



Annex H South Feather Water and Power Agency

H.1 Introduction

This Annex details the hazard mitigation planning elements specific to the South Feather Water and Power (SFWPA or Agency), a new participating jurisdiction to the 2026 Plumas County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the Agency. This Annex provides information specific to the SFWPA, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this jurisdiction.

H.2 Planning Process

As described above, the SFWPA followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Plumas County Hazard Mitigation Planning Committee (HMPC), the Agency formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table H-1. Additional details on Plan participation and Agency representatives are included in Appendix A. **FILL OUT TABLE WITH WHO PARTICIPATED AND HOW.**

Table H-1 SFWPA – Planning Team

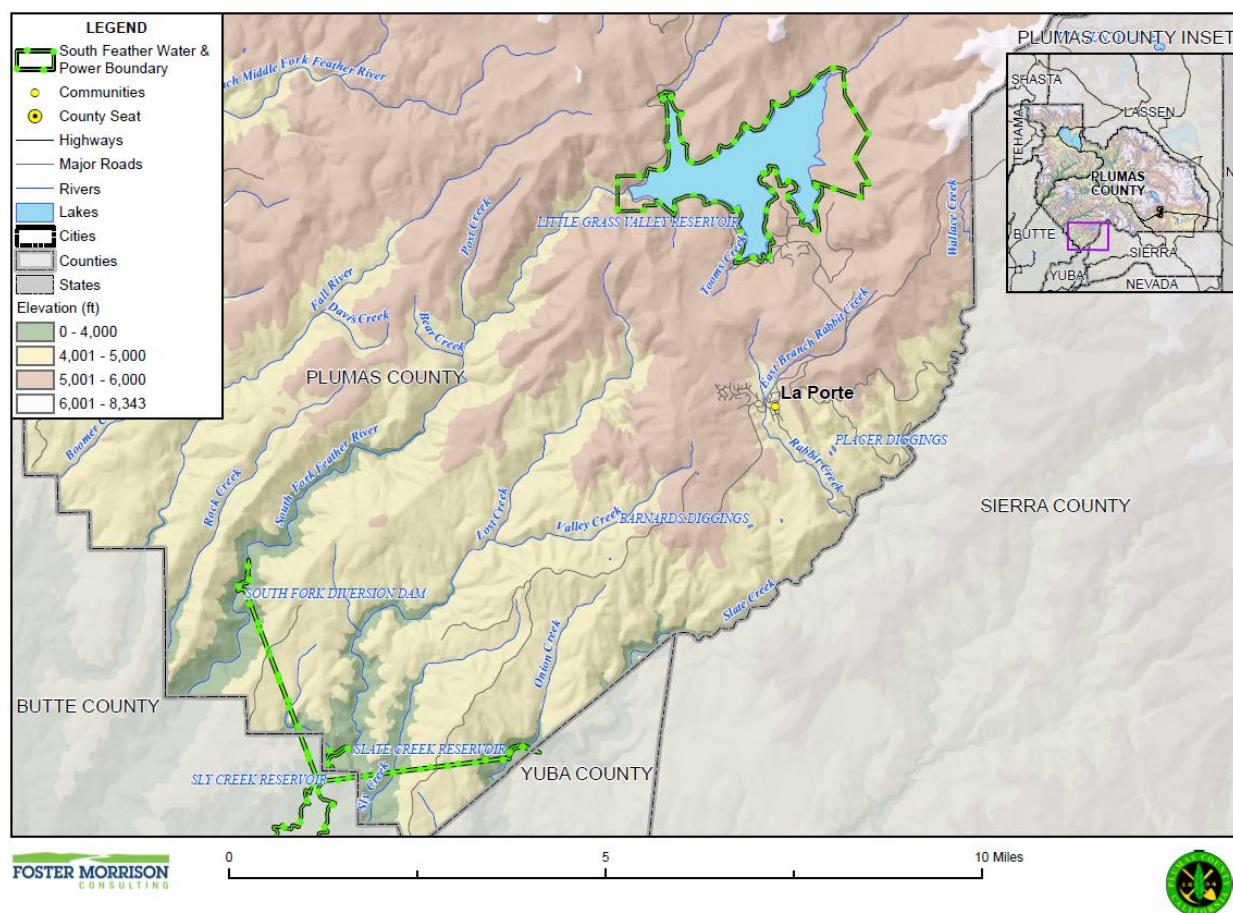
Name	Position/Title	How Participated
Kristen McKillop	Regulatory Compliance Manager	Attended every coordination meeting hosted by PC OES. Provided Agency details, hazard identification, hazard input, developed mitigation project, and provided document review and comments.
Hunter Doyle	Power Division Manager	Worked to develop mitigation strategies and provided document review and comments.

Source: SFWPA

H.3 Agency Profile

The community profile for the SFWPA is detailed in the following sections. Figure H-1 displays a Agency map and the location of SFWPA within Plumas County.

Figure H-1 SFWPA



H.3.1. Overview and Background

South Feather Water and Power Agency – originally named Oroville Wyandotte Irrigation District (“OWID”) – has roots extending back to the California gold rush. The ditch system utilized by the Agency today to distribute its irrigation water is a modification and expansion of the ditch network constructed by early miners who diverted water from tributaries of the Feather River to their mining claims.

OWID was organized on November 17, 1919, and included 16,800 acres of land. The District was formed by assuming the old water rights from the South Feather Land and Water Company and the Palermo Land and Water Company. The residential growth rate within the District was greatly accelerated by the housing demands associated with the construction of the Oroville Dam in the early 1960’s. By 1962, OWID served approximately 4,800 acres of agricultural land, with 8,000 AF of irrigation water delivered by the District. In addition to irrigation service, the district furnished water to approximately 2,500 residences.

As a result of the concern for an adequate water supply and for a revenue source to fund the District’s expanding infrastructure, the District’s board of directors proposed the construction of the South Feather Power Project (originally named South Fork Project, FERC License No. 2088). The Agency’s hydropower

project is located in Butte, Plumas and Yuba counties on the South Fork of the Feather River and Slate Creek, a tributary to the North Fork Yuba River, and mostly within the Plumas National Forest.

The project lies within the Middle Fork Feather hydrologic unit (1802023), and water is supplied to the project from two watersheds; the South Fork Feather River watershed and the North Fork Yuba River watershed. The United States Forest Service has managed up to 1,146,000 acres of scenic mountain lands designated as the Plumas National Forest in the northern Sierra Nevada since the Forest was established in 1905. The SFPP lies within the boundaries of the Plumas National Forest, includes a small piece situated on federal lands administered by the Bureau of Land Management, and the balance is on SFWPA owned lands, or private property. Project facilities are located on the South Fork Feather River; on Lost Creek, a tributary to the South Fork Feather River; and on Slate Creek, a tributary to the North Yuba River. The highest elevation facility, Little Grass Valley Dam is located at about 5,050 feet above sea level, while the lowest elevation facility, Kelly Ridge Powerhouse, is located at about 225 feet above sea level.

The power project facilities include eight dams, seven tunnels, four powerhouses, and an open conduit that includes elevated flume and siphon sections. There are a series of reservoirs owned and operated by SFWPA; Little Grass Valley, Sly Creek, Lost Creek, Ponderosa and Miners Ranch which have a combined storage of 164,577 acre-feet. Irrigation and treated water is supplied to customers of South Feather Water and Power Agency in Butte County and North Yuba Water District in Yuba County. Water not consumed by the customers of these two organizations is released via the Kelly Ridge Powerhouse into the Thermalito Diversion Pool, owned and operated by the California Department of Water Resources as part of the California State Water Project.

The mission of SFWPA is to deliver a dependable supply of safe, quality drinking water to its current and future customers, and a dependable supply of water for irrigation and agricultural users, in an economical, efficient and publicly responsible manner for the benefit of the entire district. Hydroelectric generation facilities shall be utilized to optimize revenue from power generation, consistent with providing adequate and dependable water supplies to customers. SFWPA is also committed to providing its employees a safe work environment and encouraging personal growth and attainment of goals. The Agency service area is located 70 miles north of Sacramento on the east side of California's Sacramento Valley in the Sierra foothills of southeast Butte County. The 33,718-acre (52.68) service area, including the west side of Butte County and the areas south of Lake Oroville and east of downtown Oroville.

SFWPA is an independent special district formed under the Irrigation Code of the State of California. It is governed by a five-member elected board of directors. The Agency provides treated water service to the communities of Oroville, Palermo and Bangor in southeast Butte County. In addition to water delivery, power generation, and agricultural irrigation, SFWPA provides a multitude of recreational opportunities for the local communities and visitors and provides habitat for many fish and wildlife species.

H.4 Risk Assessment

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. “It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.”

The SFWPA risk assessment identifies and profiles relevant hazards and assesses the exposure of lives, property, infrastructure, and the environment to these hazards. The process allows for a better understanding of the Agency's potential risk and vulnerability to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Building on the Agency Profile above, a risk assessment was performed for the Agency. This includes the following sections:

- H.4.1 Assets Inventory and Growth and Development Trends
- H.4.2 Hazard Identification
- H.4.3 Hazard Profiles and Vulnerability to Specific Hazards

H.4.1. Assets Inventory and Growth and Development Trends

This section provides an inventory of the SFWPA's total assets potentially at risk to hazards and an overview of growth and development trends. This section is broken into two parts:

- **Asset Inventory** – The assets inventory identifies the SFWPA's total assets, including the people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. This data is not hazard specific, but is representative of total assets within the Agency, potentially at risk to identified hazards as discussed in Section H.4.3 Hazard Profiles and Vulnerability to Specific Hazards.
- **Growth and Development Trends** – A discussion of growth and development trends in the Agency, both current and future, is presented.

Assets Inventory

The Agency's asset inventory is detailed in the following sections:

- People and Populations
- Structures
- Critical Facilities and Infrastructure
- Community Lifelines
- Natural, Historic, and Cultural Resources
- Economic Assets and Community Activities of Value

A discussion of each of these assets follows and serves as the template for the asset discussion for each hazard in Section H.4.3.

People and Populations

The most important asset within any community are the people and populations that reside in the community. People and populations served by the Agency include both Agency staff as well as those populations located within Agency boundaries. This section includes an inventory of past and current populations of the Agency and also discusses vulnerable populations and underserved communities as a

subsection of people and populations located within the Agency and potentially at risk to hazards. Information from the Agency and other sources as detailed below form the basis of this discussion.

Historic Population Trends and Current Population

The most important asset within any community are the people and populations that reside in the Agency. The Agency’s Sphere of Influence (SOI) is almost twice the size of its boundary. The SOI includes 11,853 parcels, which is slightly more parcels than the 11,127 parcels within the boundary. SFWPA currently serves just over 6,900 households with treated domestic water and 500 irrigation customers with raw water. This equates to roughly 16,900 total customers served. In addition, the Agency employs 55 staff.

According to the DWR DAC mapping tool, Census blocks where the median income is less than 80 percent of the state median income, almost the entire service area qualifies as a disadvantaged community .

Structures and Critical Facilities

This section considers the SFWPA’s assets at risk, with a focus on key Agency assets such as critical facilities and infrastructure, and other Agency assets and their values. With respect to Agency assets, the majority of these assets are considered critical facilities as defined for this Plan. Critical facilities are defined for this Plan as:

Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.

A critical facility is classified by the following categories: (1) Essential Services Facilities; (2) At-Risk Populations Facilities, and (3) Hazardous Materials Facilities.

Table H-2 lists critical facilities and other Agency assets identified by the Agency Planning Team as important to protect in the event of a disaster. SFWPA’s physical assets, valued at over \$128 million, consist of structures and infrastructure to support the Agency’s operations.

Table H-2 SFWPA Critical Facilities and Infrastructure, and Other Agency Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Little Grass Valley Dam (and related infrastructure like gates, spillways, and buildings)	Dam	\$50,093,499.30	Climate Change, Dam Failure, Earthquake, Landslide, Heavy Rains and Storms, Wildfire
South Fork Diversion Dam (and related infrastructure like gates, spillways, and buildings)	Dam	\$37,458,903.87	Climate Change, Dam Failure, Earthquake, Landslide, Heavy Rains and Storms, Wildfire
Slate Creek Diversion Dam (and related infrastructure like gates, spillways, and buildings)	Dam	\$40,956,799.34	Climate Change, Dam Failure, Earthquake, Landslide, Heavy Rains and Storms, Wildfire

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Total		\$128,509,203	

Source: SFWPA

Community Lifelines

Assessing the vulnerability of the SFWPA to natural hazards and disasters also involves reviewing and inventorying the community lifelines in place that could be affected. It is important to include these items in hazard discussions as the continuous operation of critical government and business functions is essential to human health and safety, property protection, and economic security. The importance of community lifelines is discussed below:

- Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.
- FEMA has developed a method for objectives-based response that prioritizes the rapid stabilization of Community Lifelines after a disaster.
- The integrated network of assets, services, and capabilities that provide lifeline services are used day-to-day to support the recurring needs of the community and enable all other aspects of society to function.
- When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.

Community lifelines, as defined by FEMA, include the following:

- **Safety and Security** – Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety
- **Food, Hydration, Shelter** – Food, Water, Shelter, Agriculture
- **Health and Medical** – Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management
- **Energy** – Power Grid, Fuel
- **Communications** – Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch
- **Transportation** – Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- **Hazardous Material** – Facilities, HAZMAT, Pollutants, Contaminants
- **Water Systems** – Potable Water Infrastructure, Wastewater Management

It should be noted that these community lifelines are all in place and functional as part of regular government operations in the Plumas County Planning Area serving as a partnership between the city, local special districts and agencies, and Plumas County. Due to its more rural nature, there is an interplay in community lifelines between all jurisdictions in the County. Most all of the Agency's community lifelines overlap with the Planning Area's. It should also be noted that these lifelines collectively include many of the critical facilities and infrastructure assets inventoried for this LHMP, including those assets owned by the Agency. As such, specific information on these community lifelines in the Agency and how they may be affected by a hazard event or disaster are discussed in the Base Plan.

Natural, Historic, and Cultural Resources

Assessing the vulnerability of the SFWPA to natural hazards and disasters also involves inventorying the natural, historic, and cultural assets of the area. This step is important for the following reasons:

- Environmental and natural resources add to a community's identity and quality of life. They also help the local economy through agriculture, tourism, and recreation. They support ecosystem services, such as clean air and water.
- Conserving the environment may help people mitigate risk. It can also protect sensitive habitats, develop parks and trails, and build the economy.
- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

Natural Resources

SFWPA has a variety of natural resources of value to the Agency. These natural resources parallel that of Plumas County as a whole. Information can be found in Section 4.2.1 of the Base Plan.

SFWPA's reservoirs provide opportunities for mountain biking, horseback riding, skiing, fishing, boating, snowmobiling, camping, swimming, picnicking, and hiking within the scenic Plumas National Forest. Two developed recreation areas are located within the South Feather Power Project's boundaries: the Sly Creek Reservoir Recreation Area, operated and maintained by SFWPA, and the Little Grass Valley Reservoir Recreation Area, operated and maintained by the US Forest Service. There are 16 developed recreational facilities associated with the Little Grass Valley Reservoir Recreation Area.

Historic and Cultural Resources

SFWPA has a variety of historic and cultural resources of value to the Agency. Many of these historic and cultural resources parallel that of Plumas County as a whole. Information can be found in Section 4.2.1 of the Base Plan. The Agency noted specific historical and cultural resources. The South Feather Power Project is largely located in the traditional territory of the Native American communities known collectively as the Koncow. The Koncow are one of three main groups representing the Maidu language family.

Figure H-2 Historical and Archeological Sites of Note

South Feather Water and Power Agency
South Feather Power Project
FERC Project No. 2088

TABLE E6.4-2

Historical and Archeological Sites within the APE Identified By South Feather Water and Power Agency during Its Relicensing Surveys.

Resource Identification #	Type
SLY CREEK DEVELOPMENT (Little Grass Valley Reservoir)	
PA-04-100	The site consists of a scatter of prehistoric and historic period artifacts. Approximately 100 basalt debitage fragments created during the manufacture and maintenance of lithic tools were discovered as was an applied lip whiskey bottle fragment.
PA-04-101	The site consists of a scatter of prehistoric and historic period artifacts. Approximately 250 basalt debitage fragments created during the manufacture and maintenance of lithic tools were discovered.
PA-04-102	The site consists of a scatter of prehistoric and historic period artifacts. Approximately 150 basalt debitage fragments created during the manufacture and maintenance of lithic tools were discovered as was a circular-shaped depression that may represent the remains of a prehistoric period shelter.
PA-04-103	The site consists of a large boulder with possible prehistoric period rock art inscriptions. At least two panels of the prominent boulder possess faint traces of what may be prehistoric period scratches. Modern graffiti is also present on other portions of the boulder.
PA-04-104	The site consists of a scatter of prehistoric period artifacts associated with the exploitation of a natural outcrop of basalt. Approximately 500 basalt debitage fragments, cores, and hammerstones were discovered as was one obsidian debitage fragment.
PA-04-105	The site consists of two bedrock outcrops that contain three shallow mortar cups.
PA-04-106	The site consists of a bedrock outcrop with one shallow mortar cup.
IF-04-20	This isolated stone artifact, a core, was discovered along a south facing shoreline of Little Grass Valley Reservoir.

Economic Assets and Community Activities of Value

Assessing the vulnerability of the SFWPA to natural hazards and disasters also involves inventorying the economic assets and community activities of value in the Agency.

Economic Assets

After a disaster, economic resiliency is one of the major drivers of a speedy recovery. Each community has specific economic drivers. Economic assets for the County were discussed in Section 4.2.1 of the Base Plan and are assumed to be the same or similar for the Agency.

As discussed in the Future Development section below, the South Fork Power Project heavily subsidizes the Agency's water rates, and therefore anything that happens at the headwaters of the system (and potentially inducing cascading failure of more than one dam and impacting two powerhouses along the South Fork of the Feather River) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

Community Activities of Value

Inventorying economic assets in the Agency and their vulnerability to natural hazards and disasters also involves inventorying activities that have value to the community. This includes activities that are important to a community, like long-standing traditions such as a festival or fair or other activities that bring

money into the communities such as sports tournaments and other recreational activities. Community Activities of Value for the County were discussed in Section 4.2.1 of the Base Plan and are assumed to be the same or similar for the Agency.

Growth and Development Trends

As part of the planning process, the Agency looked at changes in growth and development, both current and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. This inventory section details future development/redevelopment projects that are likely to occur over the next five years covered by this 2025 LHMP. For Districts, this generally includes the following:

- Construction/development projects related to adding new District facilities, infrastructure, land acquisition, etc.
- Plans for expansion or build out of the District's service area, including new service hookups, and other District functions related to where the District will be expanding services.

Population Trends and Projections

Much like the rest of the County, the Agency is expecting to see a slowly shrinking population over time.

Future Development Areas

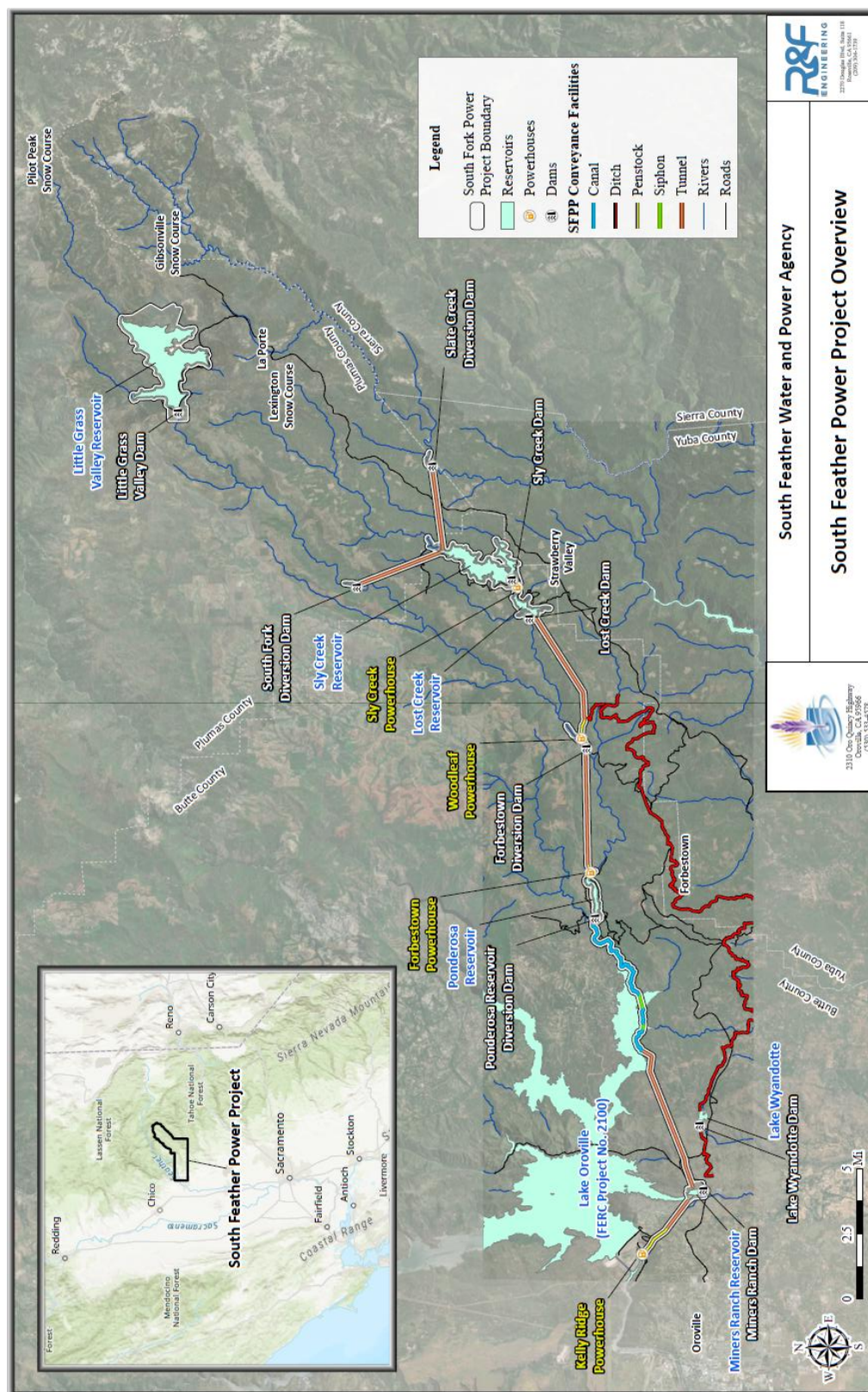
It is important to review future development plans for the Agency. Future development should be sited in areas that are away from known hazard risks. If this is not possible, mitigation should be done to ensure that future development is protected against future hazards.

On March 26, 2007, the South Feather Water and Power Agency (SFWPA or Licensee) filed with the Federal Energy Regulatory Commission (FERC or Commission) an application to relicense its 117.3-megawatt (MW) South Feather Power Project, FERC Project Number 2088. Since the initial license expired, SFWPA has operated the Project under annual licenses from FERC and is expected to continue to do so until a new license is issued. The Agency has no certain timeline on when the new license may be issued.

The SFWPA Project 2088 and the United States Department of Agriculture, Forest Service (Forest Service) have developed a Recreation Facilities Plan (Plan) to comply with the Forest Service's Federal Power Act (FPA) final Section (§) 4(e) terms and conditions for the Agency as a component of the new license. The overall purpose of the Plan is to provide appropriate protection, mitigation, and enhancement recreation measures for the Project by incorporating the information from SFWPA's relicensing recreation studies and the Forest Service's Final § 4(e) terms and conditions related to recreation. This Plan addresses both existing Facilities, including improvements and new Facilities, to be constructed as part of the new license. This Plan includes the requirements for major rehabilitation of existing, and development of proposed facilities at Little Grass Valley Reservoir in Plumas County. Projects will address road improvements, parking, campsite spurs, boat ramps, trail systems, public signage, toilet buildings and wastewater systems, water systems, campground and picnic sites spelled out in Chapter 3 of the Plan. It is expected that Planning, Design and Construction will begin within the first five years following license issuance.

This can be seen on Figure H-3. Additionally, the Power Project heavily subsidizes water rates, and therefore anything that happened at the top of the system (and potentially inducing failure of more than one dam and impacting two powerhouses along the South Fork of the Feather River) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities. Revenue associated with power generation by the South Feather Power Project is used to subsidize water rates for SFWPA's domestic water customers and to fund expanding infrastructure that ensure and adequate water supply. The revenue shortage that would result from the loss of a single powerhouse would have immediate consequences for SFWPA's ability to provide domestic water to its customers.

Figure H-3 SFWPA – Power Project Overview Map



Source: SFWPA

H.4.2. Hazard Identification

The SFWPA identified the hazards that affect the Agency and summarized their location, extent, likelihood of future occurrence, potential magnitude, and significance (or priority of a hazard) specific to the Agency.

Those hazards identified as a high or medium significance in Table H-3 are considered priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact in the Agency were determined to be of low significance and not considered a priority hazard to the Agency. Significance was determined based on the hazard profile, focusing on key criteria such as frequency, extent, and resulting damage, including deaths/injuries and property, natural and cultural resources, and economic damage. The ability of a jurisdiction to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. This assessment was used to prioritize those hazards of greatest significance, enabling the Agency to focus resources where they are most needed.

WE NOTICED YOU MOVED DROUGHT TO A MEDIUM SIGNIFICANCE HAZARD, WILL YOU HAVE AN ACCOMPANYING MITIGATION ACTION FOR IT?

Table H-3 SFWPA—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Ag Hazard: Severe Weather/Pests/Weeds	Extensive	Highly Likely	Critical	Low	Low
Climate Change	Extensive	Likely	Limited	Medium	Medium
Dam Failure	Extensive	Unlikely	Critical	Medium	--
Drought & Water Shortage (w/tree mortality)	Extensive	Likely	Limited	Low	Medium
Earthquake	Extensive	Unlikely/Occasional	Catastrophic	Medium	Medium
Flood: 1%/0.2% annual chance (w/levee failure)	Significant	Occasional/Unlikely	Critical	Low	Low
Flood: Localized Stormwater	Significant	Highly Likely	Negligible	Low	Medium
Haz Mat Transportation	Significant	Occasional	Critical	Low	Medium
Landslide, Mudslide, and Debris Flow	Significant	Likely	Negligible	Medium	Medium
Severe Weather: Extreme Cold, Freeze, and Snow (w/avalanche)	Extensive	Highly Likely	Negligible	Low	Medium
Severe Weather: Extreme Heat	Significant	Likely	Negligible	Low	Medium
Severe Weather: Heavy Rains and Storms	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Limited	Low	Medium
Volcano	Extensive	Unlikely	Limited	Low	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	Medium	Medium
<p>Geographic Extent <i>Limited:</i> Less than 10% of planning area <i>Significant:</i> 10-50% of planning area <i>Extensive:</i> 50-100% of planning area</p> <p>Likelihood of Future Occurrences <i>Highly Likely:</i> Near 100% chance of occurrence in next year, or happens every year. <i>Likely:</i> Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. <i>Occasional:</i> Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. <i>Unlikely:</i> Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.</p> <p>Magnitude/Severity <i>Catastrophic:</i> More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths <i>Critical:</i> 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability <i>Limited:</i> 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability <i>Negligible:</i> Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid</p> <p>Significance <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>High:</i> Widespread potential impact</p> <p>Climate Change Influence <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>High:</i> Widespread potential impact</p>					

H.4.3. Hazard Profiles and Vulnerability to Specific Hazards

This section includes the hazard profiles and vulnerability assessment for hazards ranked of medium or high significance specific to the SFWPA (as identified in the Significance column of Table H-3). This section focuses on where and how the Agency is affected by their priority hazards. Chapter 4 of the Base Plan provides more detailed information about these hazards and their impacts on the Plumas County Planning Area. Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.2 of the Base Plan.

Hazard Profiles and Vulnerability Assessment

Each hazard is profiled in the following format:

- **Hazard Profile** – A hazard profile is included for each hazard. This includes information on:
 - ✓ **Hazard Overview** – A general discussion of the hazard and related issues is detailed here.
 - ✓ **Location and Extent** – Location is the geographic area within the Agency that is affected by the hazard. Extent is the expected range of intensity for each hazard. These are discussed in specific detail for mapped hazards, and in more general detail for those hazards that do not have discrete mapped hazard areas.
 - ✓ **Past Occurrences** – Past occurrences are discussed for each hazard. A discussion of disaster declarations is included in each hazard section. NCEM events are also discussed. Other past occurrences data specific to the Agency follow the disaster declarations and NCEM events for each hazard.
 - ✓ **Climate Change** – This section contains the effects of climate change (as applicable). The possible influence of climate change on the hazard is discussed.

After the hazard profile, a vulnerability assessment is presented. As part of the vulnerability assessment, an estimate of the vulnerability of the Agency to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

After this classification, a general discussion of hazard vulnerabilities occurs. This is done in the following format:

- **Vulnerability Overview** – A general discussion of the hazard vulnerability and related issues is detailed here.
- **Local Concerns** – This includes Agency provided information on how the Agency is uniquely affected by or vulnerable to each hazard.
- **Assets at Risk** – A discussion of the assets at risk follows, presented in the same order as in Section H.4.1 above, with a few exceptions. This includes sections on: People and Populations; Structures and Critical Facilities and Infrastructure; and Natural, Historic, and Cultural Resources. These are discussed in specific terms for mapped hazards, and in more general terms for those hazards that are unmapped. Sections on Community Lifelines and Economic Assets and Community Activities of Value are not included in the Sections below, as they are common to all jurisdictions and are fully covered in Section H.4.1 above and Chapter 4 of the Base Plan.
- **Impacts** – A discussion on hazard impacts follows. Impacts describe how each hazard can affect the Agency, its assets, and the ability to provide continued and reliable services. The type and severity of impacts reflect both the potential magnitude of the hazard and the vulnerability of the asset.
- **Future Conditions/Future Development** – A discussion of how future conditions and future development will affect or influence each hazard over time is also included. This considers both new Agency assets and improvements as well as any changes in service area.

Power Interruption/Power Failure: A Common Vulnerability of all Hazards

An impact of almost all hazards evaluated as part of this LHMP Update relates to power shortage and/or power failures. The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the U.S. Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. In addition to blackouts, brownouts can occur. A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. Intentional brownouts are used for load reduction in an emergency. Electric power disruptions can be generally grouped into two categories: intentional and unintentional. More information on types of power disruptions can be found in Section 4.3 of the Base Plan.

Public Safety Power Shutoff (PSPS)

An intentional disruption type of power shortage/failure event has been recently implemented in California as a result of wildfires starting as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in 2018. As a result, California's three largest energy companies (including PG&E), at the direction of the California Public Utilities Commission (CPUC), are preparing all Californians for the threat of wildfires and power outages during times of extreme (fire) weather. To help protect customers and communities during extreme fire weather events, electric power may be shut off for public safety in an effort to proactively prevent wildfire. This is called a PSPS. More information on PSPS criteria can be found in Section 4.3 of the Base Plan.

In addition to PSPSs, to help prevent wildfires, electric utilities have begun to evolve safety efforts. This includes installing safety settings on powerlines in and around high fire-risk areas. These are known as Enhanced Powerline Safety Settings (EPSS), and they help prevent falling tree branches, animals and other

hazards from causing a wildfire. By stopping ignitions, it helps prevent wildfires from starting and spreading. According to PG&E, if ignitions occur, the size of fires can be much smaller due to EPSS. In 2022, there was a 99% decrease in acres impacted by ignitions (as measured by fire size from electric distribution equipment (compared to the 2018-2020 average). This decrease occurred despite dry conditions.

Local Concerns

The Agency noted that there have been PSPS events that have impacted them, however, all power division/hydropower project assets requiring power have backup generators. The last PSPS event that could be recalled was October 2020. Transmission and distribution was temporarily affected, but the powerhouses have the ability to self-supply during these outages.

Climate Change

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile

Climate change adaptation is a key priority of the State of California. The 2023 State of California Multi-Hazard Mitigation Plan noted that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the State’s infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

California’s Adaptation Planning Guide: Understanding Regional Characteristics (from 2017) has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations. The Agency falls in the North Sierra Region. A map and climate projections for this region are shown in Section 4.3.7 of the Base Plan and include an increase in temperatures, moderate changes in rainfall, and increased risk to wildfire.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the SFWPA, the Plumas County Planning Area, surrounding counties, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, such as drought, extreme heat, flooding, wildfire, and others. The speed of onset of climate change is very slow. The duration of climate change is not yet known but is feared to be tens to hundreds of years.

Past Occurrences

Disaster Declaration History

Climate change has never been directly linked to any declared disasters.

NCDC Events

NCDC does not track climate change events.

SFWPA Events

While the SFWPA Planning Team noted no past occurrences of climate change, the Agency works in support of local Climate Action Plans to protect resources and prepare for changing precipitation patterns, reduced water supply and increased hazards such as flooding, heat waves and wildfire. While the Agency has not adopted any internal procedures to this risk, they continue to monitor the weather trends and the potential issues associated with this risk for all agency purposes.

Vulnerability to Climate Change

The whole of the Agency is at some measure of vulnerability to climate change. The Agency Planning Team has concerns that the vulnerability of the Agency to climate change will continue to increase in the future. An assessment of a community's vulnerability to climate change begins with an understanding of local exposure to climate change. This is included in the Local Concerns section below followed by a discussion of the Agency's assets at risk, and impacts to this hazard.

Local Concerns

The Agency has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

The Agency is concerned that reduced snowpack or rains could cause stored water volumes in the Agency reservoirs (impounded by both Low and High Hazard dams in Plumas) to be reduced, which would lead to reduced income from power generation along with reduced ability to provide clean energy to the grid. In addition, the Agency is concerned that climate change could exacerbate wildfire in and around the Agency's dams. Not only could this damage structures, but the burn scar could cause landslides above Agency dams.

Assets at Risk

Assets at risk from this hazard include people and populations; structures and critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

Climate change affects people and populations within a community, especially those climate change issues related to increases in temperature over time.

While all populations (Agency staff and those served by the Agency) can be affected by temperature extremes, populations particularly vulnerable include the very old and very young, medically fragile people, people without means of shelter (and air conditioning or heat) or transportation, people who are socially isolated and other vulnerable or underserved populations (as shown in the discussion in Section H.4.1). Acclimatization to extreme temperatures and other weather extremes may help reduce impacts from these extreme events, such as from heat waves, in the healthy general population but may not be sufficient to protect those with underlying medical conditions.

Structures and Critical Facilities and Infrastructure

Climate change, on its own, does not generally impact structures. However, structures in areas of increased wildfire, drought, extreme heat, or flood areas exacerbated by the effects of climate change would be at increased risk, as described throughout this LHMP. Due to the slow onset of climate change, many structures in the Agency are expected to undergo improvements and adapt over time to a new climate normal.

Natural, Historic, and Cultural Resources

The rivers, streams, agricultural areas, and open space areas of the Agency support rich biodiversity, including many special-status species and habitat areas. These are all at risk from the effects of climate change. In addition, if heat continues to contribute to changes in wildfire patterns, all areas (on land) of the Agency are at increased risk from fire – including natural, historic, and cultural resources. Furthermore, as climate change exacerbates the extreme heat and drought hazard, areas of wetlands in the Agency may be reduced or dry up temporarily, which could damage habitat areas for waterfowl and other species that depend on these areas.

Impacts from Climate Change

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra Region in which the Agency is part of:

- Increased temperatures
- Reduced precipitation
- Public health – heat and air pollution
- Reduced agricultural productivity (e.g., wine grapes)
- Reduced tourism

In addition to these sources, the 2023 State of California Hazard Mitigation Plan noted that according to California’s Fourth Climate Change Assessment, the state will experience the following climate impacts:

- Annual average daily high temperatures are expected to rise by 2.7°F by 2040, 5.8°F by 2070, and 8.8°F by 2100 compared to observed and modeled historical conditions. These changes are statewide averages.
- Heat waves are projected to become longer, more intense, and more frequent.

- Warming temperatures are expected to increase soil moisture loss and lead to drier conditions. Summer dryness may become prolonged, with soil drying beginning earlier in the spring and lasting longer into the fall and winter.
- Droughts are likely to become more frequent and persistent through 2100.
- The strength of the most intense precipitation and storm events affecting California is expected to increase.
- Snowpack levels are projected to decline significantly by 2100 due to reduced snowfall and faster snowmelt.
- Marine layer clouds are projected to decrease.
- Extreme wildfires (i.e., fires larger than 24,710 acres) would occur 50 percent more frequently. The maximum area burned statewide may increase 178 percent by the end of the century.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the Agency may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the Agency include the following:

- As climate change continues to accelerate over time, climate related impacts to the Agency will continue to increase.
- Population projections for the area served by the Agency show shrinking populations, which should reduce the affect of this hazard and associated impacts to the Agency. The Agency may add staff, but this number would be small. The Agency noted it has no control over population changes in its service territory, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Agency are expected to be limited in the near future and thus are not likely to affect climate change impacts to the Agency. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the Agency to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future Development

Climate change can influence future development in the Agency over time. The Agency could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. While there are currently no formal studies of specific migration patterns expected to impact the Agency, climate-induced

migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies.

The Agency's SFP Project 2088 is not thought to be directly affected by climate change, but if climate change exacerbates the hazards in the discussions below, Project 2088 could be indirectly affected. Additionally, the Power Project heavily subsidizes water rates, any damage inducing hazard that happened at the headwaters of the system (and potentially inducing failure of more than one dam and impacting two powerhouses along the South Fork of the Feather River) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

Dam Failure

Likelihood of Future Occurrence—Unlikely

Vulnerability—Extremely High

Hazard Profile

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any given year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped or fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake.

Location and Extent

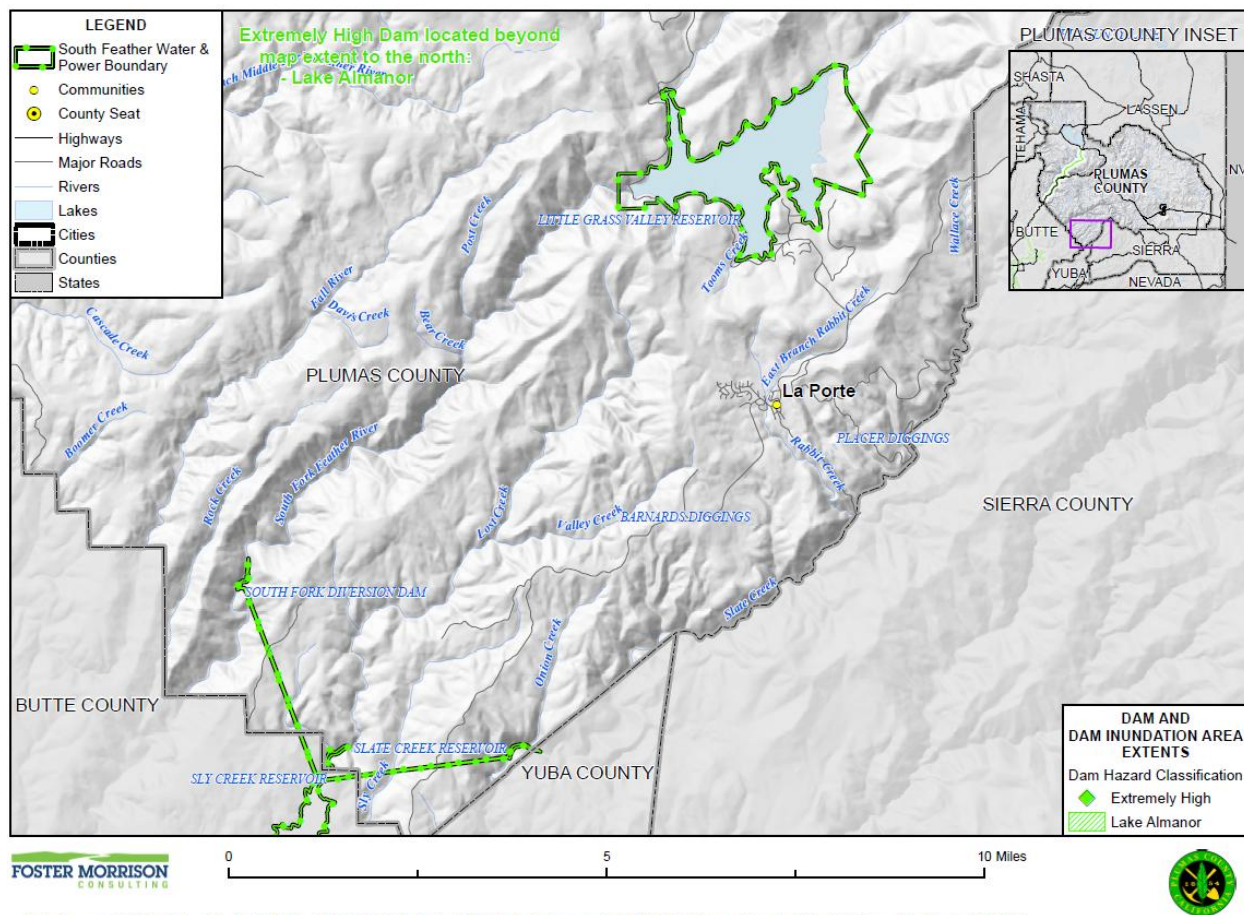
An inventory map of dams located within Plumas County was shown in Section 4.3.8 in the Base Plan. Dams with an inundation area within the SFWPA are shown on Figure H-5. This includes the Little Grass Valley Dam. In addition to this dam, the Agency is concerned with the South Fork Diversion Dam and the Slate Creek Diversion Dam. These are both owned by the Agency. These are not shown on the maps below, but are shown on Figure H-3 above.

There is no scale with which to measure dam failure. However, FEMA and CA DWR Division of Safety of Dams (DSOD) assign hazard potential classifications to dams within the State that provides information on the potential impact should a dam fail. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. FEMA categorizes the downstream hazard potential into three categories in increasing severity: Low, Significant, and High. DSOD adds a fourth category of Extremely High. Dams are classified in these four categories that identify the potential hazard to life and property. These were discussed in more detail in Section 4.3.8 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. For dam overtopping, the speed of onset is somewhat slower than that of a dam break, and the duration is longer (as evidenced in the 2017 Oroville Dam spillway event). The Agency would be affected for as long as the flood waters from the dam failure took to drain downstream.

Geographic flood extent from the DSOD dam inundation areas is shown on Figure H-4 and Figure H-5, as well as in Table H-4. As shown, the Agency does not have any areas affected by extremely high hazard dams. As such, no tabular analysis for extents are shown.

Figure H-4 SFWPA – Extremely High Hazard Dam Inundation Areas



Data Source: Cal OES Dam Status 3/2025, DWR DSOD (updated 1/2025; data downloaded 3/2025), Plumas County GIS, Cal-Atlas; Map Date: 6/3/2025.

NOTE: SFWP is entirely Outside of the EH inundation area.

Figure H-5 SFWPA – High Hazard Dam Inundation Areas

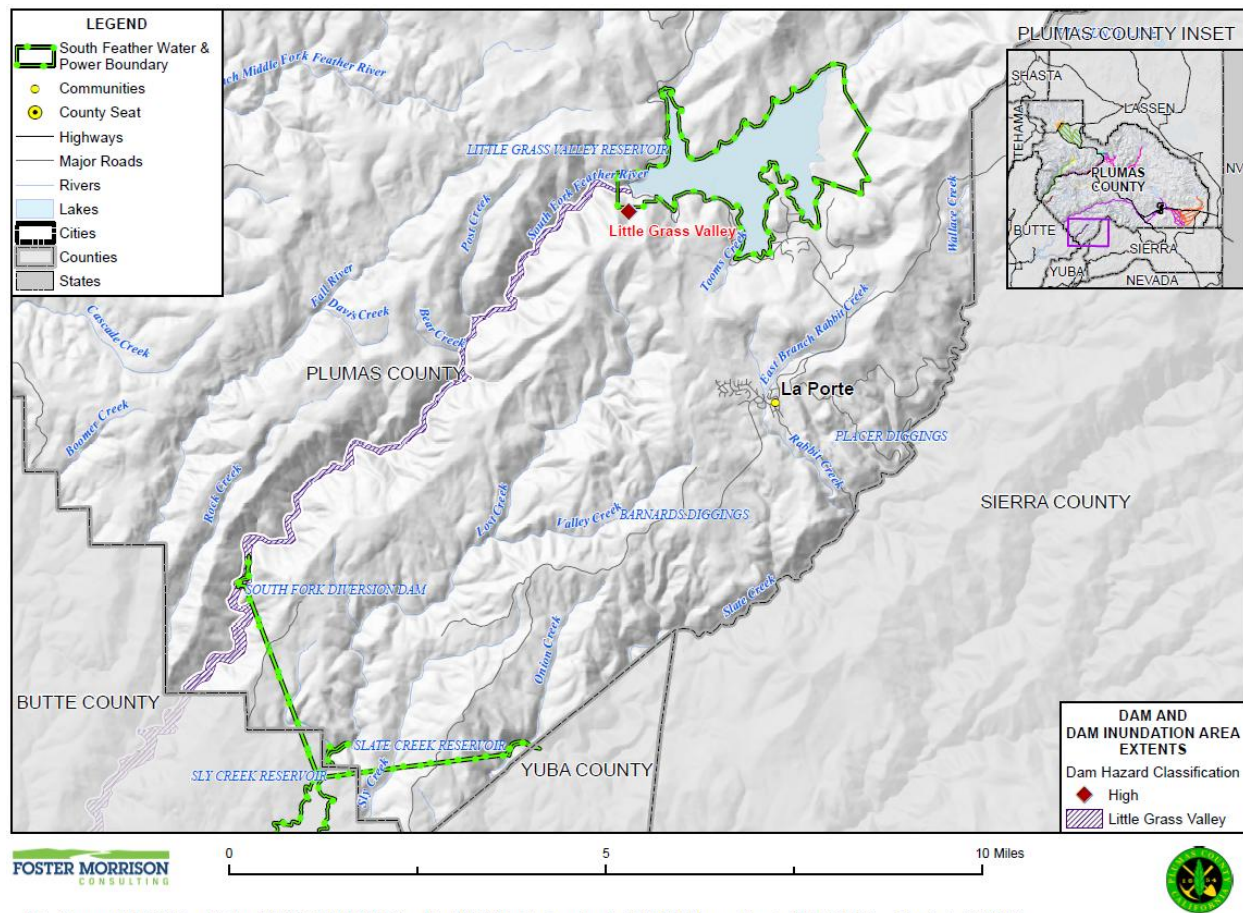


Table H-4 SFWPA – Dam Inundation Areas Geographical Extents

Jurisdiction / Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Little Grass Valley						
Agricultural	7	0.3%	0	0%	7	0.3%
Commercial	0	0%	0	0%	0	0.0%
Federal Lands	1,305	57%	0	0%	1,305	58%
Government	0	0%	0	0%	0	0.0%
Miscellaneous	34	2%	0	0%	34	2%
Residential	0	0%	0	0%	0	0.0%
Little Grass Valley Total	1,346	59%	0	0%	1,346	59%

Source: Cal OES, DSOD, Plumas County GIS

Past Occurrences

Disaster Declaration History

There have been no state or federal disaster declarations for dam failure in Plumas County.

NCDC Events

The NCDC does not contain any dam failure events for Plumas County.

SFWPA Events

There have been no past dam failures in the Agency.

Climate Change and Dam Failure

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with dam failure. More information on future impacts to the Agency can be found below and in the Future Conditions/Future Development section of the Vulnerability Assessment below.

The 2023 California State Hazard Mitigation Plan noted that modeling described in California's Fourth Climate Change Assessment projects less frequent but more extreme daily precipitation. Year-to-year precipitation will become more volatile, and the number of dry years will increase by mid-century. As the climate continues to warm, atmospheric rivers will carry more moisture, and extreme precipitation may increase. Climate model projections show a tendency for the northern part of the State to become wetter. Increases in both precipitation and heat causing snow melt in areas upstream of dams could increase the potential for dam failure and uncontrolled releases from Agency assets located in Plumas County.

Vulnerability to Dam Failure

The vulnerability of the Agency to dam failure flooding would vary depending on which dam fails and the nature and extent of the dam failure and associated flooding. An assessment of a community's vulnerability to dam failure begins with an understanding of local exposure to dam failure. This is included in the Local Concerns section below followed by a discussion of the Agency's Assets at Risk to this hazard.

Local Concerns

The Agency has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

The Agency maintains operational compliance with Dam Safety, Public Safety and Security guidelines set forth by FERC and DSOD in order to reduce vulnerability to dam failure events. In addition to those requirements, the Power Division team is well-versed in monitoring, documenting, and maintaining their dam and spillway structures to recognize any vulnerabilities.

Impacts to the SFWPA from dam failure include damage to property and critical facilities. Costs to repair dams that fail would also fall to the SFWPA for any Agency owned dams.

While there are no houses in the inundation pathway, there is one cabin below Lost Creek that the Agency just had an elevation cert survey done on to potentially remove it from modeling as a downstream risk. Golden Trout Campground, owned and operated by the USFS is the biggest downstream risk. The bridge connecting two sides of the campground is higher than the peak inundation flow, but should massive debris come down the river along with the inundation, in its current condition, there is not a guarantee that it couldn't be damaged enough to not be usable. It was noted that this has happened in the past due to high flows, was repaired by a private timber company, and is slated for replacement by USFS.

Assets at Risk

Assets at risk from this hazard include people and populations ; structures and critical facilities; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All people and populations (including both Agency staff and Agency residents) located in dam inundation areas are vulnerable to dam failure. Certain vulnerable populations may be at increased risk to dam failure, especially during a large event with minimal advance notice. These vulnerable populations may include: the unsheltered, those with limited mobility, and those that lack the resources to leave the area. Agency residents that live in these dam inundation areas are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events.

Structures and Critical Facilities and Infrastructure

Most structures and critical facilities and infrastructure in the Agency have some measure of risk to dam failure. Dam failure flooding can affect the built environment of the Agency. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to totally inundated. All Agency assets (listed in Table H-2) would be at risk to dam failure flooding

Natural, Historic, and Cultural Resources

A major dam failure event and associated flooding could have a devastating impact on the Agency. Large flood events can affect all natural, historic, and cultural resources that lie in the dam inundation areas. There are a number of ways floodwaters associated with a dam failure event can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to these structures within the inundated areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme dam failure flood events.

Impacts from Dam Failure

Impacts to the Agency from dam failure flooding could be extensive and widespread and include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Levees within the Agency and surrounding areas may also be damaged or destroyed contributing to the flood waters. Additionally, mass evacuations may be necessary and compounded by impacts to transportation systems and infrastructure. Economic losses to the Agency and Plumas County Planning Area can also be significant.

Other impacts associated with dam failure include landslides, bank erosion, and destruction of habitat. Dam failures can cause downstream flooding and can transport large volumes of sediment and debris and contaminants from the floodwaters. Other environmental impacts can include contamination from septic system failures and releases of contaminants from hazardous materials facilities, contamination of potable water supplies; changes in configurations of streams; loss of wildlife habitats; and degradation of wetlands. A large dam failure event could have significant and catastrophic impacts.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the Agency may be affected in the future by climate change (which was discussed in the Climate Change and Dam Failure discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the Agency include the following:

- Climate change is likely to exacerbate future rain and storm conditions and associated impacts and vulnerability of the Agency to dam failure.
- Population projections for the area served by the Agency show the population to be shrinking, which limits additional impacts to the Agency. The Agency may add staff, but this number would be small. Additional growth within the dam inundation areas of the Agency would place additional populations at risk to dam failure. The Agency noted it has no control over population changes, it merely reacts to them by providing additional (or reduced) services.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures, and critical facilities and infrastructure within or near areas of dam failure risk may put additional development at risk. Depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the Agency to this hazard.

Future Development

Dam owners always face the potential of future dam failure events, and that is why regulatory oversight exists, and dam safety requirements are in place. The Agency may have dam failure events happen in the future on the South Feather Power Project. Future development in the Agency's inundation areas will be limited due to the remote nature of the South Fork Power Project. Private parcels are few and far between, with recreation improvements on USFS land being the most likely developments. The Agency's SFWPA Project 2088 would be directly affected by dam failure. Additionally, the Power Project heavily subsidizes water rates, and therefore anything that happened at the headwaters of the system (and potentially inducing failure of more than one dam and impacting two powerhouses along the South Fork of the Feather River) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

Earthquake

Likelihood of Future Occurrence—Occasional (minor)/ Unlikely (major)

Vulnerability—Extremely High

Hazard Profile

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction.

The Agency is highly concerned about earthquakes and earthquake liquefaction. Because of this, The Agency actively monitors seismic activity in and around Project-2088.

Location and Extent

Since earthquakes are regional events, the whole of the Agency is at risk to earthquake. The SFWPA, Plumas County, and surrounding areas have some level of risk from seismic and geologic hazards. Faults in and around the Agency are shown in Section 4.3.10 of the Base Plan. These include the Almanor Fault, Butt Creek Fault Zone, the Mohawk Valley Fault, the Dogwood Peak Fault, and others that traverse the County. The Indian Valley Fault is also considered an active fault located within the County. A significant seismic event on any of these major faults could cause damage to assets owned by SFWPA.

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales, as

discussed in Section 4.3.10 of the Base Plan. The Agency maintains Standard Operating Procedures for Post-Earthquake inspections of assets based on the magnitude and proximity to structures.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The Agency is located in an area where earthquakes of some magnitude occur.. Seismic shaking maps for the area in Section 4.3.10 of the Base Plan show Plumas County and the Agency fall within a low to moderate shake risk.

The Little Grass Valley Dam is situated in the foothills of the Sierra Nevada, on the western slope of the northern Sierra Nevada Mountain range in Plumas County, California. Basement rocks are mainly metavolcanic rocks of the early Jurassic-age Slate Creek Complex and are overlain by abundant Tertiary-age volcanic deposits, including the Miocene Lovejoy Basalt and Miocene-Pliocene age andesitic volcanoclastic deposits (STID, 2024). The dam is located about 800 feet west of the Dogwood Peak fault, a Mesozoic-age fault/suture zone, and east of the Camel Peak fault, another Mesozoic-age fault/suture zone, five miles downstream of the dam.

Past Occurrences

Disaster Declaration History

There has been no state or federal disaster declarations in Plumas County from earthquake.

NCDC Events

The NCDC does not track earthquake events.

SFWPA Events

As shown in the Base Plan, no disaster declarations have occurred in the County due to earthquake. The Agency Planning Team searched their records, including official board meeting minutes from the Agency. These did not indicate that there was any damage to agency infrastructure as a result of the Oroville earthquake. The HMPC noted no other past occurrences of earthquakes or liquefaction that affected the Agency. in any meaningful way.

Climate Change and Earthquake

Climate change is unlikely to increase earthquake frequency or strength. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquakes as a result of the periodic release of tectonic stresses Earthquake vulnerability is primarily based on population and the built environment. More urban areas in high seismic hazard zones

are the most vulnerable, while uninhabited areas are less vulnerable. The primary impacts of concern are life safety and property damage. Although several faults are in and near the Plumas County Planning Area, seismic hazard mapping indicates that the Agency has low to moderate seismic hazard potential. There is the potential for the Agency and Plumas County Planning Area to be subject to some level of moderate seismic shaking. Some degree of structural damage due to stronger seismic shaking could be expected.

Earthquake shaking can also cause liquefaction to occur. Areas with loose soil and high water tables are at risk from liquefaction. There are limited areas in and near the Agency prone to liquefaction.

The whole of the Agency is at some measure of vulnerability to earthquake. An assessment of a community's vulnerability to earthquakes begins with an understanding of local exposure to earthquakes. This is included in the Local Concerns section below followed by a discussion of the Agency's Assets at Risk to this hazard.

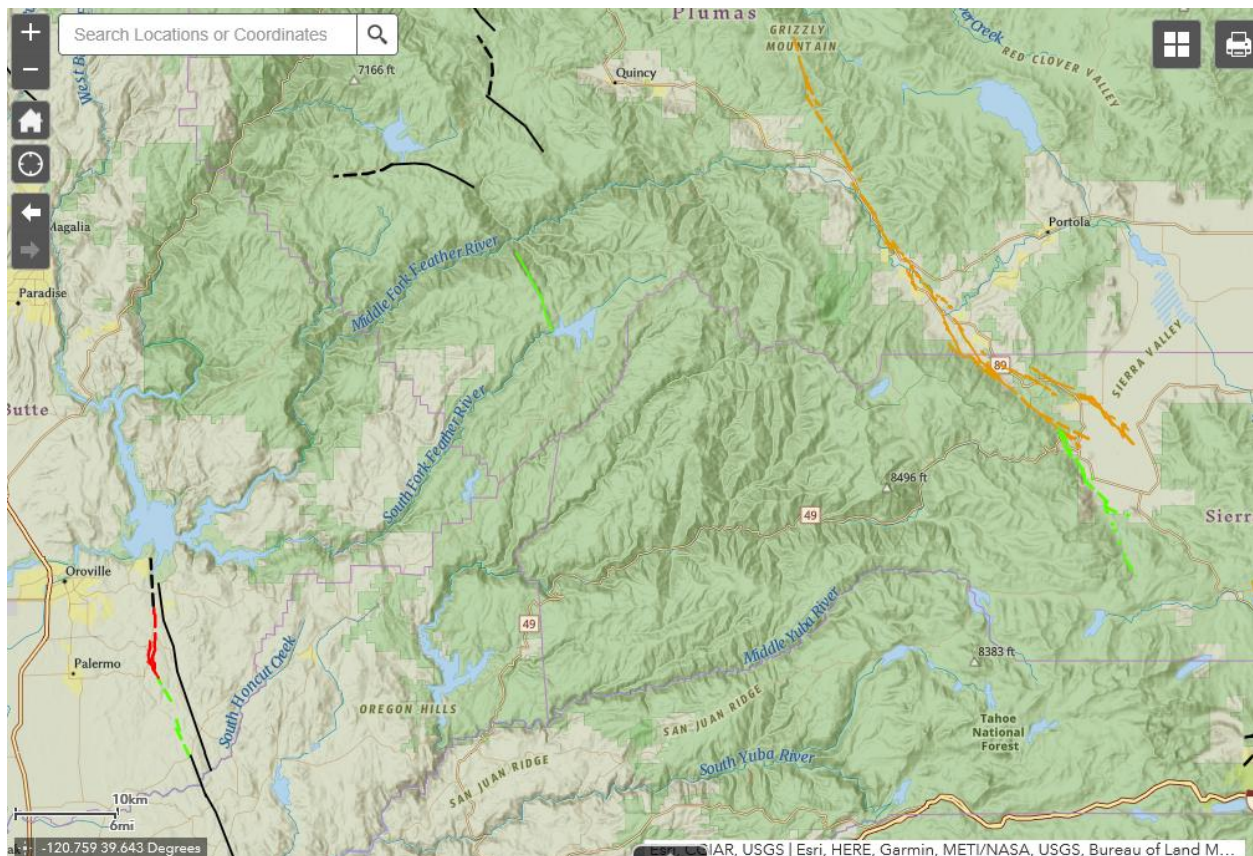
Local Concerns

The Agency has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. The SFWPA is within Zone 3.

The Agency is aware of the local fault lines and recognizes the potential risks associated with a seismic event. The distant span and varying topography for the Agency's assets are a concern for both the Power and Water Division respectfully. The green line in the middle of Figure H-6 is the Little Grass Valley fault, which is the start of the Agency's power project and water conveyance in Plumas County. Also note the green, black, and red fault lines towards the bottom left corner of the map that displays the Foothills Fault system that runs through a portion of the Agency's water distribution systems (both domestic and irrigation).

Figure H-6 Faults in or near Agency Boundaries



<https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf>

Assets at Risk

Assets at risk from this hazard include people and populations; structures and critical facilities; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All people and populations (both Agency staff and those residing in the Agency Service Area) are at risk from earthquake shaking and associated hazards. The greatest risk to people and populations from earthquake is death and injury. More information on people and populations at risk to earthquake shaking events can be seen in the Hazus scenarios developed for this LHMP. More information on the Hazus scenarios and how the County and District may be affected is included in Section 4.3.10 of the Base Plan.

Structures and Critical Facilities and Infrastructure

All structures and critical facilities and infrastructure in the Agency are vulnerable to earthquakes, depending on the severity and location of the event. The Hazus scenarios conducted for the entire Plumas County Planning Area show how structures may be affected. All Agency assets from Table H-2 would be at risk to earthquake.

Natural, Historic, and Cultural Resources

The 2023 State Hazard Mitigation Plan noted that environmental problems from earthquakes can be numerous. It is possible for earthquakes to reroute streams, which can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater and/or springs may dry up because of changes in underlying geology. Another threat to the environment from earthquakes is the potential release of hazardous materials. Historical and cultural resources are at risk, often due to their age and construction types. The Hazus scenarios in Section 4.3.10 of the Base Plan and included below are relatively silent on the vulnerability to natural, historic, and cultural resources, but impacts to these resources could be long lasting.

Impacts from Earthquake

Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on the built environment. The greatest impact is to life safety of the SFWPA staff, residents, and visitors. Other impacts to the Agency could include damages to infrastructure such as roads, bridges, and dams; damages and loss of services to utilities and critical infrastructure, including those related to gas, power, water, wastewater and communication systems; damages to structures and other development; and possible loss of life and injuries.

Earthquakes can also cause failure of dams, levees, and reservoirs. Facilities and land downslope from dams or water reservoirs might be subject to flooding, if the dams, reservoirs, or other flood control structures fail as a result of an earthquake. The Agency has locations with significant flood risk that include facilities downslope from dams or reservoirs that could be affected by a significant earthquake event.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the Agency may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the SFWPA include the following:

- As discussed in the hazard profile section, climate change is not anticipated to affect this hazard over time.
- Population projections for the area served by the Agency show the population to be shrinking, which limits additional impacts to the Agency. The Agency may add staff, but this number would be small. The Agency noted it has no control over population changes in its service territory, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Agency are expected to be limited in the near future and thus are not likely to affect earthquake and associated impacts to the Agency. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the Agency to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future Development

Although new growth and development would fall in the area affected by earthquake, given the limited chance of major earthquake and the building codes in effect, development in areas prone to earthquakes will continue to occur. The Agency is subject to the California Building Code, which mandates construction techniques that minimize seismic hazards. Future development in the Agency is subject to these building codes and land use planning.

Based on today's environmental and political climates, the Agency doesn't believe the SFWPA Project 2088 would expand in the ways of additional dams or power houses. In terms of domestic and irrigation water service, the Agency does not anticipate any major operational changes, unless a predictability curve suggested the Agency take additional precautions. Additionally, the Power Project heavily subsidizes water rates, and therefore anything that happened at the headwaters of the system (and potentially inducing failure of more than one dam and impacting two powerhouses along the South Fork of the Feather River) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

Landslide, Mudslide, and Debris Flow

Likelihood of Future Occurrence—Likely

Vulnerability—Medium

Hazard Profile

Like its earthquake-generating faults, California's mountainous terrain is a consequence of dynamic geologic processes in operation as the North American Plate grinds past the Pacific Plate. According to the CGS, a landslide is a general term for a variety of mass-movement processes that generate a down-slope movement of mud, soil, rock, and/or vegetation. Landslides are classified into many different types based

on form and type of movement. They range from slow-moving rotational slumps and earth flows, which can slowly distress structures but are less threatening to personal safety, to fast-moving rock avalanches and debris flows that are a serious threat to structures and have been responsible for most fatalities during landslide events. For the purposes of this LHMP Update, the term landslide includes mudslides, debris flows, and rockfalls that tend to occur suddenly; as well as hillside erosion, which is a similar process that tends to occur on smaller scales and more gradually but can exacerbate landslide events.

Landslides, debris flows and mudslides are closely related to flooding, as both processes are related to precipitation, runoff, and the saturation of ground by water. In addition, landslides, mud flows, and debris flows can occur on small, steep stream channels and are often mistaken for floods. However, landslide events may be much more destructive than floods because of their higher densities, high debris loads, and high velocities.

Natural conditions that contribute to landslide, mudslides, debris flows, hillside and streambank erosion, include the following:

- Degree of slope
- Water (heavy rain, river flows, or wave action)
- Unconsolidated soil or soft rock and sediments
- Lack of vegetation (no stabilizing root structure)
- Previous wildfires and other forest disturbances (discussed in the Wildfire section below)
- Road building, excavation, and grading
- Earthquake

The 2023 California State Hazard Mitigation Plan noted that more than one third of California is mountainous terrain that generally trends parallel to the coast, forming a barrier that captures moisture from offshore storms originating in the Gulf of Alaska and Mexico. Steep topography, weak rocks, heavy winter rains, and occasional earthquakes all lead to slope failures more frequently than would otherwise occur under gravity alone. This is true in the sloped areas inside the Agency's boundaries.

Location and Extent

Landslides can occur in areas with steep slopes and weak soils. It can also occur in areas where erosion has previously occurred. Both winter storms (precipitation-induced) and earthquake triggered landslides tend to occur in or near places that have experienced previous landslides. However, landslides may also occur in other locations over time. Landslides and debris flows may also occur in fire burn scar areas.

Figure H-7 shows the CGS areas at susceptible to deep-seated landslides. The legend on Figure H-7 shows the susceptibility scale (from 0-X with 0 being the least and X being the most susceptible) that the CGS uses to show the susceptibility of landslides. It is a primarily a combination of slope class and rock strength. Geographic extents of these classes are shown on Table H-5. According to the 2023 State Hazard Mitigation Plan, the susceptibility classes were further categorized into Very High (susceptibility class X) and High (susceptibility classes VII, VIII, & IX) for exposure analysis. The rest of the classes were not categorized. CGS mapping indicates that the eastern portions of the Agency and surrounding area are at high to very high susceptibility areas for landslides. This can be seen in the darker orange and red colors.

The speed of onset of landslide is often short, especially in past landslide areas as well as in post-wildfire burn scar areas, but it can also take years for a slope to fail. Landslide duration is usually short, though digging out and repairing landslide areas can take some time.

Figure H-7 SFWPA – Susceptibility to Deep-Seated Landslides

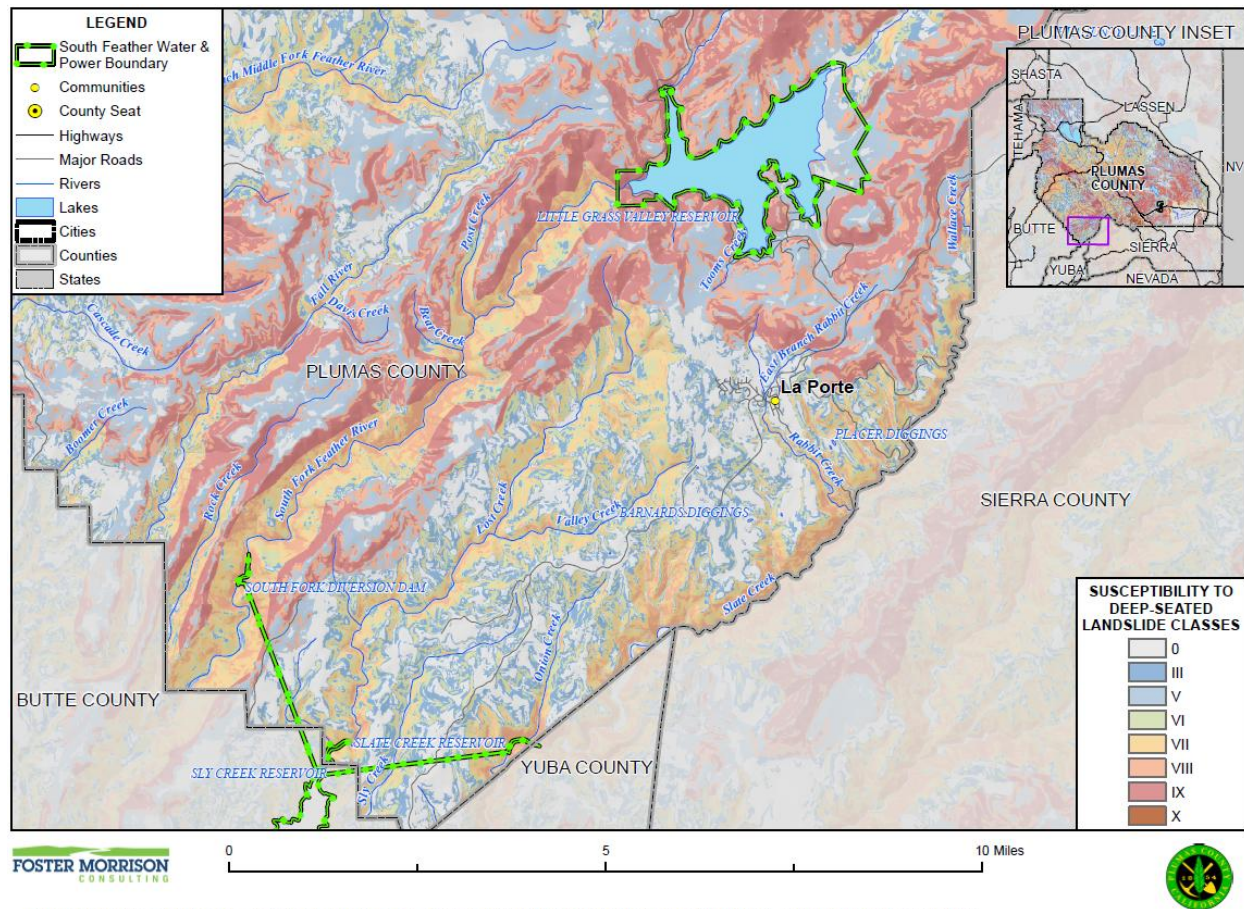


Table H-5 SFWPA – Susceptibility to Deep-Seated Landslide Geographical Extents by Class

Jurisdiction / Susceptibility to Deep-Seated Landslide Class	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
0	39	2%	0	0%	39	2%
V	2	0.1%	2	32%	0.3	0.01%
VI	1	0.04%	0	0%	1	0.04%
VIII	233	10%	0	7%	232	10%
IX	1,995	88%	4	61%	1,991	88%
Grand Total	2,270	100%	6	100%	2,263	100%

Source: CGS

Past Occurrences

Disaster Declarations

There have been no disaster declarations associated with just landslides in Plumas County; however, as shown in Table H-6, there have been 9 state and 10 federal disaster declarations for flood (including heavy rains and storms) which included landslides as a component.

Table H-6 Plumas County – Federal and State Disaster Declarations Summary 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (events that included landslide)	9	1995 (twice), 2006 (twice), 2017 (twice), 2019, 2023 (twice)	10	1995 (twice), 2006 (twice), 2017 (twice), 2019, 2023 (three)

Source: Cal OES, FEMA. Retrieved March 2025.

NCDC Events

The NCDC contains 21 records for landslides or debris flows in Plumas County since 1993. These were not known to affect the Agency.

SFWPA Past Occurrences

The Agency noted that there are no documented landslide past occurrences with impacts to Agency assets.

Climate Change and Landslide and Debris Flows

According to the 2021 CAS (as well as the 2024 Draft CAS), climate change may result in precipitation extremes (i.e., wetter wet periods and drier dry periods). More information on precipitation increases can be found in Section 4.3.4 of the Base Plan. While total average annual rainfall may decrease only slightly, rainfall is predicted to occur in fewer, more intense precipitation events. The combination of a generally drier climate in the future, which will increase the chance of drought and wildfires, and the occasional extreme downpour is likely to cause more mudslides, landslides, and debris flows.

Vulnerability from Landslide

Portions of the Agency are at some measure of vulnerability to landslide. This is true when atmospheric rivers or heavy rain and storm events occur. Post wildfire areas are also more prone to landslide events. An assessment of a community’s vulnerability to landslide begins with an understanding of local exposure to landslide. This is included in the Local Concerns section below followed by a discussion of the Agency’s Assets at Risk to this hazard.

Local Concerns

The Agency has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

Following the North Complex Fire, the Agency is concerned with landslides that occur in the burn scar areas above Agency dams. These can cause rockfall that damage dams, critical appurtenant structures, and spillways (see small example in Figure H-10). Agency buildings may be damaged as well. Landslides can also cause excess sedimentation in the dams, reducing capacities.

In May of 2024 , there was a significant rockfall event that originated in North Complex burn scar above the USFS Road 21N11Y, which entirely blocked sole ingress/egress to South Fork Diversion Dam. Emergency repairs by a specialty contractor included services to drill and split the rock, heavy equipment to haul and dispose of rock, and repair of the damaged section of roadway.

Figure H-8 Rockslide Debris Slides Blocking Roadway to Dam



Figure H-9 Rockslide Debris Slides Blocking Roadway to Dam – Alternate view



Figure H-10 Debris Slides Post North Complex Fire Above Little Grass Valley Dam



Figure H-11 Debris Slides Post North Complex Fire Above Little Grass Valley Dam – Alternate view



Source: SFWPA

AN LGVR SPILLWAY NORTH WALL COMMENT WAS LEFT IN THE DOCUMENT SENT TO US.
WHAT DOES THIS MEAN OR WHAT WOULD THIS ENTAIL?

Assets at Risk

Assets at risk from this hazard include people and populations; structures and critical facilities; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All populations (both Agency staff and Agency residents) located within areas of landslide susceptibility, especially in the High to Very High hazard areas (i.e., Classes VII to X) are at some vulnerability to landslide. Most vulnerable are those people working or residing in these landslide potential areas as well as those that might reside or work within the landslide run out areas. People residing in the Agency service areas as well as Agency staff may also be cut off from transportation routes if roads and streets providing a means of ingress and egress are impacted. Certain vulnerable populations may be at greater risk due to the often sudden onset of a landslide event and include: the unsheltered, those with limited mobility, and those that lack the resources to leave the area.

Structures and Critical Facilities and Infrastructure

Landslides can affect the built environment of the Agency and those structures and critical facilities located within the High to Very High hazard areas (i.e., Classes VII to X) are especially vulnerable, as are the structures located within the landslide run out areas. This includes all Agency assets listed in Table H-2.

Natural, Historic, and Cultural Resources

Landslides can affect natural, historic, and cultural resources that lie in the landslide area, or the landslide run out area. Landslides can destroy large tracts of forest and open space areas, destroy wildlife habitat, and remove productive soils and vegetation from slopes. It can also fill in waterways, impact water quality, and potentially affect flooding potential. Natural resources that fall in the High or Very High susceptibility areas shown on Figure H-7 would be most vulnerable, as well as those in the run-out areas. As shown on the map, this would include a relatively small area of the developed area of the Agency, since most of this occurs in the less developed areas of the Agency.

Impacts from Landslide

Any type of landslide may result in damages or complete destruction of buildings in their path, as well as deaths and injuries. Landslides can cause road blockages by depositing debris on road surfaces or road damage if the road surface itself slides downhill. Utility lines and pipes are also prone to breakage in slide areas. Large landslides can collapse into water bodies, causing seiches. Landslides can relocate river channels. Landslides and debris flows can also impact water quality and the storage capacity of surface water reservoirs used to store potable water.

Landslides, debris flows, and mud flows impacts vary by location and severity of any given event and will likely only affect certain areas of the Agency susceptible to landslide. Based on the risk assessment, there is potential for significant landslides to occur in the Agency. However, most (but not all) of the historic landslides in the Agency have been minor, localized events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility; and
- Significant economic impact (jobs, sales, tax revenue) to the community.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the Agency may be affected in the future by climate change (which was discussed in the hazard profile above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the Agency include the following:

- Climate change is likely to exacerbate future landslide, mudslide, and debris flow conditions and associated impacts and vulnerability of the Agency to landslide.
- Population projections for the area served by the Agency show the population to be shrinking, which limits additional impacts to the Agency. The Agency noted it has no control over population changes, it merely reacts to them by providing additional (or reduced) services.
- It is unknown how changes in land use and development will affect landslide in the Agency. Building that occurs in the VI or higher deep seated landslide classes may increase risk to additional lands. County building codes are in effect to reduce this risk and should be updated as necessary to continue to address future landslide or erosion conditions.

Future Development

Additional growth and development within moderate or higher deep-seated landslide susceptibility classes in the Agency would place additional values at risk to landslide. New Agency facilities will take landslide into account when siting new facilities. The Agency's SFWPA Project 2088 may be affected by landslide in the burn scar areas. Additionally, the Power Project heavily subsidizes water rates, and therefore anything that happened at the headwaters of the system (and potentially inducing failure of more than one dam and impacting two powerhouses along the South Fork of the Feather River) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Hazard Profile

Storms in the Agency occur annually and are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it

contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the Agency falls mainly in the fall, winter, and spring months. Wind often accompanies these storms; hail and lightning are rare in the Agency.

Location and Extent

Rains and storms can occur in any location of the Agency. All portions of the Agency are at risk to heavy rains and storms. Most of the severe rains occur during the fall, winter, and spring months in the Agency as discussed below. There is no scale by which heavy rains and severe storms are measured. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Hail and lightning are rarer in the Agency and Plumas County. Duration of severe storms in the Agency can range from minutes to hours to days.

Past Occurrences

Disaster Declaration History

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the Agency. This contributes to many of the federal disaster declarations related to flooding. Disaster declarations from flooding, including heavy rains and storms, are shown on Table H-7. IN addition, there have been two USDA disaster declarations from heavy rain and storms (once in 2016 and once in 2017) since 2012.

Table H-7 Plumas County – State and Federal Disaster Declarations from Flood (Heavy Rain and Storms) 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	22	1950, 1955, 1958 (twice), 1964, 1963, 1964, 1969, 1970 1980, 1986, 1993, 1992*, 1995 (twice*), 1996, 1997, 2006, 2017 (twice*), 2023 (twice*)	19	1950, 1955, 1958 (twice), 1963, 1964, 1969, 1970, 1986, 1992 (twice), 1995 (twice), 1997, 2006*, 2017 (twice*), 2023 (twice*)

Source: Cal OES, FEMA

NCDC Events

The NCDC data recorded 132 hail, heavy rain, and storm incidents for Plumas County since 1950.

SFWPA Events

The Agency noted that heavy rains and storms are an annual occurrence often resulting in flooding.

LIST PAST EVENTS AFFECTING THE AGENCY. INCLUDE INFORMATION ON IMPACTS AND DAMAGES AS AVAILABLE? IF NO PAST EVENTS, PLEASE STATE THAT.

Climate Change and Heavy Rains and Storms

It is likely that climate change will increase the chance of future occurrence as well as future impacts from heavy rains and storms. More information on future impacts to the Agency can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

According to the 2021 CAS (as well as the 2024 Draft CAS), while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is unlikely that hail will become more common in Plumas County and the SFWPA. The amount of lightning is not projected to change.

Cal-Adapt noted that, on average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. Cal-Adapt modeled scenarios are shown in Section 4.3.4 of the Base Plan.

Vulnerability to Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the Agency. These events can cause both significant and localized flooding. Flooding can be worse during times where the ground is already saturated. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the Agency, but also can cause damage, with lightning occasionally igniting wildfires.

The whole of the Agency is at some measure of vulnerability to heavy rain and storms. An assessment of a community's vulnerability to heavy rains and storms begins with an understanding of local exposure to heavy rain and storms. This is included in the Local Concerns section below followed by a discussion of the Agency's Assets at Risk to this hazard.

Local Concerns

The Agency has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

The Agency noted that one of the primary issues associated with heavy rains and storms is the resulting flooding caused by large precipitation events. The Agency is also concerned with rain on snow events, which can cause greater flooding in the Agency. In addition, the Agency is concerned that heavy rains and storms in the burn scar areas could cause erosion, landslide, or debris flow.

Impacts from these storm events of great concern following the North Complex Fire, as multiple Project assets are subject to burn scar debris flow. Impacts are primarily from debris flow that could potentially create dam safety issues if not monitored and mitigated. These impacts can include large logs on concrete arch dam ogee sections can alter flow concentrations below, and cause impacts on the below scour pad, or debris can fall and cause damage to valving present on the downstream side of the dam.

Rain on snow events require ongoing monitoring for the duration, and assets are inspected after high flow events. Heavy rain and runoff can absolutely cause a dam safety event at LGVR especially during the spring months when the spillway gates are down. Improved access would help mitigate issues for the Agency and its assets.

Assets at Risk

Assets at risk from this hazard include people and populations; structures and critical facilities; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All Agency staff and the populations served by the Agency are at some vulnerability to heavy rains and storms. Those Agency employees that work outdoors could be affected to a limited extent by this hazard. All populations served by the Agency have some measure of risk to heavy rains and storms. Those populations that work or recreate outside and unhoused individuals are more vulnerable to impacts from heavy storm events. Heavy rains and storms occur every year and do not generally cause significant adverse impacts to individuals; it is the secondary hazard, flooding, which poses the biggest impact to people.

Structures and Critical Facilities and Infrastructure

Agency facilities and structures have some risk to heavy rains and storms. Heavy rain and storms can affect critical facilities and infrastructure during large events. Structures built to modern building codes are built to withstand heavy rains and storms (including thunderstorm winds and lightning); older structures may be more vulnerable. During a heavy storm, localized flooding may cause water intrusion into buildings from the outside. Trees can be downed causing impacts to structures. Older homes and buildings may be at increased risk to heavy rains and storms. Power outages during severe storm events can occur, impacting the use of structures until the power is back online. Local roads, streets, and bridges can be impacted resulting in closures restricting traffic flow in the Agency. In certain areas, large storms can cause erosion and localized landslides which can impact affected facilities.

All Agency assets in Table H-2 would be at risk to heavy rains and storms, if flooding from them caused a dam event to occur.

Natural, Historic, and Cultural Resources

Large rain and storm events and associated flooding can affect natural, historic, and cultural resources. Silt and sediment can damage natural areas. Trees can be uprooted and downed by high winds. Extended periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. While some natural systems can be adversely impacted during these large storms, heavy rain events can also provide benefits. Groundwater and wetland areas can be recharged and water supplies replenished. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures affected by large storm events, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme rain and storm and events.

Impacts from Heavy Rain and Storms

Impacts from heavy rains and storms include damage to property, critical facilities and infrastructure, and the natural landscape. This includes: erosion; downed trees; damaged utility structures and infrastructure; power outages; road damage and blockages; and even lightning strikes to critical infrastructure and people. Lightning can also cause wildfires and urban fires to occur. Landsliding and erosion occur when the soil on slopes becomes oversaturated and fails. Climate change may cause these impacts to worsen.

Actual damage associated with the primary effects of severe storms and heavy rains has been somewhat limited. It is the secondary hazards caused by these severe weather events, such as floods and erosion that would likely have the greatest impact.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the Agency may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the Agency include the following:

- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.
- Population projections for the area served by the Agency show the population to be shrinking, which limits additional impacts to the Agency. The Agency may add staff, but this number would be small. The Agency noted it has no control over population changes in its service territory, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Agency are expected to be limited in the near future and thus are not likely to affect heavy rains and storm and associated impacts to the Agency. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the Agency to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future Development

New Agency facilities follow state and local building codes, also requiring approval from FERC, DSOD, and USFS, which should reduce the risk to future development in the Agency from heavy rains and storms. New critical facilities should be built to withstand hail damage, lightning, and thunderstorm winds. The Agency's SFWPA Project 2088 may be affected by landslide in the burn scar areas. Additionally, the Power

Project heavily subsidizes water rates, and therefore anything that happened at the top of the system (and potentially inducing cascading failure through the system) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

Wildfire (with smoke and air quality)

Likelihood of Future Occurrence–Highly Likely

Vulnerability–Extremely High

Hazard Profile

Wildland fire and the risk of a conflagration is an ongoing concern for the SFWPA. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountainous areas and subsequent fire control practices have affected the natural cycle of fire regimes. Wildland fires affect grass, forest, and brushlands, as well as structures. Where there is human access to wildland areas, the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern.

Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. These weather conditions can result in red flag (e.g., fire weather) days, and can result in PSPS events in the Agency. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires also occur in more populated developed areas. There is also the concern of wildfires occurring in these more remote, forested areas, that under certain weather conditions, can extend into areas not generally considered at a high risk to wildfire. Smoke and air quality also become an issue, both from fires occurring inside and outside of the Plumas County Planning Area and the Agency.

Wildfire Smoke and Air Quality

Smoke from wildfires is made up of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract.

Wildfire smoke can have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in both Plumas County, nearby northern California communities, and elsewhere have created significant air pollution affecting area residents. This was the case during the 2021 Caldor Fire, as well as others that affected the Plumas County Planning Area.

Location and Extent

Wildfire can affect all areas of the Agency. CAL FIRE has estimated that the risk varies across the Agency and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of

the Base Plan, wildfire maps for the SFWPA were created. Figure H-12 shows the CAL FIRE State Responsibility Areas (SRA) and Federal Responsibility Areas (FRA) and their associated Fire Hazard Severity Zones (FHSZ) in the Agency. Figure H-13 shows the CAL FIRE Local Responsibility Areas (LRA) and their associated Fire Hazard Severity Zones (FHSZ) in the Agency. The Agency falls only in the SRA/FRA, as such no LRA tabular analysis was performed. As shown on the maps, FHSZs within the Agency is Very High.

Figure H-12 SFWPA – CAL FIRE SRA/FRA Fire Hazard Severity Zones

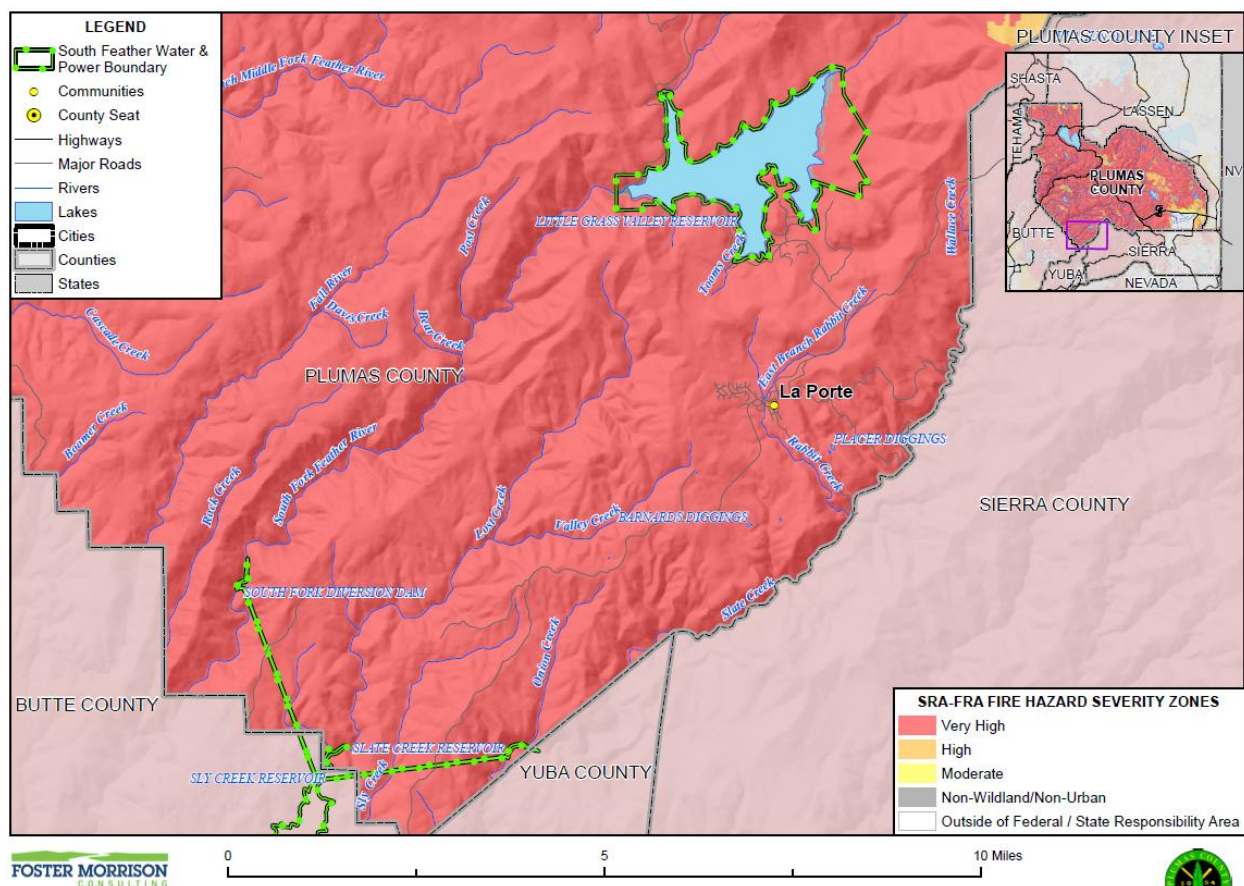
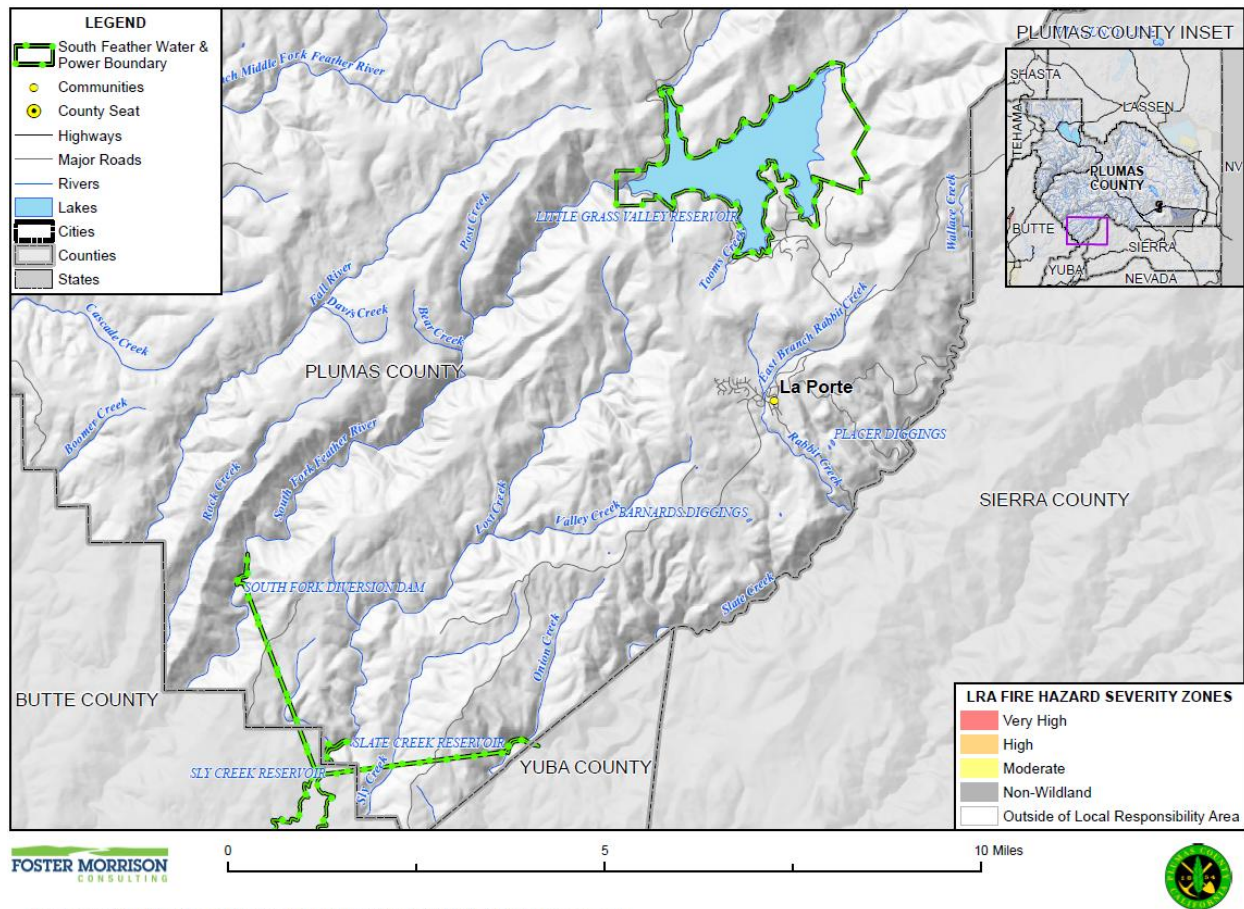


Figure H-13 SFWPA – CAL FIRE LRA Fire Hazard Severity Zones



Data Source: CAL FIRE (Local Responsibility Area FHSZ 2/2025 FHSZLRA25_Phase1_v1), Plumas County GIS, Cal-Atlas; Map Date: 6/3/2025.

NOTE: SFWP is entirely Outside of the Local Responsibility Area

Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time or may have durations lasting for a week or more. Geographical FHSZ extents in the SRA/FRA are shown in Table H-8, while extents in the LRA are not shown in table format since the District is not in the LRA..

Table H-8 SFWPA – CAL FIRE SRA/FRA Fire Hazard Severity Zone Geographical Extents

Jurisdiction/ Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	2,270	100%	6	100%	2,263	100%
Grand Total	2,270	100%	6	100%	2,263	100%

Source: CAL FIRE

Past Occurrences

Disaster Declaration History

There has been eight state and six federal disaster declarations due to fire, as shown in Table H-9.

Table H-9 Plumas County – State and Federal Wildfire Disaster Declarations 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	8	1960 (unnamed), 1987(Clarks Fire), 1999 (Bucks Fire), 2020 (twice – Bear Fire, North Complex Fire), 2021 (three – Dixie Fire, Monument Fire, Lava Fire/Beckwourth Complex)	6	1999 (Bucks Fire), 2008 (BTU Lightning Complex), 2020 (twice – Bear Fire, North Complex Fire), 2021 (twice – Dixie Fire, Lava Fire/Beckwourth Complex)

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked 15 wildfire events in the County dating back to 1993. Many more fires have occurred, but were not reported to the NCDC database.

SFWPA Events

The 2020 North Complex Fire threatened the entire upper sections of the Agency’s Power Project, including the Power Division Headquarters located in Forbestown. The fire burned adjacent to SFWPA facilities from Little Grass Valley Dam & Reservoir to South Fork Diversion Dam and impoundment in Plumas County. South Fork Diversion Dam had safety and debris buoys burned (required replacement). The most hazardous trees burned in the fire had to be removed in order to avoid impacts to the tunnel control building. The Agency is still dealing with tree mortality on the road into the dam (see Figure H-15). Significant debris flow began immediately following the fire, and continues today. An example of this can be seen on Figure H-16.

Figure H-14 Burns on Piping from North Complex Fire



Source: SFWPA

Figure H-15 Tree Mortality around SFWPA – USFS Road to South Fork Diversion Dam



Source: SFWPA

Figure H-16 Transported North Complex Fire Debris on Dam After Storm Event



Source: SFWPA

Climate Change and Wildfire

It is likely that climate change will increase the chance of future occurrence as well as future impacts from wildfire. More information on future impacts to the Agency can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Warmer temperatures can exacerbate drought conditions. Drought often kills plants and trees, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle. Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2090-2099, as compared to recent (2010) conditions. This is shown in Section 4.3.16 of the Base Plan. Based on this model, Cal-Adapt predicts that wildfire risk in Plumas County will increase moderately at the end of the century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in the Plumas County Planning Area, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

Vulnerability to Wildfire

Risk and vulnerability to the Agency from wildfire is of significant concern. Wildfires that occur in the Agency occur from a variety of both natural and manmade causes. The Agency can be affected both by fires that start on or near Agency lands as well as those that start elsewhere and move into the Agency. In addition to burning large areas of land, air quality can be affected in the Agency by smoke from fires occurring inside the Agency as well as those from many miles away.

The whole of the Agency is at some measure of vulnerability to wildfire. An assessment of a community's vulnerability to wildfire begins with an understanding of local exposure to wildfire. This is included in the Local Concerns section below followed by a discussion of the Agency's Assets at Risk to this hazard.

Local Concerns

The Agency has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

The Agency noted that, with the exception of Kelly Powerhouse, the entire Power Division is located in the very high hazard portion of the map provided above. In addition to power generation assets, the hillsides surrounding the Miners Ranch Canal are also extremely vulnerable to wildfire risks, which then cause soil erosion issues during the winter months.

Assets at Risk

Assets at risk from this hazard include people and populations served; structures and critical facilities; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All populations (both Agency staff and Service Area populations) are at some vulnerability to wildfire. Certain vulnerable populations are at greater risk to the effects of wildfire as well as smoke and air quality issues that wildfires bring. Vulnerable populations include the unhoused, infants and children under age five and their caregivers, the elderly (65 and older), individuals with disabilities, individuals' dependent on medical equipment, individuals who exercise, recreate, or work (like Agency staff) outdoors, and individuals with impaired mobility.

Structures and Critical Facilities and Infrastructure

All structures in the Agency have some risk to wildfire. Wildfire presents a threat to critical facilities and infrastructure. This includes all Agency assets in Table H-2.

Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources located within areas at risk to wildfire would be vulnerable. Should a wildfire occur in the Agency, the impacts to natural, historic and cultural resources could be extensive

and include air pollution, contamination from water runoff containing toxic products, other environmental discharges or releases from burned materials affecting soils, habitat areas, wildlife, and aquatic resources, and total destruction of natural resources. Debris and runoff from burned areas can affect reservoirs and rivers in the Agency. Historic and cultural resources can be damaged or destroyed and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

Impacts from Wildfire

Potential impacts from wildfire include loss of life and injuries; damage to structures, critical facilities and infrastructure, and other improvements, natural and cultural resources, croplands, and timber; and loss of recreational opportunities. Out of control wildfires can have catastrophic impacts. Wildfires can cause short-term and long-term disruption to the Agency. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the Agency by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the Agency; smoke and air pollution from wildfires can be a severe health hazard. Smoke impacts may come from wildfires outside the Agency, as well as from within.

Although the physical damages and casualties arising from wildland-urban interface or conflagration fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Schools and businesses can be forced to close for extended periods of time. Recently, the threat of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E, Plumas Sierra REC, or Liberty Utilities to initiate a PSPS which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The impacts of a fire are felt long after the fire is extinguished. In addition to the loss of property in fires, the loss in vegetation and changes in surface soils alters the environment. When supporting vegetation is burned, hillsides become destabilized and prone to erosion. The burnt surface soils are harder and absorb less water. When winter rains come, this leads to increased runoff, erosion, and landslides in hilly areas.

Wildfire smoke can also have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in nearby northern California communities since the previous LHMP have created significant air pollution affecting area residents. Agency residents have been affected by wildfire smoke and poor air quality, from fires both within the County and from those much further away.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the Agency may be affected in the future by climate change (which was discussed in the hazard profile above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the SFWPA include the following:

- Climate change is likely to exacerbate future wildfire conditions and associated impacts and vulnerability of the Agency to wildfire.
- Population projections for the area served by the Agency show the population to be shrinking, which limits additional impacts to the Agency. The Agency noted it has no control over population changes, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Agency are expected to be limited in the near future and thus would have possible associated wildfire impacts to the Agency. Additional development traditionally leads to additional fires. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the Agency to this hazard. With adherence to development standards, future losses to new development should be minimal.

The Agency will take wildfire into account when siting new facilities. Fire hydrants, defensible space, well production, water storage, and distribution should all be considered when assessing future development. New facilities will be built to the most current California Building standards for wildfire.

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the Agency would place additional assets at risk to wildfire. However, Agency building codes are in effect and should continue to be updated as appropriate to reduce future impacts. The Agency's SFWPA Project 2088 is in areas affected by wildfire. Additionally, the Power Project heavily subsidizes water rates, and therefore anything that happened at the top of the system (and potentially inducing cascading failure through the system) would have a catastrophic economic impact to the Agency by modifying/losing maximum power generation capabilities.

H.5 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

H.5.1. Regulatory Mitigation Capabilities

Table H-10 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the SFWPA.

Note: The Agency does not have the authority to regulate land use and development within its jurisdiction. Authority for promulgating and enforcing zoning, land use, and development requirements falls to counties and incorporated communities. As such development within the Agency’s jurisdictional boundaries will conform to the zoning and land use development ordinances and building codes of the county or incorporated community in which the Agency is located.

Table H-10 SFWPA’s Regulatory Mitigation Capabilities

Plans	In Place Y/N	Does the plan address hazards? Can the plan be used to carry out mitigation actions? When was it last updated??
Capital Improvements Plan	Y	Available funds are distributed for operational upgrades that vary from IT to Safety Equipment
Climate Change Adaptation Plan		
Community Wildfire Protection Plan	N	
Comprehensive/Master Plan	Y	General Operational Guidelines that support both Power and Water Divisions
Continuity of Operations Plan	Y	Miners Ranch Treatment Plant and the Water Division for domestic water distribution
Economic Development Plan	N	
Land Use Plan		
Local Emergency Operations Plan	Y	Emergency Action Plans are written for both Water and Power Divisions
Stormwater Management Plan	N	
Transportation Plan	N	
Other (describe)		
		Is the ordinance an effective way to reduce hazard impacts?
Land Use Planning and Ordinances	Y/N	Is the ordinance adequately administered and enforced?
Acquisition of land for open space and public recreation use	N	Plumas County
Building code	N	Plumas County
Flood insurance rate maps	N	Plumas County
Floodplain ordinance	N	Plumas County
Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	N	Plumas County
Subdivision ordinance	N	Plumas County

Zoning ordinance	N	Plumas County
Other		
How can these capabilities be expanded and improved to reduce risk?		
Continue to monitor various grants opportunities available to improve dam infrastructure.		

Source: SFWPA

Language in the Plumas County Municipal Code Regarding SFWPA

CHAPTER 2. - OROVILLE-WYANDOTTE IRRIGATION DISTRICT WATERS AND LANDS

Sec. 10-2.01. - Project area.

The water surface of any lake owned by the Oroville-Wyandotte Irrigation District and lying within the County and any portion of land owned by the Oroville-Wyandotte Irrigation District and inundated by such reservoir surface lying within the County shall be subject to the provisions of this chapter. This chapter shall further apply to any land owned by the Oroville-Wyandotte Irrigation District located within the boundaries of the Federal Power Commission License for the South Fork Project, Federal Power Commission License No. 2088, and located in the County. All of such area is referred to in this chapter as the "project area". (§ 1, Ord. 78-268, eff. June 6, 1978)

H.5.2. Administrative/Technical Mitigation Capabilities

Table H-11 identifies the Agency department(s) responsible for activities related to mitigation and loss prevention in the SFWPA.

Table H-11 SFWPA's Administrative and Technical Mitigation Capabilities

Administration	In Place Y/N	Describe capability Is coordination effective?
Staff		Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	N	Plumas County
Civil Engineer, including dam and levee safety	Y	Power Division Manager, Chief Dam Safety Engineer, Chief Dam Safety Coordinator
Community Planner	N	Plumas County
Emergency Manager	Y	Power Division Manager, Chief Dam Safety Engineer, Emergency Action Plan Coordinator
Floodplain Administrator	N	Plumas County
GIS Coordinator	N	Plumas County
Planning Commission	N	Plumas County
Other		

Technical	Y/N	Has capability been used to assess/mitigate risk in the past?
Grant writing	N	
Hazard data and information	N	
GIS analysis		
Mutual aid agreements	Y	Plumas County
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The agency would continue to promote our e-mail system and provide the customers that sign-up with the most current and accurate information possible, especially in the event of an emergency or outage. Again, continue to grow the coordination of efforts with other local jurisdictions.		

Source: SFWPA

H.5.3. Fiscal Mitigation Capabilities

Table H-12 identifies financial tools or resources that the Agency could potentially use to help fund mitigation activities. ***Prefilled this table from the SFWPA Butte Annex and swapped out County language. Check over the entire table, including the last cell.***

Table H-12 SFWPA's Fiscal Mitigation Capabilities

Funding Resource	In Place Y/N	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Infrastructure Upgrades for both Water and Power Divisions
Community Development Block Grant	N	
Federal funding programs (non-FEMA)	Y	Reviewing all available options for grant funding to increase water service capabilities
Fees for water, sewer, gas, or electric services	Y	Operational expenses to provide domestic and irrigation water to customers
Impact fees for new development	Y	System Capacity Fees
State funding programs	Y	Reviewing all available options for grant funding to increase water service capabilities
Stormwater utility fee	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Continue to apply for various grants to improve infrastructure and better serve our customer base. Projects would also include limiting risks to our agency assets that would potentially cause an outage to our customer base.		

Source: SFWPA

H.5.4. Mitigation Education, Outreach, and Partnerships

Table H-13 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table H-13 SFWPA's Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters		
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)		
Local news		
Organizations that interact with underserved and vulnerable communities		
Social media		
Other	Yes	The Agency website includes Dam Safety content with public safety materials specific to the SFPP for viewing and printing. The Agency maintains a Public Safety Plan specific to the SFPP assets.
How can these capabilities be expanded and improved to reduce risk?		
The Agency will continue to provide Dam Safety content to the public on the website, at monthly Board of Directors meetings, and through enhanced safety signage throughout the Project.		

Source: SFWPA

H.5.5. Other Mitigation Efforts

The Agency has many other completed or ongoing mitigation projects/efforts that include the following:

- Emergency Action Plans, Hazardous Waste Plans, Environmental Studies, and Security plans are maintained and updated as needed by the Agency.

H.6 Mitigation Strategy

H.6.1. Mitigation Goals and Objectives

The SFWPA adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

H.6.2. NFIP Mitigation Strategy

The Agency does not participate in the NFIP, as it is not an eligible participant. Many of the Agency's projects work to reduce impacts from flooding thus furthering the objectives of the NFIP.

H.6.3. Mitigation Actions

The Planning Team for the SFWPA identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, , and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning based on criteria detailed in Chapter 5:

- Climate Change
- Dam Failure
- Earthquake
- Landslide, Mudslide, and Debris Flow
- Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)
- Wildfire (w/smoke and air quality)

Non-priority hazards for mitigation planning include:

- Agricultural Hazards (Severe Weather/Pests/Invasive Species)
- Drought & Water shortage
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Hazardous Materials Transport
- Severe Weather: Extreme Cold, Freeze, and Snow (w/avalanche)
- Severe Weather: Extreme Heat
- Severe Weather: High Winds and Tornado
- Volcano

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the countywide public outreach action, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority. Collectively, this LHMP's multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Mitigation Actions

Action 1. Little Grass Valley Dam Spillway Northern Slope Stabilization and Rockfall Protection Project

Hazards Addressed: Climate Change, Dam Failure, Landslide, Mudslide, and Debris Flow, Heavy Rains and Storms, Earthquake, Wildfire

Issue/Background (Problem Statement): The spillway at Little Grass Valley Dam was constructed by excavation of volcanic rock material of intrinsically high specimen strength. The mass strength properties of the rock is fundamentally degraded by preexisting, adversely oriented, persistent, intersecting planar rock defects – joints and sheer surfaces oriented adversely with respect to the exposed face of the spillway and road. The spillway is at risk from landslide, heavy rains and storms, earthquake, and wildfires (exacerbated by climate change), as each can cause:

1. Rockfall into spillway damaging spillway gates trunnion arm, allowing for uncontrolled release of reservoir.
2. Rockfall and debris falls into the spillway and the blocking leads to overtopping of the dam, allowing for uncontrolled release of the reservoir.

These failure modes could potentially be initiated during a significant enough seismic or severe storm event.

Project Description: The Little Grass Valley Dam Slope Stabilization and Rockfall Protection Project will require further engineering review of recently completed geological assessments in order to determine the most appropriate mitigation strategies. South Feather Water & Power Agency is currently under contract to conduct further field investigations and develop fully engineered design plans and specifications. The purpose of the mitigation measures will be to reduce the risk of damage to the spillway structure due to rock fall events. Possible mitigation measures could include rock scaling, minor excavations, rock anchors and rock fall netting designed to conform to the existing slope face and reduce the risk of erosion and sediment accumulation within the spillway.

Other Alternatives: Other alternatives such as soil nails and/or shotcrete application are not being considered at this time due to cost.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The engineering review and project design is being funded out of the Agency's budget. The Agency will explore all options for funding to construct the mitigation project.

Responsible Office/Partners: South Feather Water & Power Agency

Benefits (Losses Avoided): The Little Grass Valley Dam Slope Stabilization and Rockfall Protection Project will prevent rockfall into the spillway that could damage spillway gates trunnion arm, allowing for uncontrolled release of reservoir, and/or prevent rockfall and debris into the spillway and creating damage or blockage leading to overtopping of the dam, allowing for uncontrolled release of the reservoir

Potential Funding (Local Budgets, Grant Funds, etc.): South Feather Water & Power Agency budgets. Any applicable and available grant opportunities will be explored.

Timeline: October 2025 through January 2030

Project Priority (High, Medium, Low): Medium