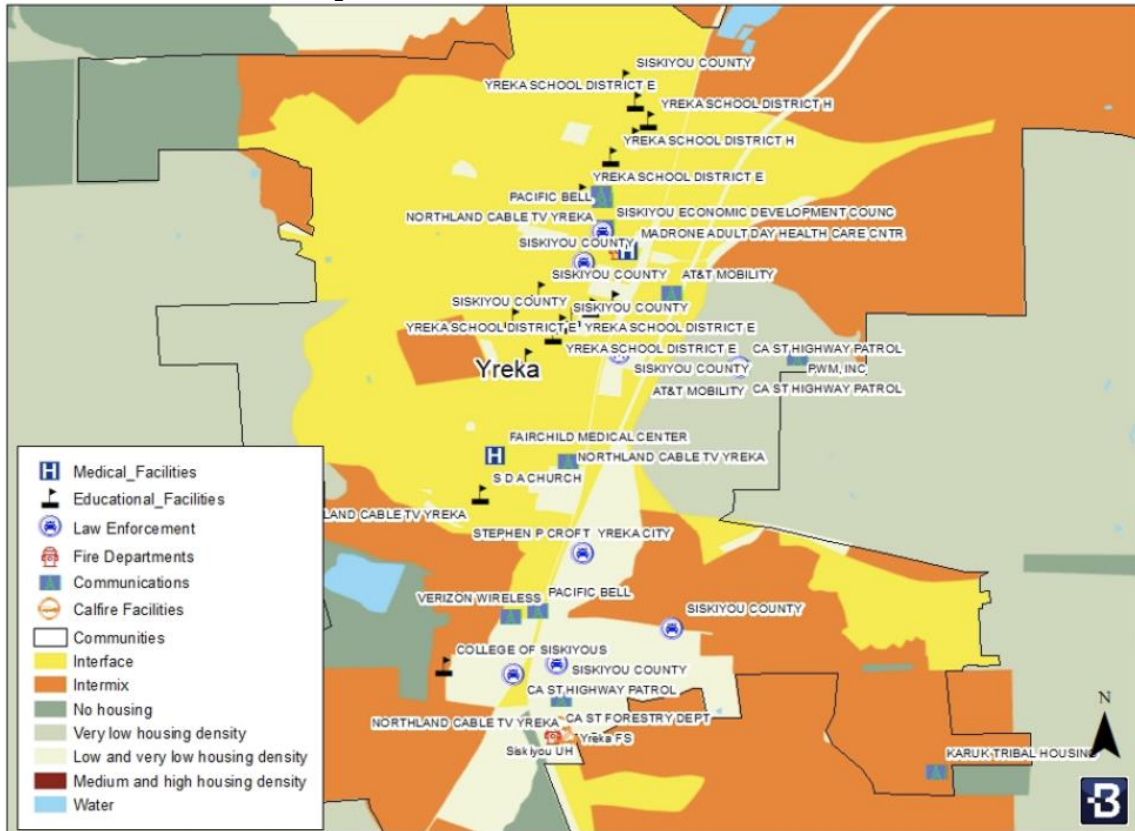
Source: Siskiyou County and BOLDplanning

Map: Weed Critical Facilities In WUI Areas



Source: Siskiyou County and BOLDplanning

Map: Yreka Critical Facilities In WUI Areas



Source: Siskiyou County and BOLDplanning

Communication Systems

All communication systems within Siskiyou County are at risk to wildfire events. Wildfires can disrupt vital communications system, affecting reliability and functionality. Some of the key vulnerabilities include:

- **Physical Infrastructure Damage:** Wildfires can cause physical damage to communication infrastructure such as cell towers, antennas, cables, and data centers. This damage can result in network outages and disruptions.
- **Power Outages:** Wildfires often lead to power outages, which can affect the operation of communication networks. Without a stable power supply, cell towers, data centers, and other critical components may become non-functional, leading to service interruptions.
- **Communication Tower Instability:** Wildfires can compromise the stability of communication towers. If towers are not designed to withstand severe weather, they may collapse, leading to network outages.
- **Network Congestion:** In the event of a disaster, communication networks may experience a surge in usage as people attempt to contact emergency services, friends, and family. This increased demand can lead to network congestion, making it difficult for users to connect.

The cost to repair communications networks can vary widely depending on the extent of the damage, the size of the network, and the specific technologies involved. Repair costs may include expenses for labor, equipment replacement or repair, materials, and any additional resources required to restore the network to full functionality. Estimated repair cost from the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency may be found in Section 5.8.6.

Environmental and Agricultural Impacts

Wildfire events can cause significant agricultural impacts. The following map from the United States Department of Agriculture details total agricultural losses, by county, due to wildfire events from 1989 - 2023:

Map : Agricultural Losses Due to Wildfire Events, 1989 - 2023



Source: USDA

Wildfires have significant and often devastating effects on the environment. These impacts can be both immediate and long-lasting, affecting air quality, ecosystems, water resources, soil stability, and wildlife. Wildfires release large quantities of smoke, which contains fine particulate matter, carbon monoxide, and other harmful pollutants. These particles can travel long distances, reducing air quality far from the fire itself, and can cause respiratory issues, especially for vulnerable populations. Wildfires contribute to climate change by releasing significant amounts of carbon dioxide (CO₂), methane (CH₄), and other greenhouse gases stored in vegetation and trees, intensifying global warming.

Fires can decimate forests, grasslands, and other plant ecosystems. The loss of vegetation can result in habitat destruction for countless species, reducing biodiversity and altering the structure of the ecosystem. Recovery can take decades, depending on the severity of the fire and the resilience of the vegetation. Wildfires can degrade soil by burning away organic matter, making it less fertile. Intense heat can also cause soil to become hydrophobic (water-repellent), increasing the risk of erosion and reducing water infiltration, which impacts plant regrowth.

After a wildfire, ash, debris, and eroded soil can be washed into rivers and streams during rainstorms, contaminating water supplies. This can affect both aquatic ecosystems and human water sources, requiring extensive treatment. The destruction of vegetation disrupts the local hydrological cycle by reducing transpiration (the release of water vapor from plants). This can result in lower humidity levels, reduced rainfall, and potentially, longer drought periods.

Animals are often killed directly by fire, especially those that are less mobile (like reptiles, amphibians, and small mammals) or those caught in fast-moving fires. Wildfires destroy habitats, which can lead to displacement, loss of food sources, and increased competition for remaining resources. This can cause population declines in already vulnerable species. Wildfires can disrupt key ecosystem services such as pollination, seed dispersal, and predator-prey relationships, affecting the balance of the ecosystem.

With the loss of vegetation, the soil becomes more susceptible to erosion. Without plants to stabilize the soil, rain and wind can easily carry away topsoil, which is crucial for plant regrowth and nutrient cycling. In steep areas, the loss of vegetation can lead to landslides during subsequent rain events. These slides can cause further destruction to the landscape, waterways, and infrastructure.

Wildfires can create opportunities for invasive species to take hold. Invasive plants, often better adapted to disturbed environments, may outcompete native species in the post-fire landscape, leading to long-term changes in ecosystem composition and reducing biodiversity. Some ecosystems, like certain forests and grasslands, are adapted to periodic

fire and even rely on it for regeneration. However, the increasing intensity and frequency of wildfires, driven by climate change, can overwhelm these ecosystems, preventing recovery and pushing them beyond their adaptive capacity.

Cascading Impacts

Cascading impacts often result when one a hazard event triggers one or more differing hazard events or loss of community lifelines. Cascading impacts associated with wildfires may include:

- Direct physical damage to buildings and structures:
- After event flooding, landslides, and mudslides
- Transportation infrastructure disruption
- Power outages and electrical grid disruption
- Communication system disruption
- Transportation and supply chain disruptions
- Environmental and ecological damage
- Economic impacts and business closures
- Emergency services overload

Consequence Analysis

This consequence analysis lists the potential impacts of a hazard on various elements of a community. The impact of each hazard is evaluated in terms of disruption of operations, recovery challenges, and overall wellbeing to all Siskiyou County residents and first responder personnel. The consequence analysis supplements the hazard profile by analyzing specific impacts.

Table : Wildfire Consequence Analysis

Subject	Potential Impacts
Impact on the Public	People located in the immediate area of the fire face the risk injury or death if not evacuated in time. Once evacuated, they may face a lengthy period of relocation. Fires can release toxic components which can cause adverse health effects including respiratory and cardiovascular system impacts. Psychological and psychiatric concerns may arise due to exposure to the traumatic event. Young children and the elderly are especially vulnerable to health issues stemming from fire and smoke exposure.
Impact on Responders	Fire, police, and emergency responders may be called to evacuate people from the fire area, close roads, create fire breaks, attend to the injured, and direct traffic. Firefighters are at a higher risk of smoke inhalation, burns, and health problems due to working in close proximity to fires and the subsequent smoke.
Continuity of Operations	Local jurisdictions maintain continuity plans which can be enacted as necessary based on the situation. Wildfires may impact an agency’s ability to maintain continuity of operations due to impacts on critical infrastructure.
Delivery of Services	Fires can cause disruption of services, including the ability to deliver goods and services. Impacts on operations could lead to a reduction or cessation of services. Goods and facilities may be damaged or destroyed by fire, smoke, or extremely high temperatures.
Property, Facilities, and Infrastructure	Fire can damage or completely destroy property and critical facilities, as well as lead to interruption of the power supply system. A fire of significant strength can cause major damage to buildings or farmland. Large fires may also interrupt transportation systems such as train and bus lines, creating a challenge for public transit and evacuation.
Impact on Environment	Fires can have significant impact to the environment by spreading pollution, damaging agricultural crops, and disturbing the wildlife and natural areas. Water and soil pollution caused by fire can cause longer term threats to ecosystem health. Fire damage may also affect soil formation, nutrient cycling, and carbon sequestration and storage.

Table : Wildfire Consequence Analysis

Subject	Potential Impacts
Economic Conditions	Fires can cause a fiscal impact on the local government, even if costs can be recouped by federal grants. Agriculture is a major component of the local, county and local economy, and major fires could cause significant impact. Costs may be associated with loss of income, damage to property, and firefighting can be significant.
Public Confidence in Governance	Governmental response, on all levels, state and local, would require direct action that must be immediate and effective to maintain public confidence.

5.17.7 Mitigation Opportunities

The following table presents examples of potential actions that can be instituted for mitigating the volcanic activity hazard.

Table : Example Wildfire Weather Mitigation Actions

Category	Example Action
Planning and Regulation	Using GIS mapping of wildfire hazard areas to facilitate analysis and planning decisions through comparison with zoning, development, infrastructure, etc.
	Using zoning and/or a special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.
	Promoting conservation of open space or wildland-urban boundary zones to separate developed areas from high-hazard areas.
	Setting guidelines for annexation and service extensions in high-risk areas
	Addressing fire mitigation through access, signage, fire hydrants, water availability, vegetation management, and special building construction standards.
	Establishing wildfire mitigation planning requirements for large scale developments or planned unit developments.
	Enclosing the foundations of homes and other buildings in wildfire-prone areas, rather than leaving them open and potentially exposing undersides to blown embers or other materials.
	Encouraging the use of functional shutters on windows
	Using fire resistant roofing and building materials in remodels, upgrades, and new construction.
Infrastructure	Installing roof coverings, sheathing, flashing, skylights, roof and attic vents, eaves, and gutters that conform to ignition-resistant construction standards.
	Protecting propane tanks or other external fuel sources.
	Creating buffers around residential and non-residential structures through the removal or reduction of flammable vegetation, including vertical clearance of tree branches.
	Performing arson prevention cleanup activities in areas of abandoned or collapsed structures, accumulated trash or debris, and with a history of storing flammable materials where spills or dumping may have occurred.
	Preventing or alleviating wildfires by proper maintenance and separation of power lines as well as efficient response to fallen power lines.
Natural Systems	Performing maintenance including fuel management techniques such as pruning and clearing dead vegetation, selective logging, cutting high grass, planting fire-resistant vegetation, and creating fuel/fire breaks (i.e., areas where the spread of wildfires will be slowed or stopped by the removal of fuels).
	Using prescribed burning to reduce fuel loads that threaten public safety and property.
	Cutting firebreaks into public wooded areas in the wildland-urban interface.
	Developing a vegetation management plan

Table : Example Wildfire Weather Mitigation Actions

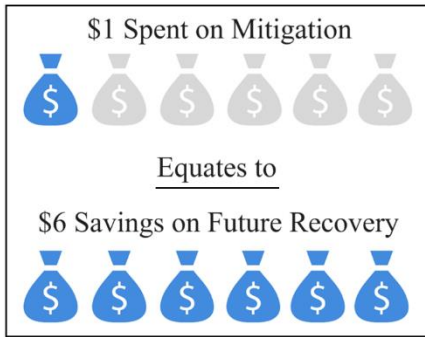
Education	Joining the “Firewise Communities/USA” recognition program sponsored by the National Wildlife Coordinating Group
	Offering GIS hazard mapping online for residents and design professionals.
	Sponsoring awareness workshops for local officials, developers, civic groups, and neighborhood/homeowners’ associations.
	Organizing a local fire department tour to show local elected officials and planners the most vulnerable areas of the community’s wildland-urban interface and increase their understanding of risks.
	Working with insurance companies, utility providers, and others to include wildfire safety information in materials provided to area residents.
	Developing partnerships with neighborhood groups, homeowners’ associations, and others to conduct outreach activities.
	Creating a defensible space or buffer zone cleared of combustible materials around property.
	Removing dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches, and yards.

Section 6 – Mitigation Strategy

6.1 Introduction

As part of this planning effort, Siskiyou County worked to minimize the risk of future impacts from identified hazards to all citizens of the region. In an attempt to shape future regulations, ordinances and policy decisions the MPC reviewed, revised, and developed a comprehensive hazard mitigation strategy. This comprehensive strategy includes:

- Goals to guide the selection of activities to mitigate and reduce potential loss.
- A discussion of funding capabilities for hazard mitigation projects.
- Identification, evaluation, and prioritization of mitigation actions along with potential funding sources.



Siskiyou County’s mitigation strategy promotes long-term hazard resilience that will have a positive impact on quality-of-life issues. By minimizing both the exposure to, and potential impacts from, identified hazards jurisdictions can expect to minimize injuries and loss of life, reduce property damage, and minimize the day-to-day social and economic disruptions that follow hazard events.

According to an analysis by the National Institute of Building Sciences, natural hazard mitigation saves \$6 on average for every \$1 spent on federal mitigation grants. Additional findings indicate that:

6.2 Goals and Objectives

Siskiyou County, participating jurisdictions, and all stakeholders reviewed the previous LHMP’s goals and objectives to determine if they remained viable and valid. In general terms, the relationship between goals and objectives is as follows:

- **Hierarchy:** Goals provide the overarching direction and desired outcomes, while objectives break down those goals into specific, actionable steps.
- **Alignment:** Objectives should align with and support the achievement of goals. Each objective should be directly related to one or more goals.
- **Measurement:** Goals set the vision, and objectives provide the means to measure progress toward that vision. Objectives are often used to track and evaluate the success of achieving broader goals.

During this process, and after a thorough review and discussion with all stakeholders, it was determined that the priorities of the Siskiyou County in relation to hazard mitigation planning have not changed during the five years of the previous planning cycle. Additionally, and based on discussion with all stakeholders, it was determined that the goals and objectives identified in the previous LHMP remained viable and valid. However, a need was determined to include a goal addressing the relationship between climate change and hazard mitigation. As such, Goal 6 was added to address the impacts of climate change on the landscape of mitigation planning. The following represent the identified goals for the 2024 LHMP:

- **Goal 1:** Protect life, health, property and the environment by planning and implementing whole-community risk reduction and resilience strategies.
 - **Objective:** Eliminate or minimize disruption of local government operations caused by natural hazards.
 - **Objective:** Increase resilience of (or protect and maintain) infrastructure and critical facilities.
 - **Objective:** Improve understanding of the location, causes and potential impacts of natural hazards.
 - **Objective:** Develop or improve early warning emergency response systems, communications and evacuation procedures.

- **Goal 2:** Increase public awareness of vulnerability and enable the public to mitigate, prepare for, respond to and recover from the impacts of hazards and disasters by building capacity and capabilities among historically underserved populations.
 - **Objective:** Educate the public on the risk from natural hazards and increase awareness, preparation, mitigation, response, and recovery activities.
 - **Objective (new):** Improve community engagement and outreach by organizations and agencies that provide services to underserved communities and vulnerable populations.
 - **Objective (new):** Improve and advertise public access to hazard information, data, and maps to enhance understanding of hazards and potential risks.
- **Goal 3:** Reduce the adverse impacts of disasters on the economy.
 - **Objective (new):** Strengthen disaster resistance and resiliency of major employers
 - **Objective:** Consider the impacts of natural hazards on future land uses within the planning area.
 - **Objective (new):** Partner with private sector to leverage resources.
- **Goal 4:** Improve cooperative emergency management capabilities among all entities
 - **Objective:** Sustain reliable local emergency operations and facilities during and after a disaster.
 - **Objective:** Encourage coordination among all jurisdictions, adjoining communities and stakeholders by establishing and maintaining mutual agreements or MOUs to enhance collaboration in hazard mitigation, preparedness, response, and recovery efforts.
 - **Objective (new):** Establish and secure sustainable funding sources for hazard mitigation and adaptation projects to ensure long-term resilience and the ability to implement ongoing and future initiatives effectively.
- **Goal 5:** Facilitate the development and implementation of long-term, cost-effective and environmentally sound mitigation projects and programs.
 - **Objective (new):** Implement mitigation programs that promote reliability of community lifelines to minimize impacts from hazards and expedite recovery.
 - **Objective:** Retrofit, relocate, or elevate structures in high hazard areas including those known to be repetitively damaged.
 - **Objective (new):** Incorporate effective mitigation strategies into capital improvement projects.
- **Goal 6 (new):** Continue to adopt and enact climate adaptation measures to help reduce the long-term risk and impacts of climate change.
 - **Objective (new):** Advance understanding about the relationship between climate change and natural hazards.
 - **Objective (new):** Develop hazard mitigation and climate change adaptation policies that prevent long-term negative effects on the environment.

Participants in the LHMP will continuously evaluate these identified goals and objectives against current capabilities and conditions. As part of this process, and where possible, data and feedback from plan stakeholders will be collected and analyzed to help identify gaps, roadblocks, and achievements. Using this information, strategies will be developed to bridge identified gaps, remove identified roadblocks, and celebrate identified successes in achieving the goals of this LHMP. Additionally, when necessary, goals and objectives will be modified, updated, or expanded based on the review process. In addition, SCOES will work with all local, county, regional, and state agencies and policy makers to help integrate the goals delineated in the LHMP and goals and plans for combating climate change.

6.3 Review and Creation of Hazard Mitigation Actions

Hazard mitigation actions are proactive measures taken to reduce or eliminate the long-term risk and impact of natural and human-made hazards. These actions are designed to minimize the damage caused by disasters and contribute to the overall resilience of communities and infrastructure.

For this plan update, members of the MPC were provided with a complete list of previously identified mitigation actions and asked to review them to determine their status. Previously identified mitigation action status was reported using the following definitions:

- **Completed:** The action has been fully completed.
- **Not Completed:** The action was not started or has been started and is not completed.
- **Revised:** Action has been revised to reflect current planning environment or identified changes.
- **Cancelled:** The action has been removed from consideration due to either a lack of resources or changing mitigation priorities.
- **On-going:** The action is completed and has become an ongoing activity or capability.

Additionally, MPC members and participating community stakeholders were provided with opportunities to identify and incorporate newly identified actions based on the changing hazard environment or previously unidentified needs. When considering new mitigation actions, participating jurisdictions were provided with two sources of guidance. Each risk assessment chapter of this LHMP provides a listing of potential mitigation actions for the specific hazard addressed. Additionally, jurisdictions were guided to the January 2013 FEMA publication *Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards*. This document offers a comprehensive collection of strategies and best practices for reducing risks associated with natural hazards. It covers various types of natural hazards, and provides practical ideas for communities, local governments, and individuals to implement.

In preparing a mitigation strategy all reasonable and obtainable mitigation actions were considered to help achieve the general goals. Priorities were developed based on past damage, existing exposure to risk, and weaknesses identified by the capability assessment. In identifying mitigation actions, the following activities were considered:

- The use of applicable building construction standards.
- Hazard avoidance through appropriate land-use practices.
- Relocation, retrofitting, or removal of structures at risk.
- Removal or elimination of the hazard.
- Reduction or limitation of the amount or size of the hazard.
- Segregation of the hazard from that which is to be protected.
- Modification of the basic characteristics of the hazard.
- Control of the rate of release of the hazard.
- Provision of protective systems or equipment for both cyber and physical risks.
- Establishment of hazard warning and communication procedures.
- Redundancy or duplication of essential personnel, critical systems, equipment, and information materials.

In general, all identified mitigation actions were classified under one of the following broad categories:

- **Local plans and regulations:** Actions that create or update plans to reflect situational changes and/or actions that aid in the creation, revision, or adoption of regulations related to hazard mitigation and management.
- **Infrastructure:** Actions that the modification of existing buildings or structures or involve the construction of structures to reduce the impact of hazard.
- **Natural system protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- **Public education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

Current climate adaptation strategies highlights using natural system solutions, when possible, to promote community resilience. Natural system solutions utilize natural features or processes to build more resilient communities, which in turn can contribute to climate change mitigation, climate adaptation, hazard mitigation, and environmental justice. These natural system solutions, often referred to as “green infrastructure” provide many additional community benefits

including improving community health and wellness, protecting the environment, creating wildfire habitats, reducing greenhouse gas emissions, and providing recreational opportunities. As an additional benefit, the FEMA Building Resilient Infrastructure and Communities grant program provides additional scoring criteria to promote and encourage the utilization of natural system solutions.

6.4 Prioritization of Mitigation Actions

The MPC and subject matter experts worked together to prioritize both previously identified and newly identified hazard mitigation actions. The methodology used to determine mitigation action priorities was based upon the following:

- Review of the updated risk assessments.
- Review of revised goals and objectives.
- Review of capabilities.

A multi-pronged and flexible analysis method was used for determining and prioritizing mitigation actions. An initial review of previously identified, but not completed, actions was conducted to ensure that, based on current condition and capabilities, the actions were still viable. Actions that were considered viable were retained in this plan update, with minor revisions completed as necessary.

For identified actions that were retained, and for newly identified actions, the FEMA recommended Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria were used to assist with prioritization. The following table details the STAPLEE criteria:

Table : STAPLEE Review Criteria

Criteria	Discussion	Example Considerations
Social	There should be community acceptance and support for the mitigation action.	Does the action have community acceptance? Will the proposed action adversely affect one segment of the population?
Technical	The proposed mitigation action should be technically feasible and should provide a long-term reduction in losses.	How effective is the action in avoiding or reducing future losses? Does it solve a problem or only a symptom? Does the action create additional problems?
Administrative	Personnel and administrative capabilities should be available to administer all phases of the project.	Are the staffing and administrative capabilities to implement the action in place? Is there someone to coordinate and lead the effort?
Political	Political support for the mitigation action needs to be present.	Is the action politically acceptable? Have political leaders been involved in the planning process? Is there a political champion to help see the project to completion?
Legal	The legal authority to implement the actions need to be in place or possible with the passing of laws or regulations.	Does the legal authority to implement the proposed action exist? Are there potential legal repercussions?
Economic	The current budget (and/or general obligation bonds or other instruments) need to be in place to fully fund the mitigation action.	Do the potential benefits of this action exceed the potential costs? Has funding been secured for the proposed action? What are the potential funding sources (public, non-profit, and private)? How will this action affect the fiscal capability of the community(s)? Does the action contribute to other community goals, such as capital improvements or economic development?

Table : STAPLEE Review Criteria

Criteria	Discussion	Example Considerations
Environmental	Actions should interface with the need for sustainable and environmentally healthy communities. Also, statutory considerations, such as the National Environmental Policy Act need to be considered for federal funds.	How will the action affect the environment? Will the action need environmental regulatory approvals? Will it meet federal, state, and local state regulatory requirements? Are endangered or threatened species likely to be affected?

Based on the prioritization review, each mitigation action was assigned one of the following rankings:

- **High Priority:** Actions that provide substantial progress towards improving resiliency and are determined as potentially urgent in nature by the MPC. This would include actions that strongly support the reduction of high hazard risks and meet mitigation goals. Additionally, actions in this ranking may have imminent funding availability or strong community support.
- **Medium Priority:** Actions that provide reasonable progress towards improving resiliency and are determined as moderately urgent in nature by the MPC. This would include actions that would lessen impact hazard events, but not eliminate the impact completely.
- **Low Priority:** Actions that provide incremental progress towards improving resiliency and are determined as slightly urgent in nature by the MPC. This would include actions that are generally the responsibility of the local community, actions outside the normal authority of the State, or actions whose cost/benefit analysis returns a low yield.

6.5 Mitigation Action Funding Sources

It is generally recognized that mitigation actions help realize long term savings by preventing future losses due to hazard events. However, many mitigation actions are beyond the budgetary capabilities of a single jurisdiction. This section provides a general description of some of the avenues available to defray the cost of implementing mitigation actions.

FEMA provides financial assistance to state, local, tribal, and territorial governments, as well as certain private non-profit organizations, to implement projects that help reduce the risk and impact of future disasters. These grant programs are designed to support initiatives aimed at mitigating hazards and improving resilience. The main grant program offered by FEMA for hazard mitigation is the Hazard Mitigation Assistance (HMA) program. The HMA program includes four subprograms, the Hazard Mitigation Grant Program (HMGP), the HMGP Post-Fire, Building Resilient Infrastructure and Communities (BRIC), and the Flood Mitigation Assistance (FMA) grant program. Applicants to these grant programs are required to submit project proposals that demonstrate the effectiveness of their proposed mitigation projects. The eligibility criteria, application process, and specific requirements for each program are outlined by FEMA in their guidelines and announcements, which are typically published on FEMA’s website.





The following provides a general overview of major grant funding streams:

- **HMGP and HMGP Post Fire:** The HMGP grants assist in implementing long-term hazard mitigation measures following Presidential disaster declarations, including fire declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.
- **BRIC:** BRIC supports states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency. Working in coordination with BRIC, the National Mitigation Investment Strategy is intended to provide a national, whole-community approach to investments in mitigation activities and risk management.
- **FMA Grant Program:** FMA is a competitive grant program that provides funding to states, local communities, federally recognized tribes and territories. Funds can be used for projects that reduce or eliminate the risk of

repetitive flood damage to buildings insured by the NFIP. FEMA chooses recipients based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project. FEMA requires state, local, tribal and territorial governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for hazard mitigation assistance projects.

The following table summarizes HMA grants programs:

Chart : HMA Grant Program Summary

HMA Program Comparison	 HMGP	 HMGP Post Fire	 BRIC	 FMA
Program Type	Post-disaster	Post-disaster	Pre-disaster	Pre-disaster
Funding Availability	Presidentially declared disaster	FMAG-declared disaster	6% set aside from federal post-disaster grant funding	Annual appropriations
Competitive?	No	No	Yes	Yes
Eligible Applicants	States, federally recognized tribes, territories and the District of Columbia (DC)	States, federally recognized tribes, territories and DC	States, federally recognized tribes, territories and DC	States, federally recognized tribes, territories and DC
Eligible Subapplicants	State agencies, local governments, tribes and private nonprofit organizations	State agencies, local governments, tribes and private nonprofit organizations	State agencies, local governments and tribes	State agencies, local governments and tribes
Hazard Mitigation Plan Requirement	Yes	Yes	Yes	Yes
NFIP Participation	Communities with projects in Special Flood Hazard Areas (SFHAs)	Communities with projects in SFHAs	Communities with projects in SFHAs	Subapplicants and properties

Additionally, the following provide available grant funding avenues for hazard mitigation projects:

- **Rehabilitation Of High Hazard Potential Dam (HHPD) Grant Program:** HHPD awards provide technical, planning, design and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. A state or territory with an enacted dam safety program, the State Administrative Agency, or an equivalent state agency, is eligible for the grant.
- **Emergency Management Performance Grant:** Program provides state, local, tribal and territorial emergency management agencies with the resources required for implementation of the National Preparedness System and works toward the National Preparedness Goal of a secure and resilient nation. Allowable costs support efforts

to build and sustain core capabilities across the prevention, protection, mitigation, response and recovery mission areas.

- **State Homeland Security Program:** Program includes a suite of risk-based grants to assist state, local, tribal and territorial efforts in preventing, protecting against, mitigating, responding to and recovering from acts of terrorism and other threats. This grant provides grantees with the resources required for implementation of the National Preparedness System and working toward the National Preparedness Goal of a secure and resilient nation.
- **Nonprofit Security Grant Program:** Program is one of three grant programs that support DHS/FEMA's focus on enhancing the ability of state, local, tribal, and territorial governments, as well as nonprofits, to prevent, protect against, prepare for, and respond to terrorist or other extremist attacks. These grant programs are part of a comprehensive set of measures authorized by Congress and implemented by DHS to help strengthen the nation's communities against potential terrorist or other extremist attacks. Among the five basic homeland security missions noted in the DHS Strategic Plan for Fiscal Years 2020-2024
- **Public Assistance Program:** The mission of FEMA's Public Assistance program is to provide assistance to 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. Through the Public Assistance program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain private non-profit organizations. The Public Assistance Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process. The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The grantee determines how the non-Federal share (up to 25%) is split with the eligible applicants.
- **Individual Assistance Program:** After a disaster, the federal government determines if any county in the state meets the criteria for individual disaster assistance. The decision is based on damage related to the severity and magnitude of the event. When a county receives an Individual Assistance declaration from the President of the United States, anyone who lives in that county can apply for assistance.
- **Small Business Administration Disaster Loans:** The Small Business Administration provides low-interest disaster loans to homeowners, renters, businesses of all sizes, and most private nonprofit organizations. Small Business Administration disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.
- **The Housing and Urban Development Agency:** Provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.
- **Community Development Block Grant Program:** This is a flexible program that provides communities with resources to address a wide range of unique community development needs. The program provides annual grants on a formula basis to general units of local government and States.
- **Individual and Households, Other Needs Assistance Program:** This program provides financial assistance to individuals or households who sustain damage or develop serious needs because of a natural or man-made disaster. The funding share is 75% federal funds and 25% state funds. The program provides grants for necessary expenses and serious needs that cannot be provided for by insurance, another federal program, or other source of assistance. The current maximum allowable amount for any one disaster to individuals or families is \$25,000. The program gives funds for disaster-related necessary expenses and serious needs, including personal property, transportation, medical and dental, funeral, essential tools, flood insurance, and moving and storage.
- **WUI Grants:** The 10-Year Comprehensive Strategy focuses on assisting people and communities in the WUI to moderate the threat of catastrophic fire through the four broad goals of improving prevention and suppression, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. The WUI Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance.

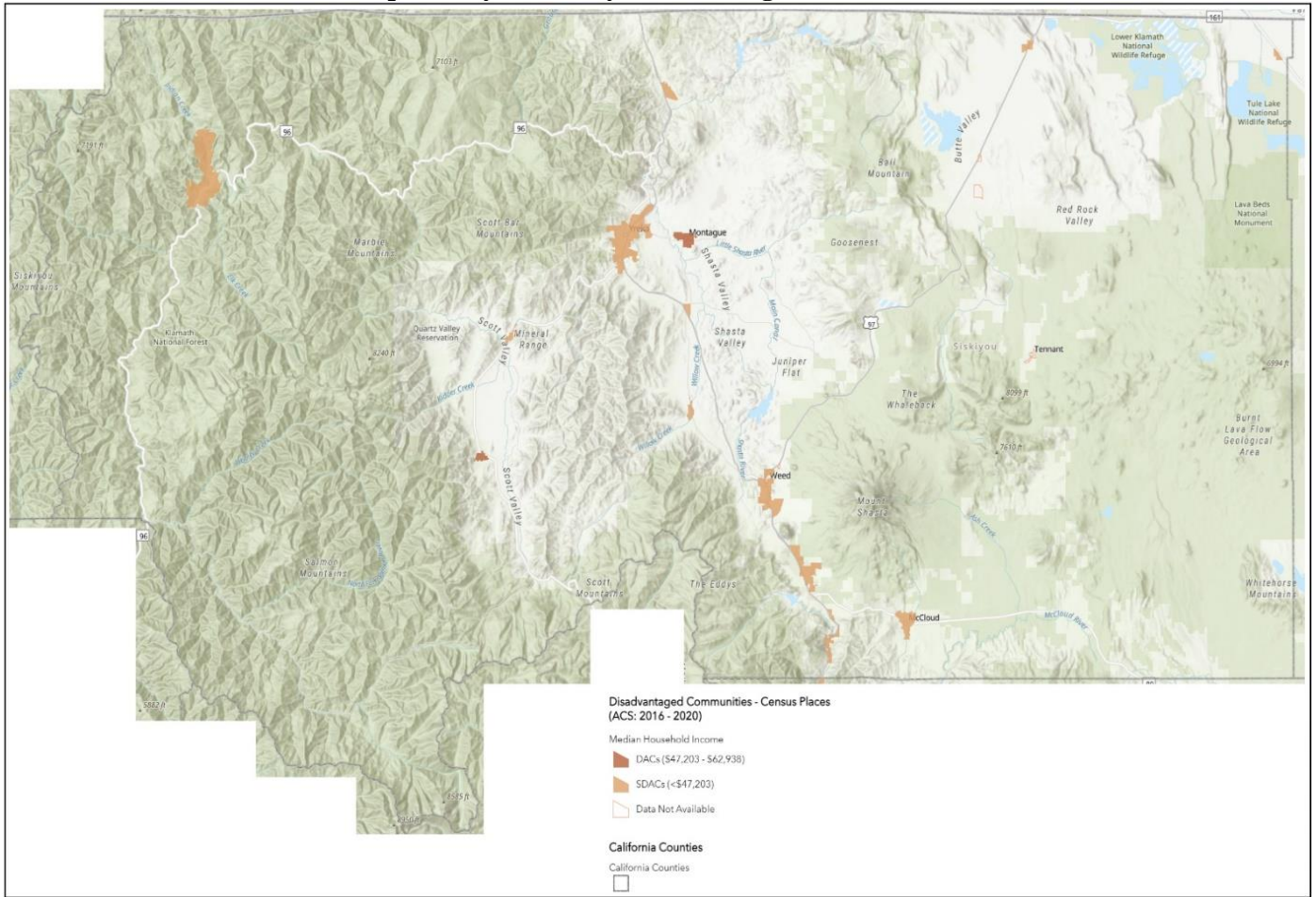
- **Forest Health Grant Program:** Awards funding to landscape-scaled land management programs that restore forest health and bolster disaster resilience on forest lands, protect the State’s upper watersheds, promote long-term storage of carbon in forest trees and soil, minimize the loss of forest carbon from unnaturally high severity wildfires, and further the goals of various State climate and land management plans.
- **Wildfire Prevention Grants Program:** Provides funding for wildfire prevention projects and activities in and near fire-threatened communities that focus on increasing the protection of people, structures, and communities. Funded activities include hazardous fuels reduction, wildfire prevention planning, and wildfire prevention education, with an emphasis on improving public health and safety while reducing greenhouse gas emissions.
- **Urban and Community Forestry Grant Program:** These grants are designed to help communities to create or implement projects with a focus on reducing greenhouse gas emissions, increasing climate resilience, and providing optimal co-benefits, with a particular focus on disadvantaged communities.
- **California Forest Improvement Program:** The State’s primary assistance program for nonindustrial private forest owners, the program provides eligible landowners with technical and financial assistance for planning, reforestation, and resource management investments to improve the health and resilience of California’s forestland.
- **CAL FIRE Wildfire Resilience Block Grants:** Funds technical and financial assistance for smaller, private forestland owners. The purpose of the grant is to allow prospective grantees the ability to assist nonindustrial forest landowners.

Small and impoverished communities that receive grants may receive a federal cost share of up to 90% of the total amount approved under the grant award. As defined in 44 CFR 201.2, a small and impoverished community is:

- A community of 3,000 or fewer individuals that is identified by the State as a rural community
- Is not a remote area within the corporate boundaries of a larger city
- Is economically disadvantaged, by having an average per capita annual income of residents not exceeding 80% of national, per capita income
- The local unemployment rate exceeds by one percentage point or more, the most recently reported, average yearly national unemployment rate
- Any other factors identified in the State Plan in which the community is located

The following map details disadvantaged communities within Siskiyou County

Map : Siskiyou County Disadvantaged Communities



Source: State of California DAC Mapping Tool

6.6 Previously Identified Jurisdictional Mitigation Actions

Previously identified hazard mitigation actions were reviewed by the relevant jurisdiction to determine the status of each action. The status of these previously identified hazard mitigation actions indicates if the action has been completed, is carried over to this version of the plan, has been revised, or is no longer being considered. Additionally, each action was assigned a new number to conform with the numbering system in this LHMP. Completed actions may be found in the following section. Carried over, revised, and deleted actions may be found in Appendix D.

6.7 Completed Hazard Mitigation Actions

Siskiyou County and all participating jurisdictions remain committed to investigating and obtaining all available grant funding for the completion of hazard mitigation projects. Since the completion of the previous LHMP in 2019 the following previously identified mitigation actions have been completed:

Table : Previously Identified Hazard Mitigation Action Progress

Previous LHMP Action Number	Description	Status
DUN -3	Inventory and assess condition of primary and secondary evacuation routes in the City and improve and maintain these routes as needed to ensure safe and efficient vehicle and pedestrian movement during emergency conditions.	Completed
DUN-4	Develop a post-disaster action plan that includes grant funding and debris removal components. The grant funding component should	Completed

Table : Previously Identified Hazard Mitigation Action Progress

Previous LHMP Action Number	Description	Status
	include a list of private, nonprofit, and government funding sources as well as the funding requirements for same.	
DUN -7	Increase reliability, capacity, and fire safety through the addition of a new 0.9 MG water storage tank in the Downtown Pressure Zone, strengthening of the main distribution system, and replacement of pipelines that are at or beyond their serviceable life.	Completed

Additionally, the following hazard mitigation projects, funded through a variety of programs, are currently being conducted in Siskiyou County:

- Siskiyou County Wildfire Mitigation and Preparedness:** As part of a statewide initiative by the USDA Forest Service, the Community Organized Relief Effort is partnering with the Fire Safe Council of Siskiyou County to support wildfire mitigation and preparedness throughout Siskiyou County. This five-year, multi-phase program (prepare, educate, empower) engages community members through public outreach and other fuel reduction initiatives. Numerous events will be hosted to share crucial emergency evacuation information and resources, assist with emergency sign-ups, and distribute go-bags and other tailored materials. The program also offers free home assessments to low-income households in the county, with the goal of creating defensible spaces or a buffer zone to help slow or halt the progress of an intruding fire.
- Dunsmuir Fuels Mitigation Project:** This project will reduce hazardous fuels in the Dunsmuir Wildland-Urban Interface in the City of Dunsmuir. The project will seek environmental compliance on approximately 690 acres in the community with a subset of that area, approximately 183 acres, receiving on-the-ground fuel reduction treatments.
- Lake Shastina Fuels Reduction Project:** This project is currently conducting a Vegetation Treatment Plan. This will allow more diverse use of the land in the future. Project Specific Analysis will include over 6,000 acres, exceeding the 197 acres originally respectively and will be conducted under the lead of the Shasta Valley Resource Conservation District.
- Climate Resiliency Grant:** The California Strategic Growth Council awarded \$1,500,000 to the Siskiyou Economic Development Council and the Siskiyou Climate Collaborative Program as part of a three-year grant that will focus on planning for fire and climate resiliency in the communities of Dorris, Dunsmuir, Etna, Fort Jones, Montague, Mount Shasta, Tulelake, Weed, and Yreka.

6.8 Jurisdictional Hazard Mitigation Actions

To support the mitigation goals identified in this LHMP, Siskiyou County and all participating jurisdictions identified a comprehensive range mitigation projects and activities. The selected set of hazard mitigation actions carefully takes a holistic approach to mitigation while simultaneously addressing each of the plan’s profiled hazards. The list of mitigation actions is based upon the potential to reduce risk to life and property with an emphasis on ease of implementation, community and agency support, consistency with local jurisdictions’ plans and capabilities, available funding, and jurisdictional vulnerability. It is important to note that since the previous LHMP, requirements for plan approval have changed. In the previous plan, Siskiyou County and many participating jurisdictions identified only a few mitigation actions, with none specific to an identified hazard. As such, numerous additional actions have been identified to ensure there is at least one action per identified hazard.

Please see Appendix D - Jurisdictional Mitigation Actions for a full list of jurisdictional mitigation actions.

To ensure that all hazard that could potentially impact a participating jurisdiction have been assigned a mitigation action, the following table provides a cross check of action and identified hazards:

Table : Jurisdictional Mitigation Action Cross Check

Jurisdiction	All Hazards	Dam Failure	Drought	Earthquake	Extreme Heat	Flood	Landslide	Severe Weather	Subsidence	Volcano	Wildfire
Siskiyou County	1-12	1-12, 13, 14	1-12, 15, 16	1-12, 17, 18,19	1-12, 20, 21	1-12, 22-30	1-12, 31, 32	1-12, 33, 34, 35	1-12, 36, 37	1-12, 38, 39	1-12, 40-44
Dorris	-	N/A	1	2, 3, 4	N/A	1, 3, 4, 5, 6	1, 3, 4	3, 4	N/A	3	1, 3, 7
Dunsmuir	1-13	1-13, 14	1-13	1-13	1-13, 15, 16	1-13, 14, 17, 18	1-13	1-13, 14	1-13	1-13	1-13, 14, 19-22
Etna	1-5	N/A	1-5, 6, 7	1-5	1-5	1-5, 6, 8, 9, 10, 11	1-5	1-5	1-5	1-5	1-5, 6, 7, 11, 13, 14
Fort Jones	1	N/A	1	1	1	1, 2, 3, 4	1	1	1	1	1, 5, ,6
Lake Shastina	1, 2	1, 2	1, 2, 3	1, 2, 4	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2, 4, 5	1, 2, 3, 5, 6, 7
Montague	-	1, 2	3, 4	5, 6, 7	9, 10	10-16	17, 18	19, 20	21	22, 23	24, 25, 26
Mt. Shasta	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41
Tulelake	1-6	N/A	1-6	1-6, 7, 8, 9, 10, 11, 12, 13	1-6	1-6, 7	1-6, 7	1-6, 7, 8, 9, 10, 11, 12, 13	1-6	1-6	1-6, 8, 9, 10, 11, 12, 13
Weed	1-3	N/A	1-3	1-3	1-3	1-3, 4-7	1-3	1-3	1-3	1-3	1-3, 8, 9
Yreka	1-5	1-5, 6, 7	1-5, 8	1-5, 8-14	1-5	1-5, 6, 7, 8, 10-18	1-5	1-5, 6, 7, 10, 11, 12, 17	1-5	1-5, 18	1-5, 8, 10-14, 18, 19, 20

Prior to the implementation of any action further feasibility analysis will be performed. Additionally, a Benefit-Cost Analysis that determines the future risk reduction benefits of a hazard mitigation project and compares those benefits to its costs will be conducted as required. Applicants and sub-applicants will use FEMA approved methodologies and tools, such as the Benefit-Cost Analysis Toolkit, to demonstrate the cost-effectiveness of their projects. The result of the analysis is a Benefit-Cost Ratio, and a project is considered cost-effective when the Benefit-Cost Ratio is 1.0 or greater. Depending on the project, either a full Benefit-Cost Analysis will be completed by entering documented values into the FEMA Benefit-Cost Analysis Toolkit, which calculates a benefit-cost ratio or, if the project meets specified criteria, a streamlined Benefit-Cost Analysis may be completed (FEMA’s cost-effectiveness requirement is never waived).

Siskiyou County and all participating jurisdictions acknowledge that the adoption and approval of this plan does not obligate the completion of each identified action. Rather, it is understood that progress should be shown in mitigation efforts which may include the completion of mitigation actions or other actions or progress in achieving the goals of this LHMP.

6.9 Mitigation Action Implementation and Monitoring

Siskiyou County is responsible for implementing and managing identified mitigation actions. To foster accountability and increase the likelihood that actions will be implemented, every proposed action is assigned to a specific department or position as a champion. In general:

- The identified champion will be responsible for tracking and reporting on action status.

- The identified champion should provide input on whether the action as implemented is successful in reducing vulnerability, if applicable.
- If the action is unsuccessful in reducing vulnerability, the identified champion will be tasked with identifying deficiencies and additional required actions.

Additionally, each action has been assigned a proposed completion timeframe to determine if the action is being implemented according to plan.

SCOES is responsible for monitoring the progress of mitigation activities and projects throughout the county in conjunction with the participating stakeholder communities. To facilitate the tracking of any awarded hazard mitigation grants, the SCOES will compile a list of projects funded throughout the calendar year, if any, and add it to an electronic database. Additionally, SCOES will monitor information on any other mitigation projects that were not funded through hazard mitigation grants. SCOES will utilize the Cal OES Grants Central System, an automated system that provides a streamlined and efficient way to apply for and manage grant funding. The Grants Central System:

- Automates the grant application process
- Provides the applicant notifications and status updates
- Simplifies the payment process

Providing grant oversight, Cal OES will continuously monitor the grant process to ensure compliance with federal and state regulations and requirements. Monitoring focuses on providing technical assistance and guidance to validate or improve administrative and fiscal efficiencies in managing award funds. Required by federal and state mandates, Cal OES Grants Management Monitoring Division assesses Grant Subaward programs to verify that expenditures submitted for reimbursement are allowable, reasonable, benefit the Grant Subaward, and have been appropriately charged to the correct cost category. Cal OES will also verify adequate policies, procedures, and systems are in place to manage Grant Subawards effectively. As part of the monitoring process, Cal OES will provide:

- **Desk Compliance Assessment:** A review of all related transactions and processes to verify that Grant Subaward funds were expended in compliance with federal and state regulations and the terms and conditions of the Subaward.
- **Onsite Compliance Assessment:** An assessment of the capability, performance, and compliance of subrecipients against applicable administrative and fiscal grant regulations and requirements.
- **Schedule (Questionnaire) Review:** A periodic self-certification that focuses on a particular topic or topics related to policies, procedures and/or payments.
- **Independent Auditor’s Assessment:** For projects over \$750,000, an independent auditor’s assessment of a Subrecipient’s fiscal processes and compliance with federal grant guidelines. If the auditor suggests there are areas for improvement or noncompliance with grant requirements, the monitoring staff will follow up with the Subrecipient to ensure that corrective actions are being taken.

During the monitoring process, Cal OES may determine that the process is not in compliance with federal and state regulation and requirements. The following are common areas of non-compliance:

- **Internal Controls**
 - Lack of segregation of duties for smaller nonprofit organizations
 - Inadequate policies for victim petty cash/financial assistance
 - Single audit findings, audit reports submitted late, lack of required audits
 - Inadequate monitoring of second tier subrecipients
- **Financial Management**
 - Improper/inadequate tracking and recording of Subaward costs
 - Costs not allocated properly and/or Inadequate cost allocation plan
 - Overcharging of office facility rent or indirect costs

- Inadequate/unsupported/unallowable required match
- Match not recorded or not identified in accounting records as match
- Match not claimed on reimbursement request as occurred
- Reimbursement requests not submitted timely
- Personnel
 - Functional timesheets not used for Subaward Personnel costs
 - Fringe benefit costs claimed in incorrect cost category
 - Unsupported/unallowable Personnel costs
 - Unsupported volunteer in-kind match claimed on reimbursement request
- Operating
 - Unsupported/unallowable operating cost items
 - Lack of proof of payment of cost item(s)
 - Cost claimed on reimbursement request prior to expending money
- Equipment
 - Equipment inventory records missing required information
 - Disposal data and information missing from records
 - Physical equipment inventory/record reconciliation not performed
 - Missing or unidentifiable equipment (onsite equipment inspections)
- Procurements/Contracts
 - Lack of written procurement procedures
 - Lack of written code of conduct covering conflicts of interest in procurements
 - Improper procurement
 - Non-competitive procurement not justified/approved
 - Procurement documentation not maintained
 - Suspension/debarment not checked prior to awarding contract
 - Competition requirements not met (quotes, bids, proposals)
 - No cost/price analysis
 - Lack of negotiating profit/discount when required
 - Contracts/purchase orders do not contain all required provisions

Should any areas be determined as non-complaint, a Corrective Action Plan may be required to address any identified issues, with the plan needing to be completed and implemented in a specific time frame.

Upon completion of a project, a member of the awarded jurisdiction, a member of the Siskiyou County MPC, and a Cal OES representative will conduct a closeout site visit to:

- Review all files and documents
- Review all procurement files and contracts to third parties
- Take photos of the completed project

Project closeout packages will generally be submitted 90 days after a project has been completed, and will include the following:

- Summary of documentation
- Pictures of completed project
- Materials, labor, and equipment forms, if required
- Close-out certification

Section 7 – Plan Maintenance

7.1 Introduction

The LHMP is a living document that will be updated and submitted to FEMA for approval every five years as required by 44 CRF 201.6. During the five-year cycle, the plan will undergo continuous monitoring and evaluation to ensure that the policies, procedures, priorities, and state environment established in the plan reflect current conditions. Siskiyou County and all participating jurisdictions will utilize the MPC to provide plan updates, revisions, and data collection for future LHMP planning purposes.

7.2 Plan Maintenance Responsibilities

SCOES serves as the lead coordinating agency for plan maintenance. Additional assistance in the plan maintenance process is provided by members of the MPC, subject matter experts, and representatives of local jurisdictions.

SCOES will facilitate the review and revision of the LHMP every five years, with each participating jurisdiction managing the revision of their specific jurisdictional annex. The review and revision will be an ongoing process. This process will incorporate all of the revisions made during the life of the plan, especially newly obtained data on hazard occurrence or identified vulnerability.

7.3 Plan Review Meetings

The MPC will meet annually for the first two years after plan approval. MPC members will determine the meeting dates and locations and will ensure that the meetings are open to all interested parties. The Siskiyou County Emergency Manager will be the main point of contact for these meetings and will maintain attendance and meeting minutes.

The purpose of these meetings is to discuss capability changes, the status of proposed projects, and any new studies or mapping that may inform the LHMP. Should a specific plan element or section require revision or amendment due to a state or federal legislation or policy change, the MPC will work with Cal OES to complete a plan addendum and submit it to FEMA as quickly as is practicable.

During these meetings, and in order to monitor LHMP progress, the following information will be tracked:

- How the actions from the mitigation strategy are being pursued and completed
 - Are actions being prioritized
- How the plan goals and objectives are being carried out
- How mitigation funding mechanisms are being utilized
- How is technical assistance being received

Additionally, the MPC will monitor the following elements to ensure the LHMP is current and correct:

- Reviewing the hazards and determining if any of them have changed
- Determining if there are new hazards that pose a risk to the state
- Ensuring goals and objectives are still relevant
- Determining if any actions have been completed or are deemed irrelevant
- Determining if new actions should be added
- Determining if capabilities have changed

After each meeting, the MPC will compile a meeting report for usage in future plan revisions.

In addition to these meetings, MPC members will monitor and evaluate the progress of mitigation projects via quarterly reports, site visits, correspondence, and reimbursements. Completed projects will be evaluated for loss avoidance and alignment with local development plans.

Cal OES may request a non-scheduled report on the monitoring, evaluation, or updating of any portion of the LHMP due to irregular progress on mitigation actions and or projects, in the aftermath of a hazard event, or for any reason deemed appropriate.

7.4 Plan Monitoring and Situational Change

Plan monitoring can be defined as the ongoing process by which stakeholders obtain regular feedback on the progress being made towards achieving their goals and objectives. In the more limited approach, monitoring may focus on tracking projects and the use of the agency's resources. In the broader approach, monitoring also involves tracking strategies and actions being taken by partners and non-partners, and figuring out what new strategies and actions need to be taken to ensure progress towards the most important results.

The MPC will track and record all substantial situational changes and will address, as appropriate, the following questions:

- Is the mitigation project under, over, or on budget?
- Is the mitigation project behind, ahead of, or on schedule?
- Are there any changes in jurisdictional capabilities which impact the plan?
- Are there any changes in jurisdictional hazard risk?
- Has the mitigation action been initiated, or its initiation planned?
- Is the current process of prioritizing mitigation actions and projects appropriate and accurate?
- Has the current method of incorporating mitigation actions and projects yielded a comprehensive action and project strategy to address seen and unforeseen hazards?
- Has there been regular collaboration among stakeholders?
- Was a negative result caused directly or indirectly by insufficient levels of public outreach?
- If any, what plan updates occurred, why they occurred, and what is their impact?

7.5 Post-Disaster Review

After each Presidential disaster declaration, and in coordination with FEMA and the Cal OES, the MPC will convene to document impacts on Siskiyou County and to determine if any mitigation actions should be considered to reduce future risk. This will allow for the development of hazard mitigation recommendations to FEMA during the disaster operation as well as to update the mitigation strategy as needed. The post-disaster review may coincide with established meetings or may be convened as separate events.

7.6 Plan Evaluation

A plan evaluation is a rigorous and independent assessment of either completed or ongoing activities to determine the extent to which they are achieving stated goals and contributing to decision making.

A plan evaluation report will be completed when the situation dictates. The following situations are typical examples of when an evaluation will be necessary.

- Post hazard event
- Post training exercise
- Post tabletop or drill exercise
- Significant change or completion of a mitigation project
- Significant change or completion of a mitigation action

An evaluation report will ask the following questions in response to the previously listed events.

- Do the mitigation objectives and goals continue to address the current hazards?
- Are there new or previously unforeseen hazards?

- Does a change in hazard vulnerability demand a change of or addition of mitigation actions or projects?
- Does a change in the mitigation strategy demand a change of or addition of mitigation actions or projects?
- Are current resources appropriate for implementing a mitigation project?
- Was the outcome of a mitigation action/project expected?
- Are there implementation problems?
- Was the public engaged to the point where they were satisfied with current engagement strategies?
- Did the public participate in a number that produced a positive yield on the plan, action, or project?
- Are there coordination problems?

7.7 Plan Updates

Typically, the updating of a LHMP is initiated upon the completion of a plan evaluation when the evaluation determines an update is appropriate. A plan update also occurs every five years per FEMA guidelines or at any time it is deemed necessary by MPC.

According to FEMA DMA 2000 guidelines for mitigation planning, Siskiyou County will begin the update process three years from this plan’s adoption. An increase in meeting tempo to twice a year will allow MPC to gather relevant information needed for the next plan update. The following meeting schedule indicates the tasks to be performed during this plan update period:

- **2027 Spring Meeting:** The MPC will begin updating the risk assessment portion of the plan. Hazards will be analyzed to determine if they are still relevant, if location should be updated, and if new hazards should be added. Previous occurrences will be reviewed to help determine the probability of future events.
- **2027 Fall Meeting:** The MPC will begin updating the vulnerability assessment. The MPC will update the vulnerability assessment portion of the plan. Data will need to be gathered for assets, critical facilities, building stock values, jurisdictional damages, etc.
- **2028 Spring Meeting:** The MPC will review information received and determine if the goals and objectives are still relevant and if new ones should be added. Actions will be reviewed to determine if they should remain in the plan, have been completed, or are no longer relevant. The MPC will review the potential funding sources for each action.
- **2028 Fall Meeting:** As appropriate, a new MPC for Siskiyou County will be formed to take over the planning process. The new MPC will evaluate the policies, programs, capabilities, and funding sources from the previous plan to determine if they are still accurate and if any new items should be added.
- **2029 Spring Meeting:** The new MPC will review the draft copy of the mitigation plan and make comments and updates if necessary. Formal submittal to FEMA for re-approval will follow.

In general, the following steps will be taken to complete the next LHMP revision:

Table : Siskiyou County LHMP Update Task List

Task	Action
1	Evaluate and update the planning process.
2	Review the stakeholder contact list and identify new stakeholders.
3	Initiate plan outreach and discussion, including a stakeholder meeting.
4	Consider the addition, removal, or modification of hazards identified in the plan.
5	Update and revise membership of the MPC.
6	Evaluate risk assessment methodologies and data sources.
7	Evaluate and update critical facility inventory information.
8	Evaluate and update the hazard profiles.
9	Evaluate and update the risk assessment summary.
10	Evaluate and update the mitigation strategy, including proposed mitigation actions.
11	Evaluate and update the mitigation implementation system.
12	Integrate new and updated local plans.

Table : Siskiyou County LHMP Update Task List

Task	Action
13	Evaluate and update other plans sections.
14	Identify and add any additional sections or information needed.
15	Review updated plan in its entirety.
16	Conduct updated plan outreach, including public information, comment period, and meetings.
17	Integrate additional comments received.
18	Finalize plan document.
19	Complete crosswalk and submit final plan to FEMA for review and approval.
20	Make additional modifications as required.
21	Obtain jurisdictional adoption resolutions.

7.8 Continued Public Involvement

Siskiyou County and all participating jurisdictions are dedicated to involving the public in the continual shaping of the LHMP and in the development of its mitigation projects and activities.

The Siskiyou County MPC will continue to keep the public informed about hazard mitigation projects and activities through jurisdictional websites, and as appropriate, public announcements. The public will also be invited to participate in all meetings to review and discuss the mitigation-related events. Additionally, participating jurisdictions will present to public officials in a public forum concerning the progress of mitigation actions identified in this plan as progress is made.

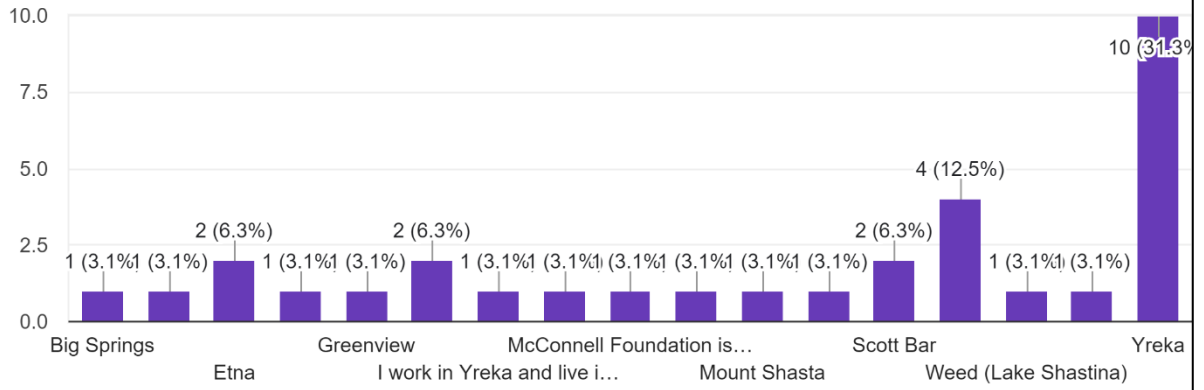
Copies of the Siskiyou County LHMP will be made available to the public, and will be posted on the dedicated Siskiyou County hazard mitigation website along with a hard copy kept at SCOES and participating stakeholder community offices.

Appendix A – Siskiyou County Adoption Documentation and FEMA Region IX Approval Documentation

Appendix B – Community Feedback

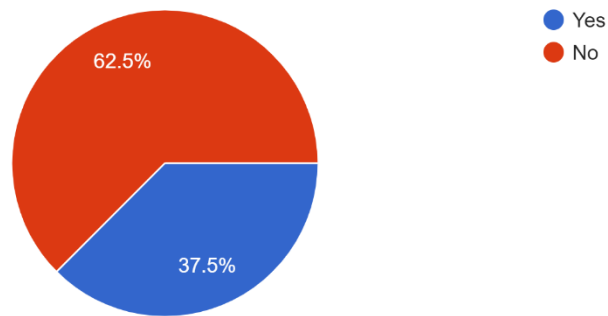
What city do you live in (or nearest city)?

32 responses



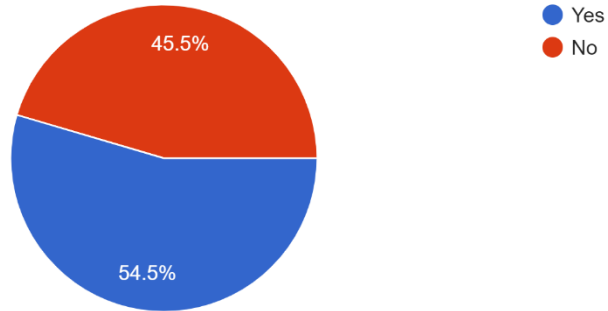
Have you read, reviewed, or used the previous (2018) Hazard Mitigation Plan

32 responses



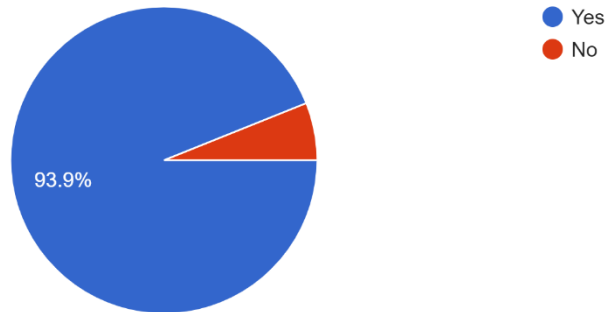
Should dam failure continue to be included in the Hazard Mitigation Plan:

33 responses



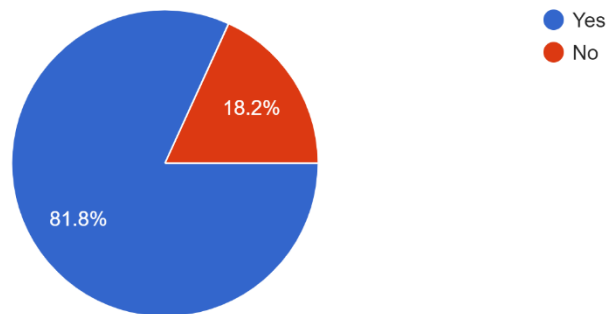
Should drought continue to be included in the Hazard Mitigation Plan:

33 responses



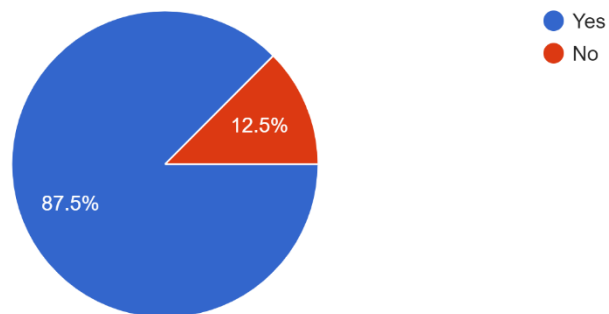
Should earthquake continue to be included in the Hazard Mitigation Plan:

33 responses



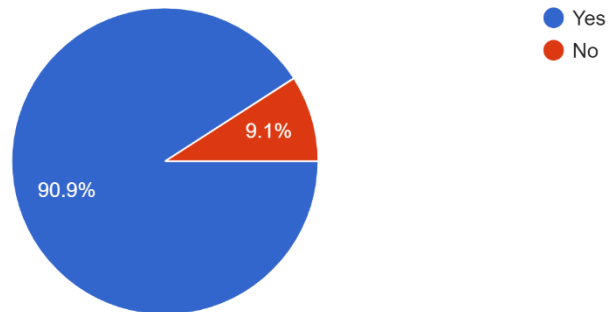
Should flood continue to be included in the Hazard Mitigation Plan:

32 responses



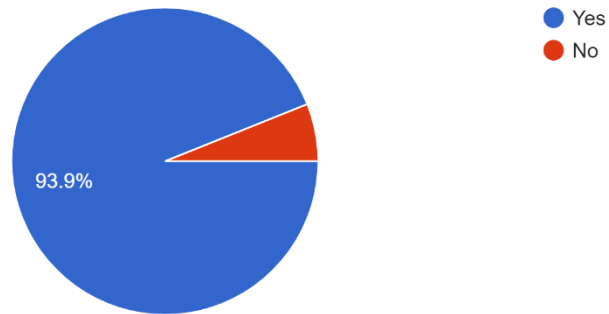
Should landslide continue to be included in the Hazard Mitigation Plan:

33 responses



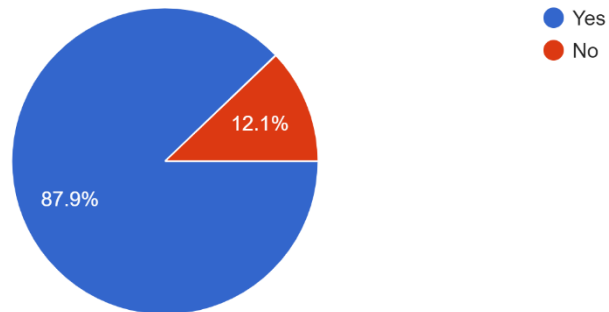
Should severe weather (high winds, lightning, thunderstorms) continue to be included in the Hazard Mitigation Plan:

33 responses



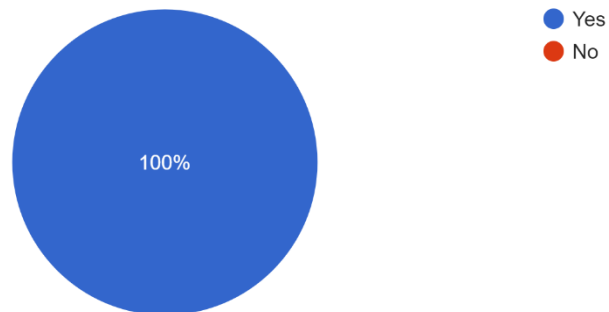
Should volcano continue to be included in the Hazard Mitigation Plan:

33 responses



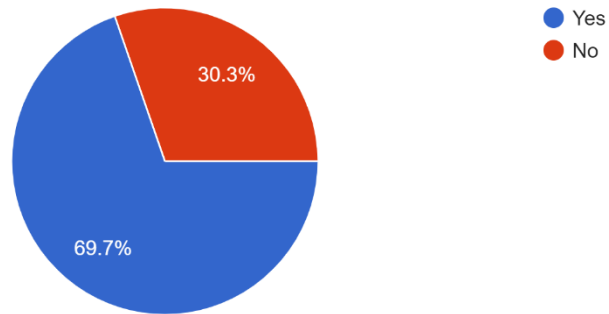
Should wildfire continue to be included in the Hazard Mitigation Plan:

33 responses



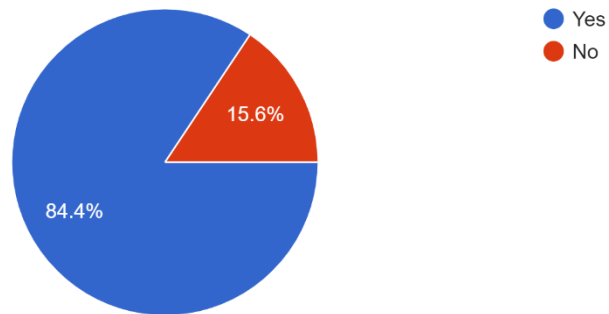
Should avalanche be added to the Hazard Mitigation Plan:

33 responses



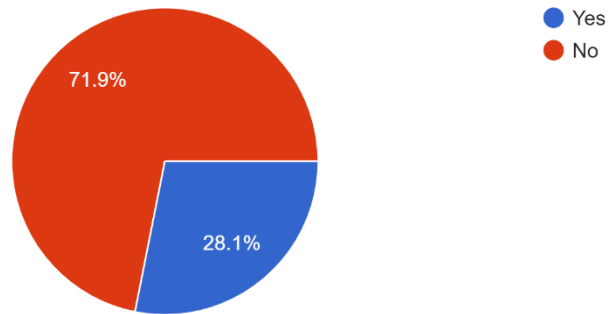
Should extreme temperatures be added to the Hazard Mitigation Plan:

32 responses



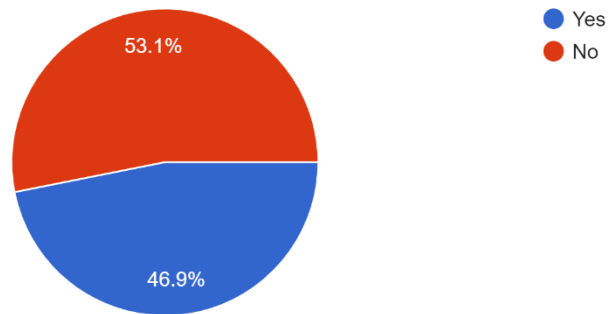
Should levee failure be added to the Hazard Mitigation Plan:

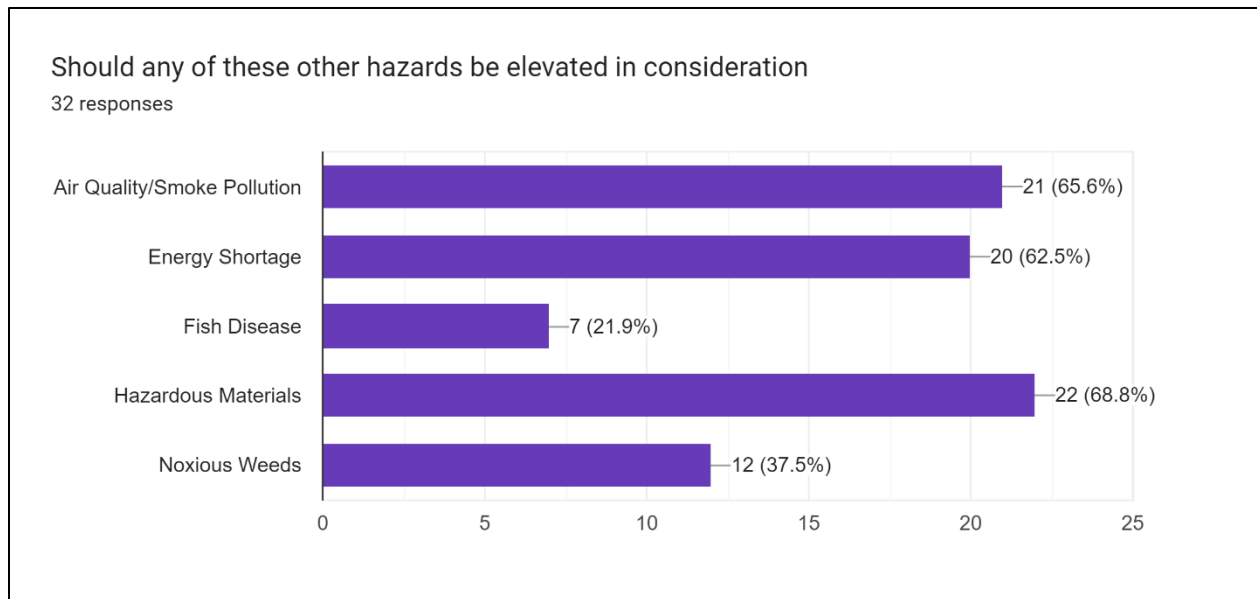
32 responses



Should subsidence be added to the Hazard Mitigation Plan:

32 responses





Do you have any specific concerns about any of these hazards?

- No
- None
- Tulelake has major subsidence occurring in the community currently that has caused several buildings to collapse. Extreme temperatures are getting more frequent, and Dunsmuir is often one of the hottest places in the County due to the lower elevation.
- Avalanches - the president's day avalanche was a near-record breaking event that fortunately occurred at a time when most people were not recreating on the mountain. However, it serves as a reminder that the Avalanche gulch path continues to be a highly active avalanche area and remains the most popular approach to the mountain for climbers, snowshoers, and backcountry skiers. Second, the presence and long-term consequences of illegal pesticides, illegal dumping, improper wastewater management, and other HAZMAT concerns should be included on future Hazard Mitigation Plans.
- McConnell has a HMGP grant under review at FEMA for Mt. Shasta and Dunsmuir area. Important to have a current LHMP to keep that funding in place. \$10 million for wildfire mitigation. Important to list stages and mitigation actions for high hazards (example: wildfire) including pre, during, and post event mitigation actions since all can be funded through the Stafford Act.
- Smoke has become quite problematic and far more likely. Citizens need a means to aid them in securing fresh, safe air especially if smoke is forecasted for an extended period of time.
- Wildfires
- I have concerns around evacuation planning, protecting vulnerable populations during hazardous events, protecting critical infrastructure, implementing backup infrastructure in case of emergency, ensuring adequate communication resources for emergency response workers, building resiliency against climate change. ensuring adequate supply of emergency resources.
- No. Most jurisdictions have already easily identified their hazards.
- General concerns about most of them
- Fires that are started in illegal cannabis grows

- Not enough power because of the dam removal. Not enough water to fight fires because of dam removal and the toxic smoke from the fires.
- Wildfire and no water because of dam removal
- Fire in our community.
- Knowing where to take hazardous waste or materials
- Wildfire
- Lack of water since the dams were removed
- wildfire is a priority due to the past and probably future issues with drought and water availability. Earthquake mitigation should be considered due to the numerous bridges that tie our communities together for access and exits. Storm severity is always an ongoing issue and education of citizens is relevant. imho.
- I am concerned about the use of fertilizers and pesticides, etc. for the cultivation of marijuana. I am also concerned about the lack of proper sewage (poop and pee) disposal at the marijuana grow sites and at the homeless sites. I am also concerned that our city workers are cleaning up sewage and needles at the homeless sites. Also, needles at our parks.
- no
- Of course I am concerned about wildfire...ongoing threat...

Is there anything else concerning hazard mitigation that you would like us to know?

- No
- Post-fire debris Flow is a major concern. Dunsmuir applied for a grant to conduct a risk assessment specifically designed to address the risk of slope failure if the area burned.
- Cascading or cumulative impacts. FEMA likes to compartmentalize hazards and mitigation actions to a single event with quantifiable impacts to life and structures but some of the hazards can be cumulative. The severe drought prior to 2023 is an example of this. Forest densification due to a century of fire suppression coupled with severe drought caused high tree mortality, drying of dense vegetation, a longer fire season and more intense fire behavior. The initial drought might not have a large quantifiable impact to life and property, but the cascading / downstream hazards do: Dead / drying fuels cause wildfires that destroy structures and loss of life, wildfires cause post fire hazards and increased potential for area to reburn in subsequent high-severity wildfires, smoke pollution, debris flows, fish kills, water quality issues, loss of forest carbon, etc. A well planned forest restoration project can reduce future drought caused tree mortality and cascading impacts, including wildfire impacts.
- Reference Nature Based Solutions (NBS) and Traditional Ecological Knowledge (TEK). Referencing NBS and TEK can broaden the mitigation actions to potentially reduce multiple hazards and cascading impacts as well as provide co-benefits. NBS and TEK may broaden the solutions set to protect life, property and other values. The other values can be important to Tribal and rural communities in Siskiyou County where population and structure densities are limited and there are other values at risk in addition to life and property (habitat, recreation, etc.).
- Some hazards may be subsequent to the primary hazard. Wildfire impacts air quality / smoke pollution, reduction in water quality, and impacts to aquatic life (fish), and can trigger debris flow / landslides. It might be redundant to list subsequent hazards (for example air quality/smoke pollution) as a separate, or primary hazard, if included under a primary hazard (wildfire).
- Climate Change

- We need to be able to show we are mitigating against wildfire, especially during a time where most of the County homeowners are being non-renewed and unable to obtain home insurance due to increased wildfire.
- not at this time
- I'm not sure what the purpose of this survey is. It seems that most of the communities in the County have identified the hazards that threaten them.
- Siskiyou County is very unique. Capacity is low, there are many disadvantaged communities, socio-economic status is low, education is low. It is important to take these factors into consideration when speaking with and working with this community. This survey does not address any of the needs, resources, education level, or preparedness of the community. These are essential factors when creating a LHMP that can actually be applied. Please take more time to reconsider your questions so that you can thoroughly assess the community you are working with.
- Fish decline is causing an emergency for Tribal members
- Cigarettes being thrown on roadsides by nationals invading our area
- Information on this effort has been very poorly shared. I go to meetings that should be talking about this and they have, but now all of a sudden this has become active. Do better.
- Anything that is a hazard because of the dam removals.
- Power cuts
- Answers depends on where you live.
- Not that I'm aware of!
- It's difficult to just answer yes or no. Some items are of critical importance right now and others "just in case."
- Yes, the cost of homeowners insurance... and the lack of it's availability...
- Mitigate the issue with Klamath River water quality due to dam takedown and silt issues. IE. inability of river community fire response to draft out of the river due to sedimentation.
- Ground water contamination from fire debris should be planned for and addressed.
- I hope that the people living on the Klamath River have the resources available to them if their wells dry up or become contaminated.
- The answers I replied "no" to, do not affect me, HOWEVER...I don't know all areas of the county, and if this is a Hazard for some, then YES it should be included.

Appendix C – Critical Facility Details

Table : Dunsmuir Critical Facility Information

Site Description	Address	Occupied As	Stories	Year Built	Sq Feet	Const Desc	Fire ISO Code	EQ Zone	Flood Zone	Total Values (2024)
FIREHOUSE AND OFFICES	5902-04 DUNSMUIR AVENUE	SHERIFF'S OFFICE/FIRE STATION/CITY COUNCIL CHAMBERS	3	1926	10,262	MASONRY CONST/WOOD ROOF	2	H	X	\$3,120,678
FIREHOUSE	5902 DUNSMUIR AVENUE	FIRE STATION	1	1921	1,913	MASONRY CONST/WOOD ROOF	2	H	X	\$352,693
CITY HALL	5915 DUNSMUIR AVENUE	CITY HALL	1	1926	3,519	MASONRY CONST/WOOD ROOF	2	H	X	\$870,235
GRANDSTAND & LIGHTS AT BALLPARK	4835 DUNSMUIR AVENUE	GRANDSTAND	1	1952	1,635	ALL COMB (WOOD FRAME)	1	H	X	\$275,725
LIGHTING AT BALLPARK	4835 DUNSMUIR AVENUE	LIGHTING AT BALLPARK			0	MIXED NON-COMB/COMB		H	X	\$97,079
COMMUNITY CENTER	4835 DUNSMUIR AVENUE	RECREATION CENTER	1	1940	3,383	MASONRY CONST/WOOD ROOF	2	H	X	\$697,214
LIBRARY	5714 DUNSMUIR AVENUE	LIBRARY - HIGH END	1	1923	4,037	MASONRY CONST/WOOD ROOF	2	H	X	\$960,851
AIRPORT HANGAR/OFFICE	1000 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1962	3,500	ALL STEEL	3	H	X	\$318,135
AIRPORT HANGAR B	MOTT ROAD	AIRCRAFT HANGAR	1	1993	1,386	ALL COMB (WOOD FRAME)	1	H	X	\$100,080
AIRPORT HANGER C	6100 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1993	1,400	ALL COMB (WOOD FRAME)	1	H	X	\$100,082
AIRPORT HANGER D	6100 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1993	1,400	ALL COMB (WOOD FRAME)	1	H	X	\$100,082
AIRPORT HANGER E	6100 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1993	1,400	ALL COMB (WOOD FRAME)	1	H	X	\$100,082
AIRPORT HANGER F	6100 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1993	1,400	ALL COMB (WOOD FRAME)	1	H	X	\$100,082
AIRPORT HANGER G	6100 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1993	1,400	ALL COMB (WOOD FRAME)	1	H	X	\$100,082
AIRPORT HANGER H	6100 MOTT AIRPORT ROAD	AIRCRAFT HANGAR	1	1993	1,400	ALL COMB (WOOD FRAME)	1	H	X	\$100,082
SEWER PLANT OPERATIONS BUILDING	1100 SOUTH 1ST STREET	WASTE - CONTROL/ADMINISTRATI ON BUILDING	1	1971	874	ALL COMB (WOOD FRAME)	1	H	X	\$353,461
SEWER PLANT OXIDATION DITCH	1100 SOUTH 1ST STREET	WASTE - OXIDATION DITCH	1	1976	12,610	FIRE RESISTIVE	6	H	X	\$2,466,533

Table : Dunsmuir Critical Facility Information

Site Description	Address	Occupied As	Stories	Year Built	Sq Feet	Const Desc	Fire ISO Code	EQ Zone	Flood Zone	Total Values (2024)
SEWER PLANT PARSHALL FLUME	1100 SOUTH 1ST STREET	WASTE - PARSHALL FLUME	1	1976	147	FIRE RESISTIVE	6	H	X	\$109,887
SEWER PLANT CHEMICAL FEED	1100 SOUTH 1ST STREET	WASTE - SO2 MIXER	1	2012	70	FIRE RESISTIVE	3	H	X	\$72,946
SEWER PLANT GENERATOR	1100 SOUTH 1ST STREET	SEWER PLANT GENERATOR		2015	0	NON COMB STEEL FRAME		H	X	\$124,602
VEHICLE CANOPY	1100 SOUTH 1ST STREET	VEHICLE CANOPY	1	1980	432	ALL COMB (WOOD FRAME)		H	X	\$15,013
SEWER PLANT AEROBIC DIGESTER	1100 SOUTH 1ST STREET	SEWER PLANT AEROBIC DIGESTER	1	1976	707	FIRE RESISTIVE		H	X	\$258,308
SEWER PLANT - BLOWER BUILDING	1100 SOUTH 1ST STREET	SEWER PLANT - BLOWER BUILDING	1	2014	1,920	ALL COMB (WOOD FRAME)		H	X	\$161,171
SEWER PLANT - SPLITTER BOX	1100 SOUTH 1ST STREET	SEWER PLANT - SPLITTER BOX	1	1976	46	FIRE RESISTIVE		H	X	\$39,346
SEWER PLANT - EFFLUENT PUMP STATION	1100 SOUTH 1ST STREET	SEWER PLANT - EFFLUENT PUMP STATION	1	1976	105	FIRE RESISTIVE		H	X	\$100,693
SEWER PLANT - SHOP/RAS BUILDING	1100 SOUTH 1ST STREET	SEWER PLANT - SHOP/RAS BUILDING	1	2014	988	MASONRY CONST/NON-COMB ROOF		H	X	\$478,318
SEWER PLANT - MIXED LIQUOR RETURN PUMP STATION	1100 SOUTH 1ST STREET	SEWER PLANT - MIXED LIQUOR RETURN PUMP STATION	1	2014	30	NON COMB STEEL FRAME		H	X	\$33,790
SEWER PLANT - HEADWORKS/GRIT AERATION	1100 SOUTH 1ST STREET	SEWER PLANT - HEADWORKS/GRIT AERATION	1	1976	336	FIRE RESISTIVE		H	X	\$290,431
SEWER PLANT - STROAGE SHED	1100 SOUTH 1ST STREET	SEWER PLANT - STROAGE SHED	1	1976	113	UNKNOWN		H	X	\$4,563
SEWER PLANT - EQUIPMENT STORAGE SHED	1100 SOUTH 1ST STREET	SEWER PLANT - EQUIPMENT STORAGE SHED	1	1976	135	MIXED NON-COMB/COMB		H	AE	\$5,586
SEWER PLANT SUB SURFACE DRAIN PUMP STATION	1100 SOUTH 1ST STREET	SEWER PLANT SUB SURFACE DRAIN PUMP STATION	1	1980	13	FIRE RESISTIVE		H	AE	\$65,281

Table : Dunsmuir Critical Facility Information

Site Description	Address	Occupied As	Stories	Year Built	Sq Feet	Const Desc	Fire ISO Code	EQ Zone	Flood Zone	Total Values (2024)
DUNSMUIR - THROUGHOUT	1100 SOUTH 1ST STREET	WASTE - SLUDGE PUMP	1	1994	110	ALL COMB (WOOD FRAME)	1	H	X	\$118,771
PUMP ROOM	1100 SOUTH 1ST STREET	WASTE - PUMP STATION	1	1971	192	ALL COMB (WOOD FRAME)	1	H	X	\$99,248
CLARIFIER	1100 SOUTH 1ST STREET	WASTE - CLARIFIER	1	1976	2,827	FIRE RESISTIVE		H	X	\$1,025,424
SLUDGE LAGOON #1	1100 SOUTH 1ST STREET	WASTE - SLUDGE LAGOON	1	1976	3,508	FIRE RESISTIVE		H	X	\$433,168
SLUDGE LAGOON #2	1100 SOUTH 1ST STREET	WASTE - SLUDGE LAGOON	1	1976	3,468	FIRE RESISTIVE		H	X	\$433,168
SLUDGE DRYING BEDS	1100 SOUTH 1ST STREET	WASTE - DRYING BEDS	1	1994	1,950	FIRE RESISTIVE		H	X	\$73,988
SAND FILTER	1100 SOUTH 1ST STREET	WASTE - SAND FILTER	1	1991	990	FIRE RESISTIVE		H	X	\$563,687
DOG POUND	1100 SOUTH 1ST STREET	DOG POUND/STORAGE BLOCK	1	1976	547	MASONRY CONST/WOOD ROOF	2	H	AE	\$54,453
PUMP HOUSE	ELIZABETH STREET	WASTE - LIFT STATION - STICK BUILT	1	1981	210	MASONRY CONST/NON-COMB ROOF	2	H	X	\$282,603
I-5 PUMP STATION	UNDER 800-FT BRIDGE	WATER - PUMPING STATION	1	1965	247	ALL COMB (WOOD FRAME)	1	H	X	\$393,686
WATER EQUIPMENT STORAGE SHOP - WATER METERS	ISGRIGG	SHOP BUILDING	1	1971	1,050	ALL COMB (WOOD FRAME)	1	H	X	\$118,782
PUMP STATION	SHASTA RETREAT	WATER - PUMPING STATION	1	1965	142	ALL COMB (WOOD FRAME)	1	H	X	\$198,690
BENLAP FOUNTAIN	DUNSMUIR AVENUE	PARK SHELTER - OPEN	1	1991	576	ALL COMB (WOOD FRAME)	1	H	X	\$63,925
PARK HOUSE	4837 DUNSMUIR AVENUE	RESIDENCE	1	1950	1,872	ALL COMB (WOOD FRAME)	1	H	X	\$247,910
LOOKOUT POINT WATER PUMP STATION	4121 DUNSMUIR AVENUE	WATER - PUMPING STATION	1	1993	129	ALL COMB (WOOD FRAME)	1	H	X	\$125,249
CENTRAL DUNSMUIR WATER TANK- 400,000 GALLON	WATER TANK	WATER TANK - GROUND 400,000	1	1987	3,848	MASONRY CONST/WOOD ROOF	2	H	X	\$1,295,183

Table : Dunsmuir Critical Facility Information

Site Description	Address	Occupied As	Stories	Year Built	Sq Feet	Const Desc	Fire ISO Code	EQ Zone	Flood Zone	Total Values (2024)
NORTH WATER TANK-650,000 GALLON	WATER TANK	WATER TANK - GROUND 650,000	1	2006	3,117	ALL STEEL	3	H	X	\$1,268,776
DUNSMUIR - THROUGHOUT	RIVER AVENUE	WASTE - LIFT STATION	1	2007	180	MASONRY CONST/NON-COMB ROOF	2	H	X	\$198,293
CHILDRENS PARK	SPRUCE STREET	PLAYGROUND EQUIPMENT		2008	0	NON COMB STEEL FRAME				\$31,902
SPRING BOTTLING PLANT	4121 N. DUNSMUIR AVE	-	2	1991	19,800	ALL STEEL		H	X	\$2,316,017
Dunsmuir Elementary School	4760 Siskiyou Ave.	-	-	-	-	-	-	-	-	-
Dunsmuir Community Pool and Community Pool Buildings	-	-	-	-	-	-	-	-	-	-
Pacific Power Substation	41.22064674724533 , - 122.2763002732790 9	-	-	-	-	-	-	-	-	-
Dunsmuir High School	5805 High School Way	-	-	-	-	-	-	-	-	-
Amtrak Station	5750 Sacramento Ave	-	-	-	-	-	-	-	-	-
Union Pacific Railyard	5750 Sacramento Ave	-	-	-	-	-	-	-	-	-
Dunsmuir-Castella Fire District Siren System	4 in Dunsmuir, North Water Tank, Ball Park, Firehouse, Cemetery	-	-	-	-	-	-	-	-	-
USPS	5530 Dunsmuir Ave	-	-	-	-	-	-	-	-	-
Dunsmuir Supermarket	5529 Dunsmuir Ave	-	-	-	-	-	-	-	-	\$844,804
Siskiyou Arts Museum	5824 Dunsmuir Ave	-	-	-	-	-	-	-	-	\$270,401
Dunsmuir Resource Center & Community Garden	5844 Dunsmuir Ave.	-	-	-	-	-	-	-	-	\$211,261

Source: City of Dunsmuir

Table : Dorris Critical Facility Information

BID	DBA	Building Description	Square Footage	Total Value
25538	S. PORTLAND AVE	BASKETBALL/TENNIS COURTS	N/A	\$27,987.00
25548	SINGLE FAMILY RESIDENCE	COMMERCIAL BUILDING	800	\$74,538.00
25545	COMMERCIAL BUILDING	COMMERCIAL BUILDING	900	\$90,073.00
25534	CONCESSION STAND	CONCESSION STAND/RESTROOM @ LITTLE LEAGUE PARK	900	\$182,486.00
25544	CITY HALL	DORRIS MUNICIPAL TOWN HALL BUILDING	4,800	\$1,568,365.00
25531	City of Dorris	FIRE STATION	5,102	\$949,811.00
25547	FORECLOSURE HOME	FORECLOSURE HOME	1,000	\$74,538.00
25535	LIBRARY	LIBRARY	3,300	\$1,170,606.00
25537	LIFT STATION	LIFT STATION	28	\$90,295.00
25539	PUMP HOUSE	LIFT STATION	160	\$97,953.00
25532	PUBLIC WORKS GARAGE	PUBLIC WORKS GARAGE	660	\$102,748.00
25541	PUMP HOUSE	PUMP HOUSE	195	\$91,073.00
25543	PUMP HOUSE	PUMP HOUSE/WELL #6	342	\$183,521.00
25549	Residential Home	Residential Home	N/A	\$109,784.00
25533	SEWER PODS	SEWER PODS	N/A	\$51,724.00
25542	PUMP HOUSE	VALVE HOUSE	100	\$4,635.00
25546	DORRIS - THROUGHOUT	WATER TANK - AST 1,000,000	N/A	\$1,200,000.00
25536	DORRIS - THROUGHOUT	WATER TANK-770,000 GALLON	N/A	\$1,529,832.00
25540	YOUTH CLUB HOUSE	YOUTH CLUB HOUSE	1,200	\$139,332.00

Source: City of Dorris

Appendix D – Jurisdictional Mitigation Actions

To support the mitigation goals identified in this LHMP, Siskiyou County and all participating jurisdictions identified a comprehensive range mitigation projects and activities. The selected set of hazard mitigation actions carefully takes a holistic approach to mitigation while simultaneously addressing each of the plan’s profiled hazards. The list of mitigation actions is based upon the potential to reduce risk to life and property with an emphasis on ease of implementation, community and agency support, consistency with local jurisdictions’ plans and capabilities, available funding, and jurisdictional vulnerability. To ensure that all hazard that could potentially impact a participating jurisdiction have been assigned a mitigation action, the following table provides a cross check of action and identified hazards:

Table : Jurisdictional Mitigation Action Cross Check

Jurisdiction	All Hazards	Dam Failure	Drought	Earthquake	Extreme Heat	Flood	Landslide	Severe Weather	Subsidence	Volcano	Wildfire
Siskiyou County	1-12	1-12, 13, 14	1-12, 15, 16	1-12, 17, 18,19	1-12, 20, 21	1-12, 22-30	1-12, 31, 32	1-12, 33, 34, 35	1-12, 36, 37	1-12, 38, 39	1-12, 40-44
Dorris	-	N/A	1	2, 3, 4	N/A	1, 3, 4, 5, 6	1, 3, 4	3, 4	N/A	3	1, 3, 7
Dunsmuir	1-13	1-13, 14	1-13	1-13	1-13, 15, 16	1-13, 14, 17, 18	1-13	1-13, 14	1-13	1-13	1-13, 14, 19-22
Etna	1-5	N/A	1-5, 6, 7	1-5	1-5	1-5, 6, 8, 9, 10, 11	1-5	1-5	1-5	1-5	1-5, 6, 7, 11, 13, 14
Fort Jones	1	N/A	1	1	1	1, 2, 3, 4	1	1	1	1	1, 5, 6
Lake Shastina	1, 2	1, 2	1, 2, 3	1, 2, 4	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2, 4, 5	1, 2, 3, 5, 6, 7
Montague	-	1, 2	3, 4	5, 6, 7	9, 10	10-16	17, 18	19, 20	21	22, 23	24, 25, 26
Mt. Shasta	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41	1-41
Tulelake	1-6	N/A	1-6	1-6, 7, 8, 9, 10, 11, 12, 13	1-6	1-6, 7	1-6, 7	1-6, 7, 8, 9, 10, 11, 12, 13	1-6	1-6	1-6, 8, 9, 10, 11, 12, 13
Weed	1-3	N/A	1-3	1-3	1-3	1-3, 4-7	1-3	1-3	1-3	1-3	1-3, 8, 9
Yreka	1-5	1-5, 6, 7	1-5, 8	1-5, 8-14	1-5	1-5, 6, 7, 8, 10-18	1-5	1-5, 6, 7, 10, 11, 12, 17	1-5	1-5, 18	1-5, 8, 10-14, 18, 19, 20

The following tables identify mitigation action items for each participating jurisdictions along with the following information:

- Hazard addressed
- Responsible party
- Overall priority
- Goal(s) addressed
- Estimated cost
- Potential funding source
- Proposed completion timeframe
- Current status

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Siskiyou County-1	Leverage public outreach partnering capabilities to inform and educate the public about hazard mitigation and preparedness.	All	SCOES Director	High	2	Staff time	General fund	Continuous	On-going
Siskiyou County-2	Coordinate all mitigation planning and project efforts, including grant application support, to maximize all resources available to the planning partnership.	All	SCOES Director	High	2, 4, 5	Staff time	General fund	Continuous	On-going
Siskiyou County-3	Support the collection of improved data (hydrologic, geologic, topographic, volcanic, historical, etc.) to better assess risks and vulnerabilities.	All	SCOES Director	High	1, 4, 5	Staff time	General fund	Continuous	On-going
Siskiyou County-4	Provide coordination and technical assistance in grant application preparation that includes assistance in cost vs. benefit analysis for grant-eligible projects.	All	SCOES Director	High	3, 4, 5	Staff time	General fund	Continuous	On-going
Siskiyou County-5	Continue to maintain a countywide hazard mitigation plan website to house the plan and plan updates, in order to provide the public an opportunity to monitor plan implementation and progress. Each planning partner may support the initiative by including an initiative in its action plan and creating a web link to the website.	All	SCOES Director	High	2, , 4, 5	Staff time	General fund	Continuous	On-going

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Siskiyou County-6	Where appropriate, support retrofitting, purchase, or relocation of structures or infrastructure located in hazard-prone areas to protect structures/infrastructure from future damage, with repetitive loss and severe repetitive loss properties as priority when applicable.	All	SCOES Director	High	1, 3	Project dependent	FEMA mitigation grant, General fund	5-10 years	Carried over, lack of funding
Siskiyou County-7	Relocate county-owned critical facilities out of identified high hazard risk zones.	All	SCOES Director	High	1, 3	Project dependent	FEMA mitigation grant, General fund	5-10 years	Carried over, lack of funding
Siskiyou County-8	Retrofit, rehabilitate or replace vulnerable road and bridge facilities and infrastructure throughout Siskiyou County.	All	Public Works Director	High	1, 3	Project dependent	FEMA mitigation grant, General fund	5-10 years	Carried over, lack of funding
Siskiyou County-9	Seek land acquisition opportunities for open space use and preservation in areas of high vulnerability due to multiple risk exposure.	All	Planning Department Director	High	1, 3	Project dependent	FEMA mitigation grant, General fund	5-10 years	Carried over, lack of funding
Siskiyou County-10	Develop and maintain a county public alert and warning plan.	All	SCOES Director	High	1, 2	Staff time	General Fund	Five years	Carried over, lack of staff
Siskiyou County-11	Integrate, where appropriate, elements from the Siskiyou County Hazard Mitigation Plan into other planning mechanisms.	All	SCOES Director	High	4	Staff time	General Fund	Continuous	On-going
Siskiyou County-12	Create and maintain a Siskiyou County disaster database to better understand disaster related trends and impacts.	All	SCOES Director, Public Works Director	High	1, 3, 4	Staff time	General Fund	1-3 years	Carried over, lack of staff

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Siskiyou County-13	Install evacuation route and high ground signage in any high hazard dam potential inundation areas.	Dam Failure	SCOES Director	Medium	1, 2	\$5,000 per location	FEMA mitigation grant, General fund	Five years	New
Siskiyou County-14	Map all infrastructure and facilities within dam inundation areas.	Dam Failure	SCOES Director	Medium	1, 2, 3	\$10,000 per location	FEMA mitigation grant, General fund	Five years	New
Siskiyou County-15	Conduct a native, low water planting program for all jurisdictional owned facilities.	Drought	Siskiyou County Facilities Director	Low	1, 3, 6	\$5,000 - \$50,000 per location	FEMA mitigation grant, General fund	Five years	New
Siskiyou County-16	Conduct agricultural education program on water reduction methods.	Drought	SCOES Director	High	1, 2, 3, 6	Staff Time	General fund	Five years	New
Siskiyou County-17	Developing an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and masonry buildings.	Earthquake	SCOES Director, Facilities director	High	1, 3,	Staff time	General fund	Three to five years	New
Siskiyou County-18	Educate homeowners about structural and non-structural retrofitting of vulnerable homes and encouraging retrofit.	Earthquake	SCOES Director	High	2	Staff time	General fund	Three to five years	New
Siskiyou County-19	Support financial incentives, such as low interest loans or tax breaks, for home and business owners who seismically retrofit their structures.	Earthquake	SCOES Director	High	1, 2, 3	Staff time	General fund	Three to five years	New
Siskiyou County-20	Modernization of HVAC systems in jurisdictional facilities.	Extreme Heat	Siskiyou County Facilities Director	Low	1, 3, 6	\$25,000 per facility	FEMA mitigation grant, General fund	-	New

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Siskiyou County-21	Identify and prepare county buildings for usage as heat shelters.	Extreme Heat	SCOES Director, Siskiyou County Facilities Director	Low	1, 3, 6	\$2,000 per facility	General fund	-	New
Siskiyou County-22	Support the retrofitting, purchase, or demolition of repetitive loss and severe repetitive loss properties.	Flood	SCOES Director		1, 3, 6	Project dependent	FEMA mitigation grant, General fund	5-10 years	Carried over, lack of funding
Siskiyou County-23	Conduct a flood insurance awareness program.	Flood	NFIP Administrator	High	2	Staff Time	General fund	Five years	New
Siskiyou County-24	Retrofit, rehabilitate, or replace vulnerable water system, storm water, and sewer facilities and infrastructure throughout the District.	Flood	McCloud Community Services Director	High	1, 3, 6	Project dependent	FEMA mitigation grant, General fund	5-10 years	Carried over, lack of funding
Siskiyou County-25	Design and construct drainage improvements along Panther Creek through the McCloud to address repetitive damage from flooding on the adjacent roads and property.	Flood	Public Works Director	High	1, 3, 6	Project dependent	General Fund, FEMA Hazard Mitigation Grant	5-10 years	Carried over, lack of funding
Siskiyou County-26	Replace undersized culverts at County maintained roads (particularly those in the Klamath and Scott River watersheds).	Flood	Public Works Director	High	1, 3, 6	Project dependent	McCloud General Fund, FEMA Hazard Mitigation Grant	5-10 years	Carried over, lack of funding
Siskiyou County-27	Continue to maintain compliance with the National Flood Insurance Program.	Flood	NFIP Coordinator	High	3	Staff Time	General fund	Continuous	On-going
Siskiyou County-28	Update the Siskiyou County Drainage Manual (1974) incorporating the last 37 years of	Flood	McCloud Public Works Director	Medium	1, 3	\$7,000	McCloud General Fund	5-10 years	Carried over, lack of funding

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	data, statistics and improvements in the field of hydrology to better estimate expected flood flows.								
Siskiyou County-29	Participate in the Community Rating System (CRS) program.	Flood	Planning Department Director	Medium	3	Staff Time	General Fund	1-3 years	Carried over, lack of staff
Siskiyou County-30	Construct rainwater retention/detention ponds at strategic locations.	Flood	NFIP Administrator, Public Works Director	Medium	1, 3, 6	Project dependent	General Fund, FEMA Hazard Mitigation Grant	Ten years	New
Siskiyou County-31	Stabilize cliffs with terracing or plantings of grasses or other plants to hold soil together.	Landslide	Public Works Director	Low	1, 3	Staff time	General Fund	5-10 years	New
Siskiyou County-32	Notify property owners located in high-risk areas.	Landslide	SCOES Director	Low	1, 2, 3	Staff time	General Fund	1-3 years	New
Siskiyou County-33	Install high wind, hail, and fire-resistant roofing on all jurisdictional facilities.	Severe Weather	Siskiyou County Facilities Director	Medium	1, 3, 6	Project dependent	General Fund, FEMA Hazard Mitigation Grant	Five years	New
Siskiyou County-34	Construct snow fences along major transportation routes.	Severe Weather	Public Works Director	Low	1, 3	Project dependent	General Fund, FEMA Hazard Mitigation Grant	Ten years	New
Siskiyou County-35	Installing and maintaining surge protection on critical electronic equipment.	Severe Weather	Siskiyou County Facilities Director	Low	1, 3	\$10,000 per location	General Fund, FEMA Hazard Mitigation Grant	Five years	New
Siskiyou County-36	Use GIS to map areas that are susceptible to subsidence.	Subsidence	SCOES Director	Low	1, 2, 3, 4	Staff time	General fund	Five years	New
Siskiyou County-37	Promote community awareness of subsidence risks and impacts.	Subsidence	SCOES Director	Low	2	Staff time	General fund	Five years	New

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Siskiyou County-38	Develop an inventory of all buildings that in potential volcanic flow areas.	Volcanic Activity	SCOES Director	Low	2	Staff time	General fund	Five years	New
Siskiyou County-39	Develop an outreach program about volcanic activity risk and mitigation activities in homes, schools, and businesses.	Volcanic Activity	SCOES Director	Low	2	Staff time	General fund	Five years	New
Siskiyou County-40	Increase public training on wildland-urban interface fire prevention.	Wildfire	SCOES Director	High	2	Staff time	General fund	Three to five years	Not started, lack of funding
Siskiyou County-41	In areas of the County with urban/wildland fire interface exposure, continue to promote access for ingress and egress as part of a defensible space initiative.	Wildfire	Fire Safe Council Director	High	1, 2, 3, 4	Staff time	McCloud General Fund, FEMA Hazard Mitigation Grant	Continuous	On-going
Siskiyou County-42	Promote landscape approach to fuel reduction as part of defensible space initiative in areas with high wildfire exposure.	Wildfire	Fire Safe Council Director	High	1, 2, 3, 4	Staff time	General fund	Continuous	On-going
Siskiyou County-43	Support defensible space for wildfire through projects that create perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation.	Wildfire	SCOES Director, Fire Chief, Planning Department Director	High	1, 2, 3, 4	Staff time	General fund	Continuous	On-going
Siskiyou County-44	Support hazardous fuels reduction projects that remove vegetative fuels proximate to at-risk structures that, if ignited, pose significant threat to human life, property, and critical facilities.	Wildfire	SCOES Director, Fire Chief, Planning Department Director	High	1, 2, 3, 4	Staff time	General fund	Continuous	On-going

Table : Siskiyou County Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
-	Collect improved data (hydrologic, geologic, topographic, volcanic, historic.) to assess risks and vulnerabilities.	-	-	-	-	-	-	-	Deleted, duplicative
-	Create a County Hazard Identification and Vulnerability Analysis utilizing enhanced technologies.	-	-	-	-	-	-	-	Deleted, duplicative
-	Develop departmental continuity of operations plans and a continuity of government plan.	-	-	-	-	-	-	-	Deleted, not mitigation
-	Develop District continuity of operations plan and continuity of government plan.	-	-	-	-	-	-	-	Deleted, not mitigation

Table : Dorris Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Dorris-1	Development and initial implementation of vegetative management programs	Drought, Flood, Landslide, Wildfire	City Manager	High	1, 3	Staff time and project dependent	CDBG, HMGP, BRIC, General funds	5-10 years	Carried over, lack of funding
Dorris-2	Undertake earthquake study for all critical infrastructure	Earthquake	Planning Department Director, City Manager	Low	1, 3	\$15,000	FEMA mitigation grant, General fund	Continuous	Carried over, lack of funding
Dorris-3	Structural and non-structural retrofitting of existing facilities (elevation, floodproofing, storm doors, tie-downs, etc.) for wildfire, seismic, wind or flood hazards (including designs and feasibility studies when included as part of the construction project)	Earthquake, Flood, Landslide, Severe Weather, Volcanic Activity, Wildfire	Fire Chief	High	1, 3	Project dependent	HMGP, BRIC, General fund	5-10 years	Carried over, lack of funding
Dorris-4	Minor structural hazard control or protection projects that may include stormwater management (e.g., culverts, floodgates, retention basins), or landslide stabilization	Earthquake, Flood, Landslide, Severe Weather	Public Works Director, City Manager	High	1, 3	Project dependent	Fire department budget	Continuous	Carried over, lack of funding
Dorris-5	Consider participation in the National Flood Insurance Program (NFIP)	Flood	City Manager	Medium	2, 3	Staff time	General fund	1- 3 years	Carried over, lack of staff
Dorris -6	Consider participation in the National Flood	Flood	City Manager	Medium	2, 3	Staff time	General fund	1- 3 years	Carried over, lack of staff

Table : Dorris Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	Insurance Program (NFIP)								
Dorris -7	Enhance/improve City code language and enforcement, including City Building and Fire Codes, to increase compliance with SB 1369 (Defensible Space) and other fire safe requirements in the City, and integrate mitigation plan into the Safety Element of the City’s General Plan	Wildfire	City Manager	High	1, 2, 3, 5	Staff time	USDA, HMGP, BRIC, General fund	1-3 years	Carried over, lack of staff
-	Continue to participate not only in general mutual-aid agreements, but also in agreements with adjoining jurisdictions for cooperative response to all hazards and disasters	-	-	-	-	-	-	-	Deleted, not mitigation
-	The Fire Department to conduct a mass care and shelter drill, which involves city and county employees, non-government agencies and the public	-	-	-	-	-	-	-	Deleted, not mitigation

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Dunsmuir-1	Develop new Safety and Environmental Justice Elements for the General Plan, including an evacuation plan, climate action, and adaptation planning elements.	All	City Manager, Resilience Specialist, Siskiyou County Sheriff, Siskiyou Climate Collaborative Director	High	All	Staff Time	General Fund	1 year	Revised
Dunsmuir-2	Develop educational materials to support active hazard mitigation projects, including hosting meetings, creating campaigns, and identifying community champions to spread the word about mitigation projects and increase participation.	All	City Manager, Resilience Specialist, Fire Safe Council Coordinator, McConnell Foundation Coordinator, Shasta Valley RCD Coordinator	High	2,5	Staff Time	General Fund	Project Dependent, Ongoing	Revised
Dunsmuir-3	Upgrading the city's audible emergency warning system (currently at end of life) to provide better coverage across the community and allow for audible messages and virtual activation.	All	City Manager, Resilience Specialist, Dunsmuir-Castella Fire Chief	High	1,2,3	\$1,000,000	FEMA Grants, General Fund	1- 3 years	Revised
Dunsmuir-4	Develop a Climate Action Implementation Guide with a robust prioritization tool for hazard mitigation and climate adaptation	All	City Manager, Resilience Specialist	High	4,5	\$150,000	FEMA Grants, EPA Grants, Other federal	1- 3 years	Revised

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	actions that incorporate the best available hazard assessment and cost-benefit data.						programs, General Fund		
Dunsmuir-5	Develop Post-Disaster Municipal Code and Building Code waivers that can be quickly implemented if and when a disaster occurs to make it easier for people to rebuild after a Disaster.	All	City Manager, Resilience Specialist, Deputy City Clerk, Building Official	High	3,4	Staff Time	General Fund	1-3 years	NEW
Dunsmuir-6	Develop Post-Disaster pre-approved Building Plans to fast-track rebuilding efforts if and when a disaster occurs	All	City Manager, Resilience Specialist, Building Official	High	3,4	Staff Time	General Fund	1-3 years	NEW
Dunsmuir-7	Become a National Weather Service StormReady Community	All	City Manager, Resilience Specialist	Low	2,4	Staff Time	General Fund	1 year	NEW
Dunsmuir-8	Relocate, retrofit, and/or mitigate the risk to existing critical facilities to protect them against identified hazards.	All	City Manager, Resilience Specialist, Public Works Director, Finance Director	High	1,3,4,5,6	Varies	FEMA Grants, USFS Grants, Infrastructure Grants, General fund	1 - 10 years	Revised
Dunsmuir -9	Implement redundancy in all communication systems and critical infrastructure, including through the provision of emergency backup power.	All	City Manager, Resilience Specialist, Public Works Director	High	1,3,4	Varies	FEMA Grants, CalFire Grants, General Fund	5 - 10 years	Revised

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Dunsmuir-10	Establish a local Hazard Mitigation Fund to provide grant matches for large-scale hazard mitigation projects.	All	City Manager, Resilience Specialist, Finance Director	Med	4,5,6	Staff Time	General Fund, Tax Measure	3-5 years	NEW
Dunsmuir-11	Develop a Post-Disaster Damage Assessment and Debris Management Annex to add to the Emergency Operations Plan	All	City Manager, Resilience Specialist, Public Works	Med	1,3,4	Staff Time	General Fund	1-3 years	NEW
Dunsmuir-12	Establish a Community-Based Small Grant Program to Promote Mitigation Work and Community Resilience	All	City Manager, Resilience Specialist	Med	1,2,3	\$50,000/year	General Fund	1-3 years	NEW
Dunsmuir-13	Build and maintain a GIS Database of local hazards and critical infrastructure layers	All	City Manager, Resilience Specialist	Low	4,5,6	\$2,500/year and Staff Time	General Fund	1-3 years	NEW
Dunsmuir-14	Where feasible and appropriate underground existing utilities and require that new utility infrastructure be located underground.	Dam Failure, Flood, Severe Weather, Wildfire	City Manager, Resilience Specialist, Public Works Director, Pacific Power Regional Manager	Med	1,3	>\$1,850,000/mile	FEMA Grants, General Fund, Pacific Power Grants	1- 10 years	Revised
Dunsmuir-15	Upgrade the Community Center with Air Conditioning so that it can function as a Cooling Center as needed.	Extreme Heat	City Manager, Resilience Specialist, Public Works Director, Recreation and	High	1,2	\$50,000	Hometown Grant Program, General Fund	1-3 years	NEW

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
			Parks District Director						
Dunsmuir-16	Develop a Cooling Center Activation Plan with partners and increase cooling center hours to ensure coverage from Noon-6 PM during the hottest time of day	Extreme Heat	City Manager, Resilience Specialist, Dunsmuir Library Manager, Dunsmuir Resource Center Director	High	1,2	Staff Time - \$50,000/year	General Fund, Small Grant Programs	1 year	NEW
Dunsmuir-17	Maintain compliance and good standing in the National Flood Insurance Program (NFIP).	Flood	City Manager, Resilience Specialist	High	1,2,3	Staff Time	General Fund	Ongoing Mitigation Program	Revised
Dunsmuir-18	Become the First Siskiyou County Community in the Community Rating System (CRS) program.	Flood	City Manager, Resilience Specialist	Medium	1,2,3	Staff Time	General Fund	1 year	Revised
Dunsmuir-19	Reduce fuel loads and harden homes in highest fire severity zones within and adjacent to the city through pursuit of grant funding, interagency coordination, and collaboration with property owners, volunteer groups and non-profit organizations (e.g., fire safe councils and resource conservation districts).	Wildfire	City Manager, Resilience Specialist, Public Works Director, Fire Safe Council Coordinator	High	All	500,000+/year	FEMA Grants, CWDG, CalFire Grants, General Fund	1- 3 years	On-going

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Dunsmuir-20	Maintain Community Firewise designation through Wildfire public outreach events and the facilitation and support of communitywide fuels reduction efforts like community Wildfire Mitigation Days, free Green Waste Days and enforcement of vegetation ordinance.	Wildfire	City Manager, Resilience Specialist, Fire Safe Council Coordinator	High	1,2,3,5,6	\$25,000/year	General Fund	Yearly Ongoing Mitigation Programming	Revised
Dunsmuir-21	Develop a maintenance and monitoring program for Wildfire treatments	Wildfire	City Manager, Resilience Specialist, Dunsmuir-Castella Fire Chief	Low	4,5,6	Staff Time	General Fund	1-3 years	NEW
Dunsmuir-22	Create a Biomass Feasibility Study to identify the best Biomass Facility	Wildfire	City Manager, Resilience Specialist, Finance Director	High	4,5,6	\$200,000	FEMA Grants, USFS Grants, General Fund	1-3 years	NEW
Dunsmuir-23	Build a Biomass Facility to accelerate Dunsmuir’s Wildfire Mitigation Work	Wildfire	City Manager, Resilience Specialist, Siskiyou Climate Collaborative Director	High	4,5,6	\$5,000,000 - \$20,000,000	FEMA Grants, USFS Grants, Infrastructure Grants, CalFire Grants, Public-Private Partnerships	5-10 years	NEW

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Dunsmuir-24	Update and maintain the Dunsmuir CWPP to ensure a coordinated Wildfire Mitigation approach	Wildfire	City Manager, Resilience Specialist, Fire Safe Council Coordinator	High	4,5,6	Staff Time - \$100,000	CWDG Grant, General Fund	1-2 years, must be updated by the end of 2026 to maintain CWDG Grant eligibility	NEW
Dunsmuir-25	Develop Pre-Event Post-Fire Debris Flow Modeling and Risk Assessment	Wildfire, Landslide, Flood	City Manager, Resilience Specialist	Med	1,2,3,5	\$150,000	FEMA Grants, General Fund	1-3 years	NEW
Deleted	Encourage, support, and maintain ongoing coordination with the California Department of Transportation, highway contractor, emergency response agencies, and public whenever construction will occur on Interstate 5 that has the potential to significantly delay emergency response efforts and/or impact evacuation.	All	City Manager				General fund	On-going	Cancelled – Not a Mitigation Action
Deleted	Continue to improve upon the city’s assessment of its hazard vulnerabilities, including through detailed assessments of risks to critical structures and infrastructure, to better inform and prioritize	All	City Manager				FEMA grant, General fund	5 - 10 years	Cancelled, too vague

Table : Dunsmuir Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	actions needed to safeguard the community.								
Deleted	Stockpile crucial supplies and replacement parts that may be difficult to obtain during emergency conditions, such as sewer and water line, snowmelt, sandbags, face masks, batteries, fuel filters, air filters, sand, etc.	All	City Manager				General fund	1 - 3 years	Cancelled – Not a Mitigation Action
Deleted	Establish a dam failure early warning alert for the city’s audible emergency warning system, along with signs alerting the public to the hazard and directing them to higher ground when and where appropriate.	Dam Failure	City Manager				General fund	5 - 10 years	Cancelled
Deleted	Support County-wide initiatives identified in Volume 1 of this Plan.	-	-	-	-	-	-	-	Delete, no longer applicable
Deleted	Continue to support the implementation, monitoring, maintenance and updating of this Plan as identified in Volume 1.	-	-	-	-	-	-	-	Delete, no longer applicable

Table : Etna Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Etna-1	Integrate risk assessment information from Siskiyou County Hazard Mitigation Plan into available City planning documents	All	City Manager	Medium	2, 5	\$10,000	General fund	1- 3 years	Carried over, lack of funding
Etna -2	Integrate the Hazard Mitigation Plan into the Safety Element of the General Plan.	All	City Manager	Medium	5, 5	\$10,000	General fund	1- 3 years	
Etna -3	Update Etna Municipal code language and enforcement re: Building and Fire Codes	All	City Manager	High	1, 3, 5, 6	\$5,000	General fund	1- 3 years	Carried over, lack of funding
Etna -4	Develop educational materials re: disaster planning, natural hazard risk, etc.; work with local schools, civic/social entities, Chamber of Commerce, Family Resource Center to educate community in hazard mitigation/disaster preparedness	All	City Manager	Medium	2	\$5,000	General fund, Public/private partnership	1- 3 years	Carried over, lack of funding
Etna -5	Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe loss properties as priority	All	City Manager	High	1, 3, 6	Per location cost	FEMA Mitigation grant, General fund	5 - 10 years	Carried over, lack of funding

Table : Etna Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Etna -6	Complete or update mutual aid agreements with adjoining entities (City of Fort Jones, Scott Valley Fire Dist., CDF)	Drought, Flood, Wildfire	City Manager	Medium	4	Staff time	General fund	1- 3 years	
Etna -7	Add a third reservoir (300,000 gallons) at the water plant for fire protection/drought management	Drought, Wildfire	City Manager	High	1, 3, 6	\$300,000	USDA Rural, FEMA Mitigation grant, DWR/State prop grant	1- 3 years	Carried over, lack of funding
Etna -8	Feasibility study for complete upgrade of stormwater drain system	Flood	City Manager	High	1, 3, 6	\$35,000	HMGP, BRIC, General fund	1-3 years	Carried over, lack of funding
Etna -9	Update/construct/retrofit storm drain system in ensure maximum efficiency	Flood	City Manager	High	1, 3, 6	\$500,00	Rural USDA, DWR, HNGP, BRIC, General fund	1-3 years	Carried over, lack of funding
Etna -10	Continue to maintain compliance and good standing in the National Flood Insurance Program (NFIP)	Flood	City Manager	High	1, 2	Staff time	General fund	Continuous	On-going
Etna -11	Retrofit sewer mains in floodplain area and extend water main for fire hydrant	Flood, Wildfire	City Manager	High	1, 3, 6	\$100,000	HMGP, BRIC, General fund	1-3 years	Carried over, lack of funding
Etna -12	Continue participation and improve class rating in ISO programs (Building Code	Flood, Wildfire	City Manager	High	1, 3, 6	Staff time	HMGP, BRIC, General fund	Continuous	

Table : Etna Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	Effectiveness Grading, Public Protection)								
Etna -13	Clear fuels to provide defensible open space: complete/maintain fuel break close to city boundaries; establish Etna Fire Safe Council	Wildfire	City Manager	High	1, 3, 6	\$20,000	FEMA Mitigation grant, General fund	1- 3 years	Carried over, lack of funding
Etna -14	Require private property owners in city limits to maintain defensible space	Wildfire	City Manager	High	1, 2, 3, 6	Staff time	General fund	Continuous	
-	Support County-wide initiatives identified in Volume 1 of this Plan	-	-	-	-	-	-	-	Delete, no longer applicable
-	Continue to support the implementation, monitoring, maintenance and updating of this Plan as identified in Volume 1	-	-	-	-	-	-	-	Delete, no longer applicable
-	Update Emergency Operations Plan	-	-	-	-	-	-	-	Delete, not mitigation

Table : Fort Jones Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Fort Jones-1	Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe loss properties as priority.	All Hazards	Town Manager	High	1, 3, 6	Facility dependent	FEMA Mitigation grant, General fund	5–10 years	Carried over, lack of funding
Fort Jones -2	Increase channel capacity of Moffett Creek by removing utility line dams, vegetation and accumulated sediment.	Flood	Town Manager	Medium	1, 3	\$260,000	HMGP, BRIC, General fund	1-3 years	Carried over, lack of funding
Fort Jones -3	Consider participation in the Community Rating System (CRS) program.	Flood	Town Manager	Medium	1, 2, 3	Staff time	General fund	1- 3 years	Carried over, lack of staff
Fort Jones -4	Continue to maintain compliance and good standing in the National Flood Insurance Program.	Flood	Town Manager	Medium	1, 2, 3	Staff time	General fund	Continuous	Carried over, lack of staff
Fort Jones -5	Clear 100 feet of defensible space for 30 vulnerable homes.	Wildfire	Town Manager	High	1, 3	\$75,000	HMGP, BRIC, General fund	1-3 years	Carried over, lack of funding
Fort Jones -6	Provide 150 acres of shaded fuel break, restore emergency fire road.	Wildfire	Town Manager	High	1, 3	\$225,000	HMGP, BRIC, General fund	1-3 years	Carried over, lack of funding
-	Support County-wide initiatives identified in Volume 1 of this Plan.	-	-	-	-	-	-	-	Delete
-	Continue to support the implementation, monitoring, maintenance and updating of this Plan as identified in Volume 1.	-	-	-	-	-	-	-	Delete

Table : Lake Shastina CSD Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Lake Shastina CSD -1	District Construction of Emergency Operations Center in conjunction with Police and Fire	All	Lake Shastina Community Services Director	High	1, 3, 4	\$650,000	Lake Shastina General Fund, FEMA Hazard Mitigation Grant	5-10 years	Carried over, lack of funding
Lake Shastina CSD -2	Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe loss properties as priority	All	Lake Shastina Community Services Director	High	1, 3, 6	Project dependent	Lake Shastina General Fund, FEMA Hazard Mitigation Grant	5-10 years	Carried over, lack of funding
Lake Shastina CSD -3	District Water Well Electrical Generator Additions	Drought, Wildfire	Lake Shastina Community Services Director	High	1, 3, 6	\$350,000	Lake Shastina General Fund, FEMA Hazard Mitigation Grant	1-3 years	Carried over, lack of funding
Lake Shastina CSD -4	District Police and Fire Facility Seismic Improvements	Earthquake, Volcano	Lake Shastina Community Services Director	Medium	1, 3	\$300,000	Lake Shastina General Fund, FEMA Hazard Mitigation Grant	1-3 years	Carried over, lack of funding
Lake Shastina CSD -5	District Fire Fuels abatement program	Volcano, Wildfire	Lake Shastina Community	High	1, 3, 6	\$20,000 per year	Lake Shastina	1-3 years	on-going

Table : Lake Shastina CSD Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
			Services Director				General Fund, FEMA Hazard Mitigation Grant		
Lake Shastina CSD -6	District Fire Engine Upgrade	Wildfire	Lake Shastina Community Services Director	High	1, 3, 6	\$550,000	Lake Shastina General Fund, FEMA Hazard Mitigation Grant	1-3 years	Carried over, lack of funding
Lake Shastina CSD -7	Protect Lake Shastina as a fire suppression resource	Wildfire	Lake Shastina Community Services Director	High	1, 3, 6	\$5,000 per year	Lake Shastina General Fund, FEMA Hazard Mitigation Grant	1-3 years	On-going

Table : Montague Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Montague-1	Install evacuation route and high ground signage in any high hazard dam potential inundation areas.	Dam Failure	City Manager	Medium	1, 2	\$5,000 per location	FEMA mitigation grant, General fund	Five years	New
Montague-2	Map all infrastructure and facilities within dam inundation areas.	Dam Failure	City Manager	Medium	1, 2, 3	\$10,000 per location	FEMA mitigation grant, General fund	Five years	New
Montague-3	Conduct a native, low water planting program for all jurisdictional owned facilities.	Drought	City Manager	Low	1, 3, 6	\$5,000 - \$50,000 per location	FEMA mitigation grant, General fund	Five years	New
Montague-4	Conduct agricultural education program on water reduction methods.	Drought	City Manager	High	1, 2, 3, 6	Staff Time	General fund	Five years	New
Montague-5	Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and masonry buildings.	Earthquake	City Manager	High	1, 3,	Staff time	General fund	Three to five years	New
Montague-6	Educate homeowners about structural and non-structural retrofitting of vulnerable homes and encouraging retrofit.	Earthquake	City Manager	High	2	Staff time	General fund	Three to five years	New
Montague-7	Support financial incentives, such as low interest loans or tax breaks, for home and business owners who	Earthquake	City Manager	High	1, 2, 3	Staff time	General fund	Three to five years	New

Table : Montague Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	seismically retrofit their structures.								
Montague-8	Modernization of HVAC systems in jurisdictional facilities.	Extreme Heat	City Manager	Low	1, 3, 6	\$25,000 per facility	FEMA mitigation grant, General fund	-	New
Montague-9	Identify and prepare county buildings for usage as heat shelters.	Extreme Heat	City Manager	Low	1, 3, 6	\$2,000 per facility	General fund	-	New
Montague-10	Support the retrofitting, purchase, or demolition of repetitive loss and severe repetitive loss properties.	Flood	City Manager		1, 3, 6	Project dependent	FEMA mitigation grant, General fund	5-10 years	New
Montague-11	Conduct a flood insurance awareness program.	Flood	City Manager	High	2	Staff Time	General fund	Five years	New
Montague-12	Retrofit, rehabilitate, or replace vulnerable water system, storm water, and sewer facilities and infrastructure throughout the District.	Flood	City Manager	High	1, 3, 6	Project dependent	FEMA mitigation grant, General fund	5-10 years	New
Montague-13	Design and construct drainage improvements along Panther Creek through the McCloud to address repetitive damage from flooding on the adjacent roads and property.	Flood	City Manager	High	1, 3, 6	Project dependent	General Fund, FEMA Hazard Mitigation Grant	5-10 years	New
Montague-14	Replace undersized culverts at County maintained roads (particularly those in the	Flood	City Manager	High	1, 3, 6	Project dependent	McCloud General Fund, FEMA	5-10 years	New

Table : Montague Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	Klamath and Scott River watersheds).						Hazard Mitigation Grant		
Montague-15	Consider participation in the National Flood Insurance Program.	Flood	City Manager	High	3	Staff Time	General fund	1-3 years	New
Montague-16	Construct rainwater retention/detention ponds at strategic locations.	Flood	City Manager	Medium	1, 3, 6	Project dependent	General Fund, FEMA Hazard Mitigation Grant	Ten years	New
Montague-17	Stabilize cliffs with terracing or plantings of grasses or other plants to hold soil together.	Landslide	City Manager	Low	1, 3	Staff time	General Fund	5-10 years	New
Montague-18	Notify property owners located in high-risk areas.	Landslide	City Manager	Low	1, 2, 3	Staff time	General Fund	1-3 years	New
Montague-19	Install high wind, hail, and fire-resistant roofing on all jurisdictional facilities.	Severe Weather	City Manager	Medium	1, 3, 6	Project dependent	General Fund, FEMA Hazard Mitigation Grant	Five years	New
Montague-20	Install and maintain surge protection on critical electronic equipment.	Severe Weather	City Manager	Low	1, 3	\$10,000 per location	General Fund, FEMA Hazard Mitigation Grant	Five years	New
Montague-21	Use GIS to map areas that are susceptible to subsidence.	Subsidence	City Manager	Low	1, 2, 3, 4	Staff time	General fund	Five years	New

Table : Montague Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Montague-22	Develop an inventory of all buildings that in potential volcanic flow areas.	Volcanic Activity	City Manager	Low	2	Staff time	General fund	Five years	New
Montague-23	Develop an outreach program about volcanic activity risk and mitigation activities in homes, schools, and businesses.	Volcanic Activity	City Manager	Low	2	Staff time	General fund	Five years	New
Montague-24	Increase public training on wildland-urban interface fire prevention.	Wildfire	City Manager	High	2	Staff time	General fund	Three to five years	New
Montague-25	Promote landscape approach to fuel reduction as part of defensible space initiative in areas with high wildfire exposure.	Wildfire	City Manager	High	1, 2, 3, 4	Staff time	General fund	Continuous	New
Montague-26	Support defensible space for wildfire through projects that create perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation.	Wildfire	City Manager	High	1, 2, 3, 4	Staff time	General fund	Continuous	New

Table : Mt. Shasta Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Mt. Shasta-1	Develop and maintain emergency preparedness guides for evacuations	All	City Manager	High	1, 2	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -2	Create a central webpage for hazard and evacuation information and materials	All	City Manager	High	1, 2	Staff time and \$5,000	City General Fund, Ford Foundation	1 year	Carried over, lack of funding
Mt. Shasta -3	Ensure all staff are properly trained in Incident Command System (ICS) communication techniques	All	City Manager	High	4	Staff time and \$5,000	City General Fund, Ford Foundation	City General Fund, Ford Foundation	Carried over, lack of funding
Mt. Shasta -4	Develop multi-lingual emergency preparedness and evacuation materials that cater to residents and visitors	All	City Manager	Medium	1, 2	Staff time and \$5,000	City General Fund, Ford Foundation	1 - 3 years	Carried over, lack of funding
Mt. Shasta -5	Develop hazard specific education and mitigation materials	All	City Manager	Medium	1, ,2, 3	Staff time and \$5,000	City General Fund, Ford Foundation	1 - 3 years	Carried over, lack of funding
Mt. Shasta -6	Establish a process to coordinate with local, regional, state, and Federal agencies to maintain up-to-date hazard data, maps, and assessments	All	Planning Department Director	Low	1, 2, 3, 4	Staff time	City General Fund	1 - 3 years	Carried over, lack of staff
Mt. Shasta -7	Develop a "Hazard Awareness Month/Week" in coordination with media to promote hazard awareness	All	City Manager	Low	2	Staff time and \$5,000	City General Fund, Ford Foundation	1 - 3 years	Carried over, lack of funding

Table : Mt. Shasta Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Mt. Shasta -8	Enhance hazard awareness of the private sector, specifically in the housing sector	All	Planning Department Director	Low	2	Staff time	City General Fund	1 - 3 years	Carried over, lack of staff
Mt. Shasta -9	Develop and share information related to local hazard vulnerability with housing and business sector	All	Planning Department Director	Low	2	Staff time	City General Fund	1 - 3 years	Carried over, lack of staff
Mt. Shasta -10	Educate the public on tradeoffs associated with multi-hazard design	All	Planning Department Director	Low	2	Staff time and \$5,000	City General Fund, Ford Foundation	1 - 3 years	Carried over, lack of funding
Mt. Shasta -11	Establish a technical assistance program for residents to access data or resources for mitigation purposes	All	Planning Department Director	Low	2	Staff time and \$5,000	City General Fund, Ford Foundation	3 - 5 years	Carried over, lack of funding
Mt. Shasta -12	Obtain local data on parcel, building footprints, critical facility locations to improve risk analysis	All	Planning Department Director	High	1, ,2, 3	Staff time	City General Fund	1 - 3 years	Carried over, lack of staff
Mt. Shasta -13	Develop and maintain a database to track community vulnerability	All	Planning Department Director	High	1, ,2, 3, 6	Staff time and \$5,000	HMGP, City General Fund	1 - 3 years	Carried over, lack of funding
Mt. Shasta -14	Develop and keep aerial photography current, especially post disaster	All	Planning Department Director	High	1, ,2, 3, 6	Staff time and \$15,000	HMGP, City General Fund	1 - 3 years	Carried over, lack of funding
Mt. Shasta -15	Develop a coordinated GIS database to track permitting, land use patterns, hazard areas, etc.	All	Planning Department Director	Medium	1, ,2, 3, 6	Staff time and \$15,000	HMGP, City General Fund	1 - 3 years	Carried over, lack of funding

Table : Mt. Shasta Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Mt. Shasta -16	Identify strategies to increase consistent, sufficient funding for hazard mitigation and recovery projects	All	Finance Department Director	High	1, 2, 3, 5, 6	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -17	Develop a list of private, nonprofit, and government funding sources for hazard mitigation and recovery	All	Planning Department Director	High	5	Staff time and \$15,000	City General Fund	1 year	Carried over, lack of funding
Mt. Shasta -18	Integrate hazards into Capital Improvements Plan	All	Planning Department Director	Medium	1, 2, 3, 6	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -19	Provide tax disincentives for developing in high hazard areas	All	Planning Department Director	Medium	1, 2, 3	Staff time and \$5,000	City General Fund	3 – 5 years	Carried over, lack of funding
Mt. Shasta -20	Develop tax abatement, public subsidies, and other incentives to encourage private mitigation practices	All	Finance Department Director	Medium	1, 2, 3	Staff Time	City General Fund	3 – 5years	Carried over, lack of staff
Mt. Shasta -21	Encourage infill development through tax incentives, streamlined approval process, etc.	All	Planning Department Director	Medium	1, 2, 3	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -22	Utilize outreach programs to advise homeowners of risks to life, health, and safety, and facilitate technical assistance programs that address measures that residents can take	All	Planning Department Director	Low	2	Staff time and \$5,000	City General Fund	1 – 3 years	Carried over, lack of funding

Table : Mt. Shasta Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Mt. Shasta -23	Establish, maintain, and promote a library section on hazard mitigation techniques for local residents and businesses	All	Planning Department Director	Low	2	Staff time and \$5,000	City General Fund	1 – 3 years	Carried over, lack of funding
Mt. Shasta -24	Develop and offer hazard susceptibility audits of local small businesses	All	City Manager	Low	1, 2, 3	Staff time and \$5,000	City General Fund	1 – 3 years	Carried over, lack of funding
Mt. Shasta -25	Complete and showcase a demonstration model showing the use of mitigation techniques for public display	All	Public Works Department Director	Low	2	Staff time and \$5,000	HMGP, BRIC, FEMA IHP, City General Fund	3 – 5years	Carried over, lack of funding
Mt. Shasta -26	Inventory and assess condition of transportation routes and alternative routes	All	Planning Department Director	High	1, 2, 3	\$50,000	HMGP, City General Fund	1 year	Carried over, lack of funding
Mt. Shasta -27	Establish and maintain communication with transportation agencies concerning current and future road improvement projects	All	Public Works Department Director	High	4	Staff time	City General Fund	1 – 3 years	Carried over, lack of staff
Mt. Shasta -28	Identify, prioritize, and improve infrastructure improvement projects to improve transportation routes	All	Public Works Department Director	High	1, 2, 3	Staff time	City General Fund	1 -3 years	Carried over, lack of staff
Mt. Shasta -29	Identify and develop green infrastructure improvements to existing and future roadway projects	All	Public Works Department Director	High	1, 2, 3, 6	Project dependent	HMGP, BRIC, City General Fund	1 -3 years	Carried over, lack of funding

Table : Mt. Shasta Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Mt. Shasta -30	Develop land use regulations and mechanisms to reduce development in wetlands, high wildfire severity zones, and areas prone to heavy winter storms.	Flood, Wildfire	Planning Department Director	Medium	1, 2, 3, 6	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -31	Develop additional building standards for development in flooding, wildfire, and seismic prone areas	Flood	Planning Department Director	Medium	1, 2, 3	Staff time	City General Fund	1 -3 years	Carried over, lack of staff
Mt. Shasta -32	Identify and eliminate development in areas experiencing high rebuilding rates from hazards	All	Planning Department Director	Low	1, 2, 3	Staff time and \$15,000	HMGP, CDA, FEMA IHP, City General Fund	1 -3 years	Carried over, lack of funding
Mt. Shasta -33	Develop internal policies and regulations to protect and restore wetland areas to absorb hazard impacts	Flood	Planning Department Director	Low	1, 2, 3, 6	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -34	Identify infrastructure vulnerable to hazards	All	Planning Department Director	High	1, 2, 3	Staff time	City General Fund	1 year	Carried over, lack of staff
Mt. Shasta -35	Develop underground standards for utilities	All	Planning Department Director	High	1, 3	Staff time	City General Fund	1 -3 years	Carried over, lack of staff
Mt. Shasta -36	Require undergrounding of new utility infrastructure, when physically possible	All	Planning Department Director	High	1, 3	Staff time	City General Fund	1 -3 years	Carried over, lack of staff
Mt. Shasta -37	Underground existing utilities, whenever physically possible	All	Public Works Department Director	High	1, 3	Project dependent	HMGP, BRIC, City	3 - 5 years	Carried over, lack of funding

Table : Mt. Shasta Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
							General Fund		
Mt. Shasta-38	Work with private utility providers to ensure system redundancy	All	City Manager	Medium	1, 3	Staff time	City General Fund	1 -3 years	Carried over, lack of staff
Mt. Shasta -39	Develop green infrastructure standards for future infrastructure projects	All	Public Works Department Director	High	1, 2, 3, 6	Staff time	City General Fund	1 - 3 years	Carried over, lack of staff
Mt. Shasta -40	Restore stream and wetland habitat	All	City Manager	Medium	1, 2, 3, 6	Project dependent	HMGP, BRIC, City General Fund	1 - 3 years	Carried over, lack of funding
Mt. Shasta -41	Develop green infrastructure standards for commercial development	All	Planning Department Director	Low	1, 2, 3, 6	Staff time	City General Fund	1 - 3 years	Carried over, lack of staff

Table : Tulelake Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Tulelake-1	Create a city wide Emergency Preparedness Plan for natural and/or manmade disasters	All	City Manager	Medium	1, 2, 3, 4	\$2,000	Local budgets	2 years	Carried over, lack of funding
Tulelake -2	Create evacuation maps with “routes” and “safe zones” to direct City residents during hazard.	All	City Manager, NFIP Coordinator	Medium	1, 2	\$3,000	Local budgets	2 years	Carried over, lack of funding
Tulelake -3	Create a city-wide Post Disaster Mitigation Plan.	All	City Manager	Medium	1, 2, 3, 4	\$3,000	Local budgets	20 years	Carried over, lack of funding
Tulelake -4	Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe loss properties as priority.	All	City Manager, Public Works Director	Medium	1, 3	Per project cost	HMGP, BRIC, Local budgets. Public/private partnership	10 years	Carried over, lack of funding
Tulelake -5	Prepare and plan for backup water supplies and storage.	All	City Manager, Public Works Director, Fire Chief	Medium	1, 3, 6	\$300,000 to \$500,000	HMGP, BRIC, EPA grant, Local budgets.	5 years	Carried over, lack of funding
Tulelake -6	Repair or replace water and sewer lines, laterals, backflows and meters.	All	Facilities Director, City Manager	Low	1, 3, 6	Per location cost	HMGP, BRIC, EPA grant, Local budgets	10 years	Carried over, lack of funding
Tulelake -7	Reinforce and/or replace liners for existing or new sewer ponds to avoid a public health risk.	Earthquake, Flood, Landslide, Severe Weather	City Manager, Public Works Director	Medium	1, 3, 6	\$3,000,000	HMGP, BRIC, DWR, Local budgets	10 years	Carried over, lack of funding

Table : Tulelake Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Tulelake -8	Demolition of Clyde Hotel, a two-story structure that is collapsing in on itself.	Earthquake, Severe Weather, Wildfire	City Manager, Building Department Director, Public Works Director	Medium	1, 3	\$500,000	HMGP, BRIC, Local budgets	10 years	Carried over, lack of funding
Tulelake -9	Renovation of City Hall to become code compliant for community meetings upstairs.	Earthquake, Severe Weather, Wildfire	Police Chief	Medium	1, 3, 4	\$580,00	HMGP, BRIC, Local budgets	10 years	Carried over, lack of funding
Tulelake -10	Renovation of Public Works shop to become code compliant for employee safety.	Earthquake, Severe Weather, Wildfire	Fire Safe Council Director	Medium	1, 3, 4	\$350,000	HMGP, BRIC, Local budgets	10 years	Carried over, lack of funding
Tulelake -11	Require engineered plan sets for retrofitting unreinforced masonry and soft story buildings.	Earthquake, Severe Weather, Wildfire	City Manager	Medium	1, 3	\$55,000	HMGP, BRIC, Local budgets	10 years	Carried over, lack of funding
Tulelake -12	Reinforce, repair and/or replace City above ground water storage tower and below ground tanks.	Earthquake, Severe Weather, Wildfire	Building Inspector	Medium	1, 3, 6	\$3,500,000	HMGP, BRIC, Local budgets	10 years	Carried over, lack of funding
Tulelake -13	Repair or replace Well House #1 and #3 and Booster Station from a natural or manmade disaster	Earthquake, Severe Weather, Wildfire	City Manager, Public Works Director, Red Cross Director	Medium	1, 3, 6	\$1,500,000	HMGP, BRIC, Local budgets. Public/private partnership	10 years	Carried over, lack of funding
Tulelake Delete -1	Continue to support the implementation, monitoring, maintenance and updating of this Plan as identified in Volume 1.	-	-	-	-	-	-	-	Delete, no longer applicable

Table : Weed Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Weed-1	Establish New Fire Station South Weed	All	City Manager	Medium	1, 3	\$5,000	FSC Grant, local budget	1 – 2 year	Carried over due to lack of funding
Weed-2	Backup Generators for Utilities	All	City Manager	High	1, 3, 4	\$1,000,000	HMGP, BRIC, Local budgets	1 – 5 years	Carried over due to lack of funding
Weed -3	Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe loss properties as priority.	All	City Manager	Medium	1, 3, 6	Per project cost	HMGP, BRIC, Local budgets. Public/ private partnership	10+ years	Carried over due to lack of funding
Weed -4	Boles Creek Main Street Mitigation.	Flood	City Manager	Medium	1, 3	\$600,000	Local budgets	1 year	Carried over due to lack of funding
Weed -5	Improve Highway 97 culvert.	Flood	City Manager	Medium	1, 3, 6	\$800,000	HMGP, BRIC, DWR, Local budgets	20 years	Carried over due to lack of funding
Weed -6	Continue to maintain compliance and good standing in the National Flood Insurance Program (NFIP)	Flood	City Manager, NFIP Coordinator	Medium	1, 2, 3	Staff time	Local budgets	1 – 2 years	Carried over due to lack of staff
Weed -7	Consider participation in the Community Rating System (CRS) program	Flood	City Manager, NFIP Coordinator	Medium	1, 2, 3	Staff time	Local budgets	2 – 5 years	Carried over due to lack of staff
Weed -8	Substitute Spring Water Source with Well	Wildfire	City Manager	Low	1, 3, 6	Project dependent	Local budget	1 – 2 years	

Table : Weed Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Weed -9	City Wide Fuel Reduction Projects	Wildfire	City Manager	Medium	1, 3, 6	\$250,000	HMGP, BRIC, Local budgets	10 years	Carried over due to lack of funding
-	Support County-wide initiatives identified in Volume 1 of this Plan	-	-	-	-	-	-	-	Delete, no longer applicable
-	Continue to support the implementation, monitoring, maintenance and updating of this Plan as identified in Volume 1	-	-	-	-	-	-	-	Delete, no longer applicable

Table : Yreka Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Yreka 1	Identify primary evacuation routes and “safe zone” collection points where people can gather.	All	Fire Chief, Police Chief, Firs Safe Council Director	Medium	1, 2	\$10,000	FSC Grant, local budget	1 – 2 year	Carried over, lack of funding
Yreka 2	Communicate the Emergency Preparedness Manual to staff, the public and key partners.	All	Police Chief	Medium	1, 2	\$1,000	Local budgets	1 year	Carried over, lack of funding
Yreka 3	Encourage Community Emergency Response Teams (CERTs) to provide neighborhood coordination and points of contact in an emergency.	All	Firs Safe Council Director	Low	1, 2	Staff time	Local budget	1 – 2 years	Carried over, lack of staff
Yreka 4	Purchase additional generators both in the community, for critical operations, and to provide backups for the City’s water and wastewater operations.	All	City Manager	High	1, 3, 4	\$250,000	HMGP, BRIC, Local budgets	1 – 5 years	Carried over, lack of funding
Yreka 5	Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe loss properties as priority.	All	City Manager	Medium	1, 3, 6	Per location cost	HMGP, BRIC, Local budgets	10 years	Carried over, lack of funding

Table : Yreka Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Yreka 6	Identify any repetitive flood loss properties. Relocate or reconfigure property to minimize flood exposure.	Dam Failure, Flood, Severe Weather	City Manager, NFIP Coordinator	High	1, 3, 6	Per location cost	HMGP, BRIC, DWR, Local budgets	10 years	Carried over, lack of funding
Yreka 7	Acquire and preserve floodplain as open space/greenbelt.	Dam Failure, Flood, Severe Weather	City Manager	Medium	1, 3, 6	\$38,000,000	HMGP, BRIC, DWR, Local budgets	20 years	Carried over, lack of funding
Yreka 8	Develop additional backup water supplies and storage.	Drought, Earthquake, Flood, Wildfire	City Manager, Public Works Director	Medium	1, 3, 6	\$25,000,000	HMGP, BRIC, DWR, Local budgets	10 years	Carried over, lack of funding
Yreka 9	Assess unreinforced masonry buildings. Develop plan to address/mitigate.	Earthquake	Building Inspector	Medium	1, 3, 6	\$10,000 assessment, per property cost	HMGP, BRIC, Local budgets	2 – 5 years	Carried over, lack of funding
Yreka 10	Develop/increase awareness of Evacuation Centers. Develop a plan to obtain from the private sector several weeks’ worth of emergency food and water supplies for people and pets.	Earthquake, Flood, Severe Weather, Wildfire	City Manager, Public Works Director, Red Cross Director	Medium	1, 2	\$25,000	HMGP, BRIC, Local budgets. Public/private partnership	1 – 2 years	Carried over, lack of funding
Yreka 11	Develop alternate transport mechanism to enable remote access (e.g. to Fall Creek water source) when roads and bridges are impassable (e.g. a shared use or chartered helicopter)	Earthquake, Flood, Severe Weather, Wildfire	City Manager, Public Works Director	Medium	1, 3	Per project cost	HMGP, BRIC, Local budgets. Public/private partnership	10+ years	Carried over, lack of funding

Table : Yreka Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
Yreka 12	Develop access to additional emergency heavy equipment resources: backhoes, dump truck, loaders, water truck, fire truck, snow blowers, plows.	Earthquake, Flood, Severe Weather, Wildfire	City Manager, Public Works Director, Fire Chief	Medium	1, 3	Per equipment cost	HMGP, BRIC, Local budgets. Public/private partnership	1 – 2 years	Carried over, lack of funding
Yreka 13	Assess critical public buildings and mitigate damage potential.	Earthquake, Flood, Wildfire	Facilities Director, City Manager	Low	1, 3, 6	\$10,000 assessment, per property cost	HMGP, BRIC, Local budgets	2 – 5 years	Carried over, lack of funding
Yreka 14	Develop self-contained communication (i.e. radio backups that are not dependent on power, outside lines, towers, etc.). Develop community emergency notification system (i.e. reverse 911).	Earthquake, Flood, Wildfire	Police Chief, Public Works Director, County Emergency Manager	Low	1, 2, 3	\$250,000	HMGP, BRIC, Local budgets	5 years	Carried over, lack of funding
Yreka 15	Consider participation in the Community Rating System (CRS) program.	Flood	NFIP Coordinator	High	1, 2	Staff time	Local budgets	1 year	Carried over, lack of staff
Yreka 16	Continue to maintain compliance and good standing in the National Flood Insurance Program (NFIP).	Flood	NFIP Coordinator	Medium	1, 2, 3	Staff time	Local budget	On-going	Carried over, lack of staff
Yreka 17	Fully implement improvements and upgrades recommended in Master Plan of Drainage.	Flood, Severe Weather	City Manager	High	1, 3	\$20,000,000	HMGP, BRIC, Local budgets	10-15 years	Carried over, lack of funding
Yreka 18	Stockpile emergency replacement parts and supplies that may be	Flood, Volcano, Wildfire	City Manager, Fire Chief	High	1, 2, 3	\$5,000	Local budgets	1 – 5 years	Carried over, lack of funding

Table : Yreka Hazard Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Status
	difficult to obtain, such as face masks, fuel filters, air filters, snowmelt chemicals, sand, sandbags, etc.								
Yreka 19	Encourage individual homeowners to stock fire gel kits.	Wildfire	City Manager, Fire Chief	High	2	\$2,500 - \$5,000 per property	Homeowner budget	1 – 5 years	Carried over, lack of funding
Yreka 20	Reduce fuel loads in highest fire severity zones. Encourage individuals to establish defensible space. Require annual fuel and weed reduction to minimize fire spread.	Wildfire	City Manager, Fire Chief	High	1, 2, 3	\$1,000-10,000 per property	HMGP, BRIC, Local budgets. Public/private partnership, USFS	On-going	Carried over, lack of funding
Yreka Delete 1	Continue to support the implementation, monitoring, maintenance and updating of this Plan as identified in Volume 1.	-	-	-	-	-	-	-	Delete, no longer applicable
Yreka Delete 2	Support County-wide initiatives identified in Volume 1 of this Plan.	-	-	-	-	-	-	-	Delete, no longer applicable