Annex E Indian Valley Community Services District

E.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Indian Valley Community Services District (IVSCD or District), 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 District. This Annex provides information specific to the IVCSD, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this jurisdiction.

E.2 Planning Process

As described above, the IVCSD 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 District 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 E-1. Additional details on Plan participation and District representatives are included in Appendix A. FILL OUT TABLE WITH WHO PARTICIPATED AND HOW.

Table E-1 IVCSD – Planning Team

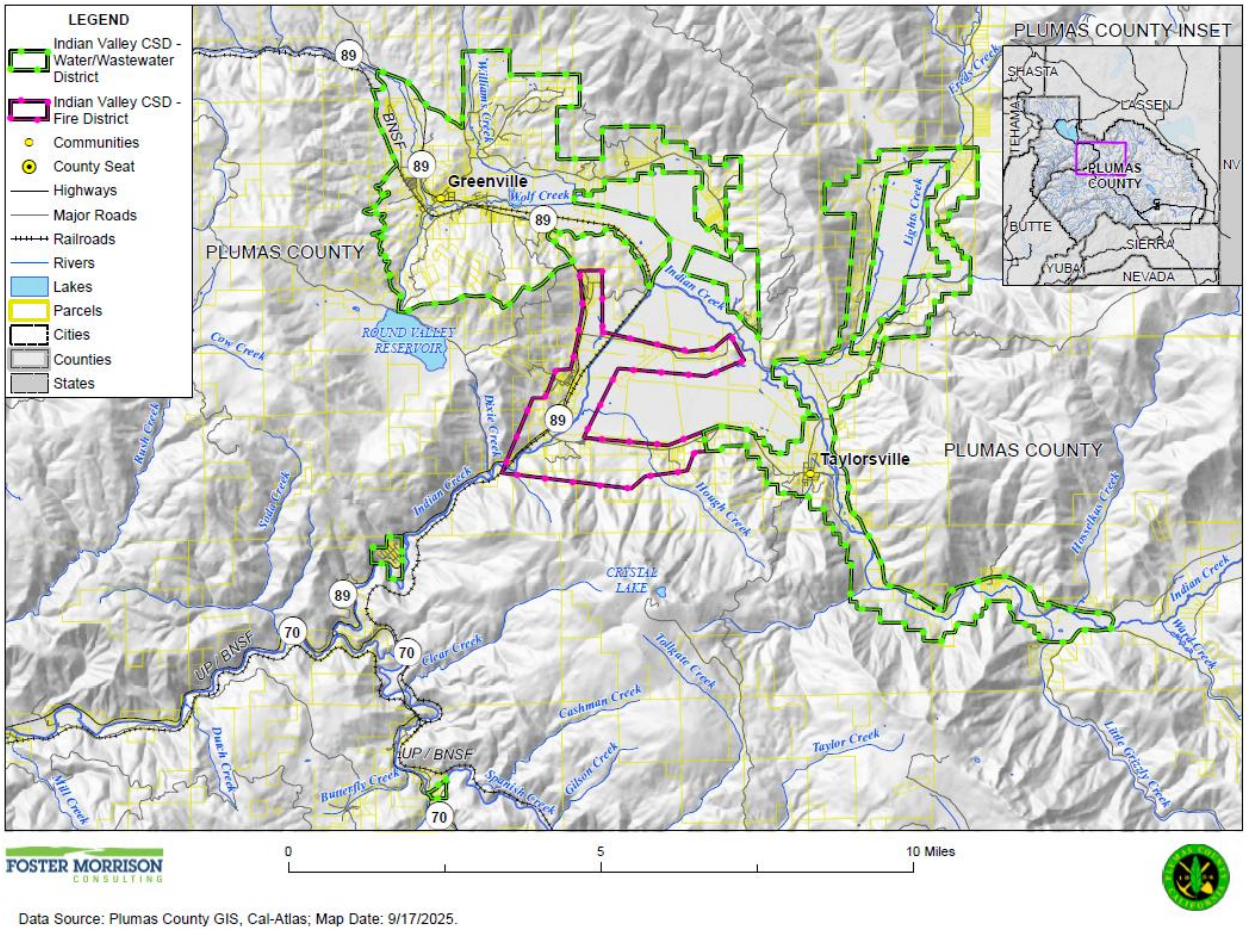
Name	Position/Title	How Participated
Jamie Little	Interim GM	Planning and coordination.
Charles Slagter	Operations Manager	Provided historical information.
Bob Orange	Previous fire chief and current community member	Provided historical information.

Source: IVCSD

E.3 District Profile

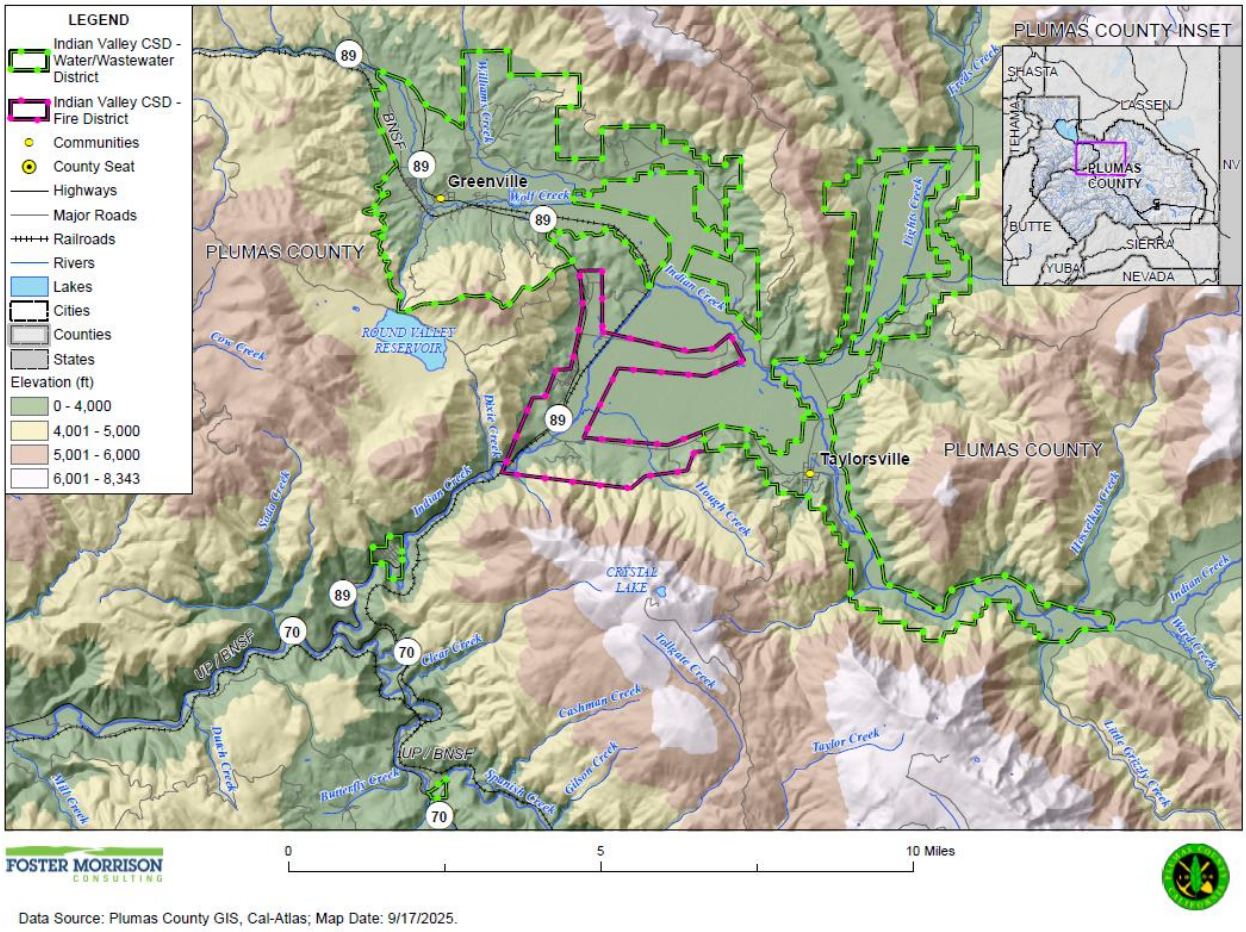
The community profile for the IVCSD is detailed in the following sections. Figure E-1 shows the location of the District in the County, as well as the parcels inside the District. This map shows both the Fire District and the Water/Wastewater District. Figure E-2 displays a District map and the elevations of IVCSD and the surrounding area.

Figure E-1 IVCSD – Parcel Map



Data Source: Plumas County GIS, Cal-Atlas; Map Date: 9/17/2025.

Figure E-2 IVCSD Elevation Map



Data Source: Plumas County GIS, Cal-Atlas; Map Date: 9/17/2025.

E.3.1. Overview and Background

Indian Valley Community Services District (IVCSD) was formed in 1993 after a reorganization of Greenville Community Services District, Taylorsville Fire Protection District and Taylorsville County Service Area into a single district. The formation resolution does not identify which services the newly formed district is authorized to provide. The District continued providing services that were offered by its predecessor agencies.

The principal act that governs the District is the State of California Community Services District Law. CSDs may potentially provide a wide array of services, including water supply, wastewater, solid waste, police and fire protection, street lighting and landscaping; airport, recreation and parks; mosquito abatement, library services; street maintenance and drainage services; ambulance service, utility undergrounding, transportation, abate graffiti, flood protection, weed abatement, hydroelectric power, among various other services.

IVCSD is located in the middle of northern Plumas County and encompasses the communities of Greenville, Crescent Mills, and Taylorsville. The nearest providers of similar services are Crescent Mills Fire Protection District and Indian Valley Parks and Recreation District, both of which IVCSD overlaps.

IVCSD provides retail water, fire protection, emergency medical, lighting, park and recreation, and wastewater treatment and collection services. Additionally, the District provides contract general manager services to the Indian Valley Ambulance Service Association through a joint powers agreement.

The District covers an area of approximately 18.6 square miles and has undergone five annexations since its formation. The latest annexation, in 1999, expanded the District to include the North Valley and Diamond Mountain areas.

E.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 IVCSD 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 District'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 District Profile above, a risk assessment was performed for the District. This includes the following sections:

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

E.4.1. Assets Inventory and Growth and Development Trends

This section provides an inventory of the IVCSD'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 IVCSD'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 District, potentially at risk to identified hazards as discussed in Section E.4.3 Hazard Profiles and Vulnerability to Specific Hazards.
- **Growth and Development Trends** – A discussion of growth and development trends in the District, both current and future, is presented.

Assets Inventory

The District'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 E.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 in the District include both District staff and workers as well as those populations located within District boundaries and are served by the District. This section includes an inventory of past and current populations of the District and also discusses vulnerable populations and underserved communities as a subsection of people and populations located within the District and potentially at risk to hazards. Information from the District 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 District. Due to the Dixie Fire in 2021, staffing levels dropped from 15 volunteers to 10 as a result of the destruction of homes and loss of jobs. Over the past three years, however, the number of volunteers has doubled to 20, including a paid part-time Chief. Along with this, IVCSD employs 9 people and contracts 1 general manager. In addition to District staff, the District provides services to around 1,600 residents.

The District did note that there are vulnerable and underserved populations in the District. For elderly and disabled residents, limited mobility raises challenges during evacuation. Hazards disrupt local supportive services for elderly, disabled, and low-income residents that they depend on. There are programs that provide resources during disasters but connectivity and isolation can prevent access. Mental and emotional health can be severely affected by a disaster and the stress of starting over for an elderly person can be immense. Low income and under employed residents face significant barriers to recovery after a disaster especially if many rental properties are destroyed. Many low-income residents lack the resources to secure new housing or replace belongings. Residents with limited resources may find it overwhelming to navigate the complex process of applying for disaster aid. Affordable housing options may become sparse due to a disaster.

The California Department of Water Resources (DWR) has developed a mapping tool to assist in determining which communities meet the disadvantaged community's median household income definition. DWR is not bound by the same law as the Plumas County Local Area Formation Commission (LAFCO) to define communities with a minimum threshold of 12 or more registered voters. Because income information is not available for this level of analysis, disadvantaged unincorporated communities with smaller populations that meet LAFCO's definition cannot be identified at this time. The DWR Mapping Tool is an interactive map application that allows users to overlay the following three US Census geographies as separate data layers—Census Place, Census Tract, and Census Block Group. The specific dataset used in the tool is the US Census American Community Survey Five-Year Data: 2016 - 2020. Only

those census geographies that meet the disadvantaged community (DAC) definition are shown on the map (i.e., only those with an annual median household income (MHI) that is less than 80 percent of the Statewide annual MHI). The statewide MHI for 2017-2021, according to Census Bureau data, is estimated at $84,097, and hence, the calculated threshold of $67,277 defines whether a community was identified as disadvantaged. Per the DWR Mapping Tool, the entirety of the IVCSD fire service area is considered a disadvantaged community.

Structures and Critical Facilities

This section considers the IVCSD's assets at risk, with a focus on key District assets such as critical facilities and infrastructure, and other District assets and their values. With respect to District 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 E-2 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. IVCSD's physical assets, valued at over $2.1 million, consist of structures and infrastructure to support the District's operations.

Table E-2 IVCSD Critical Facilities and Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Hazard Info
Water Plant (building only) Crescent Mills	Water	$29,247	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Water Plant Equipment Crescent Mills	Water	$93,589	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Storage tank	Water	$292,465	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
pumphouse	Water	$12,869	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Water treatment & equipment Greenville	Water	$250,000	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Concession stand & contents	Park	$35,096	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure

Name of Asset	Facility Type	Replacement Value	Hazard Info
Softball facility restrooms	Park	$52,000	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Community park	Park	$104,000	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Pump Station Greenville	Water	$81,890	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Pump station Greenville	Water	$70,192	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Lift station	Sewer	$87,740	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Leach field equipment	Sewer	$35,096	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Pool facility & contents	Park	$108,679	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Triangle park-small seating	Park	$4,679	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Sewer pond equipment	Sewer	$9,359	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Sewer pond equipment	Sewer	$23,397	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Lift station #1 Greenville	Sewer	$29,247	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Lift station #2 Greenville	Sewer	$40,945	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Lift station #3	Sewer	$29,247	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Office contents	Water/Sewer/Park	$11,699	Fire, earthquake, flood, landslide, mudslide debris flow
Water tank Greenville	Water	$100,000	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Round Valley Dam	Water	$100,000	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure

Name of Asset	Facility Type	Replacement Value	Hazard Info
APN 110330007 Greenville	Vacant lot	$0	Fire, earthquake, flood, landslide, mudslide debris flow
4290 Nelson Street Taylorsville	Fire Station	$391,537	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
6344 North Arm Road Taylorsville	North Arm Fire Station	$55,189	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
5497 Fir Fork Genesee	Genesee Fire Station	$58,803	Fire, earthquake, flood, landslide, mudslide debris flow, dam failure
Total		**$2,106,965.00**	

Source: IVCSD

Community Lifelines

Assessing the vulnerability of the IVCSD 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 District'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 District. As such, specific information on these community lifelines in the District 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 IVCSD 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

IVCSD has a variety of natural resources of value to the District. Specifically, there are critical water resources, abundant timber, and mineral deposits such as gold, limestone, copper, silver and iron within the boundaries of the District. These natural resources parallel that of Plumas County as a whole. Information can be found in Section 4.2.1 of the Base Plan.

Historic and Cultural Resources

IVCSD has a variety of historic and cultural resources of value to the District. Specifically, Ancient trails, archaeological sites, ceremonial & story sites, as well as Maidu artifacts 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.

Economic Assets and Community Activities of Value

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

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 District.

Community Activities of Value

Inventorying economic assets in the District 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 District.

Growth and Development Trends

As part of the planning process, the District 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

The Dixie Fire has led residents in various communities to mandatory evacuations and displacement of residents. Many have had to relocate to safer areas temporarily or permanently, impacting local population numbers and demographics. Communities within the CMFPD and IVCSD fire and EMS service boundaries, such as the town of Greenville and Indian Falls, are part of the communities that were forced to migrate. Therefore, the area may see minimal growth in the coming years, depending on the pace of recovery, housing availability, and economic opportunities.

Additionally, the Department of Finance (DOF) projects a 30 percent decline in Plumas County's population from 2024 (18,593) to 2060 (13,025). This represents an average annual growth rate (AAGR) of negative one percent, indicating an approximate one percent annual population decline from 2024 through 2060.

Future Development Areas

It is important to review future development plans for the District. 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. The economy in the area has been reshaped by

the Dixie Fire. The economic future largely depends on rebuilding efforts, tourism, and recreation. The District is are currently rebuilding the Greenville fire station. This is being done after the station was destroyed in the 2021 Dixie Fire. The new facility will be both and IVCSD Fire Station and a County Sheriff Substation. The District has no control over where future development occurs, it reacts to the development by providing increase (or decreased) services.

E.4.2. Hazard Identification

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

Those hazards identified as a high or medium significance in Table E-3 are considered priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact in the District were determined to be of low significance and not considered a priority hazard to the District. 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 District to focus resources where they are most needed.

Table E-3 IVCSD—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards (severe weather/pests/invasive species)	Extensive	Highly Likely	Limited	Low	Medium
Climate Change	Extensive	Likely	Critical	Low	–
Dam Failure	Extensive	Occasional	Critical	High	Medium
Drought & Water shortage (w/ tree mortality)	Extensive	Likely	Limited	Medium	High
Earthquake (w/subhazards)	Extensive	Likely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance (w/ levee failure)	Significant	Occasional	Catastrophic	High	Medium
Floods: Localized Stormwater	Significant	Highly Likely	Limited	Medium	Medium
Hazardous Materials Transport	Significant	Occasional	Critical	Low	–
Landslide, Mudslide, Debris Flow	Significant	Likely	Limited	High	Medium
Severe Weather: Extreme Cold, Freeze, and Snow	Extensive	Likely	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Negligible	Low	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Limited	Low	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Occasional	Limited	Medium	Medium
Volcano	Extensive	Unlikely	Catastrophic	Low	Low
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 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
Limited: 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
Negligible: 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

Significance
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Climate Change Influence
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

E.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 IVCSD (as identified in the Significance column of Table E-3). This section focuses on where and how the District 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 District 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. NCDC events are also discussed. Other past occurrences data specific to the District follow the disaster declarations and NCDC 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 District 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 District provided information on how the District 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 E.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 E.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 District, 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 District 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 District noted that there have been no Power Outages, including those associated with PSPS events, that have affected them.

Dam Failure

Likelihood of Future Occurrence–Occasional
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.

Bidwell Lake Dam impounds Round Valley Reservoir in Greenville, CA (Plumas County). It is owned by the Indian Valley Community Services District. The earthen dam was built in 1865. The dam is 325 feet long and 35 feet high. It impounds 5975 acre feet of water. It was repaired in 2018 as a result of the 2017 January-February flood event. The reservoir is used as the backup water system for the residents of the community of Greenville. The water from Bidwell Dam flows into North Creek, then Wolf Creek, then Indian Creek, and then the Feather River.

The spillway consists of two concrete walls that direct water over the crest of a concrete monolith built into bedrock. The spillway toe is 11.5 feet below its crest. The spillway flashboards are 20 inches long and aligned at an angle from the vertical plane. A valve in the spillway can be used to release water. The spillway capacity is estimated to be approximately 3,000 cfs when the water level in the reservoir is at the dam crest and the flashboards are not installed. There are no other outlets. The downstream channel capacity is approximately 257 cfs.

Per DSOD, there are no critical appurtenant structures. There are no upstream or downstream dams.

If the dam were to fail, the flood waters would follow Wolf Creek downhill to the city of Greenville, arriving in 30 minutes. The waters would spread out over the city and the downstream agricultural land at depths of mostly less than 5 feet. Within Greenville, the two schools and the Feather River Hospital would be inundated. Highway 89 would be flooded at two points

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 IVCSD are shown on Figure E-3. This includes 3 high hazard dams: Antelope, Bidwell Lake (owned by ICCSD), and Silver Lake.

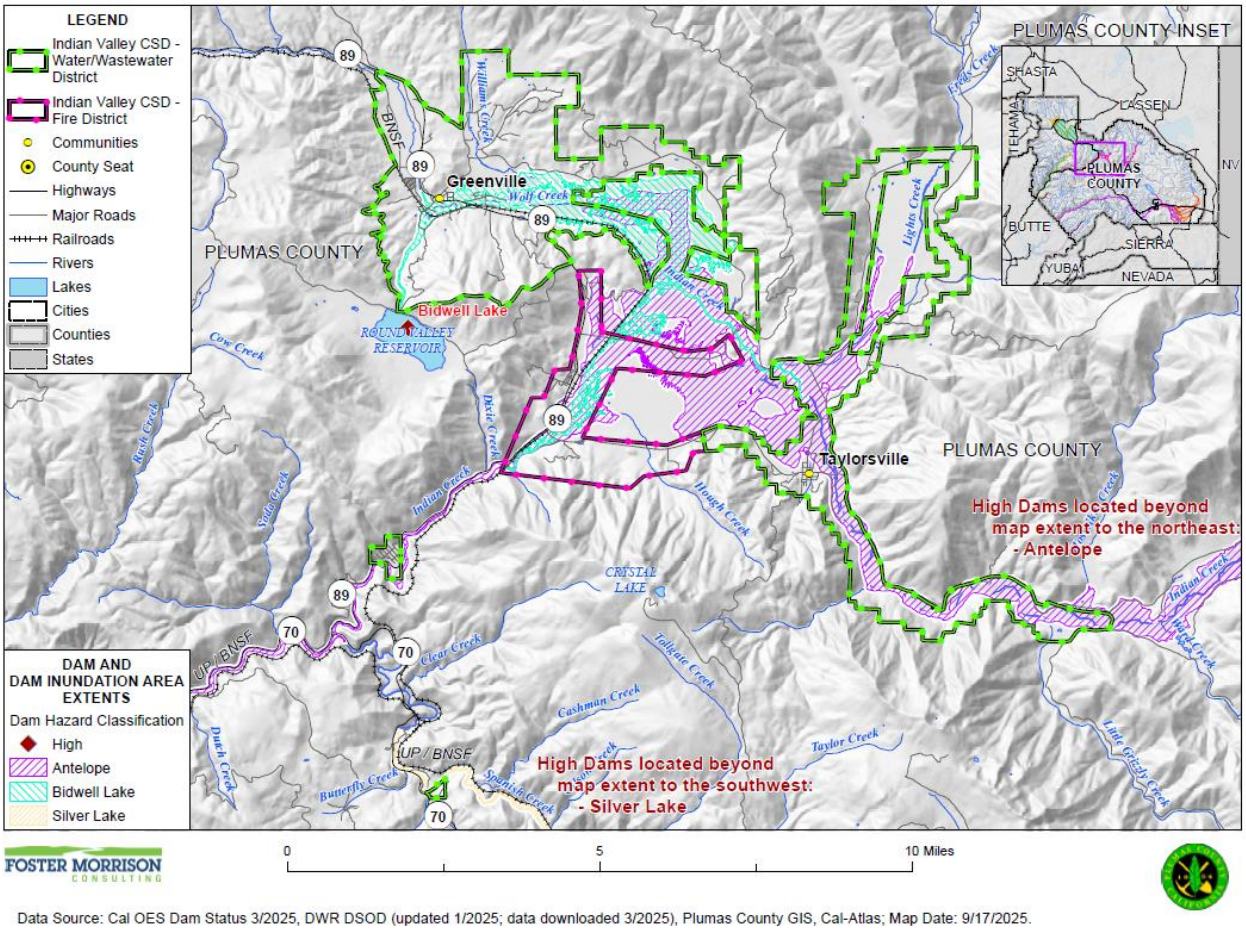
Note: There are no extremely high hazard dams that intersect the District. As such, no maps or tabular analysis is provide below.

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 District 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 E-3, as well as in Table E-4 for both the Fire District and the Water/Wastewater District.

Figure E-3 IVCSD – 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: 9/17/2025.

Table E-4 IVCSD – Dam Inundation Areas Geographical Extents

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Fire District						
Antelope	1,104	6%	188	3%	916	8%
Bidwell Lake	231	1%	50	1%	181	2%
Water/Wastewater District						
Antelope	1,951	13%	696	15%	1,254	13%
Bidwell Lake	1,227	8%	229	5%	998	10%
Silver Lake	2	0.02%	2	0.05%	-	0%

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.

IVCSD Events

There have been no past dam failure events in the District since its inception. There was an event in 2017 where the dam and reservoir were impacted. A FEMA grant helped to pay for repairs. That grant application noted that during the declared incident period, February 1 through 23, 2017, Plumas County, CA, experienced severe rainstorms and flooding. As a direct result of the incident, some of the large rocks from the IVCSD Bidwell Dam Round Valley Reservoir Spillway were washed out and a portion of the existing 4-in. HDPE water pipe (300 ft. long) was damaged.

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 District 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 in Plumas County and the District.

Vulnerability to Dam Failure

The vulnerability of the District 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 District's Assets at Risk to this hazard.

Local Concerns

The District 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.

Dam failure is the foremost concern for the District. The Round Valley Reservoir is impounded by Bidwell Lake dam. The District owns this dam. There are concerns regarding earthquakes causing an already weak and aging dam to fail. There are additional concerns about the dam failing due to the age and condition of the dam. In the event of a dam failure, the community of Greenville could face significant flooding and catastrophic casualties. To mitigate this hazard, the District either needs to repair or rebuild this dam and make sure it is retrofitted and upgraded.

The Indian Valley Community Service District was critically impacted by the 2021 Dixie Fire. The building that housed their physical records of the dam was destroyed. The District also experienced staff turnover in the subsequent years, resulting in the loss of institutional knowledge.

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 District staff and District 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 unhoused, those with limited mobility, and those that lack the resources to leave the area.

The District's ability to operate may be compromised during an event limiting their ability to provide services to the populations in their service area. For example, water and wastewater services may be cut off during and after an event until the District can get systems functioning and back on line.

Structures and Critical Facilities and Infrastructure

Many structures and critical facilities and infrastructure in the District have some measure of risk to dam failure. Dam failure flooding can affect the built environment of the District. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to totally inundated. The District noted that the dam as well as most of the assets on Table E-2 would be at risk to dam failure.

Natural, Historic, and Cultural Resources

A major dam failure event and associated flooding could have a devastating impact on the District. 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 District 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. Additionally, mass evacuations may be necessary and compounded by impacts to transportation systems and infrastructure. Economic losses to the District 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 District 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 District include the following:

- Climate change is likely to exacerbate future rain and storm conditions and associated impacts and vulnerability of the District to dam failure.
- Population projections for the area served by the District show the population to be shrinking, which limits additional impacts to the District. The District may add staff, but this number would be small. Additional growth within the dam inundation areas of the District would place additional populations at risk to dam failure. The District 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 District to this hazard.

Future Development

Future dam failure events may occur in the District. Although new growth and development may fall in the area flooded by a dam failure, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area may continue to occur.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile

Drought and water shortage are complex issues involving many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water supply is the most significant issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. Drought has also affected tree mortality in the area in the past. As the population in the area continues to grow, so will the demand for water.

Tree Mortality and Drought

One of the secondary hazards of drought in the Plumas County Planning Area, that can also affect IVCSD, is the increased risk to trees from beetle kill and other insects, pathogens and parasites, and other tree mortality and die back issues. Drought weakens trees and makes them more susceptible to insect infestation and other pathogens. Insects, such as bark beetles and others, frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. These insects and other pathogens can contribute to the decline and eventual death of trees throughout the District. The tree mortality and dieback problems are a high priority because of the issue of hazardous trees and an increased wildfire hazard. In addition to an increase in wildfire fuels, hazardous trees can fall onto structures causing damage and a result in a reduction on the tree canopy within the District that provides relief during extreme heat days.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the District and County is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme Drought
- D4 – Exceptional Drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time (which does not usually affect water shortages) or for longer periods (which may challenge water supplies). Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District are shown in Section 4.3.9 of the Base Plan.

Past Occurrences

Disaster Declaration History

There have been 2 state and 1 federal disaster declarations for Plumas County. This can be seen in Table E-5. Additionally, there have been 16 USDA Secretarial Disaster Declarations from drought in the County since 2012.

Table E-5 Plumas County –State and Federal Drought Disaster Declarations 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	2	1976, 2015	1	1977

Source: Cal OES, FEMA

NCDC Events

There have been 2 NCDC drought events in Plumas County since 1993. These most likely had some impact on the District.

IVCSD Events

Based on historical information, the occurrence of drought in California, including the IVCSD, is cyclical, driven by weather patterns. Section 4.3.9 of the Base Plan notes that five droughts have occurred in the past 86 years that likely affected the District. Drought has occurred in the past and will occur in the future.

Climate Change and Drought and Water Shortage

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

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The 2021 CAS (as well as the 2024 Draft CAS) stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that: California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.

A 2018 report from the Public Policy Institute of California noted that thousands of Californians – mostly in rural, small, disadvantaged communities – already face acute water scarcity, contaminated groundwater, or complete water loss. Climate change would make these effects worse.

Cal Adapt scenarios for modeled future drought scenarios were shown in Section 4.3.9 of the Base Plan.

Vulnerability to Drought and Water Shortage

Based on historical information, the occurrence of drought and water shortage in California, including the District, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of the IVCSD to drought may vary and include reduction in water supply, turf losses, impacts to natural resources, and an increase in dry fuels and tree dieback.

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

Local Concerns

The District 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.

Chief concerns are wildfire, water shortage and long-term ecosystem damage. Hazard mitigation measures can be implemented with extra water storage. There are significant number of large trees that were lost in recent drought years. This was primarily due to drought stress and the Dixie Fire. The economy in the area has been reshaped by the Dixie Fire. The economic future largely depends on rebuilding efforts, tourism, and recreation. Along with the cost of rebuilding, disasters disrupt the customer base. This impacts not only the rebuilding but also the replacement of aging infrastructure. These funding limitations are of high concern.

Ground water supply is source water for the Water District. The distribution system is fed by one main line into town from the treatment plant. Loss of electricity could affect redundancy to supply of maximum demands of system.

2019 Greenville Water System Planning Report noted that over recent years, the Greenville water system has struggled with efficiency in that the District only sells about 50% of the water that is produced. The 50% water loss is thought to be due to due to leaks io the distribution system and other inefficiencies such as meter inaccuracies.

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

The people and populations (both staff and those served by the District) of the District are not directly affected by general drought conditions; although, their turfed areas, trees, and other water dependent resources can all be affected. In extreme drought conditions, however, residents and other populations within the District may be vulnerable to drought and water shortage issues. Water quality can be impacted causing health problems, especially to vulnerable populations where access to clean water supplies can be more challenging. Water shortages can have an effect on all of the populations in the District, but often have a greater effect on the unhoused and other vulnerable populations that may be unable to access and afford clean drinking water during shortages. During periods of drought as the costs of water usage may increase, those who are economically disadvantaged may be unable to afford the increased costs of potable water.

Structures and Critical Facilities and Infrastructure

Most District structures, critical facilities, and infrastructure have a limited vulnerability to drought and water shortage. Should drought conditions be severe enough to cause water shortage reliability issues, some facilities and infrastructure may be affected. Water and wastewater systems (like those of the District) may be impacted during times of reduced water supply and need to employ contingencies to remain functional and fully operational. Other water dependent systems may also be adversely affected. Further, the secondary hazard of drought (increased potential for spread of urban fires and wildfire) can pose a significant risk to District facilities. Drought can also stress trees, causing die off. These trees may fall on critical infrastructure adjacent to them and impact power lines and other utilities.

The District noted that drought will likely no directly affect District facilities, but the District is concerned about drought increasing the wildfire hazard. All of the facilities listed in Table E-2 with wildfire as a concern would possibly be affected by drought exacerbated wildfire.

Natural, Historic, and Cultural Resources

Drought and water shortage can have a significant impact on natural resources. Water levels in reservoirs and lakes may be reduced and a loss of wetlands and coastal marsh areas may occur. Severe drought conditions can contribute to an increase in erosion of soils and lead to poor soil quality. Further, all of the trees in the District are at risk to drought impacts and a reduction in water supply. These trees provide a wealth of social and environmental benefits to District residents and visitors, from shade and beauty to air quality, carbon reduction and stormwater management. Drought can devastate crops and dry out pastures, dry out forests and critical habitat areas, and reduce food and water available for wildlife and livestock. Additionally, drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. It is unlikely that drought and water shortage would have a significant impact on historic and cultural resources in the District.

Impacts from Drought and Water Shortage

The vulnerability of the District to drought is District-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels. The potential for a reduction in water supply during drought conditions generally leads to both mandated and voluntary conservations measures during extended droughts. During these times, the costs of water can also increase. Also of concern, the increased dry fuels, fuel loads, and tree mortality events associated with drought conditions can result in an increased fire danger. In areas of extremely dry fuels, the intensity and speed of fires can be significant. Water supply and flows for fire suppression can also be an issue during extended droughts. Drought can also lead to tree die off within the District.

Other qualitative impacts associated with drought in the District are those related to water intensive activities such as municipal usage, tourism, and recreation use. With more precipitation likely falling as rain instead of snow in the Sierra's, and warmer temperatures causing decreased snowfall to melt faster and earlier, water supply is likely to become more unreliable. In addition, drought and water shortage is predicted to become more common. This means less water available for use over the long run, and additional challenges for water supply reliability, especially during periods of extended drought.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the hazard profile 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 IVCSD include the following:

- Climate change is likely to exacerbate future drought conditions and associated impacts and vulnerability of the District to drought and water shortage.
- Population projections for the area served by the District show the population to be shrinking, which limits additional impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- It is unknown how changes in land use and development will affect drought and water shortage in the District's Service Area. The District conducts water supply planning to ensure a continued water supply to address future drought conditions.

Future Development

The District has access to large quantities of water through its existing groundwater supplies. However, population growth in the District will add additional pressure to the District as a water company during periods of drought and water shortage.

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.

Location and Extent

Since earthquakes are regional events, the whole of the District is at risk to earthquake. The IVCSD, Plumas County, and surrounding areas have some level of risk from seismic and geologic hazards. Faults in and around the District are shown in Section 4.3.10 of the Base Plan. These include the Almanor Fault, Butt Creek Fault Zone, the Mohawk Valley 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 in the IVCSD.

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.

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 District 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 District fall within a low to moderate shake risk.

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.

IVCSD Events

As shown in the Base Plan, no disaster declarations have occurred in the County due to earthquake. The District did note an earthquake at Lake Almanor May 11, 2023, affected a large portion of Northern California. The immediate area near Lake Almanor experienced the highest intensity such as Greenville & Chester. The foothills, greater Sacramento area, Chico, Susanville, & Nevada county also felt shaking. In the District, there was no major structural damage reported. Roads were damaged. Businesses had minor damage to inventory such as inventory falling from shelves and breaking.

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 District has low to moderate seismic hazard potential. There is the potential for the District 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.

The whole of the District 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 District's Assets at Risk to this hazard.

Local Concerns

The District 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 District is concerned about a dam failure being caused by an earthquake. The District has substantial above ground infrastructure that is well built, but would be at risk to a large earthquake. In addition, the District has below ground piping that would be at risk from earthquakes. The District noted that it can help mitigate by integrating seismic resilience in infrastructure, retrofitting existing infrastructure, such as the dam at Round Valley Reservoir and ensuring the community and the district are prepared.

The District also has concerns about other cascading issues from earthquake such as earthquake-induced landslides, liquefaction, and wildfire risk. If these other events were to occur, the operational resilience of an already stressed district would cause delays in emergency responses, additional trauma to residents impacted, and increased uncertainty.

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 District staff and those residing in the District 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 District 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. The District noted (in Table E-2) that all District assets are at risk from 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 IVCSD staff,

residents, and visitors. Other impacts to the District 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 District 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 District 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 IVCSD 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 District show the population to be shrinking, which limits additional impacts to the District. The District may add staff, but this number would be small. The District 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 District are expected to be limited in the near future and thus are not likely to affect earthquake and associated impacts to the District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District 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 District enforces the California Building Code, which mandates construction techniques that minimize seismic hazards. Future development in the District is subject to these building codes and land use planning.

Flood: 1%/0.2% Annual Chance (w/Levee Failure)

Likelihood of Future Occurrence–Occasional (1%)/Unlikely (0.2%)
Vulnerability–High

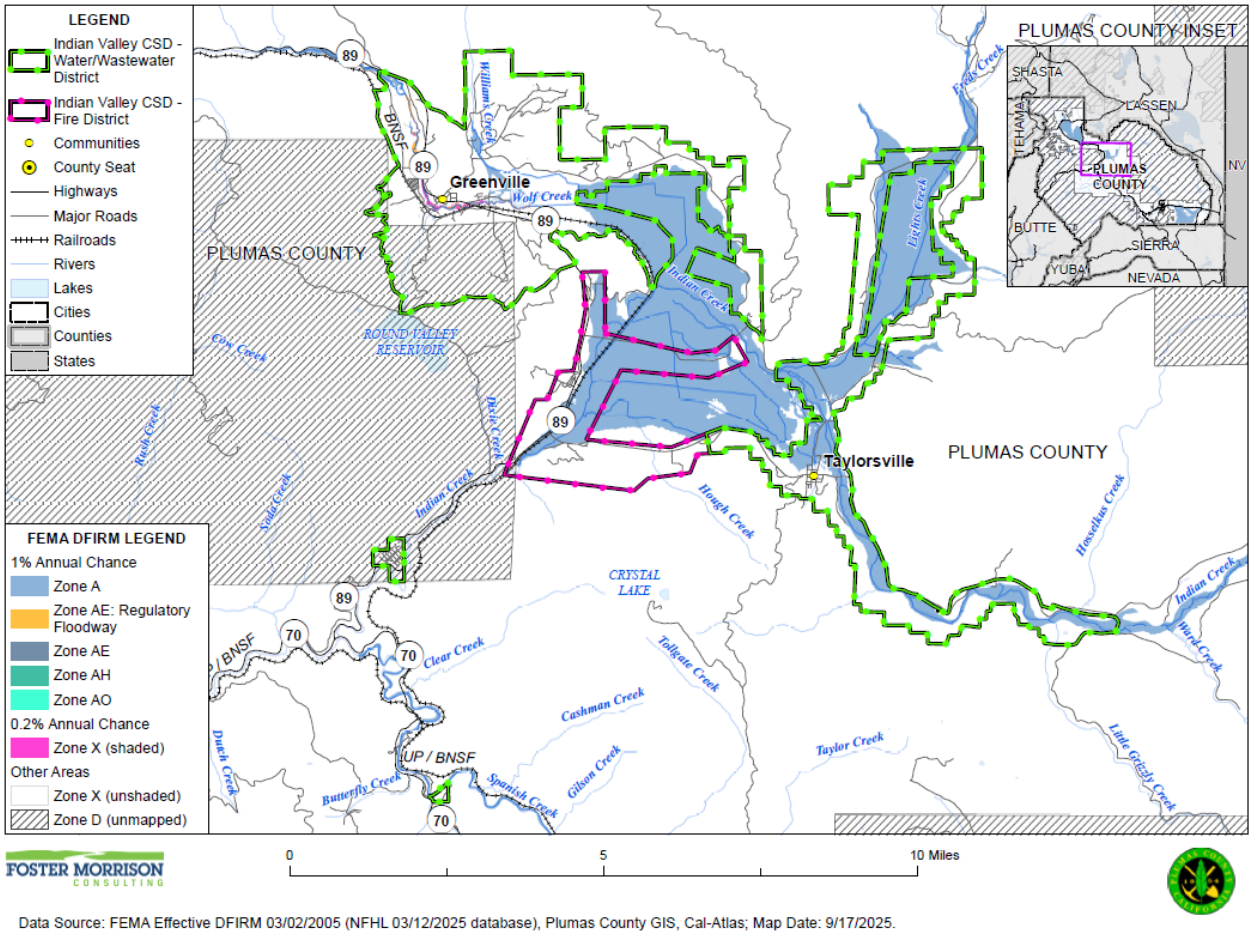
Hazard Profile

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the District and have caused damage in the past. Flooding can be a significant problem in the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the District swell with heavy rainfall and snowmelt runoff. The District has also been at risk during atmospheric river flood events. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures (like levees) located throughout the Plumas County Planning Area and the IVCSD. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% annual chance floodplains and in other localized areas in the District. Levee failure flooding is also an issue in the District (though a minor one).

Location and Extent

The IVCSD has areas located in the 1% annual chance flood zone. This is seen in Figure E-4. The District also has a small area that is protected by a levee (though the levee is not certified by FEMA as protecting against the 1% annual chance flood). This can be seen in Figure E-5.

Figure E-4 IVCSD – FEMA DFIRM Flood Zones



Data Source: FEMA Effective DFIRM 03/02/2005 (NFHL 03/12/2025 database), Plumas County GIS, Cal-Atlas; Map Date: 9/17/2025.

Figure E-5 IVCSD – FEMA DFIRM Flood Zones with Leveed Area Inset Map

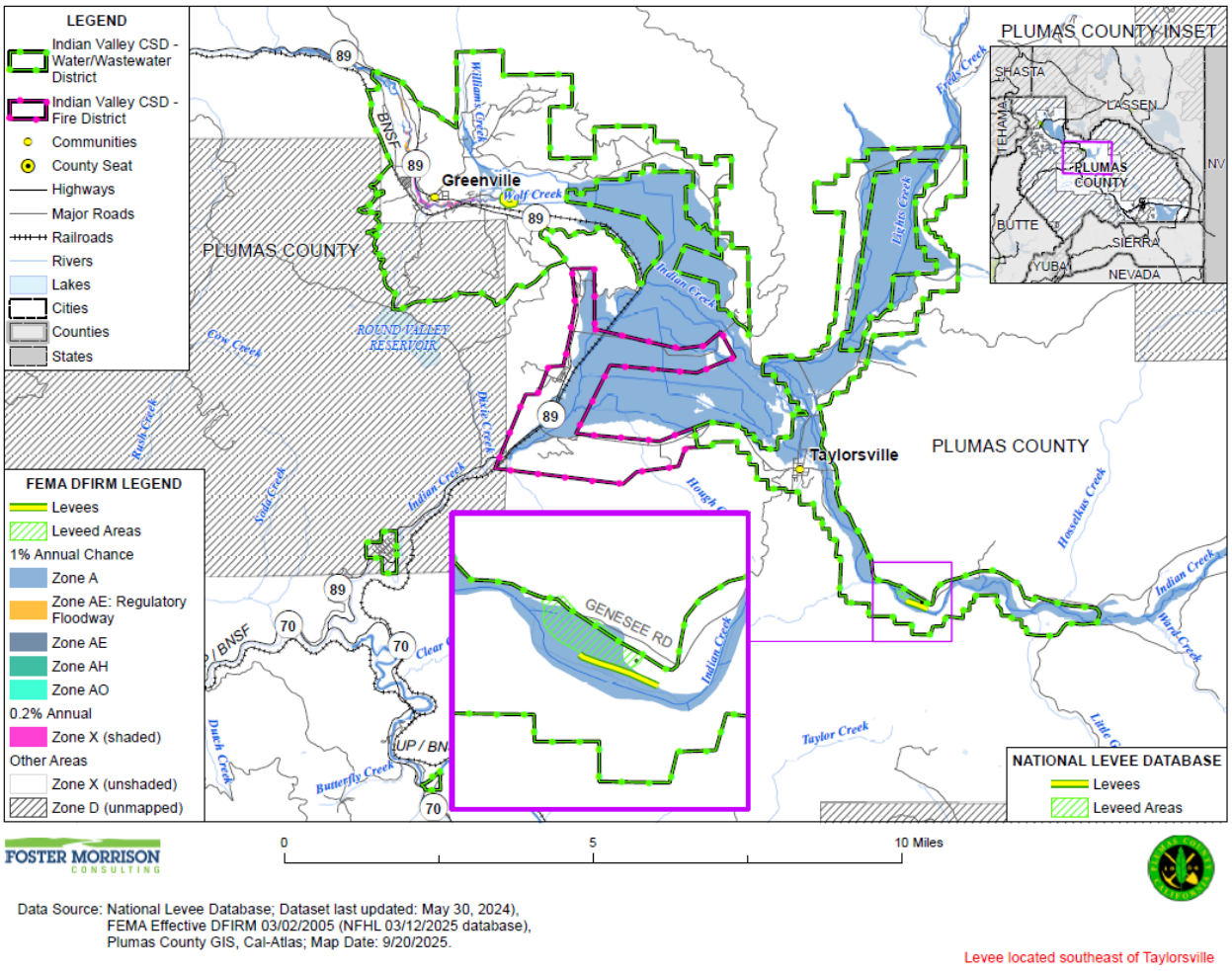


Table E-6 details the DFIRM mapped flood zones located within the District.

Table E-6 IVCSD – DFIRM Flood Hazard Zones

Flood Zone	Description	Present in District
A	1% annual chance flooding: No base flood elevations provided	X
AE	1% annual chance flooding: Base flood elevations provided	
AE Regulatory Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	
AH	1% annual chance flood areas of shallow flooding between one to three feet deep. Regulatory floodway; Base flood elevations provided	
Shaded X	0.2% annual chance flooding: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	X
Zone D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted.	X

Flood Zone	Description	Present in District
X (unshaded)	Area of minimal flood hazard	X

Source: FEMA DFIRM 03/02/2005

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the District vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the District tend to be short to medium term, until either the storm drainage system can catch up or flood waters move downstream. Flooding in the District tends to have a shorter speed of onset, due to the amount of water that flows through the District.

Geographical flood extents for the District from the FEMA DFIRMs are shown in Table E-7.

Table E-7 IVCSD – Geographical DFIRM Flood Zone Extents

Jurisdiction/ Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Fire District						
1% Annual Chance Flood Hazard	1,319	8%	254	5%	1,065	9%
0.2% Annual Chance Flood Hazard	0	0%	0	0%	0	0%
Other Areas	1,639	9%	565	10%	1,074	9%
Total	**2,958**	**17%**	**819**	**15%**	**2,139**	**18%**
Water/Wastewater District						
1% Annual Chance Flood Hazard	3,287	19%	1,360	25%	1,927	16%
0.2% Annual Chance Flood Hazard	30	0.2%	5	0.1%	25	0.2%
Other Areas	11,247	64%	3,306	60%	7,941	66%
Total	**14,564**	**83%**	**4,671**	**85%**	**9,893**	**82%**
Grand Total	**17,522**	**100%**	**5,490**	**100%**	**12,032**	**100%**

Source: FEMA DFIRM 03/02/2005

Past Occurrences

Disaster Declaration History

A list of state and federal disaster declarations for Plumas County from flooding is shown on Table E-8. These events also likely affected the District to some degree.

Table E-8 Plumas County – State and Federal Disaster Declarations from Flood 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rain and storm)	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
*included a landslide component

NCDC Events

The NCDC tracks flooding events for the County. Events have been tracked for flooding since 1993. Plumas County has seen 15 events. Depending on the location, these events most likely had some impact on the District.

IVCSD Events

The District noted that the following events had affects or damages to the District:

January of 1997 – A flood and localized flood event occurred after rains on January 1,1997. This occurred throughout Plumas County, Feather River Watershed, Greenville, and the larger Central Valley. There was minimal property damage in the District. There was significant public infrastructure damage such as roads, bridges and culverts. Significant economic impact due to transportation disruptions and infrastructure damage. There was environmental & geological damage due to channels of local creeks and streams being significantly altered.

January 2017 – Plumas County experienced heavy rainfall and snowmelt during the incident period of January 3 - 12, 2017, which resulted in roadway flooding and washout, property flooding, and wastewater lift station damages. As a direct result of the storm, IVCSD sustained generator damages at two distinct lift stations. One lift station was part of the Greenville Sewer Wastewater system. The other station was part of the Taylorsville Sewer Wastewater facility. These damages were fixed using FEMA grant funds.

August 2020 – A heavy rain prompted a flash flood warning.

October 2021 – A bomb cyclone brought heavy rain to the region.

April 2023 – Spring snowmelt cased increased waterflow. The Indian Creek overflowed and various roads in the District became submerged.

Climate Change and Flood

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with flood. More information on future impacts to the District 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), climate change may affect flooding in California, the Plumas County Planning Area, and the IVCSD. 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 possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events. Reduced snowpack and increased number of intense rainfall events are likely to put additional pressure on water infrastructure which could increase the chance of flooding associated with breaches or failures of flood control structures such as levees and dams. Cal Adapt future precipitation projections were shown in Section 4.3.4.

Vulnerability to Flood: 1% and 0.2% Annual Chance

Floods have been a part of the District's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damage. Predominantly, the effects of 1% and 0.2% annual chance flooding are generally confined to areas near the waterways of the District. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat.

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

Local Concerns

The District 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.

If the dam fails from heavy rains and storms, chief concerns would be the likelihood of a catastrophic flash flood. The rapid inundation of Indian Valley, destruction of infrastructure, and significant risk to human life. The flash flooding risk is compounded by the areas current vulnerability following the Dixie Fire. The District is also concerned with rain on snow events, which can cause greater flooding in the District.

Along with dam failure, the District is concerned with aging infrastructure being affected by large flooding events. Also, cascading events such as wildfire burn areas increasing chance of floods & mudflow and existing flood maps may underestimate the risk of floods, especially with climate change possibly exacerbating weather events. The impact on property, residents, and various financial risks are of concern as well.

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 District staff and those in the Service Area) located in the 1% and 0.2% annual chance floodplains are at some risk to flooding. Certain vulnerable populations located within areas prone to flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

Populations served by the District can be 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. The District's ability to provide services to its populations during flood events is paramount.

Structures and Critical Facilities

Certain District structures are at risk of DFIRM flooding and primarily include those structures located within the 1% and 0.2% annual chance floodplains. All District assets listed in Table E-2 would be at risk to flooding.

Flooding presents a threat to both critical facilities and infrastructure, as well as community lifelines. Critical infrastructure plays an immensely important role in our communities. As previously noted, communities rely on roads, rail corridors, and related biking and pedestrian routes for transportation, and on water infrastructure for drinking water, wastewater service, and draining streets of rainwater. Damage to any one of these systems can threaten public safety, wreak havoc on daily life, impact properties far from flood zones, and result in economic impacts that cascade throughout California.

Natural, Historic, and Cultural Resources

Large flood events can affect natural, historic, and cultural resources. There are a number of ways floodwaters 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 levees 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 structures within the flooded 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 flood events. Any of these that fall in the flood zones shown on Figure E-4 would be vulnerable.

Impacts from Flood: 1% and 0.2% Annual Chance

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Large flood events, including those associated with 1% and 0.2% annual chance floods, can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. People may be swept away in floodwaters, causing injuries or deaths. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Direct impacts, such as drowning, can

be limited with adequate warning and public education about what to do during floods. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Structures can be damaged directly from floodwaters and can also be damaged from trees falling as a result of water-saturated soils. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services causing power outages. The interruption of power causes major problems and can result in the closure of governmental offices and community businesses. Roads can be damaged and closed, causing safety and evacuation issues.

Standing water can cause damage to crops, roads, foundations, and electrical circuits. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the hazard profile 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 IVCSD 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 District show the population to be shrinking, which limits additional impacts to the District. The District may add staff, but this number would be small. The District 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 District are expected to be limited in the near future and thus are not likely to affect flooding and associated impacts to the District. Some redevelopment of the areas of the District burned in the Dixie Fire may occur, but this will occur where previous development existed. Additional development traditionally leads to additional flooding. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future Development

Future development in the District may be built in the floodplain, as long as it conforms to the standards of the floodplain ordinance. The County enforces their floodplain management ordinance on areas inside the District. More detail on the specifics of the floodplain ordinance can be found in Section 4.4.1 of the Base Plan. New District facilities and assets will be sited in such a way as to reduce the risk from flooding to District structures.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance floodplains. Flooding may be from drainages not studied by FEMA, lack of or inadequate drainage infrastructure, or inadequate maintenance. Localized, stormwater flooding occurs throughout the District and the Plumas County Planning Area, especially during the rainy season from November through April. Prolonged heavy rainfall (including that from atmospheric river events) contributes to a large volume of runoff resulting in high peak flows of moderate duration.

Location and Extent

The IVCSD is subject to localized flooding throughout the District. This is discussed in Table E-9 below. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the District vary by location. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the District tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

Disaster Declaration History

There have been no state or federal disaster declarations specific to localized floods. There would most likely have been localized flood events during the 22 state and 19 federal disaster declarations for flood events, including heavy rains and storms, as shown in the previous 1%/0.2% annual chance flood section.

NCDC Events

The NCDC occurrences of localized flooding are included in the 1% and 0.2% annual chance flood hazard profile above where past flood events were noted. These include 15 flood related events for the entire County Planning Area reported since 1993.

IVCSD Events

Localized flooding occurs every year. The flooding of 1997 was the event that caused damages. This was discussed in the Past Occurrences section of the Flood: 1%/0.2% Annual Chance above.

Climate Change and Localized Flood

It is likely that climate change will increase the chance of future occurrence as well as future impacts from localized floods. Atmospheric river events, occurring in recent years, is thought to be attributed to climate change and reflect storms of greater volume and intensity. More information on future impacts to the District can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Even if average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the likelihood of overwhelming stormwater systems built to historical rainfall and storm averages. This makes localized flooding more likely.

Vulnerability to Localized Flood

Flood vulnerability and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the District during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially significant impacts to certain areas of the District. However, while flooding can cause significant impacts, depending on the duration and volume of precipitation and the drainage in any given area, many of the floods in the District are minor, localized flood events that are more of a nuisance than a disaster.

Many areas of the District are at some measure of vulnerability to localized flooding. An assessment of a community's vulnerability to localized flooding begins with an understanding of local exposure to localized flooding. This is included in the Local Concerns section below followed by a discussion of the District's Assets at Risk to this hazard.

Local Concerns

The District 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.

Historically, the District has been affected by flooding of streams and creeks occurring during heavy rain and storm (including atmospheric river) events. Additional development in the District and in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff and contributes to localized flooding occurring in areas throughout the District. The lack of or inadequate drainage infrastructure in the District contributes to localized flooding issues.

The District is also concerned with rain on snow events, which can cause greater flooding in the District.

The District tracks localized flooding areas. Affected localized flood areas identified by the IVCSD are summarized in Table E-9.

Table E-9 IVCSD – List of Localized Flooding Problem Areas

Road/Area Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
All of Greenville if the dam breaks or there are extreme storms w/flash floods	X	X	X	X	X	X	X

Source: IVCSD

The District has concerns related to more extreme weather such as atmospheric rivers followed by severe drought increasing flash flood risk. Vulnerabilities stem from increased severe weather, the Feather River overflowing, mountainous terrain, and specific aftereffects of the Dixie Fire. Localized flood events can and do result in loss of service, which impacts the residents within the District's boundaries.

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 District staff and populations served (including vulnerable populations) are traditionally not highly vulnerable to localized flooding, but their structures and contents can be at risk. Localized flooding may also cause transportation issues as roads and lanes are impacted or closed and affect the ability for District staff and District residents to travel throughout the District.

Structures and Critical Facilities and Infrastructure

Structures and critical facilities and infrastructure in areas with localized flooding can be affected if floodwaters intrude into the structure. Structures in low lying areas, can be at greater risk. Buildings with older foundations that are prone to water intrusion are also at greater risk. Once water finds its way into a structure, it tends to continue to do so until the path that brings water into a structure is mitigated. Structures can also be damaged by trees that have become uprooted and fall during rain and storm events. Large trees falling onto structures can cause significant damage.

Many of the assets listed as being affected by flood in Table E-2 can also be affected by localized floods.

Natural, Historic, and Cultural Resources

Natural resource assets may have some vulnerabilities to localized flood during major storm events, but can benefit from floodwaters, often by design. Many open spaces take overflow water and release it into the

underlying soils and natural areas. Wetlands areas in the District actually help reduce the risk of flooding, as they can absorb excess rainfall that would have to be drained away from impervious surfaces. Flooding can provide many benefits to the natural environment, including recharging wetlands and groundwater, increasing fish production, creating wildlife habitat, and rejuvenating soil fertility. These smaller localized flooding events often provide more benefits to the environment in comparison to negative impacts associated with large flood events. Historic and cultural resources may be at some measure of vulnerability if they are located in areas subject to repeated localized flooding.

Impacts from Localized Flood

Primary concerns associated with stormwater flooding include impacts to infrastructure that provide a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical District infrastructure. Objects can also be buried or destroyed through sediment deposition. Floodwaters can break utility lines and interrupt services to District facilities. Standing water can cause damage to crops, roads, and foundations of District facilities. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Life safety issues from localized flooding would be more limited. The amount and type of damage or flooding that occurs varies from year to year and from storm to storm, depending on the quantity of precipitation and runoff.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District 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 IVCSD 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 District show the population to be shrinking, which limits additional impacts to the District. The District may add staff, but this number would be small. The District 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 District are expected to be limited in the near future and thus are not likely to affect flooding and associated impacts to the District. Additional development

traditionally leads to additional flooding. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future Development

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding. Future development in the District will add to the drainage issues already faced by the District, unless adequate drainage facilities are installed in new development locations.

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)

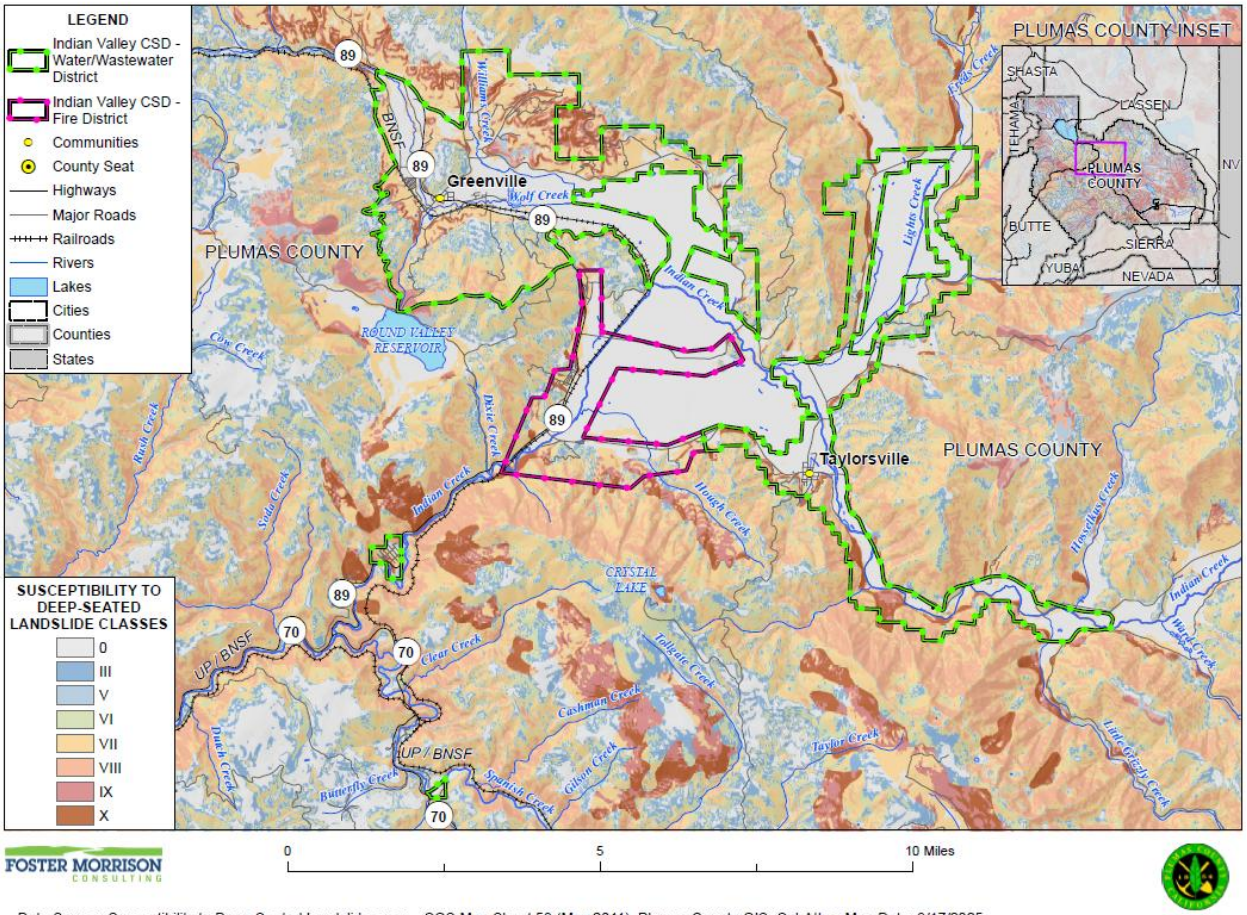
- Road building, excavation, and grading
- Earthquake

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 bordering the District where the topography is characterized by rolling hills and ridges.

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.

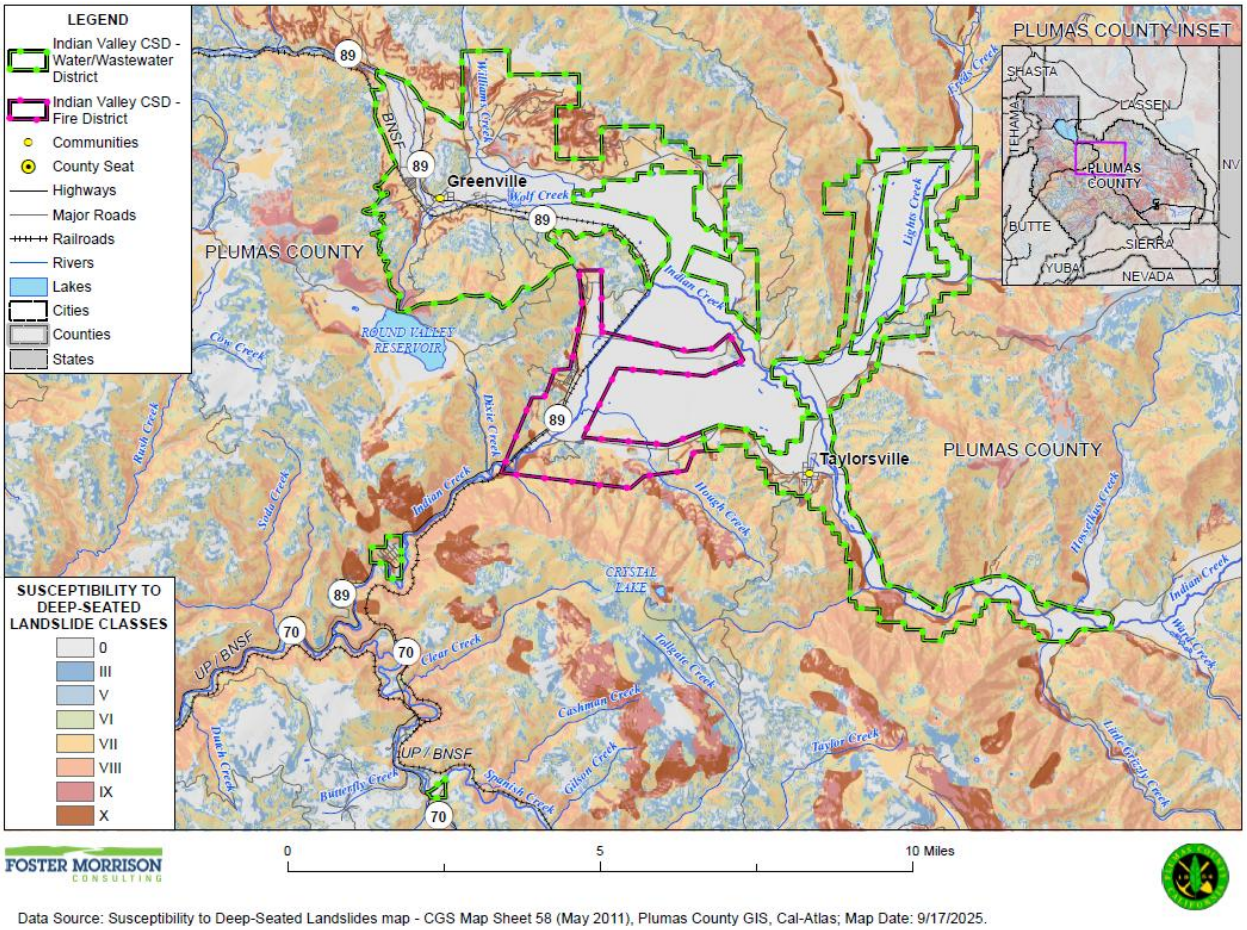
Figure E-6 shows the CGS areas at susceptible to deep-seated landslides. The legend on Figure E-6 shows the susceptibility scale (from 0-X with 0 being the least and X being the most susceptible) that the CGS uses to show the susceptibility of landslides. It is a primarily a combination of slope class and rock strength. Geographic extents of these classes are shown on Table E-10



Data Source: Susceptibility to Deep-Seated Landslides map - CGS Map Sheet 58 (May 2011), Plumas County GIS, Cal-Atlas; Map Date: 9/17/2025.

Table E-10. 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 District 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 E-6 IVCSD – Susceptibility to Deep-Seated Landslides



Data Source: Susceptibility to Deep-Seated Landslides map - CGS Map Sheet 58 (May 2011), Plumas County GIS, Cal-Atlas; Map Date: 9/17/2025.

Table E-10 IVCSD – Susceptibility to Deep-Seated Landslide Geographical Extents by Class

Susceptibility to Deep-Seated Landslide Class	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Fire District						
0	1,581	9%	370	7%	1,211	10%

Susceptibility to Deep-Seated Landslide Class	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
III	161	1%	55	1%	105.9	1%
V	-	0%	-	0%	-	0%
VI	199	1%	50	1%	149	1%
VII	677	4%	260	5%	416	3%
VIII	70	0.4%	5	0.1%	64	1%
IX	141	1%	36	1%	105	1%
X	130	1%	42	1%	88	1%
Total	2,958	17%	819	15%	2,139	18%
Water/Wastewater District						
0	6,505	37%	2,440	44%	4,064	34%
III	796	5%	176	3%	620	5%
V	60	0.3%	37	1%	23	0.2%
VI	962	5%	194	4%	768	6%
VII	4,257	24%	1,320	24%	2,937	24%
VIII	628	4%	81	1%	546	5%
IX	671	4%	214	4%	457	4%
X	686	4%	208	4%	478	4%
Total	**14,564**	**83%**	**4,671**	**85%**	**9,893**	**82%**
Grand Total	**17,522**	**100%**	**5,490**	**100%**	**12,032**	**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 E-11, there have been 9 state and 10 federal disaster declarations for flood (including heavy rains and storms) which included landslides as a component.

Table E-11 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.

IVCSD Past Occurrences

The District experienced localized landslides, mudslides, and debris flow in early 2023. The area was especially susceptible to these events due to the Dixie Fire in 2021. Rain could not be absorbed into the ground and ran off quickly, overwhelming drainage systems. There were no roots from vegetation to hold the soil in place because of the devastation caused by the Dixie Fire. The debris flow & mudslides led to the closure of local highways (specifically, Highway 70 & 89). The area was still trying to rebuild from the Dixie Fire. The mudslides and flooding added another layer of challenges for the community. To mitigate these hazards, the District worked to establish drainage control, clear and maintain existing drainage, use sandbags and silt fences to create temporary barriers & redirect water, spread erosion control blankets and hydromulch on steep hillsides, install erosion barriers, create check dams from straw bales to slow and control runoff as much as possible. There were several road closures, and significant strain on local services such as Maintenance crews and emergency services.

There was also significant debris flow in October of 2021 due to storms. Roads were washed out, bridges were damaged, and culverts were damaged. Property damage was minimal. Transportation routes were primarily affected. Greenville was cut off from supplies, residents' ability to commute to work was impacted which impacted the local businesses and economy. Costs increased due to increased travel time. There was also environmental and geological damage due to the combination of the Dixie Fire and intense rainfall triggered erosion.

A grant application noted that during DR-4308 incident period of February 1, 2017 through February 23, 2017, IVSCD experienced severe winter storms, flooding which caused damage to Greenville Water Treatment Road. Heavy rains and high water flooding brought rock, silt, plants, and vegetative debris down the hillside which overwhelmed and damaged the drainage canal directly next to the road. The remaining debris and flood waters overwhelmed, clogged and damaged the upper division culvert completely washing out a section of the road. The culvert was damaged beyond repair.

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 District 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 District's Assets at Risk to this hazard.

Local Concerns

The District 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 District is concerned both with physical damage to District property, as well as damage to transportation routes in the area. In addition, as the residents of the District have seen damages from the Dixie Fire, there is concern for landslides in fire burn scar areas.

After a fire has occurred, destabilized soil and erosion can occur within the burn scar, exacerbating the risks of landslide. A concern of the District is the fact that the risk of debris flow is not just immediately following wildfire, it can persist for years because of slow vegetation regrowth and continuous decay of soil. Along with those cascading effects, other events such as extreme weather & atmospheric rivers, rapid and destructive flows, threat to infrastructure and life, and water contamination are all impacts that the District is concerned about. Lack of early warning systems, financial burden, and ongoing road closures are impacts that the residents would be facing within the District. It can be challenging to discourage these residents from returning to an area affected by landslide, which can cause more issues, especially for emergency response services.

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 District staff and District 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 District service areas as well as District 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 District 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. The District noted that it is concerned that all assets listed in Table E-2 would have some risk to landslide.

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 E-6 would be most vulnerable, as well as those in the run-out areas.

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 District susceptible to landslide. Based on the risk assessment, there is limited potential for significant landslides to occur in the District. Most, but not all, of the historic landslides in the District have been minor, localized events that are more of a nuisance than a disaster. However, with the Dixie Fire burn scar, this may change in the future. 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 District 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 District include the following:

- Climate change is likely to exacerbate future landslide, mudslide, and debris flow conditions and associated impacts and vulnerability of the District to landslide.
- Population projections for the area served by the District show the population to be shrinking, which limits additional impacts to the District. The District 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 District. 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 District would place additional values at risk to landslide. New District facilities will take landslide into account when siting new facilities.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile

Storms in the District 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 District falls mainly in the fall, winter, and spring months. Wind often accompanies these storms; hail and lightning are rare in the District.

Location and Extent

Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains and storms. Most of the severe rains occur during the fall, winter, and spring months in the District as discussed below (with problem flooding areas associated with heavy rains and storms shown in Table E-9 in the Flood: Localized Stormwater section). 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 District and Plumas County. Duration of severe storms in the District 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 District. 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 E-12. IN addition, there have been two USDA disaster declarations from heavy rain and storms (once in 2016 and once in 2017) since 2012.

Table E-12 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.

IVCSD Events

The District noted that heavy rains and storms are an annual occurrence often resulting in flooding. Events causing flood issues are listed in the Past Occurrences section of the Flood: 1%/0.2% Annual Chance and Flood: Localized Stormwater Flooding discussions above.

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 District 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 IVCSD. 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 District. 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 District, but also can cause damage, with lightning occasionally igniting wildfires.

The whole of the District 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 District's Assets at Risk to this hazard.

Local Concerns

The District 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 District noted that one of the primary issues associated with heavy rains and storms is the resulting flooding caused by large precipitation events. A list of localized flooding problem areas are shown on Table E-9 above. The District is also concerned with rain on snow events, which can cause greater flooding in the District. The District is also concerned about increased debris flow and mudslide risk, localized flooding, water contamination, erosion, and landscape damage. Concerns for PSPS events are medical needs for residents that rely on electricity for medical devices and refrigerated medication, communication breakdowns, disruption of recovery, food and water security, and mental health impact.

Of concern to the District are cascading events, such as flash floods and debris flow, with increased risk on steep terrain downstream due to the Dixie Fire burn scar, and water contamination. These events can all cause increased infrastructure damage, service disruptions, increased costs, safety risks, isolation, access problems, rebuilding delays, and financial strain.

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 District staff and the populations served by the District are at some vulnerability to heavy rains and storms. Those District employees that work outdoors could be affected to a limited extent by this hazard. All populations served by the District 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

District 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 District. In certain areas, large storms can cause erosion and localized landslides which can impact affected facilities.

Heavy rains and storms that cause flooding would cause a risk to every District asset listed in Table E-2.

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 District 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 District 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 District show the population to be shrinking, which limits additional impacts to the District. The District may add staff, but this number would be small. The District 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 District 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 District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future Development

New District facilities follow state and local building codes which should reduce the risk to future development in the District from heavy rains and storms. New critical facilities should be built to withstand hail damage, lightning, and thunderstorm winds. Changes in land use may also amplify the impacts of heavy rains and storms, as additional impervious surfaces can cause additional runoff and localized flooding throughout the District.

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 IVCSD. 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 District. 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 District.

Wildfire Smoke and Air Quality

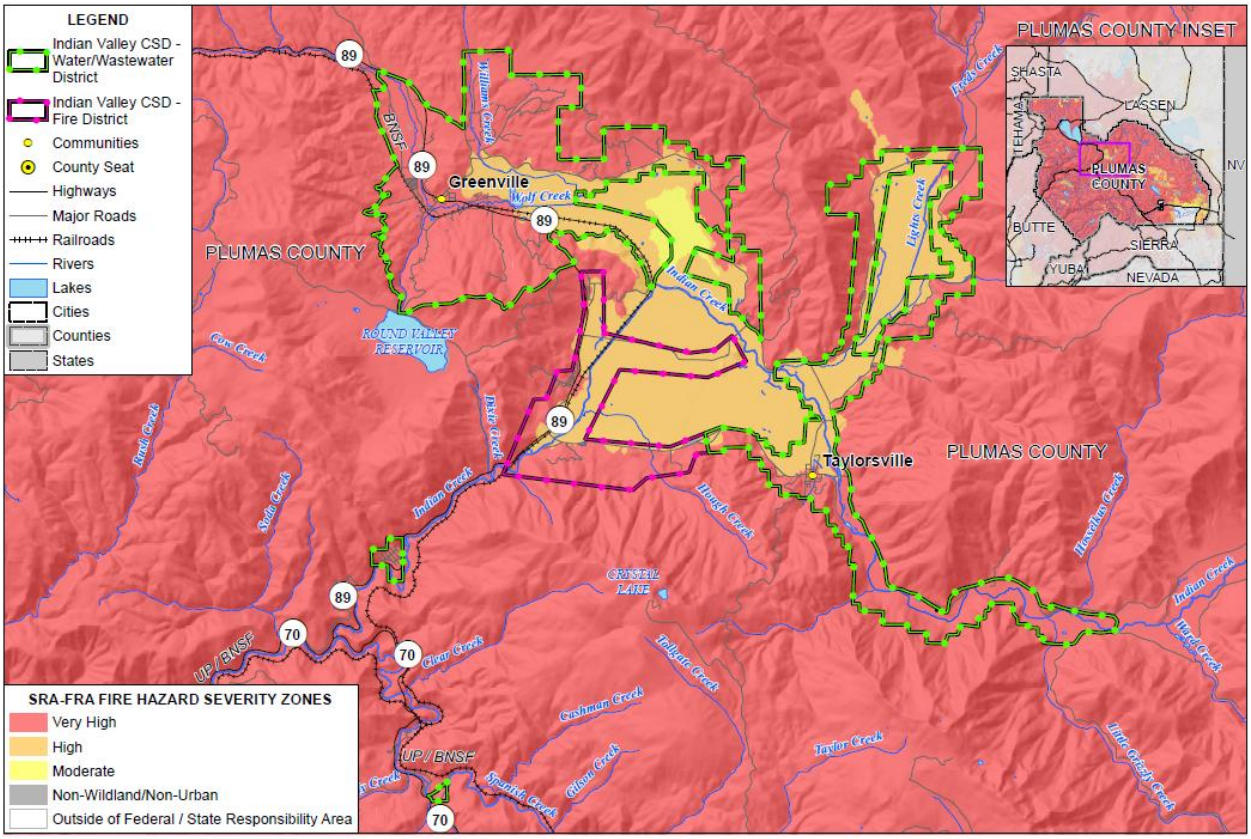
Smoke from wildfires is made up of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles 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 District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the IVCSD were created. Figure E-7 shows the CAL FIRE State Responsibility Areas (SRA) and Federal Responsibility Areas (FRA) and their associated Fire Hazard Severity Zones (FHSZ) in the District. As shown on the map, FHSZs within the District range from Moderate to Very High. Figure E-8 shows the CAL FIRE Local Responsibility Areas (LRA) and their associated Fire Hazard Severity Zones (FHSZ) in the District. As shown, there is no LRA in the District; as such, no other tabular analysis of the LRA is provided in the sections below.

Figure E-7 IVCSD – CAL FIRE SRA/FRA Fire Hazard Severity Zones



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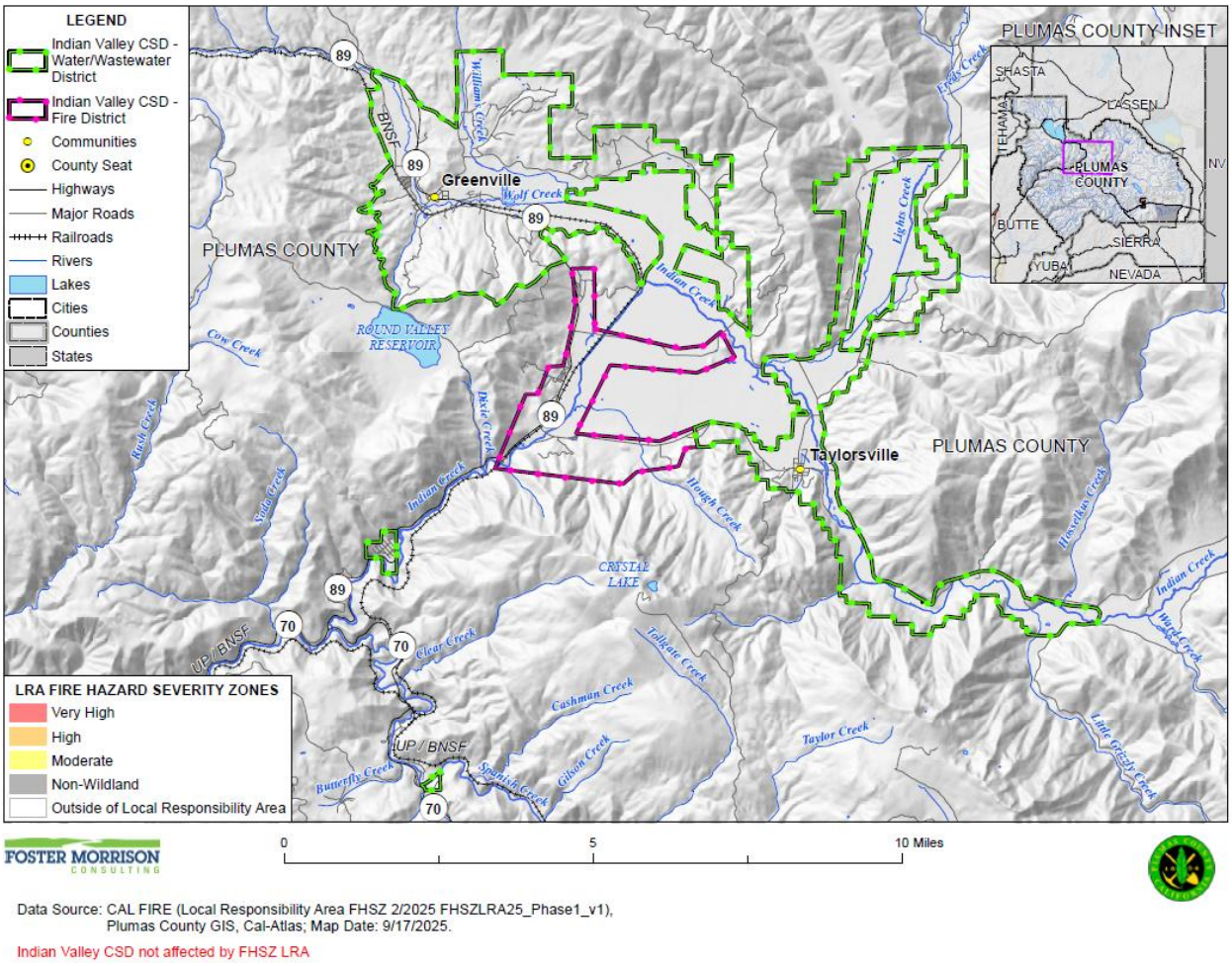
Data Source: CAL FIRE (State Responsibility Area: FHSZSRA_23_3) April 2024,
CAL FIRE (Federal Responsibility Area: Draft c32fhszl06_1) September 2007,
Plumas County GIS, Cal-Atlas; Map Date: 9/17/2025.

Figure E-8 IVCSD – CAL FIRE LRA Fire Hazard Severity Zones



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 for both the Fire District and the Water/Wastewater District are shown in Table E-13.

Table E-13 IVCSD – CAL FIRE SRA/FRA Fire Hazard Severity Zone Geographical Extents

Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Fire District						
Very High	1,418	8%	431	8%	987	8.2%
High	1,526	9%	387.7549	7%	1,138	9.5%
Non-Wildland/Non-Urban	14	0.1%	0	0%	14	0.1%

Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Fire District Total	**2,958**	**17%**	**819**	**15%**	**2,139**	**17.8%**
Water/Wastewater District						
Very High	10,727	61%	3,324	61%	7,403	61.5%
High	3,715	21%	1,321	24%	2,395	19.9%
Moderate	114	1%	26	0.5%	89	0.7%
Non-Wildland/Non-Urban	7	0.04%	0	0%	7	0.1%
Water/Wastewater District Total	**14,564**	**83%**	**4,671**	**85%**	**9,893**	**82.2%**
Grand Total	**17,522**	**100%**	**5,490**	**100%**	**12,032**	**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 E-14.

Table E-14 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.

IVCSD Events

The largest fire to affect the District was the Dixie Fire. The Dixie Fire burned from 7-13-2021 until 10-25-2021. It affected Butte, Plumas, Lassen, Shasta, and Tehama counties. There was 1 firefighter killed and several injuries reported. The damage to property, infrastructure, and the economy in the District was

severe. 75% of structures in Greenville were destroyed. This included the IVSCD Fire Station. It is likely that a wildfire of this magnitude could happen again in this area.

During this event, an estimated 5,000ft long, 12- inch diameter raw water supply line coming from the Round Valley Reservoir and ending at the Indian Valley Water Treatment Plant was damaged in spot locations by the Dixie wildfire. There is a location where the water supply line goes from a 12-inch diameter above ground metal line and connects to a 12-inch diameter PVC water line that was above ground in some locations and in other areas was put into an old shallow ditch that was once a wooden trough, the timbers of the trough were removed and the PVC pipe placed in the shallow ditch and the 4 x 12 rough cut timbers were cut into 4ft lengths and placed over the pipe, on an average 2ft on center. During the fire those timbers caught fire and melted the PVC supply line directly underneath them.

Additionally, flying embers from the Dixie Wildfire landed on a 267ft long section of 4 inch diameter welded HDPE raw water supply that was above ground which caused numerous pin hole size leaks in the line. The line start a the Round Valley Reservoir and ends at the meter box which feeds the Greenville Cemetery, there was no damage to the meter or the meter box.

During this fire, many of the IVCSD water meters, hydrants, meter boxes, valves, and valve boxes were damaged in the Greenville area. FEMA funds helped cover the damages and the District worked to repair the damages.

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

The whole of the District 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 District's Assets at Risk to this hazard.

Local Concerns

The District 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.

It is likely that a wildfire of the magnitude of the Dixie Fire could happen again in this area. Much of the area the District served was damaged by that event. The area is still recovering today, and there is a question as to whether the rebuilding will reach the previous stock of buildings. To mitigate this hazard, the District is seeking to educate the public on how they can harden homes and businesses against embers, reduce fuel in and around the area, and preparing for this kind of disaster. The District can create defensible space, use noncombustible and fire resistant materials when building, and keep vegetation trimmed. Creating shaded fuel breaks, thinning and removal in the forest, dead tree removal, and keeping forests healthy will also reduce future wildfires. Prescribed burns can help also. Developing a community wildfire protection plan may also occur. The District continues to seek to educate the community, and seeks the ability to be housing workers that are carrying out mitigation projects.

The District received a FEMA grant for $7,000,000 for Greenville recovery and rebuilding costs resulting from the Dixie Fire.

The District noted key vulnerabilities include high property risk, potential loss of infrastructure, severe economic and social impacts. property and utility damage, impact on evacuation routes, contamination from burned materials, challenges in rebuilding and recovery; all of which are heightened by a longer dry season. These long dry seasons can weaken the water supply for firefighting, placing increased strain on fire department resources. Of concern during these dry periods are hazardous fuels and forest management.

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 District 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 District staff) outdoors, and individuals with impaired mobility.

Structures and Critical Facilities and Infrastructure

All structures in the District have some risk to wildfire. Wildfire presents a threat to critical facilities and infrastructure. All District assets from Table E-2 are at risk to wildfire.

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 District, 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 District. 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 District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District 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 District; smoke and air pollution from wildfires can be a severe health hazard. Smoke impacts may come from wildfires outside the District, 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.

Impacts to the District include potential loss of water availability for fire suppression and/or consumption. Wastewater treatment can also be rendered inoperable when wildfire eliminates the availability of electricity. Without backup electricity generation, water and wastewater cannot be conveyed. Water quality

will also suffer if water treatment functionality is compromised. The economic impact alone to the District including the loss of function of buildings and infrastructure and the cost of reacting to these fires is a major concern.

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. District 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 District 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 IVCSD include the following:

- Climate change is likely to exacerbate future wildfire conditions and associated impacts and vulnerability of the District to wildfire.
- Population projections for the area served by the District show the population to be shrinking, which limits additional impacts to the District. The District 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 District are expected to be limited in the near future and thus would have possible associated wildfire impacts to the District. The area around Greenville may be rebuilt, but will most likely be built to the size of the previous development. 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 District to this hazard. With adherence to development standards, future losses to new development should be minimal.

The District 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 District would place additional assets at risk to wildfire. More vulnerable populations may experience a disproportionate impact from wildfire, and this should be considered as development continues. However, District building codes are in effect and should continue to be updated as appropriate to reduce future impacts.

E.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.

E.5.1. Regulatory Mitigation Capabilities

Table E-15 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 IVCSD.

Note: The District 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 District'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 District is located.

Table E-15 IVCSD'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	N	We will be creating one
Climate Change Adaptation Plan	N	
Community Wildfire Protection Plan	N	County wide plan covers our area
General Plan/Comprehensive Plan/Master Plan	N	
Continuity of Operations Plan	N	
Economic Development Plan	N	
Land Use Plan	N	
Local Emergency Operations Plan	Y	I have attached the ERP
Stormwater Management Plan	N	
Transportation Plan	N	
Other		

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective way to reduce hazard impacts? Is the ordinance adequately administered and enforced?
Acquisition of land for open space and public recreation use	N	County
Building code	N	County
Flood insurance rate maps	N	County
Floodplain ordinance	N	County
Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	N	County
Subdivision ordinance	N	County
Zoning ordinance	N	County
Other	N	County
How can these capabilities be expanded and improved to reduce risk?		
We need to develop a CIP and a master plan describing what the district does. They both need to be updated annually.		

Source: IVCSD

E.5.2. Administrative/Technical Mitigation Capabilities

Table E-16 identifies the District department(s) responsible for activities related to mitigation and loss prevention in the IVCSD.

Table E-16 IVCSD'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	Y	Plumas County, Michael Coelho
Civil Engineer, including dam and levee safety	N	N/A
Community Planner	Y	Plumas County Planning
Emergency Manager	Y	Plumas County office of emergency services
Floodplain Administrator	Y	Plumas County
GIS Coordinator	Y	Plumas County Planning
Planning Commission	Y	Plumas County Planning
Other		
Technical	**Y/N**	**Has capability been used to assess/mitigate risk in the past?**
Grant writing	N	unknown

Hazard data and information	Y	Plumas County, FEMA, State of CA
GIS analysis	Y	Plumas County Planning
Mutual aid agreements	Y	Chester PUD, Yes
Other		
How can these capabilities be expanded and improved to reduce risk?		
Indian Valley CSD is in Greenville CA. Greenville is unincorporated so most of these resources come from Plumas County. Our jurisdiction needs improvement in every category. If we had more mutual aid agreements with surrounding districts, we would all have more resources to use for mitigation. If we had GIS we could have accurate mapping of our service area done and be more prepared for hazards and know exactly where our potential weak areas are. Historical hazard information would be helpful to have to study to help prepare and mitigate future hazards. Most of the grants we apply for are done by staff. If we had an experienced grant writer on staff, we might have better access to grants and spend less time on the applications which would save district resources.		

Source: IVCSD

E.5.3. Fiscal Mitigation Capabilities

Table E-17 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table E-17 IVCSD'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	N	No. Yes could be used in future
Community Development Block Grant	N	No. Yesa could be used in future
Federal funding programs (non-FEMA)	Y	Yes. Rebuilding after Dixie Fire
Fees for water, sewer, gas, or electric services	Y	We charge the community for water & sewer
Impact fees for new development	N	No. Yes could be used in future
State funding programs	Y	We have received state funding for disaster recovery
Stormwater utility fee	N	Yes. Could be used in future
Other		
How can these capabilities be expanded and improved to reduce risk?		
Identify funding sources to develop CIP , identify funding sources for audits and other fiscal resources.		

Source: IVCSD

E.5.4. Mitigation Education, Outreach, and Partnerships

Table E-18 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 E-18 IVCSD's Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters	Y	We are working on a grant for transparency & community communication
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)	N	
Local news	Y	We post on our website and in the Plumas Sun
Organizations that interact with underserved and vulnerable communities	Y	Outreach to veterans and low income community members
Social media	Y	Not updated regularly
How can these capabilities be expanded and improved to reduce risk?		
Educating the community on mitigation can help us prepare for hazards and possibly not have as devastating effect. All of the above items help with this. IVCSD is applying for a grant to help with communication with the community.		

Source: IVCSD

E.5.5. Other Mitigation Efforts

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

- Put a dam EAP together along with inundation mapping.
- Greenville Water System Planning Report was put together in 2019.
- The District has an Emergency Response Plan for the Greenville and Crescent Mills Water systems.
- Cutting trees and brush and debris clearing

Mitigation Strategy

E.5.6. Mitigation Goals and Objectives

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

E.5.7. NFIP Mitigation Strategy

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

E.5.8. Mitigation Actions

The Planning Team for the IVCSD 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:

- Dam Failure
- Drought & Water shortage
- Earthquake
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- 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)
- Climate Change
- 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. Public Outreach Project

Hazards Addressed: Multi-hazard (Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning), Wildfire (w/smoke and air quality))

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): Educating the public on potential hazards that effect our community is paramount. Actions taken in this area to enhance public knowledge will lead to greater mitigation efforts within the community as a whole.

Project Description: Partnering with local resources (Cal OES, Plumas County Sheriff's Office, and others), the project will offer a variety of public education outreach efforts. Public education including but not limited to:

- Potential hazards and high hazard areas
- Property owners personal mitigation measures related to natural hazards specific to community and personal property
- Local and Plumas County emergency evacuation plan
- Living with fire, fire safe requirements, home hardening, etc.
- Forecasting information
- Hazard warning notification
- Emergency shelter locations

Other Alternatives: No outreach.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None. We are working on a grant for public outreach and transparency.

Responsible Office/Partners: IVCSD

Benefits (Losses Avoided): Build trust & relationships among community members, empower residents to act, and facilitate long term resilience.

Potential Funding (Local Budgets, Grant Funds, etc.): Federal HMA funding, state and federal mitigation funds, HMA, HMGP

Timeline: 5 years

Project Priority (High, Medium, Low): high

Action 2. Dam Failure Mitigation and/or Replacement

Hazards Addressed: Dam failure

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): If the dam (which is owned by the District) fails at Bidwell Lake, the entire town of Greenville, CA could be under water in 17 minutes.

Project Description: repair/rebuild this dam and make sure it is retrofitted and upgraded.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: The District will need to do a study and implement the findings. There is an inundation map and inspection reports.

Responsible Office/Partners: IVCSD

Benefits (Losses Avoided): Reduced property damage, reduced injury & loss of life

Potential Funding (Local Budgets, Grant Funds, etc.): HHPD funding, Federal HMA funding, state and federal mitigation funds, HMA & HMGP

Timeline: 5 years

Project Priority (High, Medium, Low): High

Action 3. IVCSD Secondary Water Source Project and Storage

Hazards Addressed: Drought

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): IVCSD only has 1 water source. If anything goes wrong with the primary source, there is no backup. If there is a fire and the primary source is compromised, there is no easily accessible secondary source and not enough storage if there is a delay in repairing the primary source

Project Description: Drill a secondary well, additional water storage tanks and water treatment plant for backup water source for Greenville, CA.

Other Alternatives: Bidwell Lake could be a source for Ag water but there is no treatment plant for the water to be used for drinking water and we also need more water storage.

Existing Planning Mechanism(s) through which Action Will Be Implemented: We need to do a study and evaluate and implement the findings from the study

Responsible Office/Partners: Indian Valley Community Services District

Benefits (Losses Avoided): Fire mitigation, extra storage in case of a problem with wells. Improved resilience and ensuring a more reliable water supply. More on hand water storage would be invaluable during wildfire season. Increased resilience to infrastructure. Support for community growth and economic stability.

Potential Funding (Local Budgets, Grant Funds, etc.): Federal HMA funding, state and federal mitigation funds & HMA, HMGP

Timeline: 5-year plan beginning in 2026

Project Priority (High, Medium, Low): Medium

Action 4. Earthquake Mitigation

Hazards Addressed: Earthquakes

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): An earthquake could cause dam failure and flood Greenville.

Project Description: Retrofitting homes & businesses, public infrastructure strengthening such as retrofitting or rebuilding the dam

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: We need to conduct a study and implement the findings

Responsible Office/Partners: IVCSD

Benefits (Losses Avoided): Mitigate property damage, injuries and loss of life

Potential Funding (Local Budgets, Grant Funds, etc.): Federal HMS funding, state and federal mitigation funds, HMA & HMGP

Timeline: 5 years

Project Priority (High, Medium, Low): High

Action 5. Landslide, Mudslide, & Debris Flow Mitigation

Hazards Addressed: Landslides, mudslides, & debris flow

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): Landslides, mudslides & debris flow significantly impact transportation and the economy. This occurred during the flooding in 2017.

Project Description: Post-fire erosion control, watershed and drainage management, Long term planning and community resilience will be sought.

Other Alternatives: Decentralized stormwater management such as micro-basins, wattles & fiber rolls

Existing Planning Mechanism(s) through which Action Will Be Implemented: We need to conduct a study and implement findings

Responsible Office/Partners: IVCSD

Benefits (Losses Avoided): Property damage, economic impact, injuries, loss of life

Potential Funding (Local Budgets, Grant Funds, etc.): Federal HMA funding, state and federal mitigation funds, HMA, HMGP

Timeline: 5 years

Project Priority (High, Medium, Low): high

Action 6. Severe Weather Mitigation

Hazards Addressed: Severe Weather: Heavy Rains & Storms

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): Infrastructure is damaged & overwhelmed by heavy rains and storms. Areas of the District are subject to localized flooding and increased erosion and landslide risk during these times.

Project Description: Erosion and soil stabilization, stormwater and drainage management, watershed and river restoration, community and property resilience

Other Alternatives: Building elevation and retrofitting

Existing Planning Mechanism(s) through which Action Will Be Implemented: The District desires to do a study and implement the findings.

Responsible Office/Partners: IVCSD

Benefits (Losses Avoided): Property damage, injuries, loss of life.

Potential Funding (Local Budgets, Grant Funds, etc.): Federal HMA funding, state and federal mitigation funds, HMA & HMGP

Timeline: 5 years

Project Priority (High, Medium, Low): medium

Action 7. Wildfire Mitigation

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background (Problem Statement): The Dixie fire significantly impacted the businesses, economy, and entire way of life for residents in Greenville CA

Project Description: Immediate post-fire hazard reduction, resilient rebuilding & hardening

Other Alternatives: Post fire watershed restoration, integrated fuels management, prescribed burns, strategic grazing

Existing Planning Mechanism(s) through which Action Will Be Implemented: We need to conduct a study and implement findings

Responsible Office/Partners: IVCSD

Benefits (Losses Avoided): Property damage, total loss of property, injuries, loss of life

Potential Funding (Local Budgets, Grant Funds, etc.): Federal HMA funding, state and federal mitigation funds, HMA, HMGP

Timeline: 5 years

Project Priority (High, Medium, Low): high