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Section 1. Introduction

Lassen County, the City of Susanville, and the Susanville Indian Rancheria joined together to prepare the 2017 update of the Local Hazard Mitigation Plan (LHMP) which was previously adopted by the three jurisdictions in 2011. The updated LHMP represents the current understanding of the natural and technological hazards having the potential to cause death, injuries, property damage, community disruption, and economic consequences within Lassen County, and presents mitigation actions that may be taken to reduce those impacts prior to such hazard events. This LHMP demonstrates the community's commitment to mitigation, fulfills regulatory requirements as established by the Federal Emergency Management Agency (FEMA), establishes eligibility for seeking hazard mitigation assistance grants, and serves as a guide to local decisions makers to implement mitigation programs.

Hazard mitigation is defined as any sustained action taken to reduce or eliminate long term risk to human life and property. Mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, it can protect critical community facilities, reduce exposure to liability, and minimize community disruption.

Section 2. Plan Purpose and Authority

The primary purpose of this LHMP is to identify community policies, actions, and tools for implementation over the short and long-term that will result in a reduction in risk and potential future losses community wide. This is accomplished by using a systematic process of learning about the hazards that can affect each of the participating jurisdictions, setting clear goals and objectives, identifying and implementing appropriate actions, and keeping the plan current.

The LHMP is an integral part of a multi-pronged approach to minimizing personal injury and property damage from natural and technological hazards, and it complements other planning documents and regulatory authorities governing pre-disaster land use planning and post-disaster response and recovery. It is intended to set the tone for the implementation of hazard mitigation practices that will build a disaster resistant and sustainable community.

The impetus and authority to create this plan is derived from the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000 (DMA 2000). In response to escalating disaster costs, the federal government adopted DMA 2000 which places emphasis on hazard mitigation planning. Under DMA 2000, state and local governments are required to have a FEMA-approved LHMP to be eligible for Hazard Mitigation Assistance grants.

The requirements and procedures for mitigation plans are found in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 and the associated Interim Final Rule changes. The federal law and associated rule changes and regulations establish planning and funding criteria for states and local communities.

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies requirements that allow Hazard Mitigation Grant Program (HMGP) funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced State Hazard Mitigation Plan (HMP). LHMPs must be consistent with the State HMP and must demonstrate that their proposed projects are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

Local governments have certain responsibilities for implementing Section 322 including:

- Preparing and submitting a LHMP
- Reviewing and updating the LHMP every five years, and
- Monitoring mitigation projects included in the LHMP

Adoption of this LHMP by the governing body of each participating jurisdiction (Lassen County, the City of Susanville, and the Susanville Indian Rancheria) through a signed resolution following formal review and approval by the California Office of Emergency Services (Cal OES) and FEMA constitutes plan completion. The formal Adoption Resolutions by the participating jurisdictions are located in **Appendix A.** .

Section 3. Planning Process

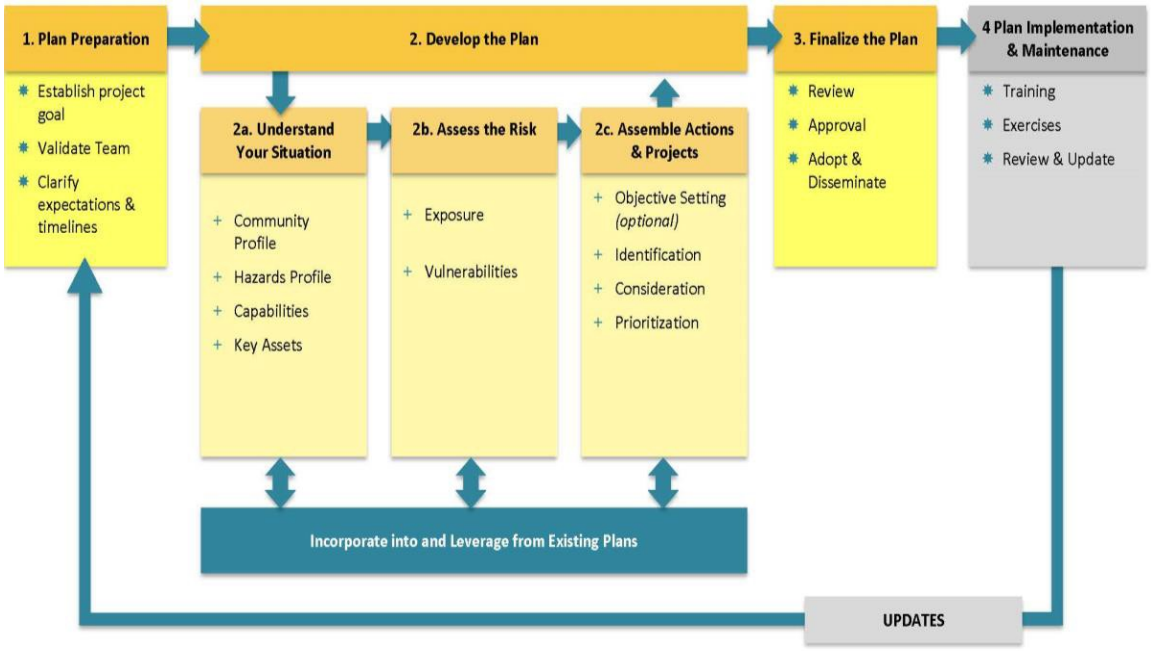
3.1. Overview

The planning process implemented for updating the Lassen County, City of Susanville, and Susanville Indian Rancheria Local Hazard Mitigation Plan (LHMP) followed the concepts and principles outlined in the Federal Emergency Management Agency (FEMA) Mitigation Guidance, as well as, FEMA's Comprehensive Preparedness Guide (CPG) 101. The planning process for the updating of the HMP incorporated the following steps:

- Plan Preparation
  - Form/Validate planning team members
  - Establishing common project goals
  - Setting expectations and timelines
- Plan Development
  - Validate and revise the existing conditions/situation within planning area; the *Capabilities Assessment and Hazard Assessment* Sections in the HMP
  - Develop and review the risk to hazards (exposure and vulnerability) within the planning area; the *Vulnerability Assessment* Section in the HMP
  - Review and identify mitigation actions and projects within the planning area; the Mitigation Strategy in the HMP
- Finalize the Plan
  - Review and revise the plan
  - Approve the plan
  - Adopt and disseminate the plan

To help the process, a planning flow chart was also developed (**Figure 3-1**.). The flow chart assisted in better visualizing the steps and the approach.

Figure 3-1. Hazard Mitigation Plan Update Planning Process



In support of the implementation of the planning process, a decision was made to form a single committee, the Steering Committee, which would perform all planning, advisory, and review functions necessary to oversee the plan development process. The Steering Committee was guided through the planning process; and as decisions were made and material developed, it was the Steering Committee's responsibility to review and accept results. The Steering Committee focused on the following underlining philosophies:

- **Focus on the mitigation strategy**
  The mitigation strategy is the plan's primary purpose. All other sections contribute to and inform the mitigation strategy and specific hazard mitigation actions.
- **Process is as important as the plan itself**
  In mitigation planning, as with most other planning efforts, the plan is only as good as the process and people involved in its development. The plan should also serve as the written record, or documentation, of the planning process.
- **This is the community's plan**
  To have value; the plan must represent the current needs and values of the community and be useful for local officials and stakeholders. Develop the mitigation plan in a way that best serves your community's purpose and people.
- **Intent is as important as Compliance**
  Plan reviews will focus on whether the mitigation plan meets the intent of the law and regulation; and ultimately that the plan will make the community safer from hazards.

Throughout this process, and though other standard practices, opportunities for public involvement was offered and encouraged. More details about public engagement are provided under the *Public Outreach, 3.3* of this section.

3.2. Mitigation Steering Committee

As previously mentioned, a Steering Committee was established for this effort. The role of the Steering Committee is to:

- Validate the planning approach
- Provide information and material
- Be the primary liaison with the community and stakeholders
- Promote public participation
- Collaborate with other Steering Committee members
- Update and review material
- Address FEMA and the California Office of Emergency Services (OES) comments
- Oversee the adoption of the LHMP.

In support of this effort, a consultant was hired to provide technical assistance. The consultant's focus was to:

- document the planning process
- conduct an earthquake and flood vulnerability assessment using Hazus
- guide the Steering Committee in the identification and development of mitigation projects and actions
- review and update material and sections, including incorporating relevant information from existing plans
- work with Steering Committee to address FEMA and OES comments
- coordinate with FEMA and OES

3.2.1. Members

In an effort to ensure this update to the LHMP is comprehensive, special considerations were given to the selection of Steering Committee members. The intent was to identify members who could represent key segments of the community. The Mitigation Steering Committee was led by the City of Susanville City Planner, and had representation from the other participating jurisdictions, as well as, key Departments and Agencies. Efforts were made to extend invitations to surrounding counties and other stakeholders, some accepted while others declined because of workload. Additionally, of those

who accepted, some were unable to participate in all meetings as their workload shifted. However, the representatives from Lassen County, the City of Susanville, and the Susanville Indian Rancheria were always in attendance. Below is a list of the Steering Committee members (**Table 3-1)**.

Table 3-1. Members of the Mitigation Steering Committee

Names	Organization	Department
Craig Hemphill	County of Lassen	Agricultural Commissioner
Craig Sanders	City of Susanville	Planning
Cort Cortez	Lassen Municipal Utility District	Operations
Dan Newton	City of Susanville	Public Works
Danny Cluck	US Forest Service	
Dean Growden	County of Lassen	Sheriff
Ed Merrill	Bureau of Land Management	
Eric Ewing	County of Lassen	OES
Gaylon Norwood	County of Lassen	Planning & Building
Ian Sims	Honey Lake Valley RCD	
James L Mackey	Susanville Indian Rancheria	Tribal Administration
James McCabe	Susanville Indian Rancheria	Emergency Services
James Moore	City of Susanville	Fire
Jessica Jones	County of Lassen	Public Health
Jim Uptegrove	City of Susanville	Police
John King	City of Susanville	Police
Lori Pini	Cal OES	Region 3
Maryann Kiar	County of Lassen	Public Health
Matt May	County of Lassen	Planning & Building
Matt McFarland	County of Lassen	Sheriff
Matt Wood	City of Susanville	Police
Michael Struve	County of Lassen	Public Health
Nancy McAllister	County of Lassen	Planning & Building
Pete Heimbigner	County of Lassen	Public Works
Sara Chandler	County of Lassen	Environmental Health
Stefano Richichi	County of Lassen	Planning & Building
Andy Petrow	Consultant	
Paula Schulz	Consultant	
John Rowden	Consultant	
Hope Seligson	Consultant	

3.2.2. Overview of the Meetings

The Steering Committee meetings were arranged and scheduled to follow the planning process steps outlined in the Overview; with each meeting designed to walk the members through sections of the HMP. In addition to reviewing and validating material, the intent was to also educate members on the planning process and purpose of each section. By taking this step, it helped ensure that each member would bring this knowledge back to their organizations and other stakeholders. **Table 3-2** provides a list and the main purpose of each of the meetings.

Table 3-2. Mitigation Advisory Committee (MAC) Meetings Summary

Date	Purpose
Nov 2016	**Meeting #1** • Introductions • Role of the Steering Committee • Overview of planning process and update requirements • Restructure/Reorganization of previous HMP • Discuss Public Outreach efforts • Next Steps
Jan 2017	**Meeting #2** • Recap of previous meeting • Review of the revised Table of Content • Review Planning Process Section • Discuss the Capability Assessment section • Discuss community hazards • Discuss Earthquake and Flood Scenarios • Identify Public Outreach target dates • Next Steps
Mar 2017	**Meeting #3** • Recap of previous meeting • Review of Capabilities Assessment Section • Discuss Hazard Assessments section • Review Critical Facilities • Prepare for Public Outreach meeting #1- project introduction • Next Steps
May 2017	**Meeting #4** • Recap of previous meeting • Review of Hazard Assessment Section • Present Initial Vulnerability Assessment results • Review Goals & Objectives • Next Steps

Date	Purpose
Jun 2017	**Meeting #5** • Recap of previous meeting • Review Vulnerability Results • Validate Hazard Ranking • Adopt Revised Goals & Objectives • Review previous mitigation strategies • Discuss new mitigation strategies • Next Steps
Jul 2017	**Meeting #6** • Recap of previous meeting • Review/Adopt Mitigation Actions List • Review Draft Mitigation Action Ranking (STAPLEE) • Establish Project Priorities • Validate Implementation Plan • Prepare for Public Outreach Meeting #2 • Discuss review and approval process

Discussions and results from each meeting were captured and incorporated into the LHMP where appropriate. Presentations of each meeting and the attendance logs can be found in **Appendix B**.

3.3. Public Outreach

There were two (2) different Public Outreach campaigns used during the Lassen County, City of Susanville, and the Susanville Indian Rancheria Local Hazard Mitigation Plan update process: the first informing the community of LHMP Update and the second educating the community of hazards. Community education of hazards is an ongoing campaign conducted by the jurisdictions that was leveraged during the LHMP update process. Below is a summary of the campaigns:

3.3.1. Informing the Community of the HMP Update Process

In late 2016, the Lassen County, the City of Susanville and the Susanville Indian Rancheria issued a joint press release announcing the commencement of the hazard mitigation planning process. This announcement invited the public to notify the City of their interest to participate in the planning process or submit comments.

In support of this announcement a Public Outreach meeting was held in March 2017 to introduce the community to the hazard mitigation planning process and to inform the community of the hazards the Steering Committee recommended be included in the LHMP. A second Public Outreach meeting was held in August 2017, to inform the community of recommended mitigation actions, provide an opportunity for their input on the mitigation actions, and to invite them to review and submit comments on the draft LHMP update.

Public Outreach meeting flyers were widely distributed throughout the three jurisdictions. Announcements were placed in the Lassen County Times, posted on the Susanville Stuff website,

posted at County, City and Rancheria public buildings, eight Post Offices throughout the county, and at two mini-marts.

Although well-announced, attendance was low at the Public Outreach meetings. Because of this, very few comments were received. The minor comments received reinforced concerns that had been raised by Steering Committee members related to addressing the seasonal flood risk on Carol Street in the City of Susanville, and the need for fire and flood evacuation planning for all three jurisdictions. The comments were shared with the Steering Committee members; and revisions were incorporated where appropriate. The public announcements and presentations for both meetings can be found in **Appendix C**.

3.3.2. Ongoing Public Outreach

Lassen County, the City of Susanville, and Susanville Indian Rancheria utilize several platforms to educate the public about hazards in the community, relevant programs to safeguard and protect themselves from the effects of the hazards, and actions they can take to prepare themselves for events. Below is a list of the different platforms used:

- County, City and Rancheria Emergency Preparedness Websites
- Social Media (Facebook, Twitter)
- Meetings/Workshops
- Public Service Announcements- radio and television
- Community Emergency Response Team Training (CERT)
- FireSafe Councils
- Evacuation training for Schools and Communities
- Weed Abatement campaigns
- Flood emergency awareness campaigns

Additional Lassen County, City of Susanville, and Susanville Indian Rancheria programs can be found in the Capability Assessment Section 4 of the LHMP.

Section 4. Capability Assessment

4.1. Overview

Lassen County is located in northeastern California. It is bordered on the north by Modoc County, on the south by Plumas and Sierra Counties, on the west by Shasta County, and on the east by Washoe County in the State of Nevada (**Figure 4-1**). Named after Peter Lassen and Lassen Peak, the County was formed in 1864. Lassen County has a total area of 3,001,780 acres (4,690.3 square miles). Over 63 percent of the land area in Lassen County is administered by Federal, state or local agencies. Portions of the Lassen National Forest, Lassen Volcanic National Park, Modoc National Forest, Plumas National Forest and Toiyabe National Forest are located in Lassen County.

Figure 4-1. Map of Lassen County

The City of Susanville is the only incorporated city in the county and serves as the County seat.

Incorporated in 1900 as a General Law city, Susanville is about 85 miles north-northwest of Reno, Nevada, on the eastern slopes of where the Sierra Nevada and the Cascade mountain ranges meet. Unincorporated communities include: Bieber, Clear Creek, Doyle, Herlong, Janesville, Johnstonville, Litchfield, Madeline, Milford, Nubieber, Patton Village, Ravendale, Spaulding, Standish, Termo, Wendel and Westwood. State Highway 36 leads west from Susanville to the Central Valley and the city of Red Bluff. State Highway 36 also leads eastward to Highway 395, then south to Reno, about a 1½ hour drive.

The Susanville Indian Rancheria is a federally recognized Indian Tribe in Northeastern California with aboriginal ties to the Mountain Maidu, Northern Paiute, Hammawi and Atsugewi Bands of the Pit River, and the Washoe Tribe. The Susanville Indian Rancheria currently consists of five (5) non-contiguous land bases (Lower Rancheria, Upper Rancheria, Herlong parcel, Ravendale parcel, and Cradle Valley parcel (Lassen/Plumas County); and totals 1,340 acres (1,100 trust; 240 fee) in Lassen County.

4.1.1. Physical Features

Lassen County is characterized by forest-covered mountains and plateaus roughly covering the western one-third of the County and sagebrush and juniper rangeland with a number of interspersed valleys covering the eastern two-thirds. Part of the Warner Range extends into northeastern Lassen County. Most of the large valleys are comprised of the remnants of ancient lake beds. The largest valley is the Honey Lake Valley in the south central part of the County, which extends into Nevada and joins Long Valley to the southeast. The Honey Lake Valley is generally considered to be part of the Great Basin. Another large valley consists of the Madeline Plains, which includes Grasshopper Valley. Big Valley is located in the northwestern part of the County. A portion of Fall River Valley extends into the northwestern part of the County from the west. Elevations range from 3,300 feet in the Fall River Valley to about 8,700 feet at Hat Mountain in the northeast comer of the County. Eagle Lake, located 16 miles north of Susanville, is the second largest natural lake located wholly within California. At an elevation of 5,100 feet, the lake covers 42 square miles and offers a variety of recreational resources and attractions.

Located in the south- central part of the county at an elevation of 4,240 feet above sea level, the City of Susanville straddles the Susan River which flows out of the mountains and drains southeastward into the Honey Lake Valley. West of Susanville, on both sides of the southeast-draining Susan River, foothills rise nearly 1,000 feet above the river valley to elevations of 5,000 to 5,200 feet. Susanville Peak, 3½ miles due north of the city, is 6,576 feet high; Diamond Mountain, 8 miles south of Susanville, is 7,738 feet above sea level; and, Thompson Peak, 13 miles southeast of Susanville and 3 miles southwest of Janesville, reaches elevations of 7,795 feet. Both Diamond Mountain and Thompson Peak straddle the Lassen County-Plumas County boundary. Mt. Lassen, a 10,437-foot volcano that last erupted in 1914 is located in Shasta County, 6 miles from the Lassen County line and approximately 50 air-miles from Susanville.

4.1.2. Climate

The climate of Lassen County is variable, but in general is characterized by warm dry summers and cold moist winters. Most of the precipitation falls between October and May. The average annual rainfall ranges from 4 inches along the Nevada border in the eastern Honey Lake Valley and increases going west to 48 inches near Juniper Lake in Lassen Volcanic National Park. Average daily temperatures range from 69.6 degrees Fahrenheit in July (although it is not uncommon to reach temperatures exceeding 90 degrees) to 20.4 Fahrenheit in January. The frost-free growing season ranges from 142 days at Susanville to 65 days in the Madeline Plains.

4.1.3. Population

As of January 1, 2016 estimated populations from the State Department of Finance are:

- Lassen County 30,780 (41% urban, 59% rural)
  - Unincorporated 15,064
  - City of Susanville 14,614
  - Susanville Indian Rancheria 450

The majority of residents (65%) fall between the ages of 18 to 65, followed by 22% under the age of 18, and 13% over the age of 65. Approximately 37% are female. The racial makeup of Lassen County was 25,532 (73.2%) White, 2,834 (8.1%) African American, 1,234 (3.5%) Native American, 356 (1.0%) Asian, 165 (0.5%) Pacific Islander, 3,562 (10.2%) from other races, and 1,212 (3.5%) from two or more races. Hispanic or Latino of any race was 6,117 persons (17.5%).

The 2010 Census reported that Lassen County had a population of 34,895. Based on the figures from the 2010 Census and the State Department of Finance estimates for 2015, the population of the county has decreased by about 4,250 people, a decrease of approximately 10%.

The table below (**Table 4-1**) represents the recent past and projected population projections for Lassen County. It should be noted that the total population figures given include an incarcerated population in the 2 state prisons and 1 federal prison located within the county. A more accurate view of the population that could potentially be affected by hazards is indicated by the household population.

Table 4-1. Projected Growth for Lassen County

	2010	2015	2020	2030	2040	2050
Total Population	34,895	32,092	36,247	37,490	39,073	39,891
Household Population	25,116	23,153	26,662	27,994	—	—

Source: California Department of Finance

Given the decrease in population it seems very unlikely that the projected populations for 2020 will be met, and the projected population for 2030 is also very much in question at this time.

4.1.4. Economy

Agriculture has long been identified as Lassen County's leading industry. In 2016, the gross dollar value of all agricultural commodities (including timber and cogeneration fuels) was estimated to be more than $125 million. Tourism and recreational activities also contribute to the local economy.

4.1.5. Employment

As of December 2016, according to the California Center for Jobs & the Economy, the unemployment rate in Lassen County stands at 6.7% which is higher than the statewide rate at 5%. The majority of jobs are in the governments sector at approximately 60%. Retail jobs follow at approximately 10% of jobs. Jobs related to accommodations and food service follow at less than 10% of jobs.

4.1.6. Historic/Cultural Resources

Because of the proximity of the Susan River, Honey Lake, and various other creeks, as well as the flat land near these water sources, the Susanville area is considered extremely sensitive for both historic and pre-historic resources.

The City of Susanville General Plan Land Use Element indicates there are 7 archaeological sites within the city limits and another 10 within one mile of the city limits, as recorded by the California Archaeological Inventory (CAI). There are also historically and culturally sensitive sites located within the Susanville Indian Rancheria. The Susanville Indian Rancheria is dedicated to the preservation of these sites and as a policy does not disclose information regarding the location of specific sites or general areas where they are present.

4.1.7. Land Use and Development

4.1.7.1 Lassen County

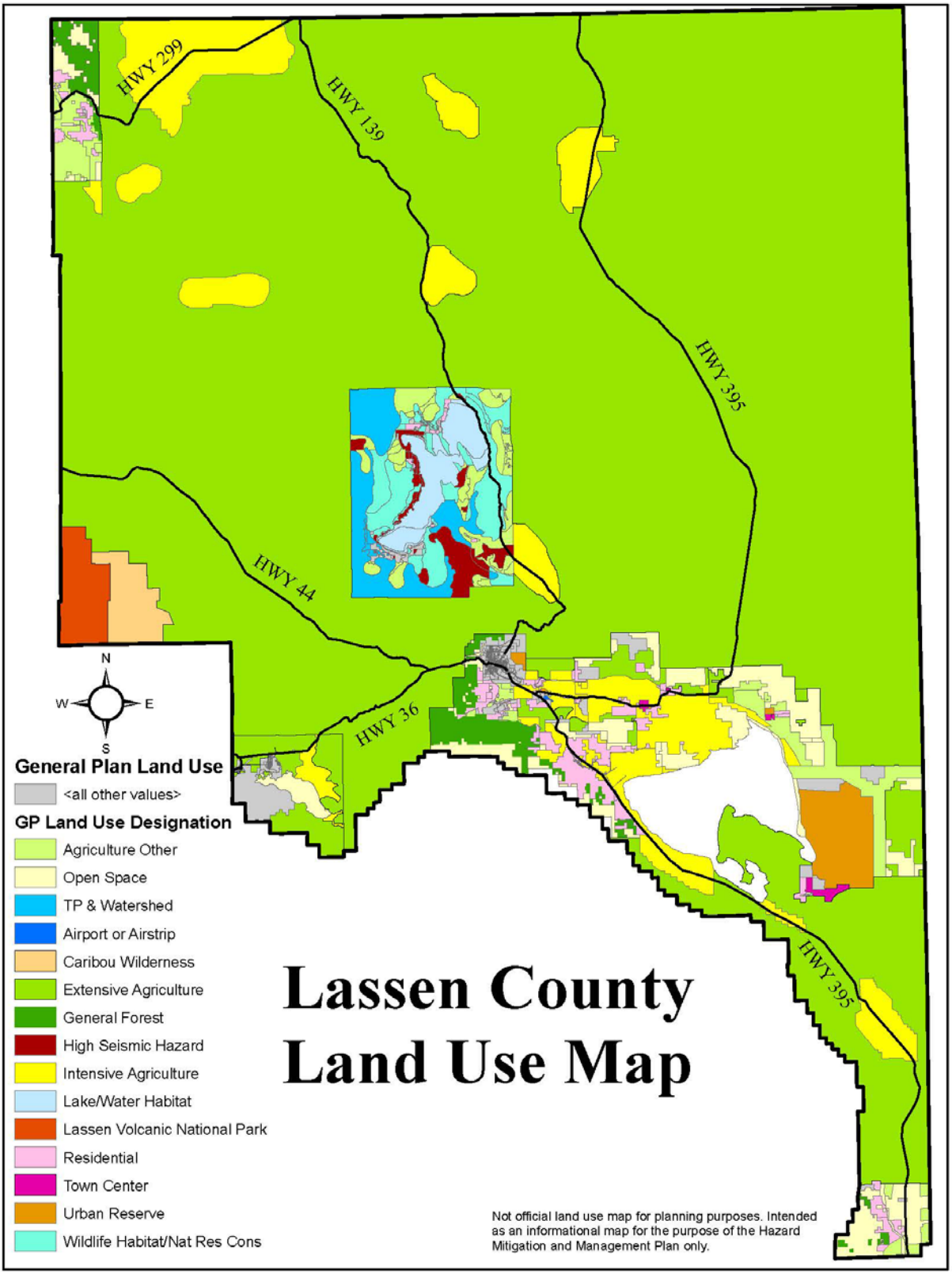
Table 4-2 provides a list of the Land Use designations for Lassen County as defined in the Lassen County General Plan. These designations are derived in an attempt to designate the proposed general distribution and intensity of uses within the county. **Figure 4-1** presents the proposed Land Use Map for Lassen County. Greater detailed information can be found in the Lassen County General Plan.

Table 4-2. Lassen County Land Use Designations and Building Density

Land Use Designation	Description	Building Density
Residential	Residential Centers	1 - 7.25
	Urban Residential	Low 1 - 7.25; High +8
	Estate Residential	.2 - 1
	Planned Development Residential	Average: 4
	Planned Development Option	Average: 4
	Rural Residential	.05 – .33
	Agricultural Residential	.025 – .05
Commercial	Commercial	1 - 7.25

	Business Park	1 - 7.25
	Neighborhood Commercial	1 - 7.25
	Highway Commercial	1 - 7.25
	Industrial (General)	1 - 7.25
	Industrial Park	1 - 7.25
Natural Resource	Intensive Agriculture	Not to Exceed: 0.025
	Extensive Agriculture	Not to Exceed: 0.025
	Open Space	N/A
	Scenic Corridor	N/A
	Conservation/Conservation Corridor	N/A
	Trail Corridor	N/A
Institutional	Governmental & non-governmental	Wide Range

Figure 4-2. General Plan Land Use- Lassen County



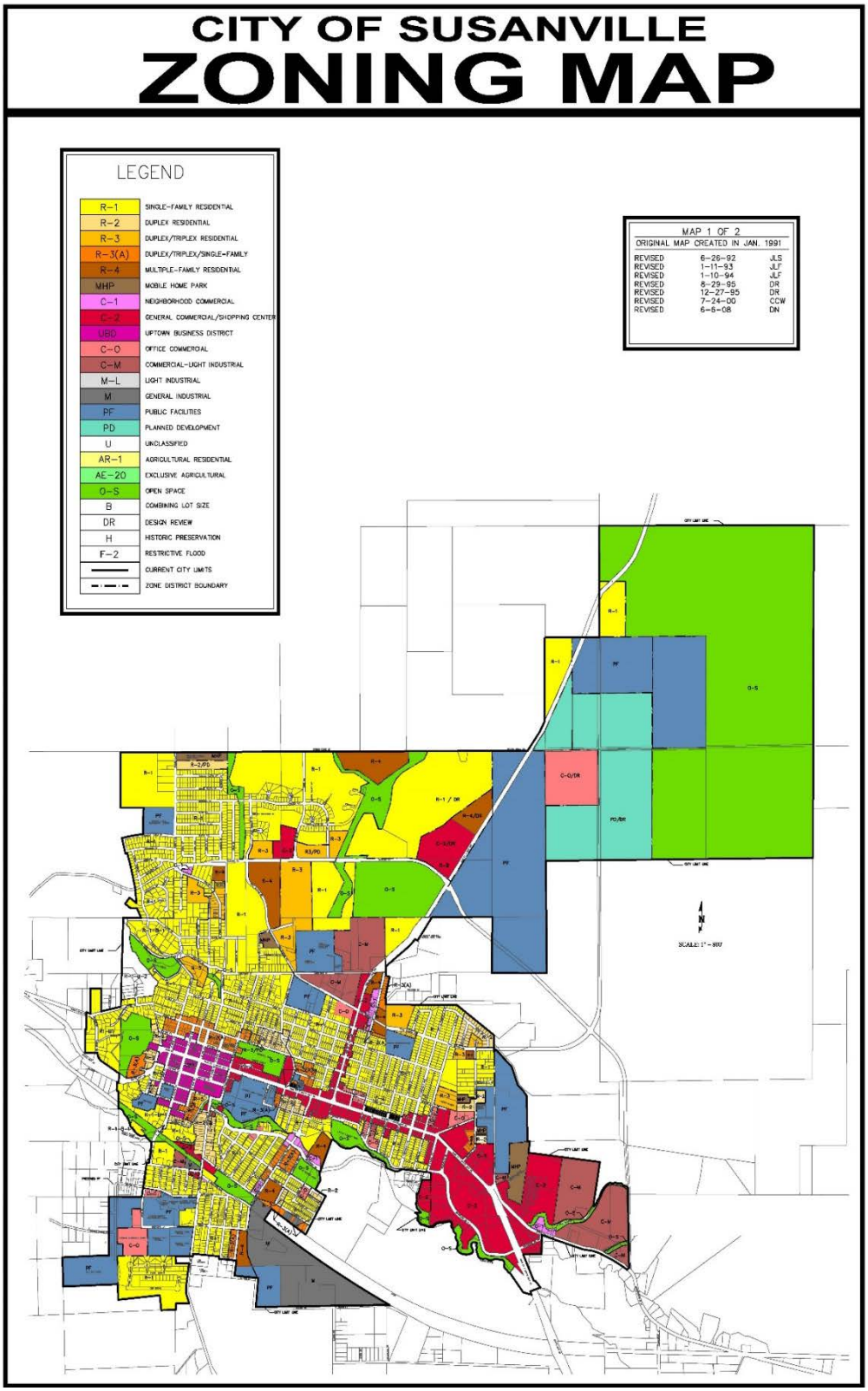
4.1.7.2 City of Susanville

All land within the Susanville planning area is grouped into categories (designations). **Table 4-3** presents the Land Use designation and **Figure 4-3** presents the distribution of Land Use designations within the city limits (Source: City of Susanville General Plan, Land Use Element). Both ensure a proper planning mechanism is in use for considerations of future planning and development, which allow for determining adjacent developments and acceptability of zone districts.

Table 4-3. City of Susanville Land Use Designations and Building Density

Land Use Designations	Description	Building Density
Residential	Single Family	0 - 7
	Duplex and Triplex	0 - 15
	Multiple Family	5 - 20
	Mobile Home Park	0 - 14
Commercial	Local/Neighborhood	5 - 20
	Commercial Office	5 - 20
	General Commercial/Shopping Center	5 - 20
	Mixed Use	5 - 20
	Commercial/Light Industrial	N/A
Industrial	Light Industry/Business Park	N/A
	Heavy/General	N/A
Agricultural	Agricultural Residential	0 - 2
Open Space	Resource Conservation	N/A
	Parks and Recreation	N/A
Public & Governmental	Critical Facilities	N/A

Figure 4-3. General Plan Land Use- City of Susanville



Because of regular flooding along the river, Susanville's earliest residential area was built on the high ground now known as Uptown. Originally, the center of the town was at Main and Lassen, but the development trend has been such that the commercial area has now extended eastward along Main Street about 2 miles. All new development, as well as redevelopment, or substantial improvement projects located in mapped flood zones are subject to the City of Susanville Floodplain Ordinance.

4.1.7.3 Susanville Indian Rancheria

The Susanville Indian Rancheria has a total of 222 acres that are either developed or partially developed. The land is held in three different parcels as follows:

- **Lower Rancheria:** The Lower Rancheria is the original 30 acre land base purchased in 1923 with funds from a congressional appropriation for the procurement of land for landless and homeless California Indians and today is utilized for housing, a health care facility, education facilities, gymnasium, administrative offices, a gaming facility, and a mini-mart. In 2001 the Susanville Indian Rancheria purchased 3.21 acres adjacent to the Lower Rancheria that was put into trust in 2003 and has since been developed for 12 additional tribal housing units.
- **Upper Rancheria:** The Upper Rancheria is a 120 acre parcel which was appropriated to the tribe by an act of congress in 1978 with help from Congressman Bizz Johnson and is located just north of Susanville city limits. The land is used for tribal housing, a public water system, and open space.
- **Herlong Parcel:** The Susanville Indian Rancheria acquired 72 acres from the Sierra Army Depot (SIAD) through the Base Realignment and Closure Act (BRAC) which was put into trust in 2000. The property consists of: 120 housing units, many of which were in disrepair when acquired; a commercial building; and open space adjacent to a railroad track. The Susanville Indian Rancheria currently operates a housing rental program and is investigating other economic development opportunities for the property.

4.1.8. Future Development

Limited growth has occurred within Lassen County in the past 5 years, and it is anticipated this trend will continue in the next 5 years. All future development proposed for Lassen County, the City of Susanville, and the Susanville Indian Rancheria will be reviewed to ensure that all relevant land use, zoning, building codes and environmental standards are met. In doing so, new projects, whether on vacant land or infill projects will not expose structures or population to potential hazards. Development on Susanville Indian Rancheria parcels which are in trust, is governed by federal statute. Parcels which are located within Lassen County or City of Susanville jurisdictional boundaries are governed by the jurisdiction in which they are located.

4.1.8.1 Lassen County

The Lassen County population in the unincorporated area has declined; however, based on recent population trends from 2010 to 2015 the population is expected to remain steady in the next 5-year time frame. Table 4-4 provides an overview of the available parcels within Lassen County.

Table 4-4. Available Parcels in Lassen County

Zoning	Vacant Acreage with Infrastructure
R-1 (Single Family Residential)	912.19
R-2 (Duplex Residential)	.58
R-3 (Duplex/Triplex Residential)	17.83
PUD (Planned Unit Development)	382.43
C-T (Town Center)	126.73
MU (Mixed Use)	87.26
Total	**1,527.02**

Source: 2014–2019 Lassen County Housing Element

4.1.8.2 City of Susanville

The City of Susanville population has increased at approximately 1-percent (1%) annually since 1990. This includes irregular growth patterns attributed to the construction of state prison facilities but does not include inmate population. Much of the City's growth has been associated with an increased employment base in government, education, and health care. While many parcels within the city could hold additional residential capacity, there is a limited supply of residential property that is ready for construction. Growth has been limited in recent years and has decreased some over the past 5 years despite improvements in the state and national economies. Table 4-5 provides an overview of the vacant acreage within the City and the associated planning zones. In addition to the land listed in the table there are 136 vacant infill parcels which can be developed with one dwelling per parcel.

All new development is required to comply with the State of California, Planning and Zoning Law, the Subdivision Map Act, any adopted Specific Plan and the California Environmental Quality Act.

Table 4-5. Available Parcels in City of Susanville

Zone District	Vacant Acreage without Environmental/ Infrastructure Constraints
R-1 (Single Family Residential)	98.00
R-1 B-1 (Single Family Residential)	1.80
R-2 (Duplex Residential)	7.08
R-3 (Duplex/Triplex Residential)	48.40
R-3A (Duplex/Triplex Residential)	3.58
R-4 (Multifamily Residential)	45.91
MHP (Mobile Home Park)	32.77
PD (Planned Development)	172.20

Zone District	Vacant Acreage without Environmental/ Infrastructure Constraints
Total	**407.94**

4.1.8.3 Susanville Indian Rancheria

- **Upper Rancheria:** In 2001, the Susanville Indian Rancheria purchased an additional 875 acres adjacent to the Upper Rancheria. This property was put into trust in 2004 and tribe plans to utilize the property for additional housing, economic development, renewable energy, and protection of cultural sites on the property. A Class III Archaeological survey performed in conjunction with an Environmental Assessment required to put the land into trust, revealed 72 sites potentially eligible for the National Register of Historic Places, many of which were petroglyph panels.
- **Ravendale Parcel:** Susanville Indian Rancheria was donated 80 acres east of Ravendale, CA (T35N, R16E, S1/2 of the SE1/4 of Sec. 36) in 1994. Buckhorn creek bisects the NW corner of the property which has steep slopes, sagebrush and western juniper habitats, and no road access. The Susanville Indian Rancheria has been discussing a possible land transfer to the Bureau of Land Management (BLM), which manages land adjacent to the property, in exchange for BLM managed lands adjacent to the Upper Rancheria and Highway 139.
- **Cradle Valley Parcel:** Susanville Indian Rancheria acquired 160 acres of forested property in Plumas County, completely surrounded by the Plumas National Forest, in 2003. The Susanville Indian Rancheria is currently developing a proposal to put this land into trust. The long-term goal for this property, executed through the Cradle Valley Indigenous Landscape Enhancement Project (CVILEP), is to return the property to pre-settlement conditions and develop a Cultural Retreat.

4.2. Administrative and Technical Capacity

The following are a list of the administrative and technical capacities for Lassen County, the City of Susanville and the Susanville Indian Rancheria which can assist with the implementation current and future mitigation strategies.

4.2.1. Roles of Departments & Agencies in Mitigation

This section includes a listing of local departments, agencies, and special districts that may have a role in developing and/or implementing hazard mitigation strategies, programs or projects. The focus is on Lassen County, the City of Susanville, and the Susanville Indian Rancheria capabilities. However due to the extensive amount of public lands located in Lassen County, a number of federal and state agencies are included as potential planning partners in hazard mitigation activities.

4.2.1.1 Lassen County Departments & Commissions

- **Administration Department:** The Administration Department is responsible for compilation, preparation, recommendation and presentation to the Board of Supervisors of the County Preliminary and Final Budgets on a yearly basis. In addition, the Department oversees the County's Information Services Department.

- **Agricultural Commission:** The Agricultural Commission promotes Lassen County agricultural production by protecting it from injurious pests and diseases, to ensure the safety and wholesomeness of food and other products for the consumer, and to build consumer and business confidence in the marketplace through the maintenance of equity.
- **Airports:** The Airports Department is responsible for the administration, operation and maintenance of Lassen County's four airports located throughout the County.
- **Buildings and Grounds:** The Roads Department provides funding for the maintenance of County road and bridge systems to safeguard the traveling public, and preserves the County's capital investment in the system.
- **Environmental Health:** The mission of Environmental Health is to protect, and promote public health and Environmental quality through the application of scientific principles, education, and the enforcement of applicable laws and regulations.
- **Grants and Loans:** The Grants and Loans Division is committed to community reinvestment through the use of Community Development Block Grant (CDBG) and HOME Investment Partnership Program (HOME) funds. The funds assist in improving the quality of life for all residents and business owners in Lassen County by providing businesses with technical assistance, homeowners the financing to complete the necessary repairs to bring a housing unit in compliance with all pertinent codes, affordable housing options, and to upgrade the infrastructure of disadvantaged rural communities.
- **Public Health:** The Public Health Emergency Preparedness Program plans response efforts to large-scale public health incidents. These emergencies could include a pandemic, anthrax attack, smallpox outbreak, earthquake, severe winter storm, and more.
- **Office of Emergency Services:** Provides for services in any extraordinary emergency situation associated with natural disasters, technological (man-made) emergencies, and war emergency operations in the Lassen Operational Area. Responsible for the policies, responsibilities and procedures required to protect the health and safety of the populace, public and private property and the environment from the effects of natural and human caused technological emergencies and disasters. Responsible for field response, Emergency Operations Center activities, and the recovery process.
- **Planning & Building Services:** Responsible for developing the County General Plan, including the Safety Element. Develops Area Plans and Zoning Maps. Provides planning and technical assistance to residents to ensure development projects are consistent with all applicable building codes and standards.
- **Public Works/Roads:** The Roads Department provides funding for the maintenance of County road and bridge systems to safeguard the traveling public, and preserves the County's capital investment in the system. The Planning and Building Director serves as the County Floodplain Manager.
- **Sheriff:** The Sheriff is responsible for a wide range of public safety services including managing a 911 dispatch center for both the city and county, providing search and rescue services and providing boating safety services on navigable waters.

4.2.1.2 City of Susanville Departments

- **Administration:** All public buildings, parks and all other public property, including the Susanville Municipal Airport and its operation, under the jurisdiction of the City Council are under the general supervision of the City Administrator. This department also oversees the

building and planning division and the finance division. Planning administers the General Plan, including Safety Element Updates. Reviews development plans within the City of Susanville. Develops and enforces zoning regulations and ensures all projects meet applicable public safety codes and standards. Building reviews all local construction projects to ensure they are consistent with all applicable building codes and standards. The Building Official serves as the City's Floodplain Manager. Parks & facilities operates, maintains and improves City owned parks and recreation facilities.

- **Fire:** Provides fire, rescue and emergency services to the Susanville community on a day to basis. Conducts emergency response activities in advance of hazard events to minimize life loss and property damage. Also provides fire prevention public education information, including vegetation management. Enforces fire safety codes and regulations.
- **Police:** Provides law enforcement services for the City of Susanville. Responds to emergencies caused by natural and manmade events.
- **Public Works:** Maintains and improves the condition of the City street and alley system, keeps drainage ways open and free of debris, maintains and operates all City controlled traffic signs, and pavement markings in a safe and effective manner, provides a safe and reliable public water and natural gas system, provides a local municipal airport and implements capital improvement projects. The Public Works Department also serves as the air pollution control district.

4.2.1.3 Susanville Indian Rancheria

- **Tribal Business Council:** The governing body of the Tribe, the Tribal Business Council is made up of elected officials. It sets tribal policy, including land use and development strategies for all tribal lands, and approves all plans, including emergency procedures, evacuation, and hazard mitigation plans.
- **Tribal Administrator:** Responsible for implementing Council policies and programs on a day to day basis.
- **Housing Authority:** Develops and administers housing programs to benefit the members of the Susanville Indian Rancheria.
- **Indian Health Care Center:** Provides public health services and health care to the Susanville Indian Rancheria.
- **Natural Resources:** To assess, protect, and enhance the Tribal and environmental resources (culture, language, land, air, water) on the ancestral homelands of the tribes and bands of SIR in order maintain a healthy community and to manage for multiple land uses.
- **Public Works:** Develops, implements, and maintains infrastructure and facilities located within the Rancheria lands. The Emergency Services Specialist (ESS) resides within the Public Works Department. The ESS develops emergency plans and procedures, participates in operational area and multi-jurisdictional hazard mitigation planning efforts.

4.2.1.4 Other Area Special Districts, State and Federal Agencies

- **Local/Regional**
  - Janesville Fire Protection District
  - Susan River Fire Protection District
  - Firenet/Lawnet Joint Powers Authority
  - Local Reuse Authority
  - Big Valley Pest Abatement District
  - Community Service Districts

- County Service Area #1
- Herlong Public Utility District
- Lassen Municipal Utility District
- Susanville School District
- Lassen High School District
- Resource Conservation Districts

- **State**
  - CalFire
  - CalTrans
  - Dam Safety
  - Fish & Game
  - Highway Patrol

- **Federal**
  - Bureau of Indian Affairs
  - Environmental Protection Agency
  - Bureau of Land Management
  - US Forest Service
  - Army Fire Department
  - Sierra Depot Police Department

4.2.2. Relevant Governance (plans, programs, regulations)

Lassen County, the City of Susanville, and the Susanville Indian Rancheria have many plans, programs and regulations that address disaster management in their respective jurisdictions. Some of them directly relate to hazard mitigation, such as the Public Safety Element of the General Plan, while others focus on different aspects of disaster management such as emergency response. Still others do not focus directly on disaster issues but have implications that are relevant to hazard mitigation, such as plans related to spending on public facilities. As part of the LHMP planning process, each of these plans, programs, and regulations were reviewed to identify relevant information to be incorporated into the LHMP Update, and to identify deficiencies which would impact proposed mitigation actions, or lead to the development of new mitigation actions.

4.2.2.1 Plans

- **General Plan:** California State law requires local governments to prepare a Comprehensive General Plan to address community policies and objectives that will guide the growth and physical development of the jurisdiction and the distribution of future land uses, both public and private. The policies of the General Plan are intended to underlie most land use decisions zoning and specific Plans, subdivisions, and capital improvements. Safety Elements of the General Plan are required to identify natural hazards, and develop policies to reduce the impacts of those hazards on the community. Lassen County and the City of Susanville periodically update their General Plans. The Susanville Indian Rancheria prepares a Master Land Use Plan to guide development within the Rancheria.
- **City of Susanville Community Fire Safe Plan 2006:** The City of Susanville Community Fire Safe Plan was utilized as the basis for the wildfire risk and vulnerability assessment. No changes have been made to this document since the adoption of the 2011 Hazard Mitigation Plan, however, the City has adopted the Very High Fire Hazard Severity Zone delineated within the city local response area by Division of Forestry/CalFire.

- **Lassen County Community Wildfire Protection Plan 2014 Work Plan:** This plan was developed by the Lassen County Community Wildfire Protection Plan (CWPP) Working Group to identify priority private, private-public and public agency fire mitigation projects within Lassen County. Three of the priority projects identified in the plan (Diamond Mountain, Little Valley, and Day Lassen Bench) have been funded through efforts by the Lassen County Firesafe Council, and are currently in progress.
- **CalFire Lassen Modoc Unit 2016 Fire Plan:** The Lassen Modoc Plumas Unit includes Lassen, Modoc and Plumas Counties and portions of Shasta and Siskiyou Counties. The Unit's Fire Management Plan is intended to provide information to CAL FIRE personnel, various County Boards of Supervisors, Firesafe Councils and other stakeholders focused on identifying specific problem areas and solving the mutually agreed upon fire issues.
- **Emergency Operations Plans:** Lassen County, the City of Susanville, and the Susanville Indian Rancheria maintain Emergency Operations Plans which include specific response procedures for earthquake, flooding, reservoir failure, fire, and other hazards. These plans are periodically updated to be consistent with all state requirements. The County Office of Emergency Services is currently leading the update of the Lassen Operational Area Emergency Operations Plan.
- **Urban Water Management Plan 2017:** The City of Susanville Urban Water Management Plan is updated every five years to monitor water supply issues and mitigate drought situations.
- **Groundwater Management Plan:** Lassen County serves as the Groundwater Sustainability Agency for Big Valley which has been designated as a medium priority groundwater basin under the Groundwater Sustainability Act. Under the Act, local GSA's have until 2022 to prepare a Groundwater Sustainability Plan for the basin. The county is currently seeking grant funds to support plan development.
- **Storm Water Resource Plan:** As a result of the regional flooding which occurred in January and February 2017, the Honey Lake Valley Resource Conservation District obtained funding from the State Water Board to develop the region's first Storm Water Resource Plan.
- **Capital Improvements Plan:** Lassen County, the City of Susanville, and the Susanville Indian Rancheria each maintain a Capital Improvements Plans (CIP) with projects that are budgeted for at least a five year period. Engineering mitigation projects are included within the Capital Improvements Plan. Additionally, the projects already included within the Capital Improvements Plan are reviewed for mitigation improvements (e.g., areas prone to flooding are configured with mitigation elements, new reservoirs are reviewed to ensure they configured with seismic flexible joints, current seismic design criteria is applied to pipeline construction, facility locations are reviewed for special hazards, etc.).

4.2.2.2 Programs

- **Lassen County Firesafe Council:** The Lassen County Fire Safe Council was formed in 2001 as a 501(c)(3) corporation. Its purpose is to make communities, neighborhoods and homes within Lassen County safe from wildfires. The Council works closely with public agencies, private landowners and the communities within Lassen County to identify, review, prioritize and implement fire mitigation projects. There are currently seven communities that have been organized and recognized by the Firewise Communities USA program.
- **Vegetation Management:** Lassen County, the City of Susanville, and the Susanville Indian Rancheria conduct vegetation management (e.g., vegetation removal, burning) to mitigate potential wildfire hazards.

- **Weed Abatement:** In order to minimize the potential for wildfires, Lassen County, the City of Susanville and the Susanville Indian Rancheria implement weed abatement programs.
- **Geographic Information Systems (GIS):** Lassen County, the City of Susanville and the Susanville Indian Rancheria have developed GIS databases to map and evaluate natural hazards (e.g., earthquake, flooding, etc.).
- **National Flood Insurance Program (NFIP):** Lassen County and the City of Susanville participate in the National Flood Insurance Program (NFIP). The Building Official is the designated floodplain manager in the City of Susanville. The City Engineer has also received floodplain management training. The Public Works Director is the designated floodplain manager for Lassen County. The Susanville Indian Rancheria is not in an NFIP designated floodplain, and therefore does not participate in the NFIP or have a designated floodplain manager.
- **Evacuation Plan:** Lassen County is currently developing an Evacuation Plan to systematically evacuate citizens from hazard areas.
- **Emergency Equipment Inventory:** Lassen County, the City of Susanville and the Susanville Indian Rancheria maintain emergency equipment and resources to enable a timely response and repair of assets to mitigate the overall impact of hazards on operations.
- **Back-up Power Generation:** Lassen County, the City of Susanville and the Susanville Indian Rancheria maintain appropriate back-up power generation at many, but not all critical facilities. Emergency power is available at the County and City Emergency Operations Centers and the Susanville Indian Rancheria Casino.
- **Emergency Preparedness Training:** Lassen County, the City of Susanville and the Susanville Indian Rancheria routinely conduct HazMat, NIMS, and SEMS training for employees, in addition to conducting exercises to simulate the response to a hazard event.
- **Hazardous Materials Response Team:** Due to concerns created by the transport of hazardous materials through Lassen County, the California Office of Emergency Services has provided a Hazardous Materials Response Vehicle and a 17 member response team designed to respond to events occurring in Lassen, Plumas, and Modoc counties.
- **Public Outreach:** Lassen County, the City of Susanville and the Susanville Indian Rancheria maintain Public Outreach through various activities and continue to improve and enhance the program.
- **CodeRED:** The Lassen County Sheriff's Office utilizes a public safety mass notification system to alert the public in emergencies, including flood, wildfire, and public health events.
- **Neighborhood Watch:** The Susanville Indian Rancheria, is implementing a "Neighborhood Watch" Program for residents of the Rancheria. Neighborhood Watch is set-up for the safety of the residents of Susanville Indian Rancheria. The Neighborhood Watch Program is a group of people living in the same area, who want to make the neighborhood safer by working together and in conjunction with the local law enforcement to reduce crime and improve their quality of life.

4.2.2.3 Municipal Codes & Ordinances

- **Lassen County**
  - Lassen County Code, Title 7: Health and Sanitation, Chapter 7.04 – Contagious Diseases
  - Lassen County Code, Title 9: Public Peace, Safety, and Morals, Chapter 9.16 – Fire Hazards
  - Lassen County Code, Title 12: Buildings and Construction, Article I – Building Code, Chapter 12.19 – Snow Load Design Standards

- Lassen County Code, Title 12: Buildings and Construction, Article I – Building Code, Chapter 12.26 – Flood Damage Prevention
- Lassen County Code, Title 12: Buildings and Construction, Article III – Storage of Hazardous Materials

- **City of Susanville**
  - Susanville Municipal Code, Title 8: Health and Safety, Chapter 8.12 – Open Burning
  - Susanville Municipal Code, Title 8: Health and Safety, Chapter 8.20 – Standards for Fire Protection Facilities And Water Flow
  - Susanville Municipal Code, Title 8: Health and Safety, Chapter 8.50 – Very High Fire Hazard Severity Zone
  - Susanville Municipal Code, Title 8: Health and Safety, Chapter 8.28 – Weed and Rubbish Abatement
  - Susanville Municipal Code, Title 15: Buildings and Construction, Chapter 15.24 – International Fire Code Adopted
  - Susanville Municipal Code, Title 15: Buildings and Construction, Chapter 15.40 – Floodplain Management
- **Susanville Indian Rancheria**
  - Tribal Environmental Policy Ordinance No. 2000-003
  - Housing Ordinance No. 2000-002
  - Discharge of Pollutants into the Waters of the Susanville Indian Rancheria Ordinance No. 2003 - 001

4.3. Fiscal Resources

4.3.1. Federal Funding Sources

- **Pre-Disaster Mitigation (PDM) Grant:** Pre-Disaster Mitigation (PDM) is administered in California by the Office of Emergency Services (OES), and was created when the Disaster Mitigation Act of 2000 amended the Stafford Act to provide a funding mechanism that is not dependent on a presidential disaster declaration.
- **Hazard Mitigation Grant Program (HMGP):** Hazard Mitigation Grant Program (HMGP) is authorized under Section 404 of the Stafford Act. The program provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. These funds are only available in states following a presidential disaster declaration. Eligible applicants include state and local governments, Native American tribes or other tribal organizations, and certain private non-profit organizations. Eligible projects must be proven to be cost-effective through a benefit /cost analysis.
- **Fire Protection & Safety (FP&S) Grants:** The Fire Protection & Safety (FP&S) Grant Program is administered by FEMA and supports projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations, firefighter safety and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire prevention and public safety education campaigns, juvenile fire setter interventions, media campaigns, and arson prevention and awareness programs.
- **Flood Mitigation Assistance (FMA) Grant Program:** FEMA provides funding to assist States and communities implement measures that reduce or eliminate the long-term risk of flood

damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

- **Urban Area Security Initiative (UASI) Grant Program:** The Urban Area Security Initiative (UASI) Grant Program is designed to set a strategic direction for the enhancement of regional response capability and capacity. Through Federal grant funding, UASI is tasked to reduce area vulnerability by strengthening the cycle of response and by ensuring that potential targets are identified, assessed and protected.
- **Hazardous Materials Emergency Planning (HMEP) Grant Program:** The Hazardous Materials Emergency Planning (HMEP) Grant Program is administered by the US Department of Transportation Pipeline and Hazardous Materials Safety Administration and provides financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training.
- **Emergency Operations Center (EOC) Grant Program:** Administered by FEMA and is intended to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, and interoperable Emergency Operations Center (EOC) with a focus on addressing identified deficiencies and needs.
- **Emergency Management Performance Grant (EMPG) Program:** States have the opportunity to use Emergency Management Performance Grant (EMPG) funds to further strengthen their ability to support emergency management mission areas while simultaneously addressing issues of national concern as identified in the National Priorities of the National Preparedness Guidelines.
- **Bureau of Indian Affairs (BIA):** Programs administered through the Bureau of Indian Affairs (BIA) include social services, natural resources management on trust lands, economic development programs, housing improvements, fire management, trail maintenance, disaster relief, replacement and repair of schools, repair and maintenance of roads and bridges, and the repair of structural deficiencies on high hazard dams.
- **Environmental Protection Agency (EPA):** Environmental Protection Agency (EPA) can assist Tribal Agencies with environmental concerns, environmental review of proposed actions, and Clean Water Act grants.
- **United States Forest Service (USFS):** United States Forest Service (USFS) by the Lassen County Resource Advisory Committee (RAC). Projects recommended by the RAC typically include trails reconstruction and maintenance, fish passage and waterway restoration, community wildfire fuels reduction efforts, conservation education programs, and noxious weed reduction efforts. Though projects may occur on both National Forest System and private lands in Lassen County, All RAC projects must show a clear benefit to the public lands.

4.3.2. State Funding Sources

- **Fire Safe California Grants Clearinghouse:** Various grant opportunities lay within this grant program to improve California's community wildfire preparedness. The California Fire Safe Council (FSC) in cooperation with its fellow member of the California Fire Alliance accomplishes its mission, to preserve and enhance California's manmade and natural resources, through public education programs and by funding community fire safety projects.
- **Infrastructure State Revolving Fund:** Provides low-cost financing for some infrastructure projects.

- **Proposition 50 Funds:** A variety of water projects can be financed through this program which is administered by the Water Resources Control Board.
- **Clean Water State Revolving Fund:** Provides low-interest loans related to water treatment projects.

4.3.3. Local Funding Sources

- **General Funds:** Lassen County and the City of Susanville adopt annual budgets which can support hazard mitigation projects through staffing and projects. Revenue sources for these jurisdictions are raised primarily through local taxes (sales, property, and transient lodging) and business license fees.
- **Capital Improvement Funds:** These funds may be used to support hazard mitigation projects and are provided through the annual budgeting process to support projects included in the community's 5-Year Capital Improvement Plan.
- **Special Assessments:** Local governments can also raise funds for mitigation projects through special assessments which can be adopted through the local voting process.
- **Community Development Block Grants:** These funds may be used for mitigation projects related to housing, economic development, public works, community facilities and public service activities serving lower income residents. Although the funds are administered by the Department of Housing and Urban Development, they are considered local funds once they are received and thereby are eligible to provide the 25 percent local match required for the receipt of federal grant programs.

Section 5. Hazards Assessment

5.1. Overview

The purpose of this section is to review, validate, and/or update the identified and profiled hazards in the 2011 Lassen County, City of Susanville, and Susanville Indian Rancheria Local Hazard Mitigation Plan (LHMP). The intent is to confirm and update the list of hazards to which the county is exposed and determine if the information is current and accurate. The importance of this is to ensure that all hazards are being considered and decisions are based on the most up-to-date information. Another purpose of this section is to screen the hazards. The screening of the hazards (ranking and prioritizing) will provide the jurisdictions with a better understanding of the significance of each hazard within their communities.

During the review and update, the Steering Committee addressed and discussed the following questions:

- Is this hazard still present and significant within each jurisdiction?
- Has the potential for the hazard changed including the severity and/or frequency?
- Should the ranking of the hazard be amended?
- Have conditions changed within each jurisdiction which would affect any aspect of the hazard ranking?

As part of process, the Steering Committee leveraged other planning efforts and documents, including the State of California Multi-Hazard Mitigation Plan, the Lassen County General Plan, the City of Susanville General Plan, and other documents containing updated information and best practices for hazards (i.e. FEMA, USGS, NOAA, USC).

5.2. Hazard Identification

Based on the review of the 2011 Lassen County, City of Susanville, and Susanville Indian Rancheria LHMP, incorporating information from other documents (i.e., the California State Multi-Hazard Mitigation Plan, local General Plans), and utilizing local experience and knowledge, the Steering Committee identified the following hazards as being relevant to the Lassen County, the City of Susanville, and the Susanville Indian Rancheria. (**Table 5-1**). The list includes the previous fourteen (14) hazards identified in the 2011 LHMP plus an additional six (6) hazards identified by the Steering Committee during the review process. Other statewide hazards were reviewed and deemed not to exist or pose a local significant risk. These include tsunami, coastal erosion, sea level rise, radiological accidents, marine invasive species, metal theft, and well stimulation/hydraulic fracturing.

Table 5-1. Relevant Hazards in Lassen County

Hazards	Lassen, County of	Susanville, City of	Susanville Indian Rancheria
Earthquake	■	■	■
Flooding and Levee Failure	■	■	
Wildfire	■	■	■
Landslide/Other Earth Movements	■	■	
Avalanche	■		
Drought/Water Shortage	■	■	■
Energy Shortage and Outages	■	■	■
Extreme Heat	■	■	■
Freeze	■	■	■
Severe Storms	■	■	■
Volcanos	■	■	■
Agricultural Pests and Disease	■		■
Dam Failure	■	■	
Infectious Disease	■	■	■
Hazardous Materials (incl. Oil Spill/Rail)	■	■	■
Natural Gas Pipeline Rupture/Storage Accident	■	■	■
Terrorism	■	■	■
Cyber Threat	■	■	■
Airline Crash	■	■	■
Civil Disturbance	■	■	■

5.3. Hazard Screening and Prioritization

The intent of screening hazards is to help prioritize which hazards create the greatest concern in the community. An alternative approach to the quantitative model used to rank hazards in the 2011 Lassen County, City of Susanville, and Susanville Indian Rancheria LHMP was used for the 2017 LHMP update. A summary of the process and the results of the hazard ranking are below:

5.3.1. Ranking Tool Design

The ranking tool prioritizes hazards based on two (2) separate factors:

1. Probability of the hazard affecting the community.
2. Potential impacts of the hazard on the community.

To further assist with the process; the following definitions of **High**, **Medium**, and **Low** probability and impacts were utilized:

Probability

High	Highly Likely/Likely
Medium	Possible
Low	Unlikely

Impact

High	Catastrophic/Critical: Major loss of function, downtime, and/or evacuations
Medium	Limited: Some loss of function, downtime, and/or evacuations
Low	Negligible: Minimal loss of function, downtime, and/or evacuations

For consistency, the County of Lassen, the City of Susanville, and the Susanville Indian Rancheria agreed to the following prioritization scheme for hazards (**Table 5-2**). The shading of the matrix boxes indicate the priority level: Red = Tier 1; Orange = Tier 2; and Gray = Tier 3.

Table 5-2. Hazard Prioritization Template

	High *Impact*	**Medium** *Impact*	**Low** *Impact*
High *Probability*			
Medium *Probability*			
Low *Probability*			

5.3.2. Hazard Prioritization

Based on the revised list of hazards and utilizing the ranking approach indicated above, the County of Lassen, the City of Susanville, and the Susanville Indian Rancheria screened the relevant hazards. The following table (**Table 5-3**) presents the results of the screening and ranking of each relevant hazard. The blank ranking (white boxes) indicate hazards not relevant to the community.

Table 5-3. Hazard Prioritization Results

Hazards	Lassen, County of	Susanville, City of	Susanville Indian Rancheria
Earthquake			
Flooding and Levee Failure			
Wildfire			
Landslide/Other Earth Movements			
Avalanche			
Drought/Water Shortage			
Energy Shortage and Outages			
Extreme Heat			
Freeze			
Severe Storms			
Volcanos			
Agricultural Pests and Disease			
Dam Failure			
Infectious Disease			
Hazardous Materials (incl. Oil Spill/Rail)			
Natural Gas Pipeline Rupture/Storage Accident			
Terrorism			
Cyber Threat			
Airline Crash			
Civil Disturbance			

5.4. Hazard Profiles

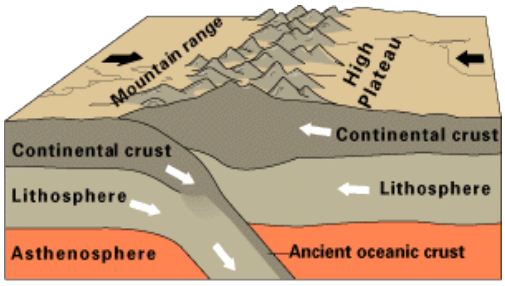
The information provided is intended to be an overview of each of the relevant hazards, which includes a brief description of the hazard, the location of potential risk, previous occurrences, and the probability of future events. More detailed information may be found in the State of California Multi-Hazard Mitigation Plan, the Lassen County General Plan, the City of Susanville General Plan, and other documents (i.e., local, state, federal and academic publications discussing specific hazards).

Based on the work done under Hazard Prioritization, there are seven (7) priority hazards- hazards categorized as "high". While there are profiles for each hazard evaluated, the seven (7) hazards will be the primary focus of the LHMP and as such, the majority of the mitigation actions will address their risk. The seven (7) priority hazards include: Earthquake, Flood, Wildfire, Drought, Energy Shortage, Severe Storms, and Hazardous Material Spills.

5.4.1. Earthquake

5.4.1.1 Description of Hazard

An earthquake is caused by a release of strain within or along the edge of the Earth's tectonic plates producing ground motion and shaking, surface fault rupture, and secondary hazards, such as ground failure. The severity of the motion increases with the amount of energy released, decreases with distance from the causative fault or epicenter, and is amplified by soft soils. After just a few seconds, significant earthquakes can cause massive damage and extensive casualties.



Continental-continental convergence

The severity of earthquake shaking at a given location is generally referred to as earthquake intensity. An intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and total destruction. The scale currently used in the United States is the Modified Mercalli Intensity (MMI) Scale (**Table 5-4**). It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. This scale is composed of 12 increasing levels of intensity, designated by Roman numerals that range from imperceptible shaking to catastrophic destruction. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects.

Table 5-4. Modified Mercalli Intensity (MMI) Scale

Intensity	Shaking	Description
I	Not Felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.

Intensity	Shaking	Description
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight
VII	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: USGS

However, most people are familiar with the Richter Magnitude scale, a method of rating the size of earthquakes based on the amplitude of seismic waves generated (**Table 5-5**). The Richter scale is logarithmic. Each one-point increase corresponds to a 10-fold increase in the amplitude of the seismic shock waves and a 32-fold increase in energy released. For an example, an earthquake registering 7.0 on the Richter scale releases over 1,000 times more energy than an earthquake registering 5.0. It should be noted that while an earthquake may have many intensity values across the impacted area, there is just one Richter magnitude associated with each event.

Table 5-5. Richter Scale and Associated Extent of Damage

Magnitude	Earthquake Effects
0-1.9	*Mirco*–Not felt by people
2.0-2.9	*Minor*–Felt by few people
3.0-3.9	*Minor*–Felt by some people, inside object can be seen shaking
4.0-4.9	*Light*–Felt by most people, inside object shake and fall
5.0-5.9	*Moderate*–Felt by everyone, damage and possible collapse of unreinforced buildings
6.0-6.9	*Strong*–Felt by everyone, widespread shaking/damage, some buildings collapse
7.0-7.9	*Major*–Felt by everyone, widespread shaking/damage, many buildings collapse
8.0 or greater	*Great*–Felt by everyone, widespread shaking/damage, most buildings collapse

Source: Various sources

Peak ground acceleration (PGA) is a measure of the strength of ground shaking across the impacted area. Larger peak ground accelerations result in greater damage to structures. PGA is used to depict the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 year return period. These values are often used for reference in construction design, and in assessing relative hazards when making economic and safety decisions.

In addition to ground shaking, earthquakes can also cause ground failure. These include: fault rupture, liquefaction, and landslides.

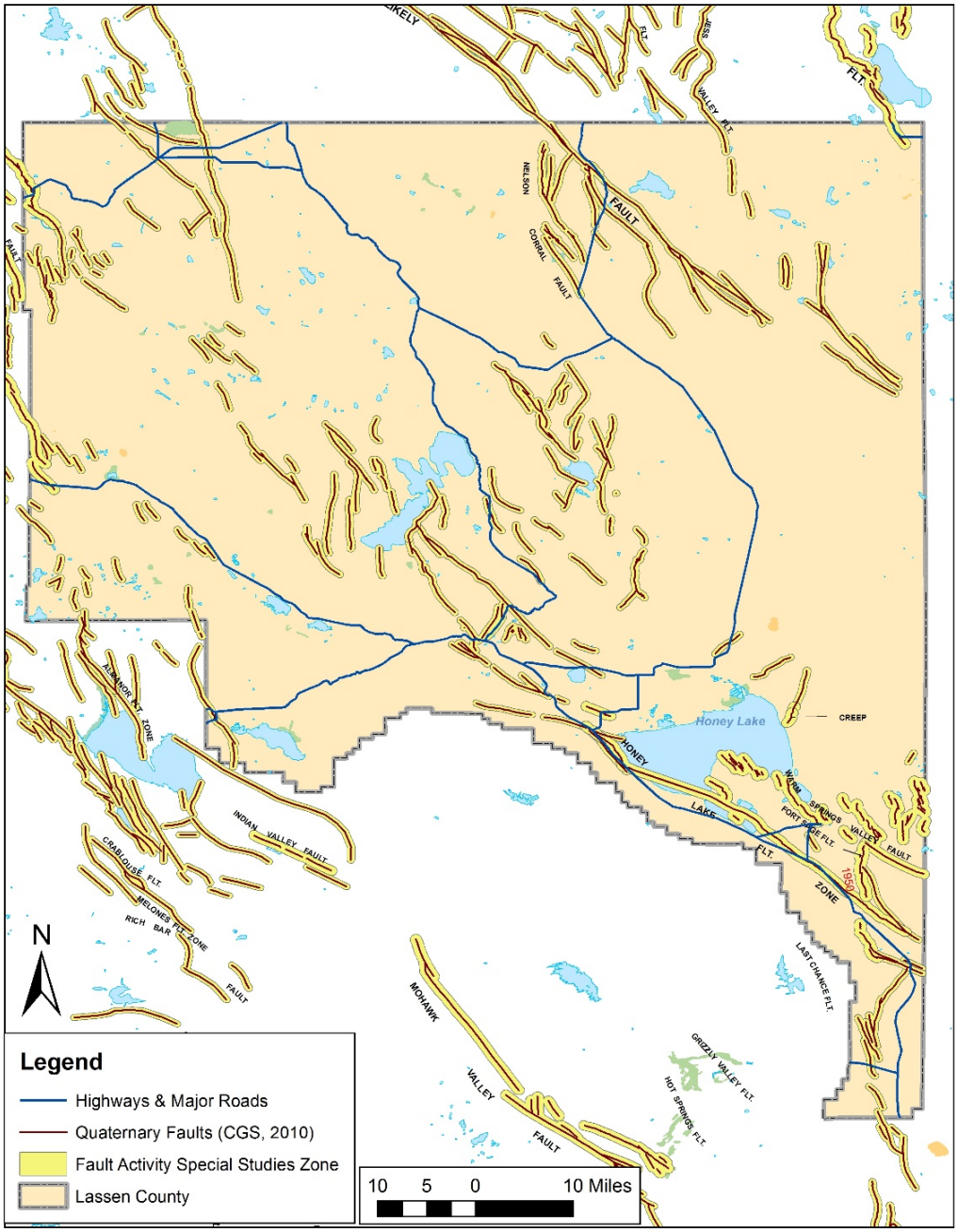
- **Fault Rupture.** The sudden sliding of one part of the earth's crust past another releases the vast store of elastic energy in the rocks as an earthquake. The resulting fracture is known as a fault, while the sliding movement of earth on either side of a fault is called fault rupture. Fault rupture generally begins below the ground surface at the earthquake hypocenter, typically between three and ten miles below the ground surface in California. If an earthquake is large enough, the fault rupture will reach the ground surface (referred to as "surface fault rupture"), wreaking havoc on structures built across its path. Recent large earthquakes in Turkey and Taiwan have shown that few structures built across the surface traces of faults can withstand the large displacements that may occur during an earthquake.
- **Liquefaction.** Liquefaction is the phenomenon that occurs when ground shaking causes loose, saturated soils to lose strength and act like a viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength or settlement. Lateral spreads develop on gentle slopes and entail the sidelong movement of large masses of soil as an underlying layer liquefies. Loss of bearing strength occurs when the soil supporting structures liquefy, causing the structures to settle, resulting in damage and, in some cases, collapse.
- **Landslides.** Landslides are the result of the down-slope movement of unstable hillside materials under the influence of weathering and gravity over time. Strength of rock and soil, steepness of slope, and weight of the hillside material all play an important role in the stability of hillside areas. Weathering and absorption of water can weaken slopes, while the added weight of saturated

materials or overlying construction can increase the chances of slope failure. Sudden failure can be triggered by heavy rainfall, excavation of weak slopes, and earthquake shaking, among other factors.

5.4.1.2 Location and Extent of Hazard in County

Figure 5-1 depicts the quaternary faults in Lassen County. Quaternary Faults are less than 1.8 million years old and are classified as "*potentially active*." A fault is considered "*active*" if displacement has occurred in the past 11,000 years; "*historic*" displacement is seismic activity which occurred within the past 200 years. Pre-quaternary faults are more than 1.8 million years old and are generally classified as "*inactive*" unless a detailed study concludes there is potential for activity.

Figure 5-1. Quaternary Earthquake Faults in Lassen County

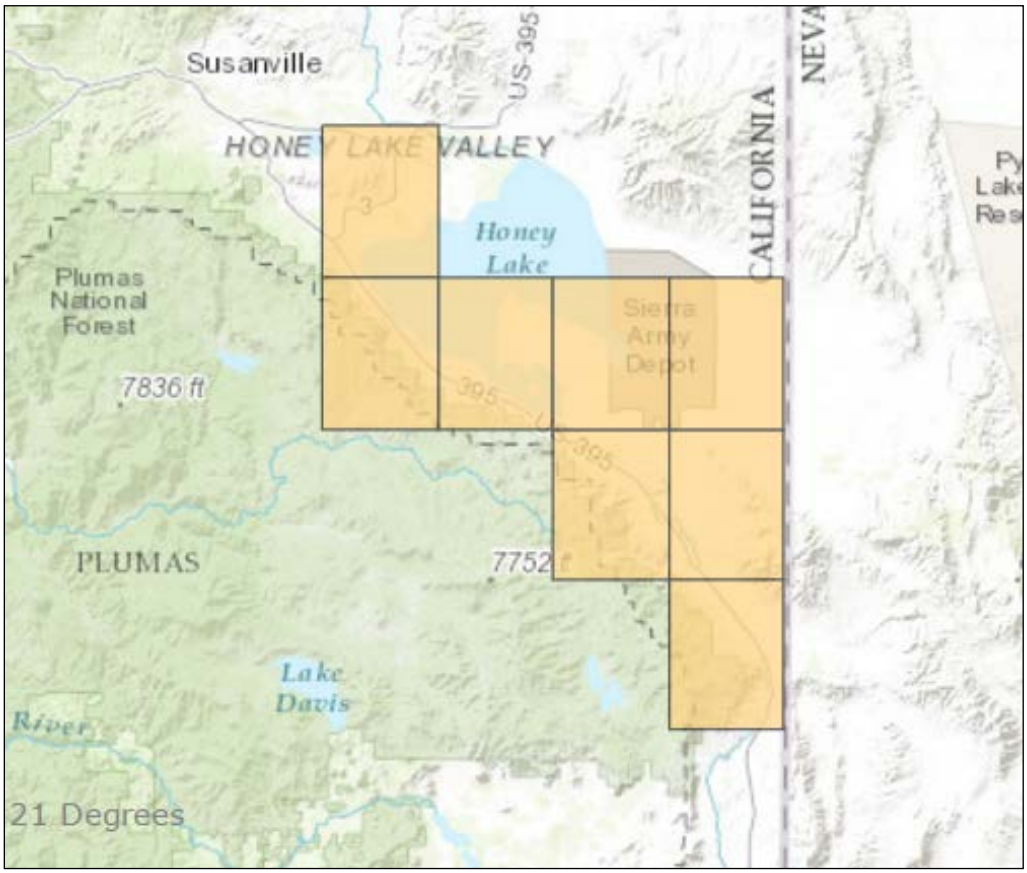


Source: California Geological Survey, Fault Activity Map of California, 2010

The City of Susanville is located within the Honey Lake Fault Zone. As mapped by the California Geological Survey, there are eight (8) quadrangle maps delineating Alquist-Priolo Earthquake Fault Zones in the Susanville area, as shown in the figure below (Figure 5-2). From top to bottom, left to right, these quadrangle maps are: Standish, Stony Ridge, Milford, Herlong, Calneva Lake, McKesick Peak, Doyle and Constantia. Properties in the earthquake fault zones are required to have a geological

evaluation prior to construction to avoid mapped fault traces of active faults. After earthquakes, some regions may be prone to fault ruptures, liquefaction, and landslides.

Figure 5-2. Quadrangle Maps Containing Earthquake Fault Zones in the Susanville Area



Source: California Geological Survey

5.4.1.3 History of Hazard in County

Historical records provide some limited information on earthquakes that impacted Lassen County prior to the widespread development of regional seismic networks. Five events are included in the USGS' "Seismicity of the United States, 1568-1989 (Revised)" (1993), as given in **Table 5-6.**

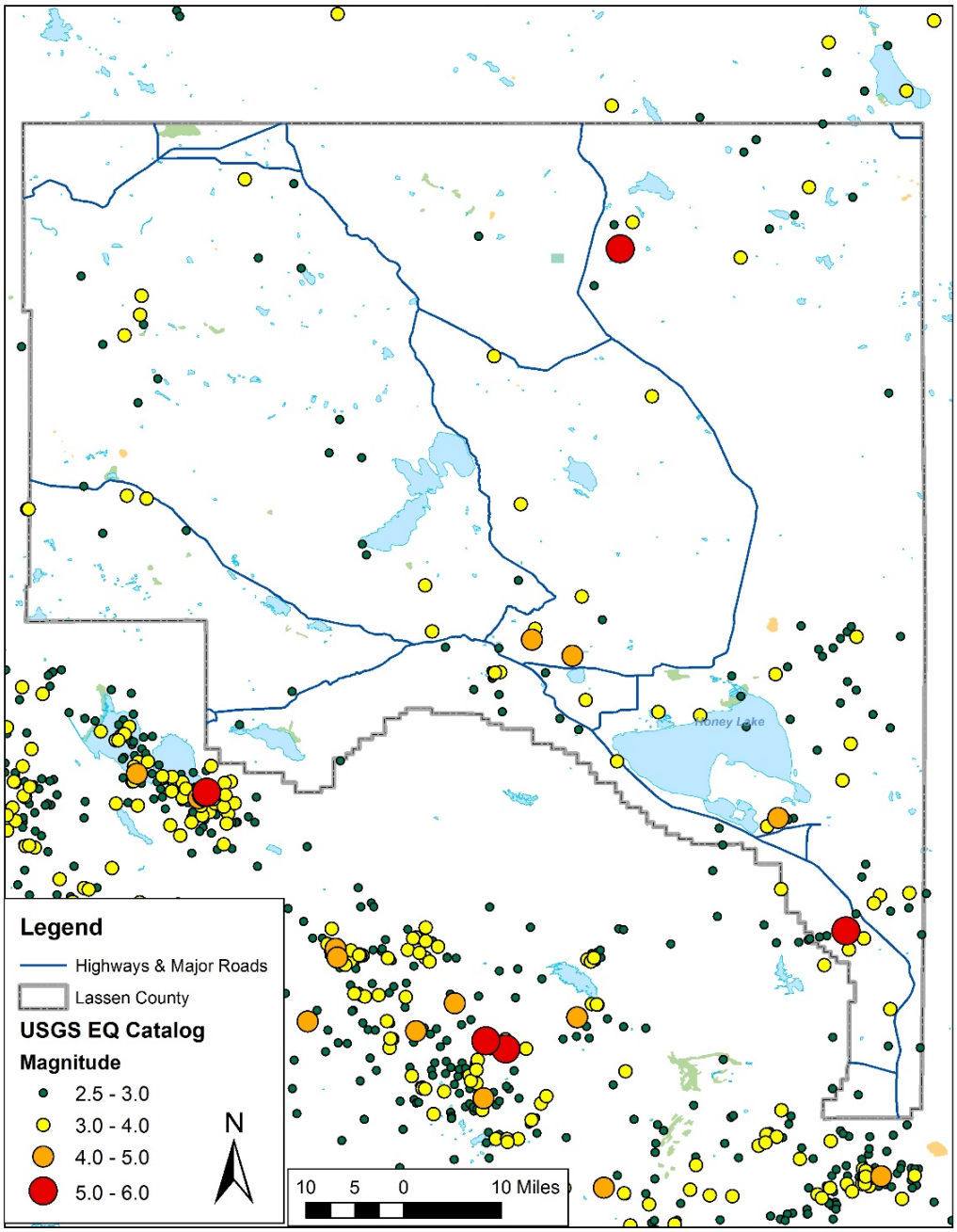
Table 5-6. Historic Earthquakes in the Vicinity of Lassen County

Magnitude	Date(s)	Location/Description
5.8 (est.)	1885-Jan 31	**Near Susanville.** Chimneys were damaged in the Honey Lake Valley towns of Buntingville and Susanville. Shocks were most severe near Janesville. Felt north to Alturas (Modoc County), south to Sacramento, and at a few towns in Nevada. More than 100 aftershocks were felt in the area to Feb. 8, 1885.
6.0 (est.)	1889-June 20	**North of Susanville.** The earthquake was most severe in the Susanville-Willow Creek area, where chimneys were thrown down, and the water in Eagle Lake was muddied. As many as 75 aftershocks occurred, 28 of which were felt within 2 hours of the main event. Felt north to Alturas (Modoc County), south to Sacramento, and east to Virginia City, Nev.
N/A	1908-Jan 27	**Honey Lake region.** Chimneys were toppled at Amedee and Milford in the Honey Lake region. Aftershocks were reported.
5.6	1950-Dec 14	**Near Herlong.** This main shock of a series caused considerable structural damage at Herlong. Many structures sustained cracks from about 0.3 to 0.6 cm in width to as much as 24 m in length. Many chimneys were broken, trusses and roof rafters were split, and several buildings were displaced on their foundations. Damage to water mains, steam pipes, and sewers also was reported. Felt from Alturas (Modoc County) south to Sacramento and east to Lovelock, Nev. Several foreshocks and aftershocks were felt in the area.
5.3	1979-Feb 22	**Honey Lake Valley.** This earthquake interrupted telephone service in the epicentral area but caused only minor property damage. Drywall was cracked at Doyle, near the Nevada border, and desks were displaced. The earthquake was felt over a large area of northeast California and western Nevada. It was preceded by a small foreshock and was followed by aftershocks through Feb. 23.

Source: USGS, 1993

Figure 5-3 depicts the USGS earthquake catalog of earthquakes occurring in the vicinity of Lassen County since 1973. The USGS earthquake catalog for the region includes more than 1,000 earthquakes within 50 miles of Lassen County, including five (5) events of Magnitude 5.0 or above, listed in **Table 5-7**, two (2) of which had its epicenter within Lassen County.

Figure 5-3. Recorded Earthquakes in the Vicinity of Lassen County



Source: USGS

Table 5-7. Recent Earthquakes of M5+ in the Vicinity of Lassen County Since 1973

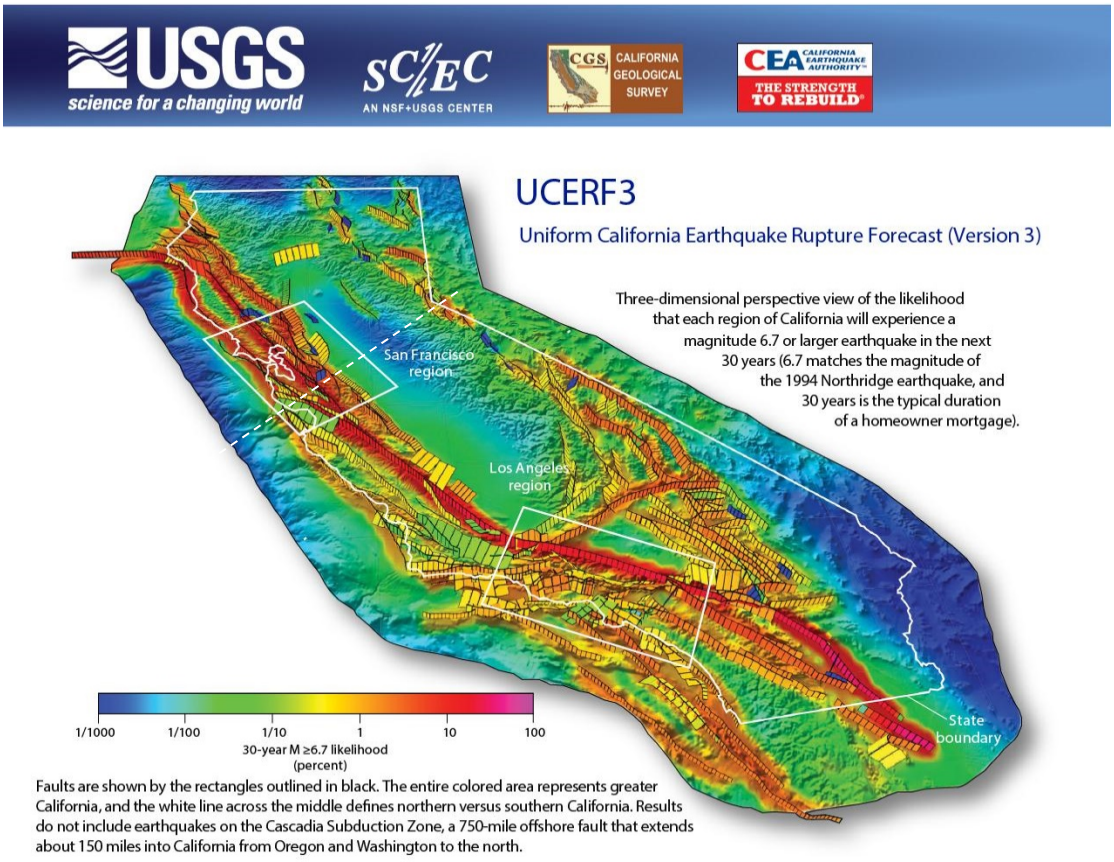
Magnitude	Date	Location/Description (when available)
5.7	2013-May 24	Plumas County/10 km WNW of Greenville CA (Canyon Dam earthquake)
5.3	1979-Feb 22	Lassen County/(see Table 5-6 for description)
5.2	2001-Aug 10	Adjacent to Lassen County
5.1	2008-Apr 26	Adjacent to Lassen County/1 km NW of Mogul, NV
5.0	1976-Nov 27	Lassen County

Source: USGS, 2015

5.4.1.4 Probability of Occurrence in County

The United States Geological Survey (USGS) and their partners, as part of the latest Uniform California Earthquake Rupture Forecast Version 3 (UCERF3; 2015), have estimated the chances of having large earthquakes throughout California over the next 30 years (**Figure 5-4**).

Figure 5-4. Rates for Earthquake of Magnitude 6.7 or Larger in the Next 30 years



Source: USGS, 2015

Statewide, the rate of earthquakes around Magnitude 6.7 (the size of the 1994 Northridge earthquake) has been estimated to be one per 6.3 years (more than 99% likelihood in the next 30 years); in northern California, the rate is one per 12 years (95% likelihood in the next 30 years). Northern California's rates are given in **Table 5-8**.

Table 5-8. Northern California Region Earthquake Likelihoods

Magnitude (greater than or equal to)	Average Repeat Time (years)	30-year likelihood of one or more events
5	0.24	100%
6	2.4	100%
6.7	12	95%
7	25	76%
7.5	92	28%
8	645	5%

Source: UCERF3, 2015

5.4.1.5 Climate Change Considerations

To date, no credible evidence has been provided that links climate to earthquakes; however, climate impacts are a significant consideration in the response and recovery efforts. Effects from climate change could create cascading complications and impacts. For example, if a significant earthquake causing damage to infrastructure such as water supply lines and storage tanks occurred during extensive drought conditions, efforts to fight post-earthquake fires or urban interface fires could be compromised. Conversely, if the earthquake were to occur during extended heightened rainfall or snowfall, landslides could occur hindering access, and prolong the need for long term sheltering of persons displaced from their housing. Damage to the power supply could be exacerbated by an increasing number of severe winter storms.

5.4.2. Flood

5.4.2.1 Description of Hazard

A flood is a general and temporary condition of partial or complete inundation on land that is normally dry. Several factors determine the severity of floods, including rainfall intensity and duration, antecedent moisture conditions, surface permeability, and geographic characteristics of the watershed such as shape and slope. Other causes can include a ruptured dam or levee, rapid ice or snow melting in the mountains, under-engineered infrastructure, or even a poorly placed beaver dam can overwhelm a river or channel and send water spreading over adjacent land or floodplains.

Floods can take several hours to days to develop; the following flood characterization designates the amount of time for response:

- **Flood Watch**—a flood is possible in the area.

- **Flood Warning**—flooding is already occurring or will occur soon in the area.
- **Flash Flood Watch**—a flash flood is possible in the area. Seek immediate shelter or higher ground.
- **Flash Flood Warning**—flooding is already occurring or will occur soon in the area. Flash floods can occur without warning, during heavy rain in mountainous regions ensure that precautions and flash flood warnings are adhered to.

Alluvial fan flooding occurs in the steep arid or semiarid mountains found throughout California. Alluvial fans are fan-shaped deposits of eroded rock and soil carried out of mountains and into valley floors by landslides, mudslides, mudflows, and surface runoff. At the beginning of the valley, alluvial fans are steep and narrow with boulders and other coarse material. The deposited material becomes increasingly fine as the gradient decreases and the material, mainly gravels, sand and mud, spreads. When rain falls, runoff from the canyon walls flows as a high-velocity sheet that channels into rivulets, and then to natural drainage courses. The rapidly moving water often carries large boulders and other material from the watershed depositing them into runoff channels, blocking the flow of water. Floodwater then spills out onto the fan, with each event finding a new channel that soon fills up with deposits and overflows. Flooding in alluvial fans often can cause greater damage than clear-water flooding.

A flash flood is a rapid flooding of low-lying areas, rivers and streams that is caused by the intense rainfall associated with a thunderstorm, or multiple thunderstorms. Flash floods also occur when a man-made structure, such as a dam, collapses. Flash flooding occurs when the ground under a storm becomes saturated with water so quickly that it cannot be absorbed. The runoff collects in low-lying areas and flows rapidly downhill. As a result, anything in its path is suddenly in rising water. A typical flash flood begins with a slow moving thunderstorm. This usually takes longer to move out of the affected areas and causes the area to endure a greater amount of rainfall for a longer period of time. In addition, a thunderstorm may pass over an affected area repeatedly, dumping even more rainfall. A large amount of rainfall in a short time can result in flash flood conditions, as can a dam failure or other sudden spill. The National Weather Service's definition of a flash flood is a flood occurring in a watershed where the time of travel of the peak of flow from one end of the watershed to the other is less than six hours.

The heavy rainfall associated with these storm systems contributes to urban flooding in a number of ways. Primarily, heavy rainfall will often overwhelm the capacity of the conventional drainage system made up of storm drains, catch basins, sewers, and additional natural mechanisms for storm-water management. These systems typically cannot handle more than one or two inches of rainfall per hour before they begin to backup and overflow. This amount is further diminished if the storm drains, and other components of the storm-water management system, have not been adequately maintained, are clogged with debris such as trash or natural waste, or are old and in a state of disrepair. Heavy rainfall, combined with storm-water runoff, can cause local waterways to rise and overflow their banks.

Within Lassen County, the Susan River is a major source of flooding. Because of this, steps have been taken to develop categories of flooding (**Table 5-9**).

Table 5-9. Susan River Flood Categories

Stage	Flood Level (feet)
Major Flood	14
Moderate Flood	13
Flood	12
Action	10.5

Source: Lassen County

5.4.2.2 Location and Extent of Hazard in County

The geographical location, climate, and topography of Lassen County makes some portions of the county prone to flooding. However, due to its geographic location, the Susanville Indian Rancheria expects minimal impacts due to flooding hazards. Floods within Lassen County area are classified into three types. The first consists of those that occur during late fall and winter, primarily as a result of prolonged rainstorms. The second type occurs during spring and early summer, mainly as a result of snowmelt from the Sierra Nevada Mountains. The third type occurs during summer as a result of intense convective rainstorms. The most significant flood-producing rainstorms are those that occur during fall and winter.

Lassen County and the City of Susanville do not have a well-developed flood protection system. As a result, flooding often occurs along many streams, damaging agricultural and urban properties and causing channel and bank erosion. Although many valleys and rivers in the county could be subject to flooding, flooding and erosion are particularly serious along the Susan River. This is supported by the fact that historical records indicate that the Susan River is the primary source of flooding within Lassen County. The Susan River (approximately 40 miles long) crosses the southern portion of Lassen County and drains into Honey Lake. The table below (**Table 5-10**) provides the Susan River flood level and the expected damage within the County.

Table 5-10. Susan River Flood Levels

River Level (feet)	Description
10.5	Those along river should begin careful monitoring of river and keep informed of forecast updates. Localized minor lowland flooding below Susanville in Johnstonville, Leavitt Lake, Standish, and Litchfield rural areas.
11.0	Local minor lowland flooding below Susanville in Johnstonville, Leavitt Lake, Standish, and Litchfield rural areas.

River Level (feet)	Description
11.5	Localized minor to moderate lowland flooding below Susanville in the Johnstonville, Leavitt Lake, Standish, and Litchfield rural areas.
12.0	Flood Stage. Several homes on Carroll Street in Susanville begin to flood. Local flooding in Susanville from Lassen Street downstream along Riverside Drive, especially below Piute Creek which enters river near Alexander Drive. Moderate lowland flooding below Susanville in Johnstonville, Leavitt Lake, Standish, and Litchfield areas. Some rural roads affected by flooding.
12.5	Minor to moderate flooding in Susanville from Lassen Street downstream along Riverside Drive. Several homes along river affected, especially on Carroll Street. Moderate lowland flooding below Susanville in Johnstonville, Leavitt Lake, Standish, and Litchfield areas. Rural roads and bridges begin to flood in these areas.
13.0	Moderate flooding in Susanville from Lassen Street downstream along Riverside Drive. Some homes along river have moderate flood affects, especially on Carroll Street. Significant lowland flooding below Susanville in Johnstonville, Leavitt Lake, Standish, and Litchfield areas. Rural roads and bridges in these areas flood. Similar to flood of 3/13/1983.
13.5	Moderate to major flooding in Susanville, Johnstonville, Leavitt Lake, Standish, and Litchfield. Susanville flooded from Lassen Street downstream along Riverside Drive and from Cornell/River Street on north to Hood Street/Sunkist Drive on south. River up to bottom of Lassen Street bridge. Many homes along river have minor to moderate flooding. Many roads and bridges in the Honey Lake Valley area flood, with moderate transportation impacts. Similar to 3/30/1974 and 1/21/1969 floods.
14.0	Major flooding in Susanville, Johnstonville, Leavitt Lake, Standish, and Litchfield. Susanville flooded from Lassen Street downstream along Riverside Drive and from Main St (Highway 36) on north to railroad tracks on south. Many homes, businesses, schools, roads, and bridges in the Honey Lake Valley area flooded. Serious transportation impacts. Impacts to power, phone, and rural water systems begin. Similar to 2/24/1958 flood.
14.5	Major flooding in Susanville, Johnstonville, Leavitt Lake, Standish, and Litchfield areas in Honey Lake Valley. Susanville flooded from Lassen Street downstream along Riverside Drive and from Main Street (Highway 36) on north to railroad tracks on south. Serious flood impacts to homes, businesses, schools, roads, and bridges throughout Honey Lake Valley. US Highway 395 flooded. Serious transportation impacts, moderate impacts to power, phone, and rural water systems. Similar to 12/23/1955 flood.

River Level (feet)	Description
15.0	Major flooding in Susanville, Johnstonville, Leavitt Lake, Standish, and Litchfield areas. Major flooding in Susanville from Lassen Street downstream along Riverside Drive, and from Main Street (Highway 36) on north to railroad tracks on south. Serious flood impacts to homes, businesses, schools, roads, and bridges throughout Honey Lake Valley. US Highway 395 flooded. Serious transportation, power, phone, and rural water system impacts. Similar to 1/31/1963 and 1/13/1980 floods.
16.0	Extensive flood damage from Susanville to Honey Lake. Serious flood impacts to homes, businesses, schools, roadways, and bridges in flood plain throughout Honey Lake Valley. Transportation impacts may be serious as US Highway 395 and Highway 36 are flooded. Extensive power, phone, and rural water system impacts. Similar to 11/23/1981 flood.
16.5	Extensive flood damage from Susanville to Honey Lake with flooding of homes, businesses, schools, roadways, brides, and water systems in flood plain throughout Honey Lake Valley. Extensive transportation, power, phone, and rural water system impacts. US Highway 395 and Highway 36 flooded. Similar to 11/23/1981 flood.
17.0	Flood disaster from Susanville to Honey Lake. Extensive flooding of homes, businesses, schools, roadways, bridges, and water systems in flood plain throughout Honey Lake Valley. Transportation very difficult as US Highway 395 and Highway 36 flooded or washed out. Extensive power, phone, and rural water system impacts. Slightly less severe than floods of 12/22/1964, 2/17/1986, and 1/02/1997.
17.5	Near record flooding from Susanville to Honey Lake. Extensive damage to homes, businesses, schools, roadways, bridges, and water systems in flood plain throughout Honey Lake Valley. Transportation in valley very difficult as US Highway 395 and Highway 36 flooded or washed out. Extensive power, phone, and rural water system impacts. Similar to floods of 12/22/1964, 2/17/1986, and 1/02/1997.
18.0	Near record flooding from Susanville to Honey Lake. Extensive damage to homes, businesses, schools, roads, bridges, and water systems in flood plain throughout Honey Lake Valley, including Susanville area. Transportation in and out of Honey Lake Valley cut off as US Highway 395 and Highway 36 flooded or washed out. Extensive power, phone, and rural water system impacts. Only exceeded by flood of 1/24/1970.

River Level (feet)	Description
18.5	Record flooding from Susanville to Honey Lake. Extensive damage to homes, businesses, schools, roads, bridges, and water systems in flood plain throughout Honey Lake Valley, including Susanville area. Transportation in and out of Honey Lake Valley cut off as US Highway 395 and Highway 36 flooded or washed out. Extensive power, phone, and rural water system impacts. Only exceeded by flood of 1/24/1970.

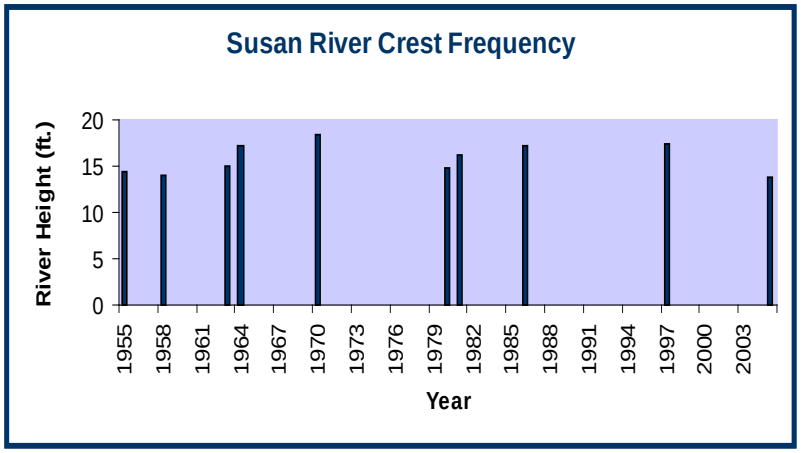
Source: Lassen County

5.4.2.3 History of Hazard in County

The City of Susanville's location on a bench above the Susan River and Piute Creek generally protected it from flooding during the early years of its development. However, there were recorded floods during years of heavy rain, including the winters of 1907, 1938, and 1955. According to the National Oceanic and Atmospheric Administration (NOAA) National Weather Service Advanced Hydrologic Prediction Service for the Susan River, the following are the most significant flooding events and the associated flood levels (**Table 5-11**):

Table 5-11. Significant Flooding Events and Associated Flood Levels- Susan River

Date	Feet
12/23/1955	14.40
02/24/1958	13.93
01/31/1963	15.10
12/22/1964	17.23
01/24/1970	18.47
01/13/1980	14.85
11/23/1981	16.30
02/17/1986	17.26
01/02/1997	17.31
12/31/2005	13.89
02/09/2017	15.19



Source: NOAA

Additionally, to indicate the potential for a flooding event, the table below (**Table 5-12**) lists an excerpt of large-scale flooding events and associated damage in Lassen County that have resulted in a presidential emergency declaration.

Table 5-12. Historical Records of Large Floods in Lassen County

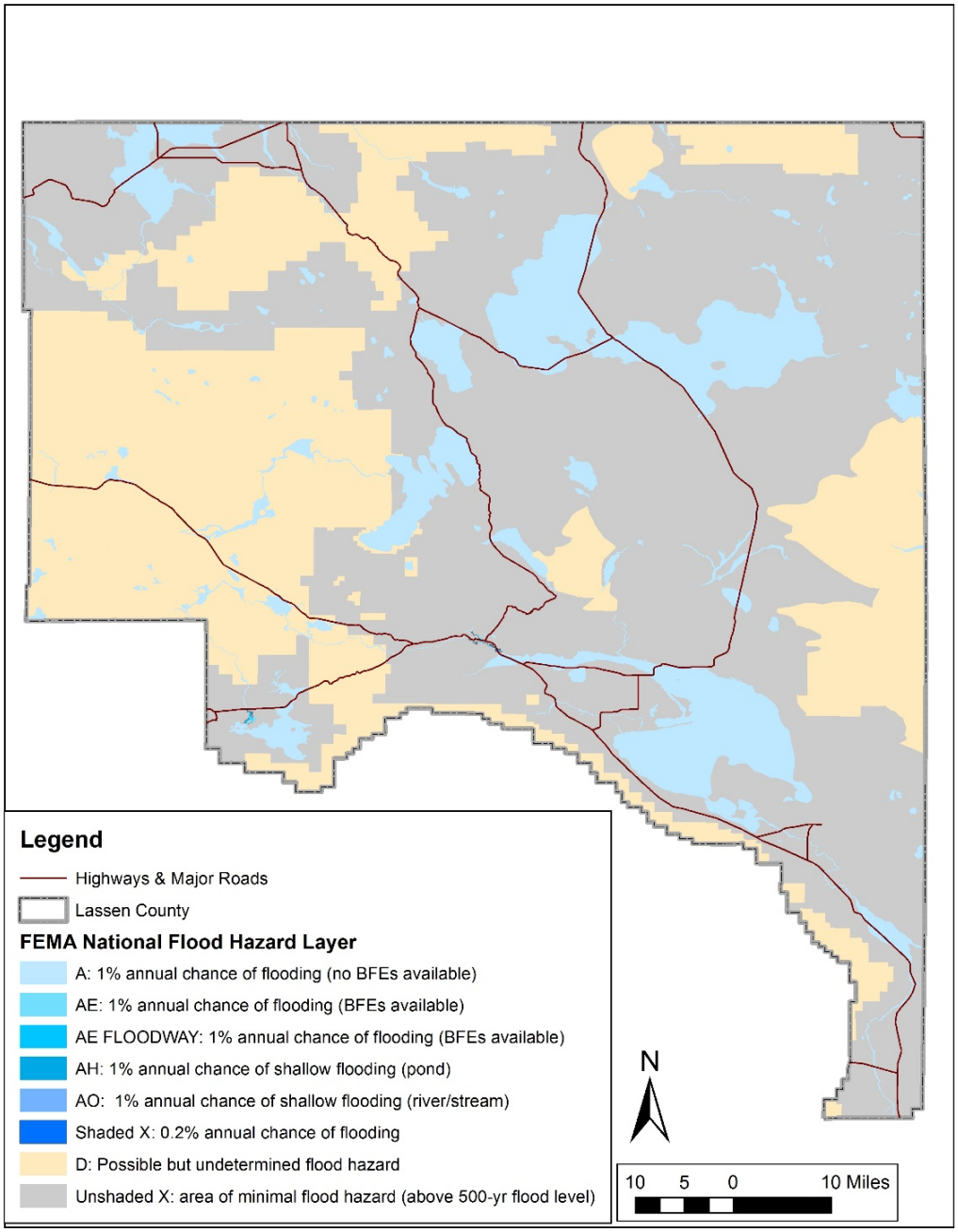
Date	Injuries	Fatalities	Property Damage	Crop Damage
12/18/1964	1.96	0.64	$1,785,714	$178.57
01/08/1973	0	0	0	$35,714
01/16/1973	0	0	$86,206	0
02/18/1986	0	0	$500,000	0
02/14/1992	0	0	$9,090	0
12/10/1992	0	0	$1,315.79	0
03/01/1995	0	0	0	$11,241,379
01/01/1997	0.22	0	$36,670,000	0
12/31/2005	0	0	$500,000	0
02/09/2017	0	0	$800,000*	0

**Estimated damage for City of Susanville as of 5/1/17*

5.4.2.4 Probability of Occurrence in County

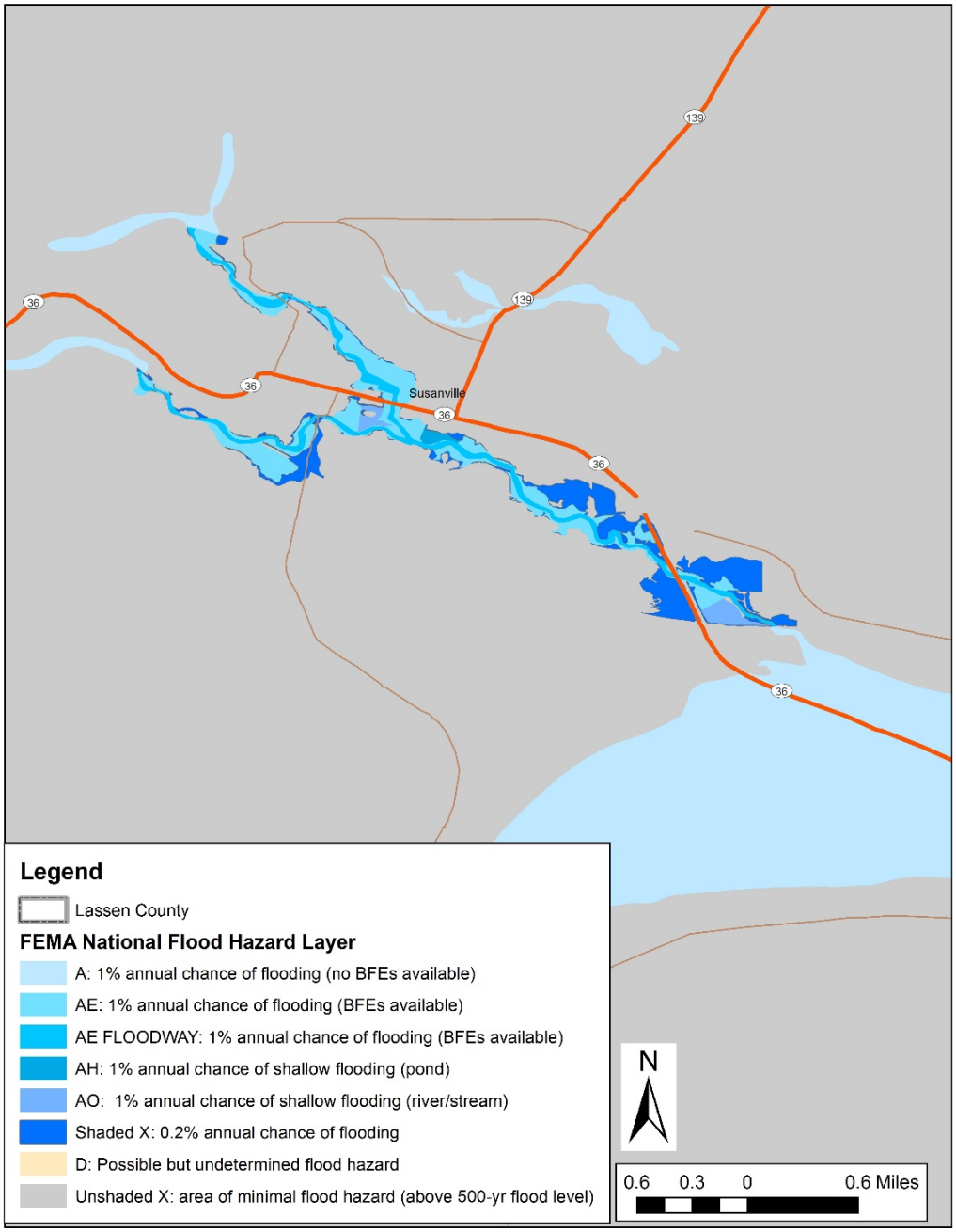
The probability of flooding in Lassen County is shown in **Figure 5-5**; and the City of Susanville on **Figure 5-6**. The maps show the location of the flood hazard layers (zones) in Lassen County and Susanville. The flood hazard zones depicted on the map are derived from FEMA's Flood Insurance Rate Maps (FIRM) and indicate the probability of flooding happening over a given period of time. Zone A, AE, AE Floodway, AH, and AO (lighter shades of blue) indicate a 1% annual chance of flooding; while Zone Shaded X (dark blue) indicates a 0.2% of annual chance of flooding. Complete definitions of flood zone designations are provided in **Table 5-13**.

Figure 5-5. FEMA National Flood Hazard Layer- Lassen County



Source: FEMA

Figure 5-6. FEMA National Flood Hazard Layer- City of Susanville



Source: FEMA

Table 5-13. FEMA Flood Zone Designations

Risk Level	Flood Zone	Description
High	A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
	AE	The base floodplain where base flood elevations are provided.
	AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
	AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
Moderate to Low	X (Shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods.
	X (Unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.
Undetermined	D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

Source: FEMA

5.4.2.5 Climate Change Consideration

Climate change is both a present and future threat. Extreme weather events have become more frequent over the past 40 to 50 years and this trend is projected to continue. Rising temperatures and changing rainfall (distribution and intensity) are expected to cause a significant amplification to many existing hazards and conditions. Because of this, climate change might impact the frequency, intensity and distribution of flood hazards.

5.4.3. Wildfire

5.4.3.1 Description of Hazard

Wildfires can be classified as either a wildland fire or a wildland-urban interface (WUI) fire. Urban fires, while present in the area, are not considered under the LHMP. In both wildland and WUI wildfires, fire behavior is dictated by conditions and/or significantly contributing factors:

- **Slope/Topography:** As slope increases, the rate of fire spread increases. South facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying fire behavior.
- **Fuel:** Weight and volume are the two methods of classifying fuel, with volume also referred to as fuel loading. Each fuel is assigned a burn index (the estimated amount of potential energy released during a fire), an estimate of the effort required to contain a fire, and an expected flame length.
- **Weather:** Variations in weather conditions have a significant effect on the occurrence and behavior of fires. Hot, dry conditions, and heavy winds can significantly enhance wildfire spread and complicate response and recovery efforts.

Fuel will affect the potential size and behavior of a wildfire depending on the amount present, its burning qualities (e.g. level of moisture), and its horizontal and vertical continuity. Topography affects the movement of air, and thus the fire, over the ground surface. The terrain can also change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather as manifested in temperature, humidity and wind (both short and long term) affect the probability, severity, and duration of wildfires.

Another contributing factor is fire suppression sources not being able to easily suppress and control the fire. The cause of a majority of wildfires is human-induced or lightning; however, earthquakes or floods have the potential to rupture buried gas lines, and high winds or accidents could cause overhead electric lines to break, creating ignition sources for wildfires.

Wildfires involve situations where fire occurs in an area that is relatively undeveloped except for low density and basic infrastructure such as roads and power lines. A WUI fire includes situations in which a wildfire enters an area that is developed with structures and other human developments. In WUI fires, the fire is fueled by both naturally occurring vegetation and the urban structural elements themselves. According to the National Fire Plan issued by the U.S. Departments of Agriculture and Interior, the wildland-urban interface is defined as "*…the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.*" The WUI fire can be subdivided into three categories (NWUIFPP, 1998): classic wildland-urban interface, mixed wildland-urban interface, and occluded wildland-urban interface.

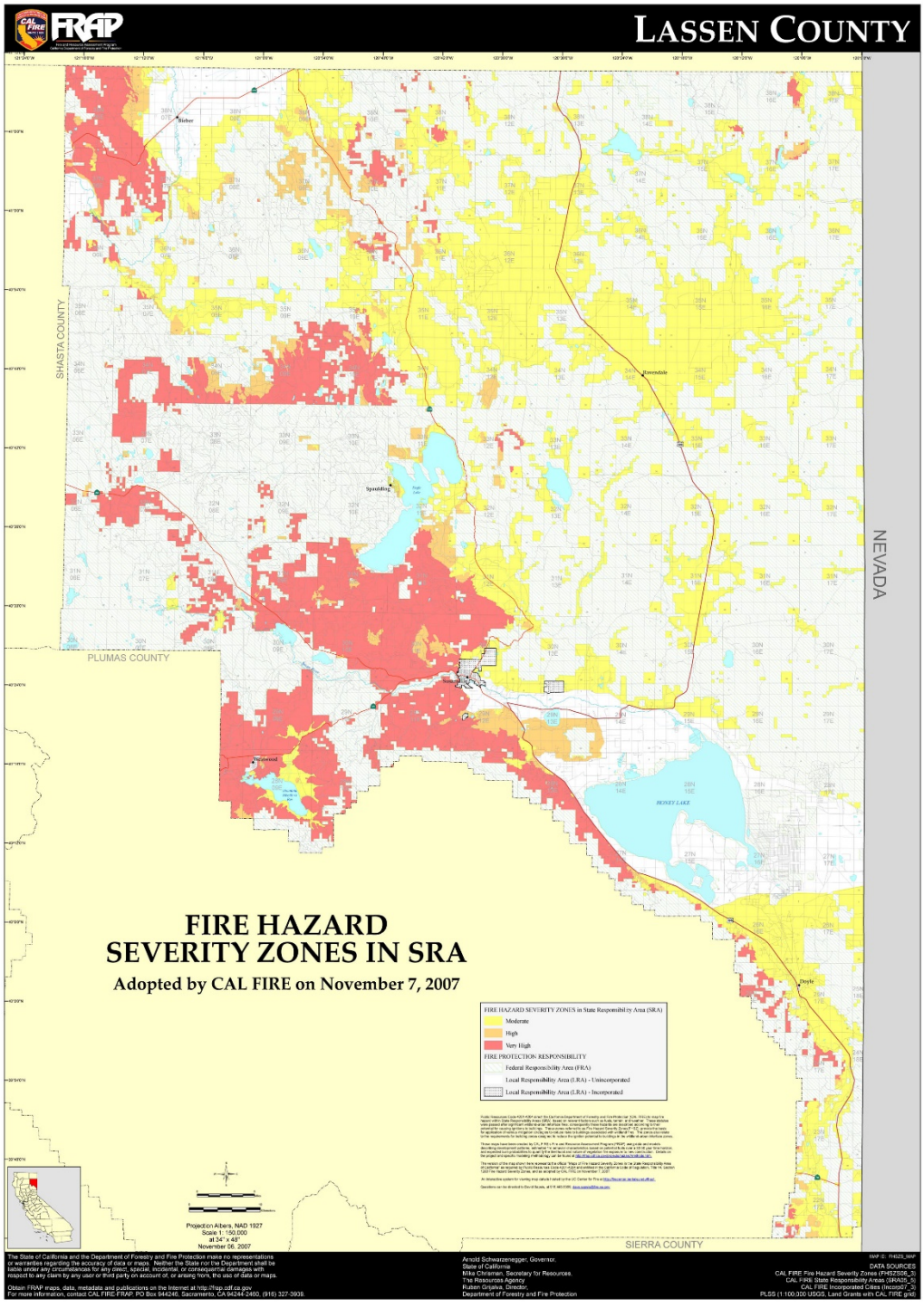
The classic wildland-urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas. The mixed wildland-urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings. The occluded wildland-urban interface exists where islands of wildland vegetation occur inside a largely urbanized area.

The aftermath of a wildfire can be as disastrous if not more so than the wildfire. A particularly destructive fire burns away plants and trees that prevent erosion. If heavy rains occur after such a fire, landslides, ash flows, and flash floods can occur. This can result in property damage outside the immediate fire area, and can affect the water quality of streams, rivers and lakes. Additionally, heat and heavy smoke from wildfires can create public health issues and impact certain operations (i.e., aviation).

5.4.3.2 Location and Extent of Hazard in County

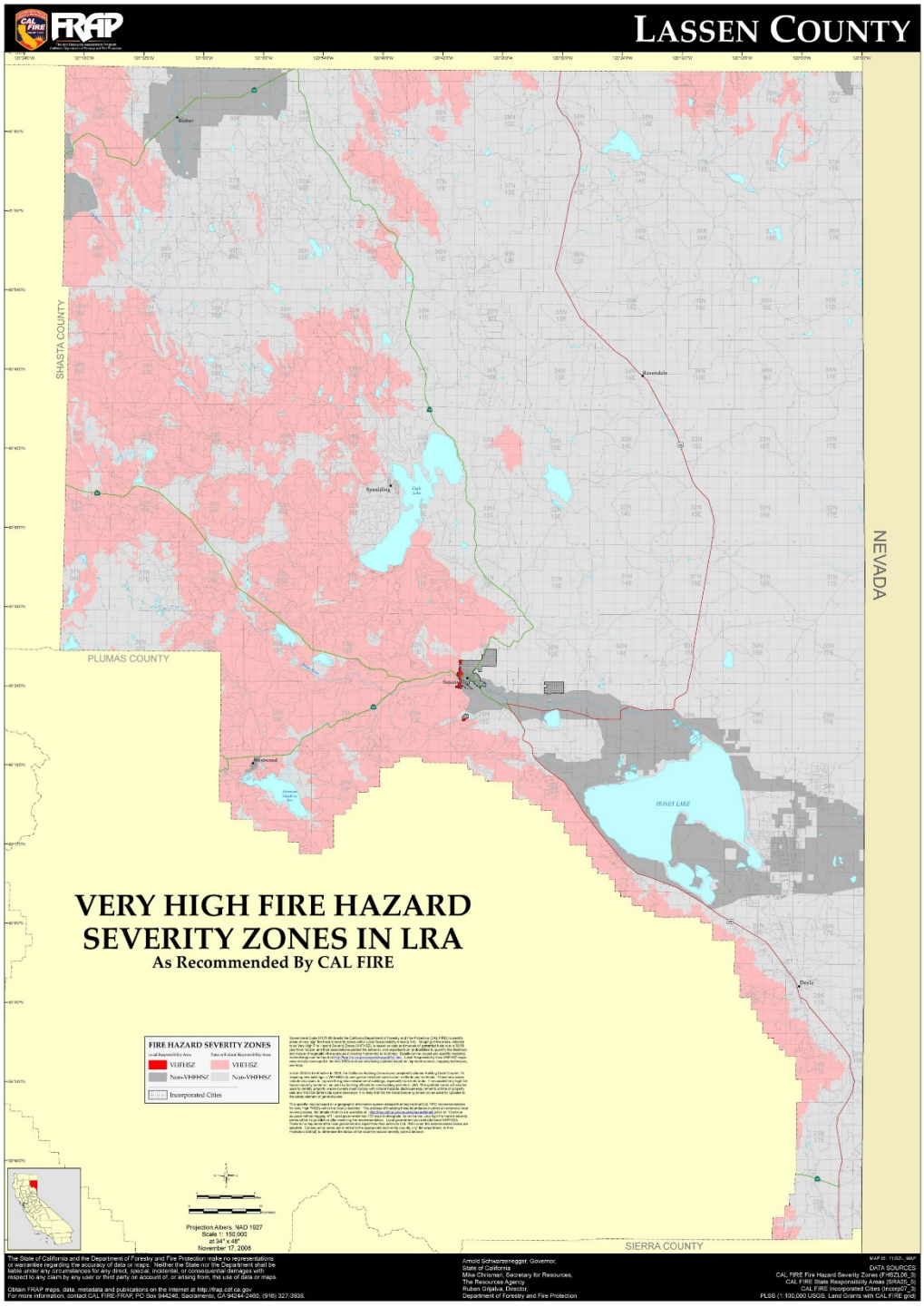
The climate, topography, and vegetation in Lassen County is conducive to wildfires. California Department of Forestry and Fire Protection, Fire Resource Assessment Program (CDF-FRAP) was mandated to map areas of significant fire hazards based on fuels (vegetation), terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones, define the application of various mitigation strategies to reduce risk associated with wildland fires. The most current mapping efforts by CDF-FRAP were conducted in 2007. **Figure 5-7** shows the Fire Hazard Severity Zones under State and Federal responsibilities in Lassen County and **Figure 5-8** shows the Fire Hazard Severity Zones under local responsibilities in Lassen County.

Figure 5-7. Fire Hazard Severity Zones- State Responsibility Areas



Source: California Department of Forestry and Fire Protection

Figure 5-8. Fire Hazard Severity Zones- Local Responsibility Areas



Source: California Department of Forestry and Fire Protection

5.4.3.3 History of Hazard in County

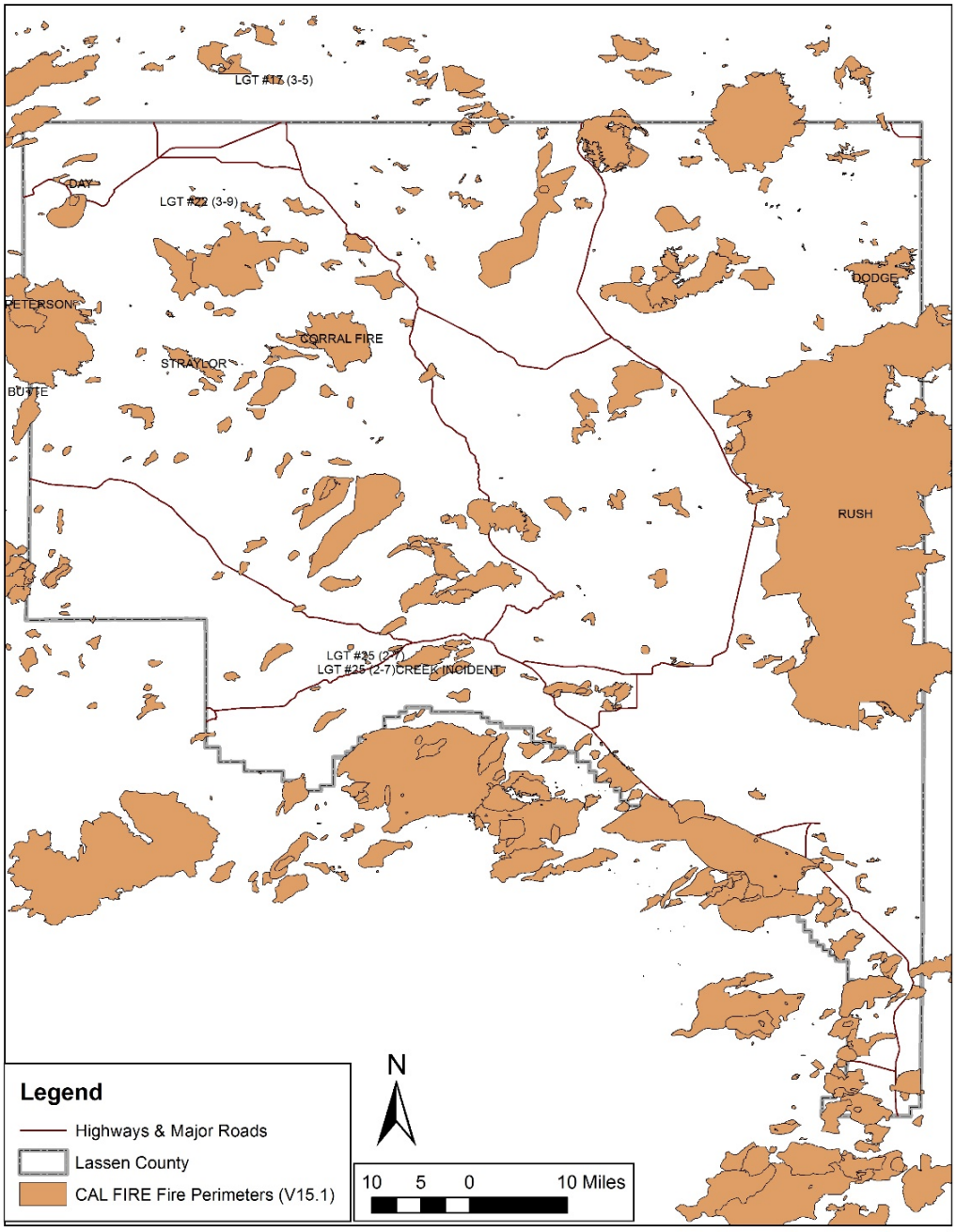
Lassen County is subject to periodic wildland fires. **Table 5-14** depicts the major wildfire history in Lassen County; while **Figure 5-9** depicts the location of the recent wildfire perimeters for the major wildfires listed in **Table 5-14**. Showing recent wildfire perimeters provides important information as they show areas that might not be as high of a risk in the near future since vegetation (fuel) may be reduce due to the recent wildfire. It should be noted that the Rush wildfire is the largest wildfire by acreage in the state of California.

Table 5-14. Major Wildfires in Lassen County

Fire Name	Date	Approximate Damage
Straylor Fire	July 22–30, 2004	Took place in the CDF Lassen-Modoc Unit, burning 3,422 acres.
Lassen/Modoc Lightning Fires	June 25, 2006	Burned approximately 3,500 acres.
Creek Fire	July 18–23, 2006	The Creek Fire took place in the CDF Lassen-Modoc Unit, burning 1,611 acres.
Popcorn Fire	June 24, 2008	The Popcorn Fire joined with the Peterson Fire to become the Peterson Complex and burned 3,100 acres near Little Valley in the Lassen National Forest in Shasta County and Lassen County.
Corral Fire	June 23, 2008	Burned 12,434 acres in the Upper Gooch Valley in Lassen County.
Dodge Complex Fire	August 1, 2009	Burned 1,600 acres, 10 miles southeast of Madeline in Lassen County.
Hat Creek Complex	August 1, 2009	Burned 11,269 acres throughout multiple locations in the Lassen and Shasta Counties. The Hat Creek Complex consists of several fires. The three major fires are Sugarloaf, Brown and Butte.
Day Fire	August 27, 2009	Burned 853 acres near Day Road/Hwy 299E in Lassen County.
Rush Fire	August 12, 2012	315,577 acres, (271,911 acres in CA) 15 miles southeast of Ravendale
Dodge Fire	August 3, 2015	Burned 10,570 acres 17 miles northeast of Ravendale
Willard Fire	September 11,2016	Burned 2,575 acres in the Susan River Canyon 6 miles west of Susanville

Source: California Department of Forestry and Fire Protection

Figure 5-9. Lassen County Recent Major Wildfire Perimeters



Source: California Department of Forestry and Fire Protection

5.4.3.4 Probability of Occurrence in County

As mentioned earlier, weather and fuel is a significant consideration with wildfires. Lassen County's climate, with its warm and dry summers, contributes to low relative humidity and low fuel moistures. When combined with high fuel loading, the potential for a catastrophic wildfire event is significant. Three (3) weather conditions specific to Lassen County that may cause the ignition and/or impact the behavior of wildfires are as follows:

- **Thunderstorms and the associated lightning** is a significant source of fire starts, and usually occurs mid to late summer.
- **High winds** can become steady up to 20 mph and gust up to 30-40 mph throughout the year but are most likely to exacerbate wildland fires during the months of August through October when dry vegetation conditions are generally present.
- **Hot, dry conditions** most commonly occur in August and September.

Furthermore, all or portions of each of the communities in Lassen County are within designated "high" or "very high" fire hazard severity zones. This coupled with the fact that Lassen County's rural appeal and associated lifestyles are highly desirable and are sought out by many can create a devastating combination. People, both local residents and visitors, participate in a variety of outdoor recreation activities during the summer and fall months. These activities include hunting, fishing, camping, hiking, mountain bike riding, 4WD exploration, and others. However, the integration of residential, recreational and commercial occupancies and activities within the flammable natural vegetation of the area can be a dangerous mix.

5.4.3.5 Climate Change Considerations

Climate change plays a significant role in wildfire hazards. The changing conditions from wet to dry can create more fuel; the increased possibility of high winds increase risk and present a challenge, and drought conditions could hinder the ability to contain fires. According to the modeling for wildfire potential available on the Cal-Adapt website, on average, more acreage will be affected by wild fire in the coming decades, particularly beyond 2050, when most of the County can expect up to 20% more land to be burned by wildfire on an average annual basis. Large wildfires also have several indirect effects beyond those of a smaller, local fire. These may include air quality and health issues, road closures, business closures, and other forms of losses. Furthermore, large wildfires increase the threat of other disasters such as landslide and flooding.

5.4.4. Drought and Water Shortage

5.4.4.1 Description of Hazard

Drought and water shortages are a gradual phenomenon and generally are not signified by one or two dry years. California's extensive system of water supply infrastructure (reservoirs, groundwater basins, and interregional conveyance facilities) generally mitigates the effects of short-term dry periods for most water users. However, drought conditions are present when a region receives below-average precipitation, resulting in prolonged shortages in its water supply, whether

atmospheric, surface, or ground water. A drought can last for months or years, or may be declared after as few as 15 days.

Drought is not a purely physical phenomenon, but rather an interplay between natural water availability and human demands for water supply. The precise definition of drought is made complex owing to political considerations, but there are generally four (4) types of conditions that are referred to as drought:

- **Meteorological drought** is brought about when there is a prolonged period with less than average precipitation.
- **Agricultural drought** is brought about when there is insufficient moisture for average crop or range production. This condition can arise, even in times of average precipitation, owing to soil conditions or agricultural techniques.
- **Hydrologic drought** is brought about when the water reserves available in sources such as aquifers, lakes, and reservoirs falls below the statistical average. This condition can arise, even in times of average (or above average) precipitation, when increased usage of water diminishes the reserves.
- **Socioeconomic drought** associates the supply and demand of water services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall.

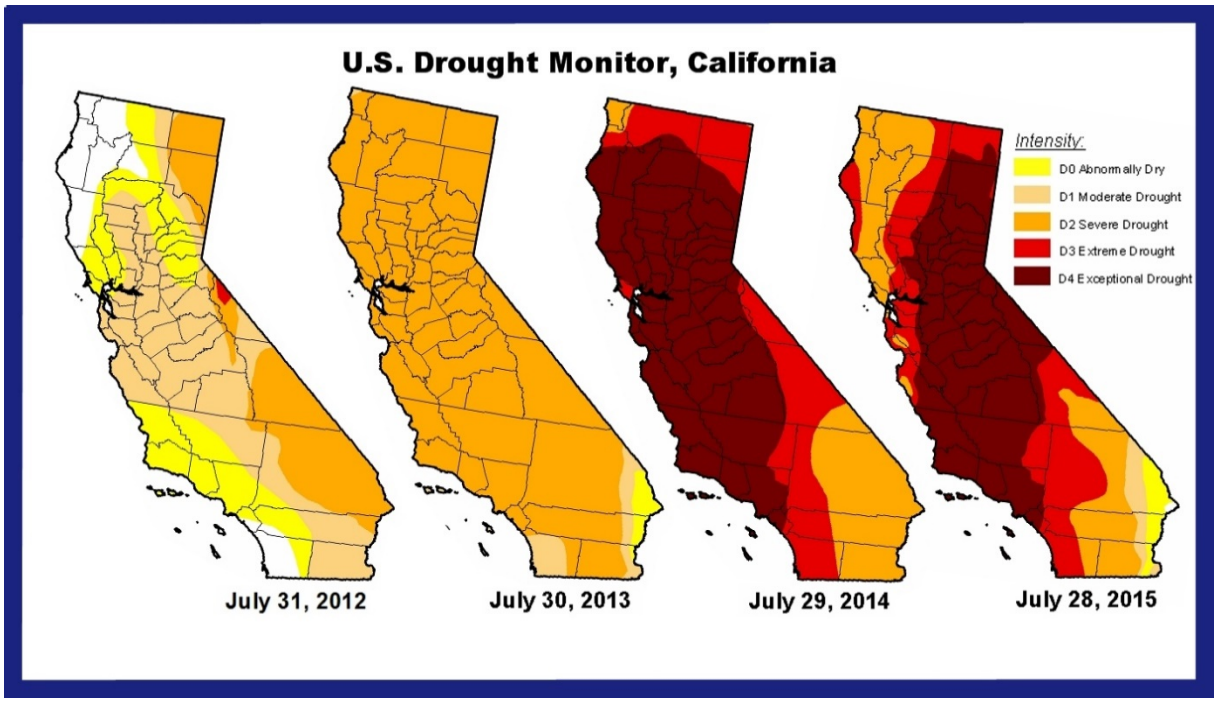
5.4.4.2 Location and Extent of Hazard in County

The entire county is subject to drought conditions and water shortages.

5.4.4.3 History of Hazard in County

Lassen County along with all of California has been experiencing a severe-to-very severe multi-year drought which began in 2012 and continued into 2016 even with a normal rainfall season (**Figure 5-10**). California's Governor declared a drought state of emergency in January 2014 and directed state agencies to take all necessary actions to respond to drought conditions.

Figure 5-10. US Drought Monitor, California



Source: US Drought Monitor

In April of 2015 the Governor announced the first-ever 25 percent statewide mandatory water reductions and a series of actions to help save water, increase enforcement to prevent wasteful water use, streamline the state's drought response and invest in new technologies that will make California more drought resilient. As secondary effect from the drought has been an unprecedented die-off of trees and a state of emergency was issued to enable federal action to mobilize resources for the safe removal of dead and dying trees which represent a significant increased wildland fire hazard. To date, guided by the California Water Action Plan, the state has committed hundreds of millions of dollars – including Water Bond funds - to emergency drought relief, disaster assistance, water conservation and infrastructure projects across the state. Efforts are also underway to establish a framework for sustainable, local groundwater management for the first time in California's history based on legislation passed in 2014. The 2017 water year brought record rainfall to California and an unprecedented snowpack to the Sierra Nevada Mountains, The drought was declared officially over for most of the state by the Governor on April 7, 2017. However, five counties in the Central Valley remain under a state drought declaration.

The majority of Lassen County is included in the North Lahontan Hydrologic Region. Hydrologic regions are defined as "*major drainage basins*" by the California Water Plan. This means that much of the County's surface water, including the Susan River, drains to the series of alkaline lakes, such as Honey Lake, that make up the region, and do not feed to the ocean. This fact creates different conditions in Lassen County than other parts of the state as its water sources are more localized and independent for regional water systems.

Historically, water levels in Honey Lake were the indicator of dry or drought years in Lassen County. Honey Lake went dry in 1859, 1865, 1887, and 1889. Following a wet cycle, the Lake once again went dry in 1919 and remained dry until 1938. Other periods of extended drought occurred in California in 1975-77, 1987-1992, 2000-2004, 2007-2009, and 2012-2016.

5.4.4.4 Probability of Occurrence

In any given year, California and/or Lassen County can be subject to drought conditions and water shortages. However, as mentioned above, because the Lassen County watershed does not drain off into the ocean, water is retained in the area and rejuvenates the groundwater system making it more resilient to drought conditions.

5.4.4.5 Climate Change Considerations

Climate change has the potential to make drought events more common in the West, including California. Extreme heat creates conditions more conducive for evaporation of moisture from the ground, thereby increasing the possibility of drought. A warming planet could lead to earlier melting of winter snow packs, leaving lower stream flows and drier conditions in the late spring and summer. Snow packs are important in terms of providing water storage and ensuring adequate supply in the summer, when water is most needed. Changing precipitation distribution and intensity have the potential to cause more of the precipitation that does fall to run-off rather than be stored. The result of these processes is an increased potential for more frequent and more severe periods of drought.

5.4.5. Energy Shortage/Outages

5.4.5.1 Description of Hazard

Energy shortages (or disruptions) are considered a form of lifeline system failure. Disruptions can be the consequence of another hazard, or can be a primary hazard, absent of an outside trigger. Most power blackouts (outages) are not human caused. They are the result of situations involving unintended events, such as an overwhelming need for power due to weather conditions, equipment failure, or accidents. Energy outages may also be due to natural hazards such as wildfires, earthquakes, floods, and landslides. These outages can last anywhere from a few minutes to, in rare instances, a week or more. Energy shortages and/or outages could impact one, or a combination of other systems (i.e., potable water system, power system, natural gas system, wastewater system, communication system, or transportation system).

Lassen County, including the City of Susanville and the Susanville Indian Rancheria, receives power from Lassen Municipal Utility District (LMUD). LMUD is connected to the California's electrical grid in Westwood, CA (Lassen County). LMUD is supplied its electrical power from Pacific Gas & Electric Company (PG&E). PG&E is connected to LMUD with two (2) PG&E owned transmission lines: 1) the Caribou line and the 2) Hat Creek line. The Hat Creek line is only used as a back-up line and does not have the capacity to support all of LMUD's customers. Therefore, if a problem arises with the Caribou line and LMUD has to switch over to the Hat Creek line, rolling blackouts would be the best case scenario as the Hat Creek line is incapable of supporting all of LMUD's customers.

5.4.5.2 Location and Extent of Hazard in County

The entire county is subject to energy shortages and outages.

5.4.5.3 History of Hazard in County

The 2000-2001 California electricity crises brought to light many critical issues surrounding the state's power generation and distribution system, including its dependency on out-of-state resources. Although California has implemented effective energy conservation programs, the state continues to experience both population growth and weather cycles that contribute to a heavy demand for power. The 2000 and 2001 blackouts occurred due to losses in transmission or generation and/or extremely severe temperatures that lead to heavy electric power consumption. Additionally, the July 2006 heat wave brought about rolling blackouts which indicates the demand for power during extreme heat events will exceed availability and appropriate planning for alternate power sources is extremely important to protect the community.

The Caribou line is the main transmission supply line. The Caribou line traverses rugged country throughout the Feather River Canyon and is susceptible to damage. Winter storms with high winds, ice storms, rain induced slides, drought kill trees, along with possibility of forest fires can all play a part in damage to the Caribou line and power failures are an annual occurrence. The Caribou line has averaged over three outages per year over the last five years. The outage duration varies depending upon the event, but can last from hours to several weeks. As mentioned above, the Hat Creek line is a back-up line and cannot meet the capcity to support all of LMUD's customers.

For certain events, LMUD has the ability to obtain power from the Honey Lake Power (HLP) biomass generation plant in a power outage emergency. During the August 2012, "Chips Fire", LMUD) received power from HLP for 24 consecutive days due to damage sustained to the Caribou line. However, during the January 2017 storm related Caribou line outage, the Honey Lake Power (HLP) plant was closed down for maintenance which led to an area wide 30 hour power outage for LMUD's customers.

5.4.5.4 Probability of Occurrence

In any given year, Lassen County can be subject to energy shortages and/or power outages.

5.4.5.5 Climate Change Considerations

With increased changes in climate, the demands on energy will shift too. This shift in demand could have significant impacts on energy supply and equipment. Additionally, climate change could have a direct impact on the energy system and equipment. Heavier than normal rain or snowfall could cause flooding and damage infrastructure, as could extreme winds.

5.4.6. Severe Storms

5.4.6.1 Description of Hazard

For the purposes of the LHMP, severe storms are being defined as: 1) Lightning/Thunderstorms, 2) Hail Storms, 3) High wind events, 4) Snow Storms, and 5) Fog events. Other severe weather events,

such as drought, flooding, extreme heat, and freeze are covered under separate sections. Below is a brief description of severe storms:

Lightning/Thunderstorms

Lightning is a powerful natural electrostatic discharge produced during some storms. This abrupt electric discharge is accompanied by the emission of visible light. The electric current passing through the discharge channels rapidly heats and expands the air, producing acoustic shock waves (thunder) in the atmosphere.

All lightning originates around 15,000 to 25,000 feet above sea level when raindrops are carried upward until some drops convert to ice. A cloud-to-ground (CG) lightning flash moves downward in 50-yard sections called step ladders. Eventually, the charge encounters something on the ground that conducts electricity. At this point the circuit is complete and the charge is lowered from the cloud to the ground. The return stroke is a flow of charge, which produces visible light.

Lightning causes thunder. The bright light of the lightning flash caused by the return stroke represents a great deal of energy. This energy heats the air in the channel to above 50,000 degrees Fahrenheit in only a few millionths of a second. The air that is now heated to such a high temperature has no time to expand, resulting in very high pressure. The high-pressure air then expands outward into the surrounding air, compressing it and causing a disturbance that propagates in all directions away from the stroke. The disturbance is a shock wave for the first 10 yards, after which it becomes an ordinary sound wave, or thunder.

Nearly 2,000 people per year in the world are injured by lightning strikes, and between 25% to 33% of those struck die. Lightning injuries result from three (3) factors: 1) electrical damage; 2) intense heat; and, 3) the mechanical energy which these generate. The following list provides the lightning hazards to the general population:

- Direct strike.
- “Splash” from nearby objects struck.
- Ground strike near victim causing a difference of potential in the ground itself, amounting to several thousand volts-per-foot, depending upon the composition of the earth that makes up the ground at that location.
- Electromagnetic pulse from close strikes - especially during positive lightning discharges

Hail Storms

Hail forms in strong thunderstorm clouds, particularly those with intense updrafts, high liquid water content, great vertical extent, large water droplets, and where a good portion of the cloud layer is below freezing (< 32 °Fahrenheit, 0 Celsius). The growth rate is maximized at about -13 Celsius, and becomes vanishingly small much below -30 Celsius as supercooled water droplets become rare. For this reason, hail is most common in midlatitudes during early summer where surface temperatures are warm enough to promote the instability associated with strong thunderstorms, but the upper atmosphere is still cool enough to support ice. Accordingly, hail is actually less common in the tropics despite a much higher frequency of thunderstorms than in the midlatitudes because the atmosphere over the tropics tends to be warmer over a much greater depth. Also, entrainment of dry air into strong thunderstorms can increase the frequency of hail by promoting evaporational cooling which lowers the freezing level of thunderstorm clouds giving hail a larger volume to grow in.

Hail is both destructive to vegetation and manmade structures. Hail is classified as severe by the National Weather Service if it is equal to or greater than 3/4" in diameter. Strong winds make these darting spheres of ice even more damaging. It is difficult to pin point where exactly a large hail shaft will strike just as it is difficult to predict where tornadoes will exactly occur. However, the general region where hail can be expected is very predictable. Hail occurs in association with thunderstorms, particularly supercell thunderstorms.

High Wind Events

High wind events with damaging winds are often called “straight-line” winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Most thunderstorm winds that cause damage at the ground are a result of outflow generated by a thunderstorm downdraft. Damaging winds are classified as those exceeding 50-60 mph. The types of damaging winds in high wind events include:

- Straight-line
- Downdraft
- Downburst
- Microburst
- Gust Front
- Derecho
- Haboob.

Damage from winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles.

Snow Storms

Snow storms events occurs when storms generate a large amount of snowfall over a short or long period of time. Additionally, many of these types of storms are accompanied by strong winds which

can create blizzard-like conditions. While some communities are equipped for regular snow events, a large amount of snowfall can create direct and indirect impacts to a community. These events can create significant health issues, as well as, create issues with transportation, lifelines, communications, and the built environment (i.e., homes and commercial buildings).

Fog Events

Fog occurs when moisture from the surface evaporates; and as this evaporated moisture moves upward, it cools and condenses into fog. All types of fog form when the relative humidity reaches 100% and the air temperature drops below the dewpoint, pushing it lower by forcing the water vapor to condense. Fog can form suddenly, and can dissipate just as rapidly, depending on what side of the dewpoint the temperature is on. Fog produces significantly reduced visibility which increases driving hazard and can result in multi-vehicle accidents when drivers do not adjust their driving speed for the conditions. Multi-vehicle accidents can close major roadways for hours and pull emergency services away from other areas of the county.

5.4.6.2 Location and Extent of Hazard in County

Severe storms can occur throughout the entire county and generally occur during the winter months; although lightning and thunderstorms also can occur during the spring and summer months. As with the other severe storms, high wind events can occur throughout the county, however they are most common and dangerous along the Highway 395 corridor which heads south from Susanville to Reno, Nevada. Severe wind events along this corridor can cause the highway to be closed to trucking and result in power outages. Fog events occur predominantly in the mountain valley areas, and can produce ice fog during sub-freezing temperatures in winter months. Snow can fall anywhere in the county with snow levels increasing as the elevation rises, leading to occasional closures of the mountain passes to the west of Susanville on Highway 36, and the seasonal closure of paved and unpaved county maintained roads.

5.4.6.3 History of Hazard in County

The following table (**Table 5-15**) depicts the history of severe storm events in the county.

Table 5-15. Historic Severe Storms in Lassen County

Date	Injuries	Fatalities	Property Damage	Crop Damage	Severe Storm Type
02/07/1962	0.26	0.35	$86,206	0	Lightning/Thunder-Wind
02/07/1962	0.26	0.35	$86,206	0	Lightning/Thunder-Wind
10/10/1962	1.79	0.36	$35,714	$35,714.20	Lightning/Thunder-Wind
10/10/1962	1.79	0.36	$35,714	$35,714	Lightning/Thunder-Wind
01/30/1963	0.57	0.14	$35,714	0	Lightning/Thunder-Wind
01/30/1963	0.57	0.14	$35,714	0	Lightning/Thunder-Wind
01/18/1969	0.17	0.78	$862,068	$8,620	Lightning/Thunder
01/16/1973	0	0	$86,206	0	Lightning/Thunder
12/23/1979	0	0	$14,285	0	Lightning/Thunder-Wind
12/22/1982	0.21	0.06	$1,041,666	$104	Wind
09/01/1987	7.29	0.57	$3,571,428	0	Lightning
12/20/1990	0	0.05	$86,206	$8,620,689	Winter Weather
01/13/1993	0.29	0	$357,142	0	Winter Weather
01/13/1993	0	0	$166,666	0	Winter Weather
01/19/1993	0.31	0.00	$31,250	$31,250	Wind
01/22/1997	0	0	$66,666	0	Winter Weather
01/21/2002	0	0	$50,000	0	Wind
11/07/2002	0	0	$50,000	0	Wind
12/14/2002	0	0	$50,000	0	Wind
12/26/2006	0	0	$16,250	0	Wind
02/06/2015	0	0	$100,000	0	Wind

5.4.6.4 Probability of Occurrence in County

In any given year, Lassen County can be subject to severe storms.

5.4.6.5 Climate Change Considerations

Climate change will play a significant role with severe storm events. The changing conditions are expected to cause a significant amplification to many existing hazards and conditions. Because of this, climate change might impact the frequency and intensity of severe storms.

5.4.7. Hazardous Materials Release

5.4.7.1 Description of Hazard

Hazardous Waste/Materials are widely used or created at facilities such as hospitals, wastewater treatments plants, universities and industrial/manufacturing warehouses. Several household products such as cleaning supplies and paint are also considered hazardous materials. Hazardous materials include:

- Explosives
- Flammable, non-flammable, and poisonous gases
- Flammable liquids
- Flammable, spontaneously combustible, and dangerous when wet solids
- Oxidizers and organic peroxides
- Poisons and infectious substances
- Radioactive materials
- Oil
- Corrosive materials.

Both mobile (i.e., trucks, rail) and external hazardous materials releases can spread and affect a wide area, through the release of plumes of chemical, biological, or radiological elements or leaks or spills. Conversely, internal releases are more likely to be confined to the structure the material is store in.

Chemicals may be corrosive or otherwise damaging over time. A hazardous materials release could also result in fire or explosion. Contamination may be carried out of the immediate area of the incident by people, vehicles, wind, and water. Weather conditions can increase the size and intensity of the Hazardous Materials Release. Typography, such as hills and canyons, can increase the size of the release or make it more difficult to contain.

5.4.7.2 Location and Extent of Hazard in County

The locations and identity of facilities that store hazardous materials are reported to local and federal governments. Many facilities have their own hazardous materials guides and response plans, including transportation companies who transport hazardous materials.

The release of hazardous materials into the environment can cause a multitude of problems. Although these incidents can happen almost anywhere, certain areas of the County are at higher risk, such as near rail lines and roadways that are frequently used to transport hazardous materials and locations with industrial facilities that use, store, and/or dispose of such materials. The presence of several small airfields and one military airfield within the county boundary also provide the opportunity for fuel or chemical spills resulting from airplane accidents.

5.4.7.3 History of Hazard in County

The California Office of Emergency Services (OES) maintains a hazardous materials spill database. For the time period from March 2006 through February 2017, one-hundred and eighteen (118) suspected hazmat spills within Lassen County were reported, fifty-nine (59) of which were within the City of Susanville limits. Most of the spills were petroleum products as a result of accidents. Other incidents included a few damaged propane tanks related to railroads, and several sewage spills. It should be noted that not all incidents for which a spill report was filed resulted in damage or injury from the spill. In short, no significant historical events to report to date

5.4.7.4 Probability of Occurrence in County

The release of hazardous materials can occur throughout the entire county. Incidences can occur during production, storage, transportation, use or disposal of hazardous materials. Communities can be at risk if a chemical is used unsafely or released in harmful amounts into the environment. Hazardous materials can cause death, serious injury, long lasting health effects, and damage to buildings, the environment, homes, and other property.

5.4.7.5 Climate Change Consideration

As mentioned above, weather can play a significant factor in hazardous material releases. While there is little evidence to link climate change to increased occurrences of hazardous material releases, it could impact the response and recovery efforts.

5.4.8. Landslide and other Earth Movements

5.4.8.1 Description of Hazard

According to the California Geological Survey, landslides are classified with a two-part designation. The designation captures both the type of material that failed and the type of movement that the failed material exhibited. Types of material include: rock/soil, debris (coarse fragments), and earth (fine fragments). Landslides movements include:

- **Falls** are masses of soil or rock that dislodge from steep slopes and free-fall, bounce, or roll downslope.
- **Topples** move by the forward pivoting of a mass around an axis below the displaced mass.
- **Spreads (lateral)** commonly induced by liquefaction of material in an earthquake, move by horizontal extension and shear or tensile fractures.
- **Slides** displace masses of material along one or more discrete planes.
    - In "*rotational"* sliding, the slide plane is curved and the mass rotates backwards around an axis parallel to the slope;
    - In "*translational*" sliding, the failure surface is more or less planar and the mass moves parallel to the ground surface.
- **Flows** mobilize as a deforming, viscous mass without a discrete failure plane.

More than one form of movement may occur during a failure, in which case the movement is classified as complex if movements occur sequentially and composite if they do not. Five (5) of the twenty (20) possible material/movement combinations are commonly found when preparing a landslide inventory map. These are *Rock Slides, Earth Flows, Debris Slides, Debris Flows* and *Rock Falls*.

The most common cause of a landslide is an increase in the down slope gravitational stress applied to slope materials, also known as over-steepening. Over-steepening can be caused by natural processes or by man-made activities. Undercutting of a valley wall by stream erosion or of a sea cliff by wave erosion are ways in which over-steeping may occur naturally. Landslides triggered by earthquakes and/or volcanos are covered under that particular hazard.

5.4.8.2 Location and Extent of Hazard in County

The California Geological Survey is in the process of recording and mapping historical and potential landslides in the state. The location and extent of landslides are extremely difficult to predict and are usually based on historical event and/or soil type and topography. Currently, the California Geological Survey has not prepared any landslide maps in Lassen County. However, landslides have the potential to occur in areas with steep slopes and weak soils. The County does not experience the frequency and magnitude of landslides that occur in other regions of the State.

5.4.8.3 History of Hazard in County

Historically, the majority of landslides in the county have been a secondary hazards to other hazards (i.e., earthquakes, volcanos); there have been no known documented landslides consistent with the above description.

5.4.8.4 Probability of Occurrence in County

It is difficult to estimate the probability of occurrence for the above identified landslide categories as no landslide susceptibility maps have been prepared for Lassen County.

5.4.8.5 Climate Change Consideration

Climate change can increase the probability, frequency, and/or intensity of landslides. Changes in precipitation, specifically the increased frequency of intense precipitation, can result in significant water run-off, which may cause landslides. These landslides may happen more frequently due to the increased number of expected heavy rainfall events due to climate change. Additionally, increase in wildfire hazards will result in loss of hillside vegetation. The loss of hillside vegetation will increase the likelihood of debris and mudflows. This could result in landslides occurring in areas not previously identified.

5.4.9. Avalanche

5.4.9.1 Description of Hazard

An avalanche is a rapid flow of snow down a slope, from either natural triggers or human activity. Typically occurring in mountainous terrain, an avalanche can mix air and water with the descending snow. Powerful avalanches have the capability to entrain ice, rocks, trees, and other material on the

slope; however, avalanches are always initiated in snow, and are primarily composed of flowing snow. In mountainous terrain avalanches are among the most serious objective hazards to life and property, with their destructive capability resulting from their potential to carry an enormous mass of snow rapidly over large distances.

Avalanches are classified by their morphological characteristics, and are rated by either their destructive potential (force), or the mass (size) of the downward flowing snow. Some of the morphological characteristics used to classify avalanches include the type of snow involved, the nature of the failure, the sliding surface, the propagation mechanism of the failure, the trigger of the avalanche, and the slope angle, direction, and elevation. Avalanche size, mass, and destructive potential are rated according to the following table (**Table 5-16**):

Table 5-16. Avalanche Classification System

Size Relative to Path		Destructive Force	
R1	Very Small	D1	Sluff or snow that slides less than 50m (150') of slope distance
R2	Small	D2	Small, relative to path
R3	Medium	D3	Medium, relative to path
R4	Large	D4	Large, relative to path
R5	Maximum	D5	Major or maximum, relative to path

Source: University Corporation for Atmospheric Research

To help reduce the probability of avalanches, an Avalanche Warning System has been developed. The purpose of the warning system is to both educate the public of the potential risk but to also ensure the public is taking appropriate actions to reduce the chance of triggering an avalanche and that they are prepared in the event of an occurrence (**Table 5-17**).

Table 5-17. Avalanche Danger Warning System

Probability and Trigger	Degree and Distribution of Danger	Recommended Action in Back Country
Low	Natural avalanches very unlikely. Human triggered avalanches unlikely. Generally stable snow. Isolated areas of instability	Travel is generally safe. Normal caution advised
Moderate	Natural avalanches unlikely. Human triggered avalanches possible. Unstable slabs possible on steep terrain	Use caution in steeper terrain
Considerable	Natural avalanches possible. Human triggered avalanches probable. Unstable slabs probable on steep terrain	Be increasingly cautious in steeper terrain
High	Natural and human triggered avalanches likely. Unstable slabs likely on a variety of aspects and slope angles	Travel in avalanche terrain is not recommended. Safest travel on windward ridges of lower angle slopes without steeper terrain above
Extreme	Widespread natural or human triggered avalanches certain. Extremely unstable slabs certain on most aspects and slope angles. Large destructive avalanches possible	Travel in avalanche terrain should be avoided and travel confined to low angle terrain well away from avalanche path run-outs

Source: Lassen County

5.4.9.2 Location and Extent of Hazard in County

The City of Susanville and the Susanville Indian Rancheria are located in relatively flat areas within Lassen County and are therefore not at risk for avalanche hazards; however, other areas within Lassen County that are in mountainous terrain with snow pack are susceptible to periodic avalanches. This includes the higher elevations of the western mountainous regions of the County including the Diamond Mountains and areas within Lassen National Park. These areas are generally owned by State or Federal agencies and are remote with no development and access typically limited to dirt roads. Private lands under County jurisdiction are very sparsely developed if developed at all.

5.4.9.3 History of Hazard in County

Documented past occurrences of avalanches as they relate to impacts on Lassen County, City of Susanville, and the Susanville Indian Rancheria are not available.

5.4.9.4 Probability of Occurrence in County

While no specific property damage or loss of life have been recorded within the County, the potential exists that an avalanche will impact the County in the higher elevations of the western mountainous regions of the County including the Diamond Mountains and areas within Lassen National Park. Because avalanches are caused by natural and human triggers, there is always a probability of occurrence if the snow pack it at significant levels.

5.4.9.5 Climate Change Consideration

Avalanches are caused by an external stress on the snow pack; they are not random or spontaneous events. Natural triggers of avalanches include additional precipitation, radiative and convective heating, rock fall, ice fall, and other sudden impacts; however, even a snow pack held at a constant temperature, pressure, and humidity will evolve over time and develop stresses, often from the downslope creep of the snow pack. These are all factors that may be impacted by climate change. The effect could include more frequent and larger events.

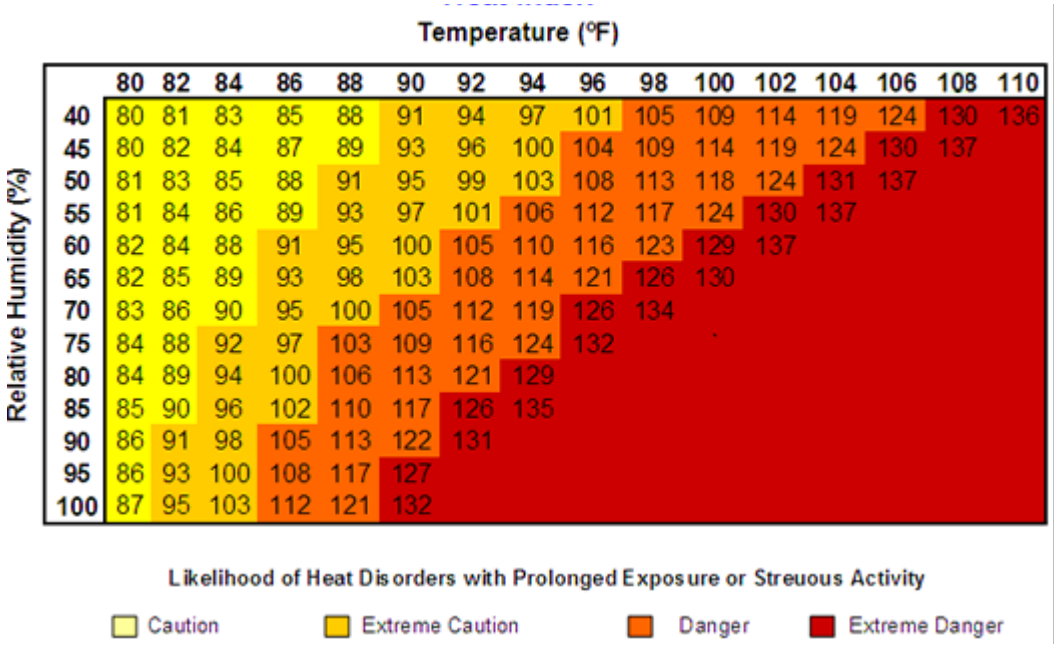
5.4.10. Extreme Heat

5.4.10.1 Description of Hazard

The definition of Extreme Heat varies between studies and is relevant to the area itself. The Cal-Adapt website defines Extreme Heat as any day in in the 7-month period between April through October where the high temperature exceeds the 98th historical percentile of the maximum daily temperature. Similarly, a heat wave is defined as five (5) days of temperatures which exceed the extreme threshold. The baseline used is calculated from data for the years 1961 through 1990. Extreme Heat is a function of heat and relative humidity. A Heat Index describes how hot the heat-humidity combination makes the air feel.

The heat index combines the effects of heat and humidity. The apparent temperature, which combines the temperature and relative humidity, is a guide to the danger. Below (**Figure 5-11**) is the heat stress index based on the apparent temperature:

Figure 5-11. Heat Stress Index



Source: NOAA

As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the Heat Index rises, so do health risks such as heat exhaustion, sunstroke, and heatstroke. Some Heat Index Program Alert procedures are implemented when the high temperature is expected to exceed 105° to 110° (depending on local climate) for at least two consecutive days.

There are also other characteristics of extreme heat which do not factor in humidity. This includes when there is a series of days at high temperatures and when temperatures do not cool down/off at night. In both of these instances there could be risks to humans and equipment.

The major human risks associated with extreme heat are as follows:

- **Heatstroke.** Considered a medical emergency, heatstroke is often fatal. It occurs when the body's responses to heat stress are insufficient to prevent a substantial rise in the body's core temperature. While no standard diagnosis exists, a medical heatstroke condition is usually diagnosed when the body's temperature exceeds 105°F due to environmental temperatures. Rapid cooling is necessary to prevent death, with an average fatality rate of 15 percent even with treatment.
- **Heat Exhaustion.** While much less serious than heatstroke, heat exhaustion victims may complain of dizziness, weakness, or fatigue. Body temperatures may be normal or slightly/moderately elevated.
- **Heat Syncope.** This refers to sudden loss of consciousness and is typically associated with people exercising who are not acclimated to warm temperatures.

- **Heat Cramps.** May occur in people unaccustomed to exercising in the heat and generally ceases to be a problem after acclimatization.

In addition to affecting people, severe heat places significant stress on plants and animals. The effects of severe heat on agricultural products may include reduced yields and even loss of crops. In events with long durations, especially when temperatures do not cool down in the evenings, it will tax and stress equipment both from the utility, as well as, personal equipment (i.e., air conditions). The loss of equipment could create large scale issues and increase the reliance on government support.

5.4.10.2 Location and Extent of Hazard in County

While the County is not subjective to high humidity, other conditions of extreme heat (series of days and no cooling off during the evenings) can occur. Because of this, the entire county could be subject to extreme heat conditions, particularly in the lower elevation valley areas.

5.4.10.3 History of Hazard in County

Lassen County has experienced several extreme heat events in the past; however, they are not well documented. The temperature baseline varies throughout Lassen County with it ranging from 84 degrees, in the higher elevation area of western Lassen County near Juniper Lake, to 96 degrees in the Honey Lake area. In the Susanville, Janesville, Standish, and Leavitt Lake area where the majority of the County's population lives the extreme heat threshold is 94-95 degrees. The County, City, and the Rancheria have, in the baseline period, reached the extreme heat threshold an average of 4 days a year and have historically averaged a heat wave once every 6 years for the 1961 to 1990 time period. However, there have generally been no adverse or limited human impact from these routine heat waves. There have been no activations of cooling centers in response to heat waves experienced in the Lassen County, the City of Susanville, or the Susanville Indian Rancheria.

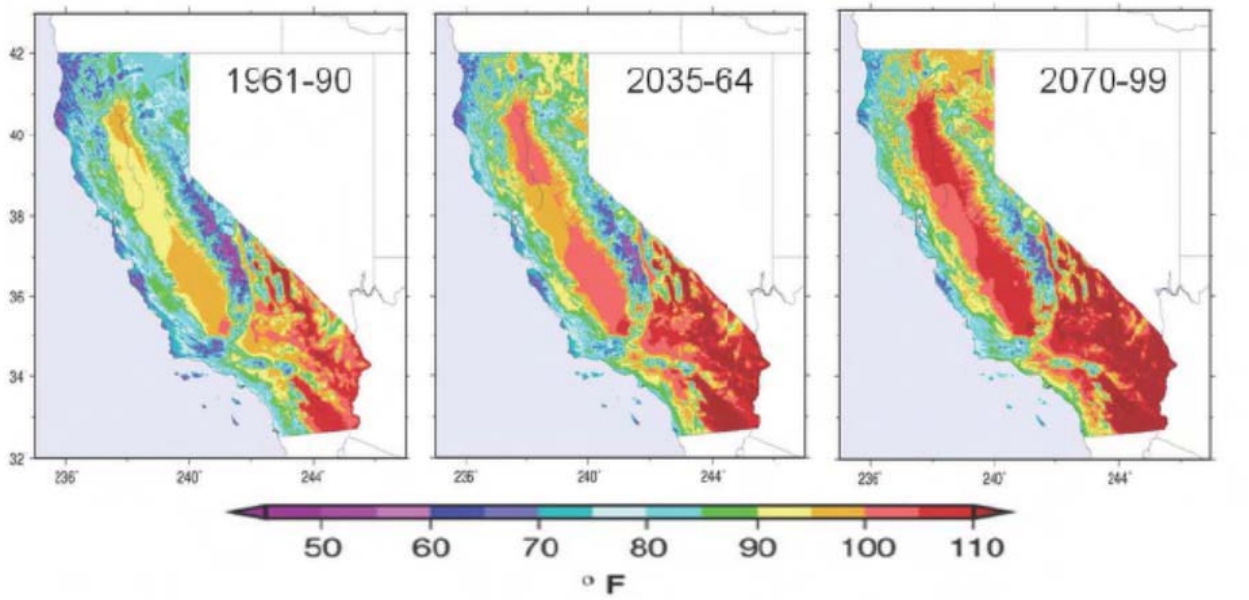
5.4.10.4 Probability of Occurrence in County

In any given year, Lassen County could be subject to extreme heat conditions. The probability of heat hazards is characterized by a heat index using temperature and humidity readings. According to the heat index for the Lassen County area, the County, City, and Rancheria have a relatively high probability of experiencing above average temperatures. However, the typical relative humidity of the area is not in the high or even medium range and the combination of heat and humidity typically do not exceed the extreme caution range.

5.4.10.5 Climate Change Considerations

As temperatures rise due to climate change, Californians will face greater risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat. By mid-century, extreme heat events in urban centers could cause two to three times more heat-related deaths than occur today. By 2100, hotter temperatures are expected throughout the state, with an increase of 3 to 5.5°F under the lower emissions scenario and 8 to 10.5°F under the higher emissions scenario (**Figure 5-12**).

Figure 5-12. Comparison between Historic and Projected Temperature



Source: California Energy Commission

5.4.11. Freeze

5.4.11.1 Description of Hazard

Freeze conditions are noted when there are sustained temperatures below freezing (32F). Prolonged freezing temperatures can pose a risk to vulnerable populations, particularly if combined with power outages. When combined with precipitation, ice can form on roadways, trees, and power lines creating secondary hazard conditions. Agriculture and livestock are subject to damage and life loss, and may cause economic impacts as well. The NOAA provides three (3) different categories of actions for freeze events: advisory, watch, and warning.

- **Frost Advisory** is issued when the minimum temperature is forecast to be 33 to 36 degrees on clear and calm nights during the growing season.
- **Freeze Watch** is issued when there is a potential for significant, widespread freezing temperatures within the next 24–36 hours.
- **Freeze Warning** is issued when significant, widespread freezing temperatures are expected.

5.4.11.2 Location and Extent of Hazard in County

The entire county is subject to freeze conditions. The variations in elevation within the county, ranging from around 3,300 feet in the valleys to over 8,000 at some mountain peaks, give an indication of the general areas subjected to extended freezing conditions. The higher elevations will experience greater levels of freezing for longer periods of time. For example, the frost-free growing season in Lassen County ranges from 142 days at Susanville to only 65 days in the Madeline Plains.

5.4.11.3 History of Hazard in County

Temperatures below freezing have been recorded in Lassen County in every month of the year. The lowest recorded temperature on record is -23F, which occurred on February 1, 1956. Temperatures falling below 0F, generally occur no more than a few days a year on average, though most of the County experiences single digit low temperatures each year. To date Lassen County has been declared under a state or federal freeze declaration only once.

5.4.11.4 Probability of Occurrence in County

In any given year, Lassen County can be subject to freeze conditions.

5.4.11.5 Climate Change Considerations

Depending on the model and the study referenced, freezing spells are likely to increase and/or decrease in frequency as climate conditions change. However, if emissions follow higher projections, freezing events could occur only once per decade in a sizable portion of the state by the second half of the 21st century.

5.4.12. Volcano

5.4.12.1 Description of Hazard

A volcano is a rupture in the crust of a planetary-mass object, such as Earth, that allows hot lava, volcanic ash, and gases to escape from a magma chamber below the surface. Volcanoes occur because the earth's crust is broken into seventeen (17) major, rigid tectonic plates that float on a hotter, softer layer in its mantle. Volcanoes can also form where there is stretching and thinning of the crust's interior plates. Therefore, volcanoes are generally found where tectonic plates are diverging or converging. There are several hazards associated with volcanic activity and they include: eruption columns and clouds, volcanic gases, lava flows and domes, pyroclastic flows, volcano landslides, and mudflows.

Volcanic threat rankings for U.S. volcanoes are derived from a combination of factors including age of the volcano, potential hazards (the destructive natural phenomena produced by a volcano), exposure (people and property at risk from the hazards), and current level of monitoring (real-time sensors in place to detect volcanic unrest).

Establishment of robust volcano monitoring networks and effective warning schemes are essential mitigation measures. The USGS monitors hazardous volcanoes and responds to volcanic crises under Congressional mandate (Public Law 93-288), which requires the USGS to issue "timely warnings" of potential volcanic hazards to responsible emergency management authorities and to the populace affected.

The USGS California Volcano Observatory, or CalVO, headquartered in Menlo Park, California obtains and interprets data from real-time monitoring sensors (seismometers, continuously recording GPS

receivers, tiltmeters, and/or strain meters) installed on California's high-to-moderate threat volcanoes, although network coverage is minimal at some locations (See monitoring capabilities and data at http://volcanoes.usgs.gov/observatories/calvo/). The sensor networks automatically and continually relay data to CalVO for scientific interpretation. Information is communicated to emergency response agencies and the public using alert level schemes for ground-based and airborne hazards (**Table 5-18** and **Table 5-19**).

Table 5-18. Ground-Based Volcanic Hazard Alert Levels

Volcano Alert Levels Used by USGS Volcano Observatories

Alert Levels are intended to inform people on the ground about a volcano's status and are issued in conjunction with the Aviation Color Code. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption and about potential or current hazards and likely outcomes.

Term	Description
NORMAL	Volcano is in typical background, noneruptive state or, *after a change from a higher level,* volcanic activity has ceased and volcano has returned to noneruptive background state.
ADVISORY	Volcano is exhibiting signs of elevated unrest above known background level or, *after a change from a higher level,* volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
WATCH	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, **OR** eruption is underway but poses limited hazards.
WARNING	Hazardous eruption is imminent, underway, or suspected.

Source: USGS

Table 5-19. Airborne Volcanic Hazards Alert Levels

Aviation Color Code Used by USGS Volcano Observatories

Color codes, which are in accordance with recommended International Civil Aviation Organization (ICAO) procedures, are intended to inform the aviation sector about a volcano's status and are issued in conjunction with an Alert Level. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption, especially in regard to ash-plume information and likely outcomes.

Color	Description
GREEN	Volcano is in typical background, noneruptive state or, *after a change from a higher level,* volcanic activity has ceased and volcano has returned to noneruptive background state.
YELLOW	Volcano is exhibiting signs of elevated unrest above known background level or, *after a change from a higher level,* volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
ORANGE	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, **OR** eruption is underway with no or minor volcanic-ash emissions [ash-plume height specified, if possible].
RED	Eruption is imminent with significant emission of volcanic ash into the atmosphere likely **OR** eruption is underway or suspected with significant emission of volcanic ash into the atmosphere [ash-plume height specified, if possible].

Source: USGS

A no-cost, email-based Volcano Notification Service (VNS) is available to agencies, businesses, and the public by registering online at http://volcanoes.usgs.gov/vns/help.php. VNS sends monthly volcano status updates to subscribers and other posts as warranted, including notification of alert level changes, details of volcanic unrest, and eruption information.

5.4.12.2 Location and Extent of Hazard in County

A national report on volcanic threat published by the USGS in 2005 lists eight (8) young and potentially hazardous volcanic areas in California (**Figure 5-13**).

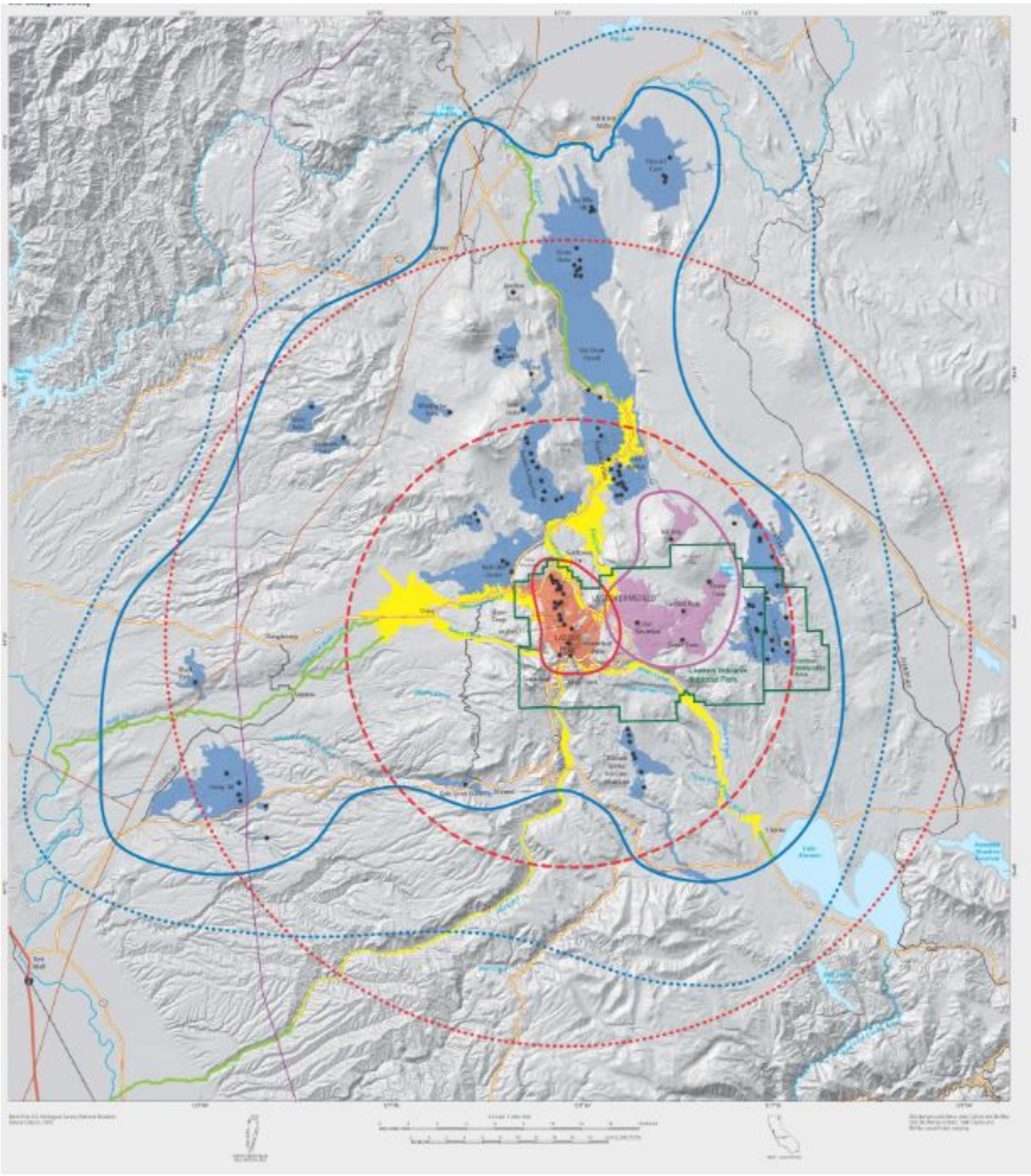
Figure 5-13. Potentially Hazardous Volcanoes of California

Source: California

The Lassen region of the southernmost Cascade Range is an active volcanic area. Mount (Mt.) Lassen itself is located six (6) miles west of the Lassen County line, and approximately 50 air miles from Susanville. **Figure 5-14** illustrates the the USGS modeled volcanic ipacts within the Lassen County area. Although there is little chance that lava flows (solid blue and red lines on the figure) would impact the county, there is a likelihood that ash fallout (dotted blue and red lines on the figure) could have public health impacts, and effect agricultural activities and air traffic. Airborne ash from future

events could last for days to weeks following an eruption. Compared to those of a typical Cascade volcano, eruptive vents at Mount (Mt.) Lassen and the surrounding area are widely dispersed, extending in a zone about 50 km wide from the southern boundary of Lassen Volcanic National Park north to the Pitt River.

Figure 5-14. Volcano Hazard Assessment- Lassen Region



Source: USGS

5.4.12.3 History of Hazard in County

Volcanic eruptions occur in the State infrequently. At least ten eruptions have occurred in California in the last 1,000 years. There have been at least fifty-eight (58) eruptions of small volcanoes in the Mt. Lassen region in the past 100,000 years, including two (2) in the past 15,000 years. At the Lassen Volcanic Center, approximately 70 eruptions have occurred in the past 100,000 years, including three (3) in the past 1,100 years: the Chaos Crags eruption 1,100 years ago; the Cinder Cone 345 years ago, and the Lassen Peak eruption which lasted from 1914 to 1917. The most notable event in the Lassen Peak eruption, occurring on May 22, 1915, devastated nearby areas and rained volcanic ash as far away as 200 miles to the east.

5.4.12.4 Probability of Occurrence in County

The USGS has designated the Lassen Volcanic Area as a very high threat volcano. According to a report published by the USGS in 2012, the record of past eruptions and the present state of the underlying magmatic and hydrothermal systems make it clear that future eruptions within the Lassen Volcanic Area are very likely. Volcanic activity over the past 100,000 years suggests that within any given year there exists about a 1 in 1,000 chance of an eruption occurring at the Lassen Volcanic Center. Although the annual probability of an eruption is small in any given year, the potential consequences of future eruptions could be regionally significant.

Unlike most other natural disasters, volcanic eruptions are usually preceded by weeks to months of precursory unrest which manifesrs as ground deformation, earthquake swarms, and gas emissions. By monitoring these indicators, scientists can make accurate eruption forecasts.

5.4.12.5 Climate Change Considerations

To date, no credible evidence has been provided that links climate to volcanic events; however, climate impacts are a significant consideration in the response and recovery efforts. Effects from climate change could create cascading complications and impacts. For example, if the volcanic eruption results coincides with a period of higher than normal rainfall, ash flows could liquefy into mud flows which would potentially impact water quality, vegetation, wildlife, and recreational activities in the surrounding areas.

5.4.13. Agricultural Pests/Disease Infestation

5.4.13.1 Description of Hazard

Agricultural pests and disease infestation occur when an undesirable organism inhabits an area in a manner that causes serious harm to agriculture crops, livestock or poultry, and wild land vegetation or animals. Countless insects and diseases live on, in, and around plants and animals in all environments. Most are harmless, while some can cause significant damage and loss. Under some conditions, insects and diseases that have been relatively harmless can become hazardous. For

example, severe drought conditions can weaken trees and make them more susceptible to destruction from insect attacks than they would be under normal conditions.

5.4.13.2 History of Hazard in County

Agricultural pests in Lassen County include both insect pests and noxious weeds. Given the arid environment of the agricultural lands in Lassen County, the predominant commodity is field crops which include hay, wheat, straw and pasture land, and account for over half the agriculture production value in the county. Scotch thistle, yellow starthistle and puncturevine are the most common noxious weeds that can impact these crops. Insect pests which are known to prey on field crops include the mormon cricket and locusts.

The Mormon cricket is a short winged katydid which is closely related to grasshoppers. The name originated in 1848 when crickets invaded crops of Mormon settlers in the Salt Lake area. Mormon crickets can create havoc and cause economic losses, as well as creating a greater amount of destruction when accompanied by a drought. Unfortunately, there are no known predators that feed specifically on Mormon crickets.

Seed, fruit, vegetable and nursery crops account for approximately fifteen percent (15%) of the county agricultural production value. They may be susceptible to mediterranean fruit fly, oriental fruit fly, gypsy moth, glassy-winged sharpshooter, asian citrus psyllid, and light-brown apple moth. According to the most recent map published by the United States Department of Agriculture in 2011, the Africanized honey bee had not spread into California counties farther north than the central valley.

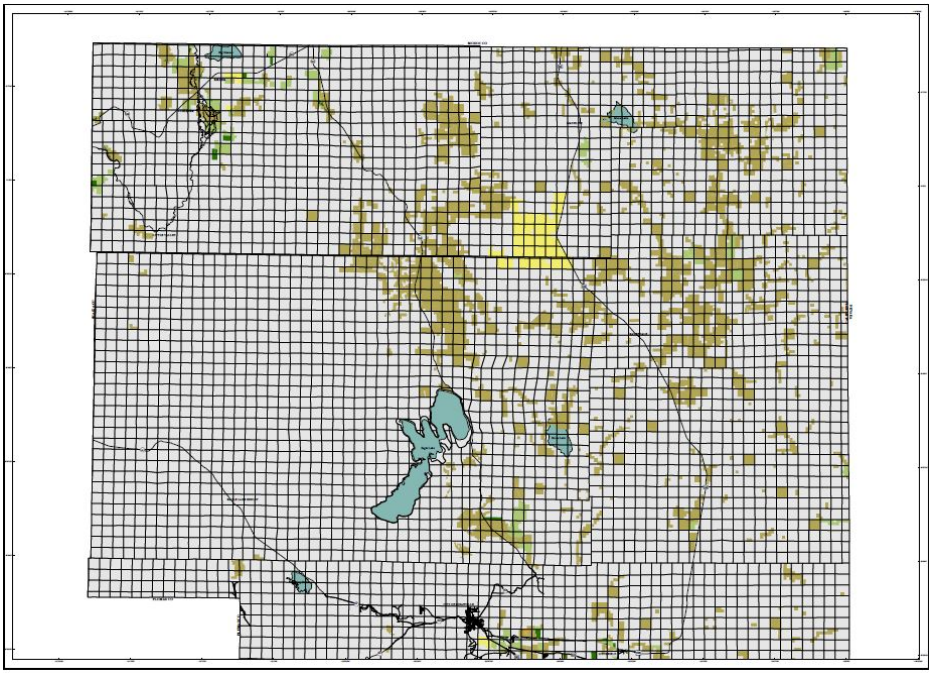
5.4.13.3 Location and Extent of Hazard in County

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value.

State funding was provided in 1971 by the Open Space Subvention Act, which created a formula for allocating annual payments to local governments based on acreage enrolled in the Williamson Act Program. Subvention payments were made through FY 2009, but have been suspended in more recent years due to revenue shortfalls.

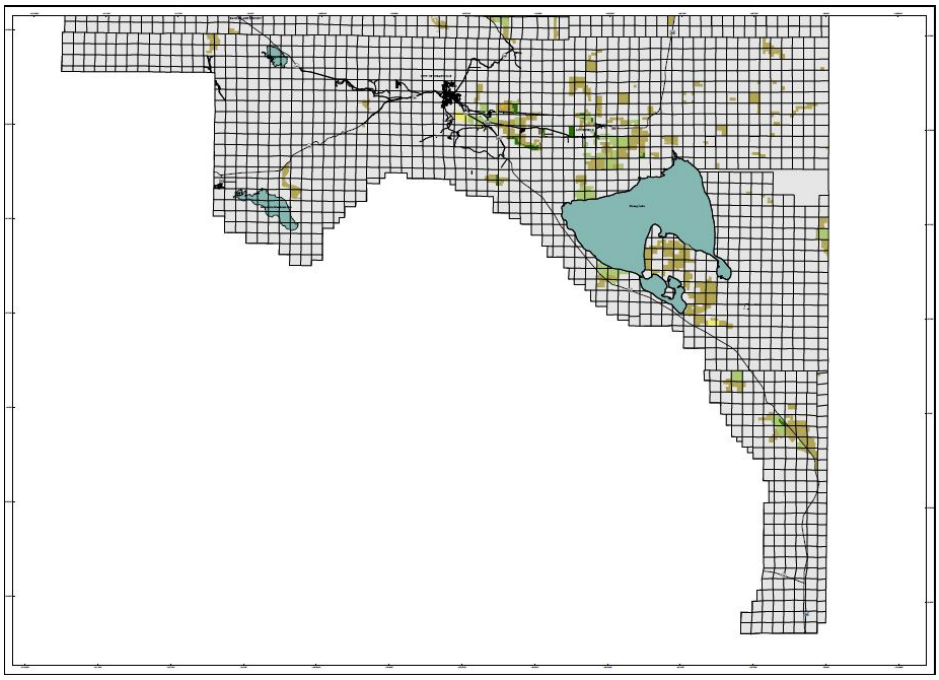
Figure 5-15 and **Figure 5-16** shows land that, under the Williamson Act, has been zoned as agricultural, open space, or recreational in Lassen County. These lands are susceptible to agricultural pests and diseases.

Figure 5-15. Land Conservation Act Maps- Lassen County, north segment



Source: California Department of Conservation

Figure 5-16. Land Conservation Act Maps- Lassen County, south segment



Source: California Department of Conservation

5.4.13.4 Probability of Occurrence in County

Due to its interaction with the global economy, its mild Mediterranean climate, and its diversified agricultural and native landscape, Lassen County currently experiences and will continue to experience periodic losses due to agricultural pests and diseases.

5.4.13.5 Climate Change Consideration

California farmers contend with a wide range of crop-damaging pests and pathogens. Continued climate change is likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates. For example, the pink bollworm, a common pest of cotton crops, is currently a problem only in southern desert valleys because it cannot survive winter frosts elsewhere in the state. However, if winter temperatures rise 3 to 4.5°F, the pink bollworm's range would likely expand northward, which could lead to substantial economic and ecological consequences for the state.

Temperature is not the only climatic influence on pests. For example, some insects are unable to cope in extreme drought, while others cannot survive in extremely wet conditions. Furthermore, while warming speeds up the lifecycles of many insects, suggesting that pest problems could increase, some insects may grow more slowly as elevated carbon dioxide levels decrease the protein content of the leaves on which they feed (California Climate Change Center 2006).

5.4.14. Dam/Reservoir Failure

5.4.14.1 Description of Hazard

Because of California's seasonal and climatic conditions, water storage is critical. Dams and reservoirs help reserve (store) the water necessary for agriculture, hydroelectric power, recreational activities, environmental protection, and a stable drinking water supply. They are also critical tools in flood and debris control. Based on the function, dams can be classified as: storage dam, diversion dam, detention dam, debris dam, or coffer dam. In addition to the classifications there are several types of dams:

- **Gravity Dams**—concrete, rubber masonry.
- **Embankment Dams**—earth or rock.
- **Arch/Multiple Arch Dams**—concrete.
- **Buttress Dams**—concrete, timber, steel.

Similarly, reservoirs are can have different functions too (i.e., storage, flood control, distribution, and multipurpose); and there are two (2) types of reservoirs: in-ground and above-ground.

Along with their many benefits, dams and reservoirs present formidable consequences if not properly designed, built, and maintained. Failures to dams and reservoir are generally due to old age, poor design/construction, lack of maintenance, structural damage, improper siting, landslides flowing into a reservoir, or terrorist actions. Structural damage is often a result of a flood, erosion, or earthquake. A catastrophic dam/reservoir failure could inundate the area downstream. The degree

of flood impact is dependent upon topography, vegetation, duration and intensity of rainfall with consequent storm water runoff. The force of the water is large enough to carry boulders, trees, automobiles, and even houses along a destructive path downstream. Another factor in dam/reservoir failures is heavy or increased precipitation, especially in very short periods of time. This increase in rainfall can crested dams, weaken structures, and erode supports. The potential for casualties, environmental damage, and economic loss is great. Damage to electric generating facilities and transmission lines could impact life support systems in communities outside the immediate hazard area.

5.4.14.2 History of Hazard in County

Lassen County has numerous reservoirs and dams; however, historically there have only been minor impacts associated with washout or overflow impacting Lassen County and City of Susanville. Furthermore, the Susanville Indian Rancheria is geographically located such that impacts from reservoirs or dams are not expected to affect the region. The State of California and the federal government have a rigorous Dam Safety Program. This is a proactive program that ensures proper planning in the event of failure but also sets standards for dam design and maintenance. Because of this, many potential issues have been addressed and/or resolved.

5.4.14.3 Location and Extent of Hazard in County

There are forty-five (45) dams in Lassen County, with a total storage capacity of 162,000 acre feet (**Table 5-20**). Only four (4) of these dams have a storage capacity of 10,000 acre feet or greater. These dams range in purpose from water storage to flood control. Most dams in this sparsely populated county are removed from the population clusters of the county. Many of the dams are privately owned and support agriculture and ranching activities. The State of California has created Dam Inundation Zone maps for some dams within the state. The maps depict areas that would be inundated should a dam fail catastrophically. Dam Inundation Zone maps have been prepared for Emerson Lake, and partial mapping has been done for Mt. Meadows/Walker Reservoir. Other dams of concern which have not been mapped include Hog Flat, and McCoy Flat.

Table 5-20. Dams and Reservoirs in Lassen County

	Name	Date	Type	Capacity (acre ft.)
1	Albaugh No 1	1953	Earth	335
2	Albaugh No 2	1966	Earth	270
3	Antelope	1918	Earth	1,500
4	Beaver Creek	1978	Earth	214
5	Branham Flat	1880	Earth	1,200
6	Buckhorn	1904	Earth	2,000
7	California Corrections Center	1980	Earth	280
8	California Corrections Center II	1995	Earth	368

	Name	Date	Type	Capacity (acre ft.)
9	Caribou Lake	1928	Earth	460
10	Chace Valley	1955	Earth	92
11	Collett Addition	1991	Earth and Rock	7,800
12	Collett Afterbay	1991	Earth	300
13	Coon Camp	1900	Earth	548
14	Coyote Flat	1928	Earth	5,250
15	Cramer Wood Ranch	1910	Earth	3,000
16	Elkins And Lane	1953	Earth	412
17	Emerson		Earth	418
18	Fredonia	1914	Earth	300
19	Gerig	1939	Flashboard and Buttress	110
20	Heath Reservoir	1965	Earth	6,850
21	Hog Flat	1891	Earth	8,000
22	Holbrook	1952	Earth	719
23	Horse Lake	1912	Earth	75
24	Indian Ole	1924	Flashboard and Buttress	24,800
25	Iverson	1968	Earth	1,800
26	Leavitt, Lake	1891	Earth	7,482
27	Leonard No 2	1968	Earth	187
28	Madeline	1900	Earth	400
29	Mardis	1941	Earth	11
30	Mccoy Flat	1891	Earth	17,290
31	Mendiboure	1949	Earth	1,130
32	Myers	1957	Earth	279
33	Nine Springs	1954	Earth	125
34	Peconom	1920	Earth	173
35	Petes Valley	1954	Earth	240
36	Rains Creek	1960	Earth	126
37	Red Rock No 1	1893	Earth	10,000
38	Round Valley	1892	Earth and Rock	5,500
39	Shugru		Earth	195
40	Silva Flat	1926	Earth	3,900
41	Smoke Creek	1949	Earth	960
42	Spaulding	1954	Earth	147

	Name	Date	Type	Capacity (acre ft.)
43	Spooner	1906	Earth	3,123
44	Sworinger	1961	Earth	4,050
45	Tule Lake	1904	Earth	39,500

Source: California Department of Water Resources

5.4.14.4 Probability of Occurrence in County

Dam failure events are infrequent and usually coincide with the events that cause them, such as earthquakes, landslides, excessive rainfall and snowmelt. These impacts can also be exacerbated by aging or poor maintenance of the structures. There is a "residual risk" associated with dams; residual risk is the risk that remains after safeguards have been implemented. For dams, the residual risk is associated with events beyond those that the facility was designed to withstand. However, the probability of occurrence of any type of dam failure event is considered to be low in today's regulatory and dam safety oversight environment.

5.4.14.5 Climate Change Considerations

Increased rainfall from changing climate conditions could present a risk to dams and reservoirs in Lassen County if volume of runoff is greater than the dam's capacity. This could cause the County to release stored water into the downstream water courses in order to ensure the integrity of the dam.

5.4.15. Infectious Disease

5.4.15.1 Description of Hazard

Infectious disease emergencies are circumstances caused by biological agents, including organisms such as bacteria, viruses or toxins, with the potential for significant illness or death in the population. Infectious disease emergencies may be caused by:

- Naturally occurring diseases spread person to person (e.g., measles, mumps, meningococcal disease, tuberculosis)
- Foodborne (e.g.: salmonella, E.coli, botulinum toxin, etc.)
- Vectors such as a mosquito that spread disease (e.g.: West Nile virus, dengue, Zika, malaria).
- Newly emerging infectious diseases (e.g.: Ebola, Zika, SARS, MERS, avian influenza).
- Intentionally caused spread of disease or toxins known as bioterrorism. Past bioterrorism events include the contamination of restaurant food with E.coli in Oregon (1984) and the release of Sarin gas in the Tokyo subway (1995).

Outbreaks, epidemics, or pandemics of infectious disease can occur when a new virus emerges to which the population has little immunity. The 20th century saw three such pandemics, the most notable of which was the 1918 Spanish influenza pandemic that was responsible for 20 million deaths throughout the world. Secondary impacts include significant economic disruption to a community's

infrastructure due to loss of employee work time, essential services and products, and costs of treating or preventing spread of the disease.

- An **outbreak** is when there are more cases than would be normally expected, often suddenly, of an infectious disease in a community or facility.
- An **epidemic** is when there are more cases than would be normally expected of an infectious disease, often suddenly, in a population of a large geographic area.
- A **pandemic** refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people. Examples include pandemic influenza and Severe Acute Respiratory Syndrome or "SARS."

Public health measures are used to control outbreaks, epidemics, or pandemics of infectious diseases, and are especially important for diseases with high morbidity or mortality and limited medical prophylaxis and/or rapid treatment. The impact of infectious disease emergencies on the local community and its critical infrastructure will depends on:

- The type of biological agent and availability of treatment for victims
- The availability of prophylaxis for responders and the public
- The scale of exposure and ongoing exposure
- The mode of transmission and whether transmission can be interrupted
- Whether the event is affecting staffing for critical infrastructure within and outside of the county such as transportation, law enforcement, health care, and the medical and food supply chains.

The Vector Borne Disease Section of the California Department of Public Health identifies the following types of diseases and infestations:

- Africanized Honeybees
- Bed Bugs
- Body Lice
- Cat Scratch Disease
- Conenose Bugs
- Zika Virus
- Head lice
- Lyme Disease
- Mosquitoes
- Murine Typhus
- Plague
- Ticks
- West Nile Virus
- Tularemia
- Scabies
- Swimmer's Itch
- Hantavirus Cardiopulmonary Syndrome
- Red Imported Fire Ants

Measures to control disease include:

- Legal measure such as isolation and quarantine of persons or products, and legal closure of food establishments.
- Control of contaminated food or water through recall of product or, for water, "Do Not Use", "Do Not Drink" or "Boil Water" orders issued by state or local health departments.
- Vector control to eliminate vectors such as mosquitos that carry the disease from person to person.

5.4.15.2 Location and Extent of Hazard in County

An infectious disease hazard can occur throughout the entire County.

5.4.15.3 History of Hazard in County

Lassen County has experienced small outbreaks of some infectious disease cases (foodborne, norovirus, H1N1). There have been no recent significant events.

5.4.15.4 Probability of Occurrence

While there are generally seasons for some types of infectious diseases, outbreaks can occur within Lassen County with little to no warning.

5.4.15.5 Climate Change Consideration

While many vector born and zoonotic diseases (VBZD), such as malaria, yellow fever, dengue, and murine typhus, are rarely seen in the United States, we are directly susceptible to VBZD that are found in warmer climates and vulnerable due to global trade and travel. Many VBZD are climate sensitive and ecological shifts associated with climate change are expected to impact the distribution and incidences of these diseases. Changes in temperature and precipitation directly affect vector born disease transmission through pathogen-host interaction, and indirectly through ecosystem changes and species composition. As temperatures increase, vectors can spread into new areas that were previously too cold. For example, two mosquito vectors that carry malaria are now found at the US-Mexico border.

5.4.16. Natural Gas Pipeline Rupture & Storage/Distribution Accidents

5.4.16.1 Description of Hazard

The United States is heavily dependent on transmission pipelines to distribute energy and fuel sources. Virtually all natural gas, which accounts for about 28 percent of energy consumed annually, is transported by transmission pipelines. Energy demand in the United States continues to increase. Although California is a leader in exploring and implementing alternative energy sources such as wind and solar, the expansion of traditional energy sources, such as natural gas, continues.

Most of the natural gas used in California comes from out-of-state natural gas basins. It is delivered to California via the interstate natural gas pipeline system. In 2012, California customers received 42 percent of their natural gas supply from basins in the Southwest, 22 percent from Canada, 23 percent from the Rocky Mountains, and 12 percent from California.

Generally speaking, transmission lines are large-diameter steel pipes carrying natural gas at high pressure and compressed to provide higher carrying capacity. Transmission lines are both interstate and intrastate, with the latter connecting to smaller distribution lines delivering gas directly to homes and businesses.

5.4.16.2 Location and Extent of Hazard in County

The natural gas supply is provided through a major transmission line that runs on the eastern portion of Lassen County. Within the county, there are several lines (spurs) off of the single transmission line that supplies the City of Susanville and select facilities. The natural gas distribution lines are all located within the City of Susanville. Currently, there is no storage of natural gas. Areas not covered by the natural gas distribution lines utilize propane. There are no large propane storage facilities but some facilities and properties do have individual storage tanks.

5.4.16.3 History of Hazard in County

No significant historical events to report to date.

5.4.16.4 Probability of Occurrence in County

The potential risk of occurrence of this hazard is related to the age and gradual deterioration of the gas transmission/distribution system due to natural causes. Causes of and contributors to pipeline failures include construction errors, material defects, internal and external corrosion, operational errors, control system malfunctions, outside force damage, subsidence, and seismicity. Significant failure, including pipe breaks and explosions, can result in loss of life, injury, property damage, wildfires, and environmental impacts.

5.4.16.5 Climate Change Consideration

Climate change could have a direct effect on natural gas pipelines as flooding, erosion, and run-off could cause damage to the pipeline. Additionally, climate change could increase the demand for natural gas. This increase in demand may require the development of new pipelines; which could increase potential complications.

5.4.17. Terrorism

5.4.17.1 Description of Hazard

The term terrorism refers to intentional, criminal malicious acts. There is no single, universally accepted definition of terrorism, and it can be interpreted in many ways. Terrorism is defined in the Code of Federal Regulations as "...*the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.*" (28 CFR, Section 0.85). For the purposes of this plan, terrorism refers to the use of weapons of mass destruction, including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and cyber terrorism. Conventional Attacks/Active Shooter incident are initiated by humans. They can be a well-planned coordinated attack with multiple suspects, or the result of a lone individual on a rampage.

5.4.17.2 Location and Extent of Hazard in County

Terrorism can occur throughout the entire county.

5.4.17.3 History of Hazard in County

There have been no significant terrorism events.

5.4.17.4 Probability of Occurrence in County

All County businesses and facilities are perceived as a soft target; however, due to the intended purpose of terrorism, it would most likely happen in more populous urban areas where more devastation (and fear) will ensue.

5.4.17.5 Climate Change Consideration

While there is little evidence to link climate change to increased occurrences of terrorism, depending on the type of attack, it could impact the response and recovery efforts.

5.4.18. Cyber Security Threat

5.4.18.1 Description of Hazard

A cyber security threat is a circumstance or event that has or indicates the potential to exploit vulnerabilities and to adversely impact organizational operations, organizational assets (including information and information systems), individuals, other organizations, or society. Critical infrastructure, such as utilities and telecommunications, are also potential targets. Examples of cyber threats include malware, phishing, denial of service attacks, ransomware, and state-sponsored hacking. Recent reports produced by Verizon and Symantec indicate the following trends:

- Public sector entities suffered 239 of 1,935 breaches, 12 percent, identified by Verizon in its 10th annual Data Breach Investigations Report, making them the third-largest victims behind financial and health care organizations.
- Most of these breaches are external, result in personal data or secrets being compromised, and take years to discover.
- The public sector is under-resourced, meaning that money stolen is rarely recovered and cybercrimes go unpunished
- Governments are growing targets, and small jurisdictions lacking resources are the most vulnerable
- About 1 in every 2329 public administration emails is a phishing attempt, according to the Symantec report, making it the fourth-most targeted sector
- The Internet of Things is also a growing concern for governments placing sensors in vehicles, equipment, and infrastructure.

5.4.18.2 Location and Extent of Hazard in County

A cyber security threat/attack can happen anywhere within the County.

5.4.18.3 History of Hazard in County

While there have been several smaller cyber threats and hacking, none have reached a level of significance.

5.4.18.4 Probability of Occurrence in County

Cyber threats/attacks are on the rise globally, national, and locally. The probability of occurrence of cyber threats is rapidly increasing, especially with increased reliance on the Internet and cloud-based computing. However, cyber security threats/attacks will generally be targeted towards larger corporations or state/national governments which are not located within the county.

5.4.18.5 Climate Change Consideration

While there is little evidence to link climate change to increase in occurrences of cyber security threats/attacks, the target could be related to persons/groups with issues with individuals or companies they perceive to have effect on the climate (i.e., greenhouse gas producers) within the community.

5.4.19. Civil Disturbance

5.4.19.1 Description of Hazards

Civil Disturbance is a term generally used to describe disorderly conduct or a breakdown of orderly society by a large group of people. Civil Disturbance can range from a protest against major socio-political problems to riots.

5.4.19.2 Location and Extent of Hazard in County

Civil Disturbance can occur in any part of Lassen County; however, it will generally be located within areas of greater population or significant assets.

5.4.19.3 History of Hazard in County

No significant historical events to report to date

5.4.19.4 Probability of Occurrence in County

There are no studies that predict the probability of civil disturbance occurrences.

5.4.19.5 Climate Change Consideration

While there is no direct linkage between climate change and civil disturbances, there could be indirect linkages. As climate change impacts are either felt or perceived to be felt it could ignite passions within people to demonstrate against possible causes or enablers.

Section 6. Vulnerability Assessment

6.1. Overview

The purpose of this section is to estimate the potential vulnerability (impacts) of the priority hazards within the county on the built environment (residential, non-residential, critical facilities, etc.) and population. To accomplish this three (3) different approaches have been used: 1) application of scientific loss estimation models; 2) analysis of exposure of critical assets to hazards; and 3) a qualitative estimate of potential impacts from hazards. It is important to note that the first two approaches can only be applied to hazards that have an exposure area (footprint). For those priority hazards where an exposure layer does not exist or where the hazard exposure area is the entire planning area (i.e., Lassen County), a brief analysis of the potential vulnerability is presented. The vulnerability assessment was only done for the seven (7) hazards within the county that have been categorized as "high" priority in Section 5 of this HMP.

6.1.1. Scientific Loss Estimation Models

The approach used to complete this efforts involves the utilization of the Federal Emergency Management Agency's (FEMA) Hazus model. Hazus is a nationally applicable standardized methodology that estimates potential losses from earthquakes, hurricane winds and floods. Hazus uses state-of-the-art Geographic Information Systems (GIS) software to map and present data results of damage and economic loss estimates for buildings and infrastructure from earthquake, hurricane winds and flood hazard. It also allows users to estimate the impacts of the hazards on populations. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning.

Hazus' standard configuration allows for "out-of-the-box" regional or community-wide loss assessment using default ("Level 1") population and building inventory databases, aggregated to the census tract level for earthquakes or census block level for flood and hurricane. Additionally, there is a default essential facilities and lifeline systems database; however, the data sets are incomplete and usually need augmentation.

A summary of Hazus default building inventory data for Lassen County is provided below. **Table 6-1** presents Hazus default building inventory data by general occupancy and **Table 6-2** presents Hazus default building inventory data by general building type.

Table 6-1. Hazus Default Building Inventory Data- General Occupancy

General Occupancy	Building Replacement Value ($1,000)	Building Replacement Value ($1,000)	Contents Replacement Value ($1,000)	Building Square Footage (1,000 Sq. Ft.)	Building Count
Residential	$2,445,605	$2,445,605	$1,223,378	19,135	11,752
Commercial	$387,734	$387,734	$467,219	1,953	445
Industrial	$30,673	$30,673	$37,983	244	110
Other	$143,293	$143,293	$148,174	856	174
TOTAL	**$3,007,305**	**$3,007,305**	**$1,876,754**	**22,188**	**12,481**

Table 6-2. Hazus Default Building Inventory Data- General Building Type

General Building Type	Building Replacement Value ($1,000)	Building Replacement Value (%)	Estimated Building Count	Building Count (%)
Concrete	$189,981	6.3%	152	1%
Manufactured Housing	$114,559	3.8%	2,228	18%
Precast Concrete	$67,395	2.2%	123	1%
Reinforced Masonry	$223,634	7.4%	269	2%
Steel	$148,321	4.9%	160	1%
Unreinforced Masonry	$27,232	0.9%	36	0%
Wood Frame (Other)	$107,002	3.6%	127	1%
Wood Frame (Single-family)	$2,129,182	70.8%	9,386	75%
TOTAL	**$3,007,305**		**12,481**	

The distribution of buildings across the various construction classes given in Table 6-2 is estimated using Hazus default relationships (e.g., x% of offices may be built of concrete frame, y% of offices may be built of reinforced masonry, etc.). The actual distribution of building across these construction types may be different.

The Hazus essential facilities default data was also used for the analysis; however, the data sets were augmented to account for a significant number of missing facilities located wtihin Lassen County. Below is a summary of the essential facilities data and the augmentation made to the data sets:

- **Fire Stations—**the Hazus default database contained 11 facilities; database was augmented to include 25 facilities.

- **Law Enforcement Facilities**—the Hazus default database contained 3 police station facilities; database was augmented to include 11 facilities (5 stations, 5 jail/prison facilities, and the Superior Court building).
- **Medical Care Facilities**—the Hazus default database contained 1 hospital; database was augmented to include 8 facilities (incorporated information on community clinics, skilled nursing facilities and home health agencies as licensed by the California Office of Statewide Health Planning and Development- OSHPD).
- **Public Schools**—the Hazus default database included 38; database was not augmented.

Table 6-3 provides a summary of the construction type and design level assumed for the essential facilities considered in the Hazus risk assessment. A more accurate risk assessment could be conducted if additional facility information was collected, such as structural system, number of stories, year of construction/seismic code used for design, building square footage, building replacement value, and content replacement value. It should be noted that the Hazus default database represents each school campus with a single building record of an assumed construction type. In reality, most public schools are multi-building campuses, built over a period of years (i.e., buildings may be designed to different seismic codes). To improve the risk assessment for public schools, information on each individual building would need to be collected.

Table 6-3. Essential Facilities Data for Lassen County Included in the Hazus Risk Assessment

Essential Facility Type	Essential Facility Sub-Type	Assumed Structural Class and Seismic Design Level	Number of Facilities
Fire Stations	Station	W2 (Wood Frame > 5,000 SF), Moderate Code Design Level	**25**
Law Enforcement Facilities	Police/Sheriff Station	W2 (Wood Frame > 5,000 SF), Moderate Code Design Level	5
	Jail/Prison	Reinforced Masonry, High Code Design Level	5
	Courthouse	Reinforced Masonry, High Code Design Level	1
		Sub-total	**11**
Medical Care Facilities	Hospital	W2 (Wood Frame >5,000 SF), High Superior Design Level	1
	Community Clinic	W1 (Wood Frame ≤ 5,000 SF), Moderate Code Design Level	5
	Skilled Nursing Facility	W1 (Wood Frame ≤ 5,000 SF), Moderate Code Design Level	1
	Home Health Agency	W1 (Wood Frame ≤ 5,000 SF), Moderate Code Design Level	1
		Sub-total	**8**
Public Schools	Schools	W1 (Wood Frame ≤ 5,000Sq.Ft.), High Code Design Level	**38**

The lifeline inventory within HAZUS is divided between transportation and utility lifeline systems. There are seven (7) transportation systems in Hazus that include 1) highways, 2) railways, 3) light rail, 4) buses, 5) ports, 6) ferries and 7) airports, and six (6) utility systems that include 1) potable water, 2) wastewater, 3) natural gas, 4) crude & refined oil, 5) electric power, and 6) communications. The current Hazus lifeline inventory default data are provided in **Table 6-4** and **Table 6-5**. Light Rail, Port and Ferry facilities have been omitted from Table 6-4 as there are no such facilities in the County. It should be noted that most utility data have been removed from the public domain for security reasons; accordingly, default utility data available in Hazus may not be fully representative of the actual exposure.

Table 6-4. Hazus Lifeline Inventory Default Data - Transportation System

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	98	54.7
	Segments	45	2,004.2
	Tunnels	0	0
	Sub-total	**143**	**2,058.9**
Railway	Bridges	1	0.04
	Facilities	0	0
	Segments	157	315.2
	Tunnels	0	0
	Sub-total	**158**	**315.24**
Bus	Facilities	1	1.3
	Sub-total	**1**	**1.3**
Airport	Facilities	3	32.0
	Runways	4	151.90
	Sub-total	**7**	**183.90**
		TOTAL	**2,559.34**

Table 6-5. Hazus Lifeline Inventory Default Data- Utility System

System	Component	#Locations/ Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	N/A	28.9
	Facilities	0	0
	Pipelines	0	0
	Sub-total	**0**	**28.9**
Waste Water	Distribution Lines	N/A	17.30
	Facilities	1	78.60
	Pipelines	0	0
	Sub-total	**1**	**95.90**
Natural Gas	Distribution Lines	N/A	11.5
	Facilities	0	0
	Pipelines	0	0
	Sub-total	**0**	**11.5**
Oil Systems	Facilities	0	0
	Pipelines	0	0
	Sub-total	**0**	**0**
Electrical Power	Facilities	2	259.6
	Sub-total	**2**	**259.6**
Communication	Facilities	3	0.40
	Sub-total	**3**	**0.40**
		TOTAL	**396.3**

6.1.2. Analysis of Exposure of Critical Assets to Hazards

The approach used to complete this effort involves using GIS software to geolocate each critical assets to identify which fall within the hazard exposure area (footprint). The results summarize the total number of exposed critical assets and the estimated cost of building replacement and content. Because of the size of the county and the disbursement of the critical assets, maps were not generated for this analysis. However, all information is maintained in GIS and Lassen County, the City of Susanville, and the Susanville Indian Rancheria have the ability to zoom in and focus on areas and generated localized maps if necessary.

Table 6-6 provides a list of the categories of critical assets identified by Lassen County, the City of Susanville, and the Susanville Indian Rancheria. This list represents the government owned and/or operated assets, as well as, some privately owned and operated assets that are of primary concern for ensuring resiliency. While similar, this list is different than the Hazus list which was developed to estimate damage (loss) from hazards. Information for government owned or operated facilities (building replacement cost and building content costs) were reviewed and updated as needed; where available the same information was reviewed and updated for the privately owned or operated facilities. A complete list of the critical assets can be found in **Appendix X**.

Table 6-6. Critical Assets within Lassen County

Category of Facility	Total Structures	Total Real Property	Total Personal Property
Airport	3	$ 6,000,000	NA
Commercial	2	$ 10,780,000	$ 10,780,000
Communications	2	$ 7,000,000	NA
Fire	7	$ 6,331,800	$ 7,387,100
Law	8	$ 16,936,012	$ 18,807,387
Medical	4	$ 5,782,499	$ 8,673,735
Other	2	$ 270,660	$ 270,660
Public Buildings	15	$ 20,453,545	$ 15,803,545
Roads/Bridges	53	$ 67,750,000	NA
Schools	20	$ 58,782,137	$ 70,250,037
Water Facilities	27	$ 11,825,000	NA
Total	**143**	**$ 211,911,653**	**$ 131,972,464**

The owners of the critical assets are as follows:

- City of Susanville 27
- Federal Government 3
- Lassen County 76
- Private 20
- Susanville Indian Rancheria 10
- State Government 7

6.1.3. Qualitative Estimate of Impacts from Hazards

The approach used to complete this effort involves utilizing readily available data (i.e., historical and recent events), After Action Reports, census data) to extrapolate and estimate potential vulnerability. In some cases, the estimation built upon historic events but projected worst case potentials.

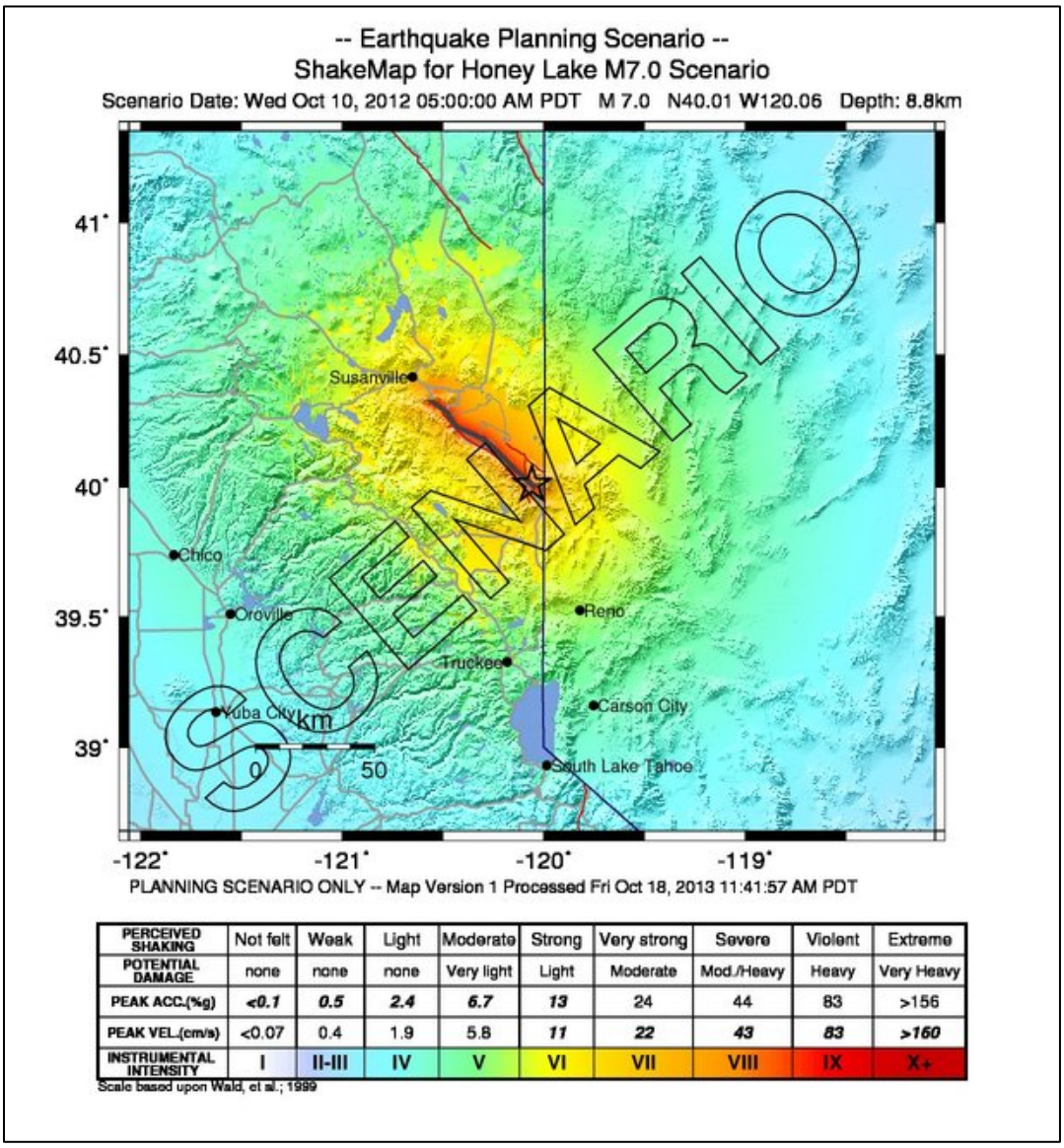
6.2. Scientific Loss Estimation Analysis

This section assesses the loss estimation (damage) using the Hazus model and its default data for the earthquake and flood hazards.

6.2.1. Earthquake

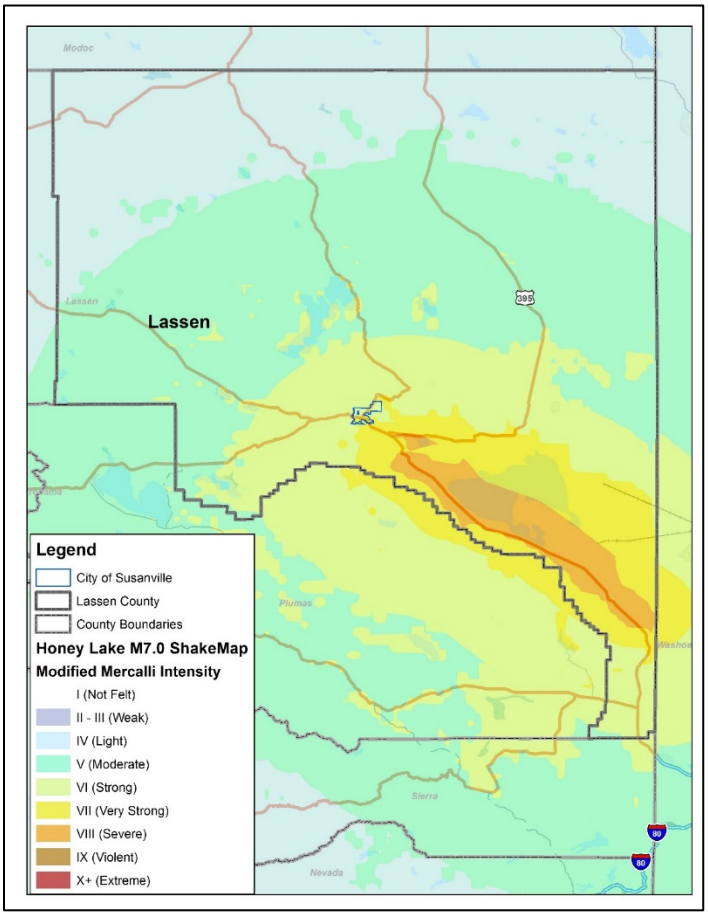
One (1) earthquake scenario developed by the United States Geological Survey (USGS) was selected to assess potential impacts from a significant earthquake on the county (**Figure 6-1**). A county-level map of ground shaking for the same scenario is shown in **Figure 6-2**.

Figure 6-1. M7.0 Earthquake on the Honey Lake Fault



Source: USGS ShakeMap

Figure 6-2. M7.0 Earthquake on the Honey Lake Fault: Ground Motions for Lassen County



Source: USGS ShakeMap

Hazus 3.2[1] (released in October, 2016) was used to conduct county-wide earthquake risk assessments. An overview of the county-wide results for the earthquake scenario is provided in **Table 6-7**. **Table 6-8** provides a breakdown of estimated building damage (building count by Hazus damage state) by general building type, allowing for an understanding of the distribution of predicted damage in the modeled scenarios. (Note: totals by building type in **Table 6-8** may not match those in **Table 6-2** due to rounding within Hazus). Functionality of essential facilities in the scenario earthquake is summarized in **Table 6-9**.

[1] While Hazus 4.0 was released in April 2017, the most significant change was the addition of a tsunami module. Since the tsunami hazard is not relevant to Lassen County, analyses already underway in Hazus 3.2 were continued.

Table 6-7. Estimated Impacts- M7.0 Honey Lake Earthquake Scenario

Direct Economic Losses for Buildings ($1,000)		
Capital Stock Losses	Cost of Structural Damage	14,101
	Cost of Non-Structural Damage	64,103
	Cost of Contents Damage	24,229
	Inventory Loss	248
Income Losses	Relocation Loss	8,757
	Capital-Related Loss	2,240
	Rental Income Loss	3,059
	Wage Losses	3,470
	Total Direct Economic Loss	**120,207**
Casualties		
Day Casualties	Casualties – 2 pm	
	Level 1 - minor injuries, basic first aid	25
	Level 2 - hospital treat & release	5
	Level 3 - injuries requiring hospitalization	1
	Level 4 - fatalities	1
	Total Casualties	**32**
Night Casualties	Casualties – 2 am	
	Level 1 - minor injuries, basic first aid	27
	Level 2 - hospital treat & release	4
	Level 3 - injuries requiring hospitalization	0
	Level 4 - fatalities	0
	Total Casualties	**31**
Shelter		
Shelter	Displaced Households	34
	People Requiring Short-term Shelter	24
Debris	Brick, Wood & Other (Light) Debris	11.6
	Concrete & Steel (Heavy) Debris	12.4
	Total Debris	**24.0**

Source: Hazus

Table 6-8. Estimated Building Damage- M7.0 Honey Lake Earthquake Scenario

General Building Type	Damage State					Total
	None	Slight	Moderate	Extensive	Complete	
Concrete	96	28	20	6	1	**151**
Manufactured Housing	866	451	578	282	52	**2,229**
Precast Concrete	75	21	20	7	1	**124**
Reinforced Masonry	196	34	30	9	1	**270**
Steel	99	27	25	7	1	**159**
Unreinforced Masonry	21	8	5	2	1	**37**
Wood Frame (other)	86	28	12	1		**127**
Wood Frame (single family)	6,954	1,872	521	31	9	**9,387**
Total	**8,393**	**2,469**	**1,211**	**345**	**66**	**12,484**

Source: Hazus

Table 6-9. Predicted Essential Facility Functionality- M7.0 Honey Lake Earthquake Scenario

Essential Facility Type	Functionality Level	Number of Facilities
Fire Stations	Functionality < 50 % on Day 1	4
	Functionality 50 - 75% on Day 1	7
	Functionality >75% Day 1	14
Law Enforcement Facilities	Functionality < 50 % on Day 1	0
	Functionality 50 - 75% on Day 1	9
	Functionality >75% Day 1	2
Medical Care Facilities	Functionality < 50 % on Day 1	0
	Functionality 50 - 75% on Day 1	5
	Functionality >75% Day 1	3
Public Schools	Functionality < 50 % on Day 1	2
	Functionality 50 - 75% on Day 1	23
	Functionality >75% Day 1	13

Source: Hazus

6.2.2. Flooding

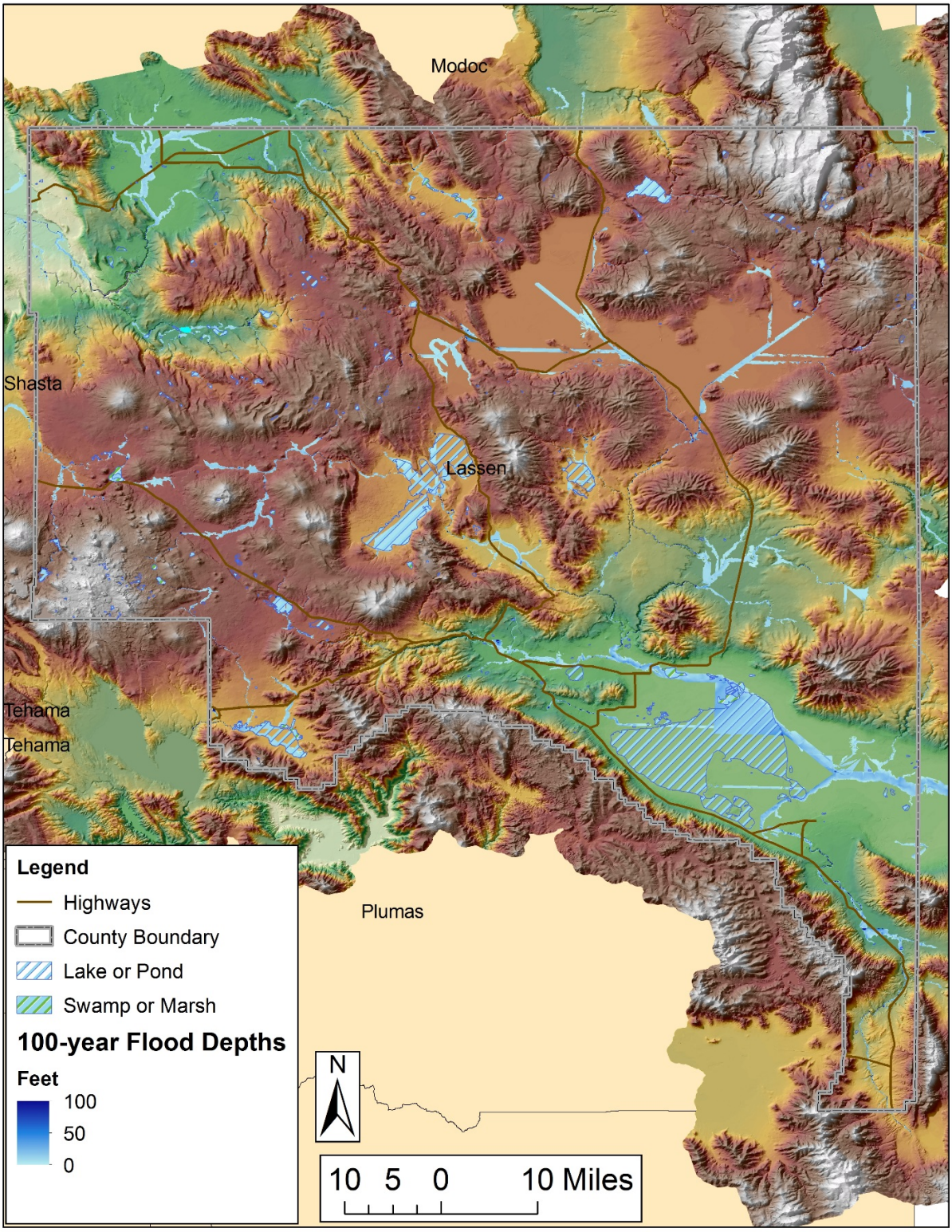
Hazus was used to develop a flood depth grid for the 1-percent annual chance (100-year) flood, using Hazus built-in, basic (i.e., Level 1) flood depth estimation methodology. The Hazus flood hazard assessment methodology uses available information and local river and floodplain characteristics, such as frequency, discharge and ground elevation to estimate flood elevation, and ultimately flood depth. Digital elevation model (DEM) data with 30-meter resolution, available from the USGS' National Elevation Dataset (see: http://nationalmap.gov/elevation.html) has been utilized in the current assessment.

It should be noted that the flood depth grid generated by Hazus is not equivalent to regulatory floodplain data contained in FEMA's Digital Flood Insurance Rate Maps (DFIRMs), which are the result of extensive, detailed engineering study. The Hazus-generated flood depth grid is a hypothetical representation of a potential flooding scenario, intended for non-regulatory uses. Further, it should also be noted that the DEM data used in the default analysis do not reflect the presence of channels and levees. A more detailed assessment would utilize higher resolution DEM data, such as LIDAR-based DEM data, and/or would require GIS-based revisions to the DEM to better reflect local flood control structures. Given that the Hazus Level 1 approach does not consider the presence of levees, Hazus loss and damage estimates produced for areas with levees should be considered "worst-case" flood losses, reflecting potential flood damage that could occur in the event that the levees fail. Hazus-estimated flood depths across Lassen County are provided in **Figure 6-3**, while **Figure 6-4** and **Figure 6-5** show flood depths in the vicinity of Susanville and the Susanville Indian Rancheria, respectively. While the Susanville Indian Rancheria (as mapped by FEMA) is not impacted by the estimated 100-year flooding, the City of Susanville may be impacted by flooding on both the Susan River and Piute Creek.

An overview of the county-wide Hazus results for the 100-year flood scenario is provided in **Table 6-10**. **Table 6-11** provides a breakdown of estimated building damage (building count by percent damage range) by general occupancy, for those occupancies with exposure in the flooded census blocks. Several occupancies (e.g., industrial, agriculture, multi-family residential) had no exposure in the flooded blocks, and have been omitted from the table. As shown, most of the flood-damaged buildings are single family homes.

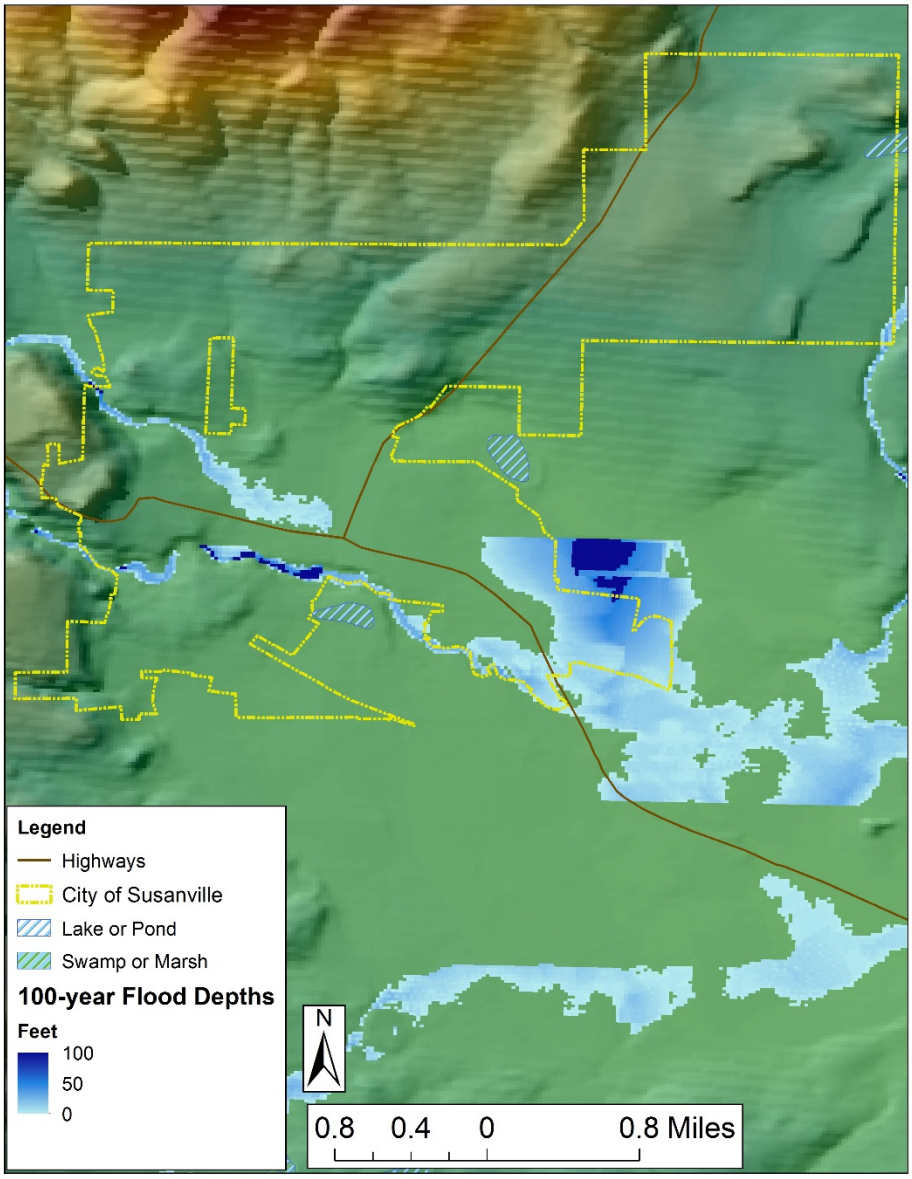
Functionality of essential facilities in the flood scenario is summarized in **Table 6-12** for Lassen County. As shown in the table, no fire stations, law enforcement facilities or schools were located within the areas predicted to be flooded in the Hazus 100-year flood assessment. Further, just two medical care facilities were located within flooded areas, and just one is anticipated to suffer any flood damage.

Figure 6-3. Flood Depths for a 1-percent Annual Chance (100-year) Flood—Lassen County



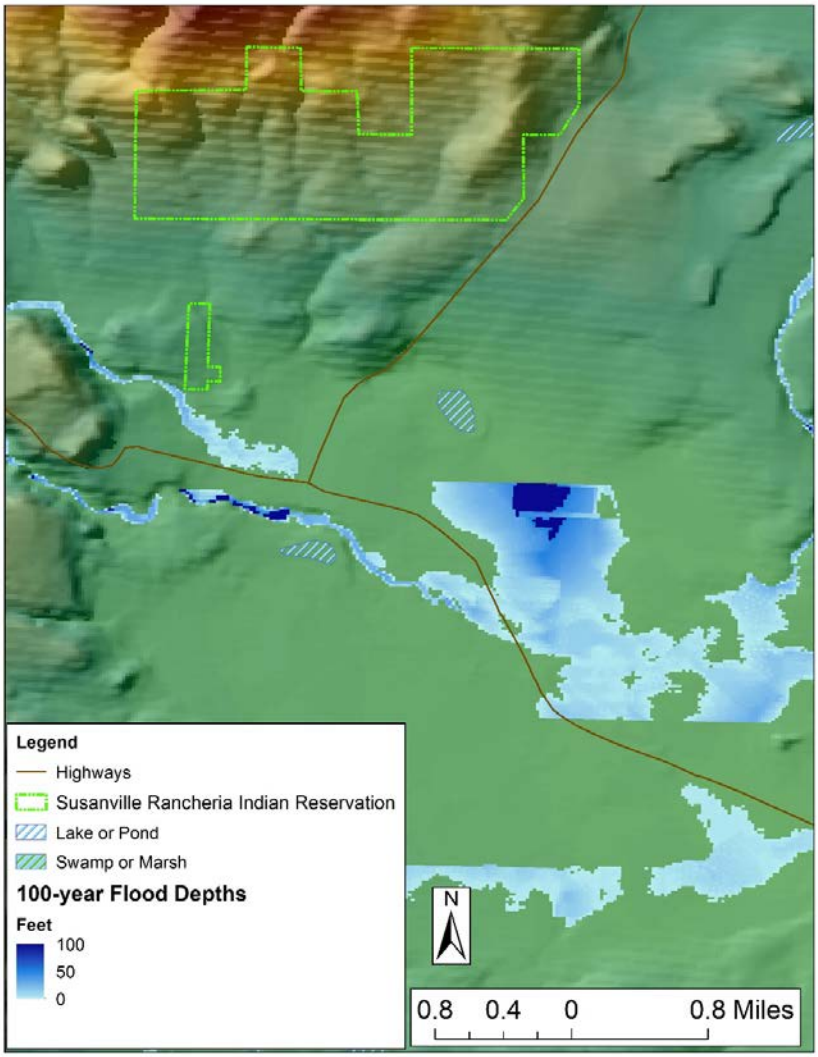
Source: Hazus

Figure 6-4. Flood Depths for a 1-percent Annual Chance (100-year) Flood—City of Susanville Vicinity



Source: Hazus

Figure 6-5. Flood Depths for a 1-percent Annual Chance (100-year) Flood—Susanville Rancheria Indian Vicinity



Source: Hazus

Table 6-10. Impacts for the 1-Percent Annual Chance (100-Year) Flood Scenario—Lassen County

Direct Economic Losses for Buildings ($1,000)		
Capital Stock Losses	Total Building Damage	16,125
	Cost of Contents Damage	16,868
	Inventory Loss	304
Income Losses	Relocation Loss	34
	Capital-Related Loss	37
	Rental Income Loss	9
	Wage Losses	273
	Total Direct Economic Loss	**33,650**
Shelter		
Shelter	Displaced Households	475
	Number of People Requiring Short-term Shelter	770
Debris (tons)		
Debris	Finishes	1,161
	Structures	302
	Foundations	507
	Total Debris	**1,970**

Source: Hazus

Table 6-11. Estimated Building Damage for a 1-percent Annual Chance (100-year) Flood Scenario—Lassen County

Occupancy	Damage State							Total
	None	1–10%	11–20%	21–30%	31–40%	41–50%	Substantial	
Single Family Homes	92	61	49	9	8	2	3	**224**
Manufactured Homes	16	2	2	2	0	1	9	**32**
Commercial	2	0	0	0	0	0	0	**2**
Total	**110**	**63**	**51**	**11**	**8**	**3**	**12**	**258**

Source: Hazus

Table 6-12. Predicted Essential Facility Functionality for a 1-percent Annual Chance (100-year) Flood Scenario—Lassen County

Essential Facility Type	Hazard Impact/Functionality	Number of Facilities
Fire Stations	# facilities located within flooded areas	0
	# facilities with Moderate or Greater Damage	0
	# facilities expected to be non-functional on Day 1	0
Law Enforcement Facilities	# facilities located within flooded areas	0
	# facilities with Moderate or Greater Damage	0
	# facilities expected to be non-functional on Day 1	0
Medical Care Facilities	# facilities located within flooded areas	2
	# facilities with Moderate or Greater Damage	0
	# facilities expected to be non-functional on Day 1	1
Public Schools	# facilities located within flooded areas	0
	# facilities with Moderate or Greater Damage	0
	# facilities expected to be non-functional on Day 1	0

Source: Hazus

6.2.2.1 Repetitive Loss (RL) Properties

As previously mentioned in Section 4 (Community Capabilities), Lassen County and the City of Susanville participate in the National Flood Insurance Program (NFIP). However, although the county has gone through several flood events in which properties have experienced repetitive loss, there are no properties that fall under the NFIP definition of Repetitive Loss Properties. Repetitive loss properties are defined as property that is insured under the NFIP that has filed two or more claims in excess of $1,000 each within any consecutive 10-year period since 1978. As such, there are no repetitive loss properties within Lassen County or the City of Susanville. The Susanville Indian Rancheria does not include any mapped floodplains, and therefore does not participate in the NFIP.

6.3. Critical Facilities Analysis

6.3.1. Earthquake

Table 6-13 represents the number of critical assets exposed to the potential Modified Mercalli Intensity (MMI) Scale and the corresponding asset replacement and content cost.

Table 6-13. Critical Asset Earthquake Exposure- Lassen County

	4.0-4.9		5.0-5.9		6.0-6.9		7.0-7.9		8.0<		TOTAL	
	#	Exposure $	#	Exposure $	#	Exposure $	#	Exposure $	#	Exposure $	#	Exposure $
City of Susanville	0		0		12	$84,551,580	14	$53,011,225	1	$2,000,000	**27**	**$139,562,805**
Federal Government	0		0		2	$2,638,250	0		1	0	**3**	**$2,638,250**
Lassen County	5	$6,116,880	8	$20,194,200	16	$35,143,039	35	$62,738,019	12	$14,421,180	**76**	**$138,613,318**
Private	5	0	5	0	5	$9,121,650	5	$10,262,400	0		**20**	**$19,384,050**
Susanville Indian Rancheria	0		0		10	$32,155,511	0				**10**	**$32,155,511**
State Government	1	$2,110,600	1	$2,110,600	2	$4,221,200	3	$2,551,875			**7**	**$10,994,275**
TOTAL	**11**	**$8,227,480**	**14**	**$22,304,800**	**47**	**$167,831,231**	**57**	**$128,563,519**	**14**	**$16,421,190**	**143**	**$343,348,210**

As presented in Section 5, severity of earthquake shaking at a given location is generally referred to as earthquake intensity. An intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and total destruction. The scale currently used in the United States is the MMI scale. Below is a summary of the more significant MMI intensities:

4.0-4.9 Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

5.0-5.9 Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop

6.0-6.9 Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.

7.0-7.9 Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

8.0 < Damage slight in specially-designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly-built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

Damage considerable in specially-designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Because of the size of the county and the lack of concentration of assets in any single location, it was determined best to provide a list of the exposed assets by owner:

City of Susanville Name of Asset	MMI
Orlo St. Well	6.4
Meadow View School	6.4
Spring Ridge Water Tank	6.4
Lassen Community College	6.6
South St. Water Tank	6.8
Lassen Municipal Utility District	6.8
Susanville Community Center	6.8
Susanville Sanitation District	6.8
McKinley Elementary School	6.8
Susanville City Hall	6.8
North St. and Paiute Creek bridge	6.8
N. Weatherlow and Paiute Creek bridge	6.8
Susanville Public Works Building	7.0
S. Lassen St. and Susan River Bridge	7.0
Foss St. bridge	7.0
Susanville District Library	7.0
City of Susanville Police Station	7.0
Richmond Road and Susan River Bridge	7.0
City of Susanville Fire Station	7.0
Credence High School	7.0
Lassen High School	7.0
Diamond View School	7.2
Riverside Drive and Susan River Bridge	7.2
Alexander Ave. and Susan River Bridge	7.2
Hwy 36 and Susan River Bridge	7.4
Grove St. well	7.4
Susanville Municipal Airport	8.0

Federal Government Name of Asset	MMI
Northeast Rural Health	6.6
U.S. Forestry Dispatch Fire Station	6.8
Herlong Correctional Facility	8.0

Lassen County Name of Asset	MMI
Hwy 299 and railroad bridge	4.8
Susanville Road bridge	4.8
Bieber bridge Hwy 299	4.8
Big Valley High School	4.8
Big Valley Elementary School	4.8
Stone Bengard Community Services	5.4
Juniper Ridge Elementary School	5.4
Clear Creek Bridge/Culvert	5.6
Westwood High School and Fletcher Walker Elementary	5.6
Westwood Airport	5.6
Spaulding Community Services District	5.6
Pine Creek bridge	5.6
Ravendale Airport	5.8
Hwy. 36 and	6.0
Karlo Rd Bridge	6.0
Hwy. 36 and Susan River Devil's Coral bridge	6.2
Lake Forest Water Tank	6.2
Cady Springs Water Tank	6.4
Bagwell Springs water tank	6.4
Harris Dr. Water Tank	6.6
Juvenile Detention Facility	6.6
Lassen County Sheriff Station	6.6
Lassen County Jail	6.6
Hwy. 139 bridge	6.6
Susan Hills Water Tank	6.8
Lassen County Administrative Complex	6.8
Westwood Community Service District	6.8
Barry Reservoir	6.8
Belfast Rd. and Willow Creek bridge	6.8
Schaffer Elementary School	7.0
Lassen County Public Works	7.0
Lake Forest Fire Department	7.0
Mapes Rd. and ? Bridge	7.2
Richmond Rd. CS 205 and Gold Run Creek	7.2
Mapes Rd. and ? Bridge	7.2
Lassen County Fairgrounds	7.2
Mapes Lane and Whitehead Slough Bridge	7.4
Mapes Road and ? Bridge	7.4
Mapes Rd. and ? Bridge	7.4

Lassen County Name of Asset	MMI
Mapes Road and ? Bridge	7.4
Mapes Road and ? Bridge	7.4
Alexander Rd. and Dill Slough Bridge	7.4
Alexander Rd. and ? Bridge	7.4
Richmond Elementary School	7.4
Hwy 395 and Willow Creek Bridge	7.4
Cut-Off Road Bridge	7.4
Center Rd. Bridge	7.4
Center Road and Willow Creek Bridge	7.4
Lassen County Superior Court	7.4
Mapes Rd and Hartson Slough Bridge	7.6
Galeppi Rd and Hartson Slough Bridge	7.6
Alexander Rd. and ? Bridge	7.6
Alexander Rd. and ? Bridge	7.6
Lambert Lane and Hartson Slough Bridge	7.6
Lambert Lane and Dill Slough Bridge	7.6
Chappius Lane and Susan River Bridge	7.6
Richmond Rd CR 205 Lassen Creek	7.8
Johnstonville Water Tank	7.8
Leavitt Lane and Susan Suver Bridge	7.8
Hwy. 395 bridge	7.8
Johnstonville Elementary School	7.8
Johnstonville Bridge A27	7.8
A27 Bridge	7.8
Travis Lane Bridge	7.8
Herlong High School	8.0
Fort Sage Middle School	8.0
Leavitt Lane and ? Bridge	8.0
A26 and Long Valley Creek Bridge	8.4
Hemphill Rd. and ? Bridge	8.4
Hemphill Rd. and ? Bridge	8.4
Hemphill Rd. and ? Bridge	8.4
A25 and Long Valley Creek Bridge	8.6
Janesville Elementary School	8.6
CR322 and Long Creek Bridge	8.7
CR322 Long Valley Creek Bridge	8.7
Long Valley Charter School	8.7

Private Name of Asset	MMI
Sworinger Reservoir	4.4
Collett Addition	4.6
Iverson Dam	4.6
Dodge Reservoir/Red Rock 1 Dam	4.8
Mendiboure Reservoir	4.8
Buckhorn Reservoir	5.0
Heath Reservoir	5.4
Indian Ole	5.6
Branham Flat Dam	5.6
Antelope Dam/Ducasse Reservoir	5.6
Hog Flat Dam	6.2
McCoy Flat Dam	6.2
Round Valley Reservoir	6.4
Banner Lassen Hospital	6.6
Lassen Historical Museum	6.8
Frontier Communications	7.0
Emerson Lake Dam	7.2
Cornerstone Christian School	7.2
Lassen Surgery Center	7.2

Susanville India Rancheria Name of Asset	MMI
Sierra Radio Network	7.4
Diamond Mountain Casino	6.4
Gas Station	6.4
Booster Station	6.4
Susanville Rancheria Community Building	6.4
Church	6.4
Susanville Rancheria Water Tank	6.4
Child Care Facility	6.6
Susanville Rancheria Medical Clinic	6.6
Susanville Rancheria Gymnasium	6.6
Susanville Rancheria Public Works	6.6

State Government Name of Asset	MMI
CalFire Bieber	4.8
CalFire Westwood	5.6
CalFire Susanville	6.4
Cal Fire Station	6.4
CCC Correctional Facility	7.6
High Desert Correctional Facility	7.6
Ca Highway Patrol Station	7.8

6.3.2. Flood

Table 6-14 represents the number of critical assets exposed to FEMA's National Flood Hazard Layer and the corresponding asset replacement and content cost.

Table 6-14. Critical Asset Flood Exposure- Lassen County

	Flood Zone A		Flood Zone X		TOTAL	
	#	Exposure $	#	Exposure $	#	Exposure $
City	7	$9,050,000	1	$400,000	**8**	**$9,450,000**
Federal Government	0	$0	0	$0	**0**	**$0**
Lassen County	44	$56,600,000	1	$11,900,584	**45**	**$68,500,584**
Private	7	$0	0	$0	**7**	**$0**
Susanville Indian Rancheria	0	$0	0	$0	**0**	**$0**
State Government	0	$0	0	$0	**0**	**$0**
TOTAL	**58**	**$65,650,000**	**2**	**$12,300,584**	**60**	**$77,950,584**

As presented in Section 5, probability of flooding is derived from work done by FEMA under its Flood Insurance Rate Maps (FIRM). The FEMA FIRM's identify several flood zones indicating the probability of flooding happening over a given period of time. Below is a summary of the more significant flood zones:

A Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. This flood zone includes A, AE, AH, and AO

X Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Often referenced as areas with a 0.2% annual chance of flooding.

Because of the size of the county and the lack of concentration of assets in any single location, it was determined best to provide a list of the exposed assets by owner:

City of Susanville Asset Name	Zone
Hwy 36 and Susan River Bridge	AE
Riverside Drive and Susan River Bridge	AE
Alexander Ave. and Susan River Bridge	AE
S. Lassen St. and Susan River Bridge	AE
Foss St. bridge	AE
Richmond Road and Susan River Bridge	AE
N. Weatherlow and Paiute Creek bridge	AE
Grove St. well	X

Lassen County Asset Name	Zone
CR322 and Long Creek Bridge	A
CR322 Long Valley Creek Bridge	A
A26 and Long Valley Creek Bridge	A
A25 and Long Valley Creek Bridge	A
Hemphill Rd. and ? Bridge	A
Hemphill Rd. and ? Bridge	A
Hemphill Rd. and ? Bridge	A
Mapes Rd and Hartson Slough Bridge	A
Mapes Lane and Whitehead Slough Bridge	A
Hwy. 36 and	A
Galeppi Rd and Hartson Slough Bridge	A
Mapes Road and ? Bridge	A
Mapes Rd. and ? Bridge	A
Mapes Road and ? Bridge	A
Mapes Road and ? Bridge	A
Alexander Rd. and Dill Slough Bridge	A
Alexander Rd. and ? Bridge	A
Alexander Rd. and ? Bridge	A
Alexander Rd. and ? Bridge	A
Mapes Rd. and ? Bridge	A
Lambert Lane and Hartson Slough Bridge	A
Lambert Lane and Dill Slough Bridge	A
Richmond Rd. CS 205 and Gold Run Creek	A

Lassen County Asset Name	Zone
Mapes Rd. and ? Bridge	A
Leavitt Lane and ? Bridge	A
Hwy 395 and Willow Creek Bridge	A
Cut-Off Road Bridge	A
Leavitt Lane and Susan Suver Bridge	A
Johnstonville Bridge A27	A
Chappius Lane and Susan River Bridge	A
A27 Bridge	A
Travis Lane Bridge	A
Hwy. 36 and Susan River Devil's coral bridge	A
Center Rd. Bridge	A
Center Road and Willow Creek Bridge	A
Barry Reservoir	A
Belfast Rd. and Willow Creek bridge	A
Hwy. 139 bridge	A
Karlo Rd Bridge	A
Pine Creek bridge	A
Ravendale Airport	A
Hwy 299 and railroad bridge	A
Susanville Road bridge	A
Bieber bridge Hwy 299	A
Lassen County Superior Court	X

Private Asset Name	Zone
Indian Ole	A
McCoy Flat Dam	A
Heath Reservoir	A
Buckhorn Reservoir	A
Dodge Reservoir/Red Rock 1 Dam	A
Mendiboure Reservoir	A
Iverson Dam	A

6.3.3. Wildfire

Table 6-15 represents the number of critical assets exposed to California Department of Forestry and Fire Protection, Fire Resource Assessment Program (CDF-FRAP) Fire Hazard Severity Zones and the corresponding asset replacement and content cost. It is important to note that while CDF does categorize areas as "*moderate*", "*high*" and "*very high*", there is no standard description; they are based on a weighted scoring system of several factors.

Table 6-15. Critical Asset Wildfire Exposure- Lassen County

	Moderate		High		Very High		TOTAL	
	#	Exposure $	#	Exposure $	#	Exposure $	#	Exposure $
City of Susanville	0	$0	0	$0	8	$34,771,020	**8**	**$34,771,020**
Federal Government	0	$0	0	$0	0	$0	**0**	**$0**
Lassen County	11	$12,363,080	2	$6,320,100	9	$16,867,730	**22**	**$35,550,910**
Private	3	$0	2	$0	2	$0	**7**	**$0**
Susanville Indian Rancheria	3	$1,019,587	0	$0	0	$0	**3**	**$1,019,587**
State Government	0	$0	1	$2,551,875	2	$4,221,200	**3**	**$6,773,075**
TOTAL	**17**	**$13,382,667**	**5**	**$8,871,975**	**21**	**$55,859,950**	**43**	**$78,114,592**

Because of the size of the county and the lack of concentration of assets in any single location, it was determined best to provide a list of the exposed assets by owner:

City of Susanville Asset Name	Zone
South St Water Tank	Very High
Diamond View Elementary School	Very High
Susanville Public Works Building	Very High
S. Lassen St. and Susan River Bridge	Very High
Lassen Municipal Utilities District	Very High
Susanville Sanitation District	Very High
Susanville City Hall	Very High
Meadow View School	Very High

Lassen County Asset Name	Zone
CR322 and Long Creek Bridge	Moderate
CR322 Long Valley Creek Bridge	Moderate
Long Valley Charter School	Moderate
A26 and Long Valley Creek Bridge	Moderate
Hwy. 36 and	Moderate
Schaffer Elementary School	Moderate
Barry Reservoir	Moderate
Belfast Rd. and Willow Creek bridge	Moderate
Hwy. 139 bridge	Moderate
Ravendale Airport	Moderate
Susanville Road bridge	Moderate
Janesville Elementary School	High
Stone Bengard Community Services	High
Clear Creek Bridge/Culvert	Very High
Westwood Airport	Very High
Susan Hills Water Tank	Very High
Hwy. 36 and Susan River Devil's coral bridge	Very High
Lassen County Public Works	Very High
Lassen County Administration Complex	Very High
Harris Drive Water Tank	Very High
Lake Forest Water Tank	Very High
Bagwell Springs Water Tank	Very High

Private Asset Name	Zone
Branham Flat Dam	Moderate
Antelope Dam/Ducasse Reservoir	Moderate
Sworinger Reservoir	Moderate
Emerson Lake Dam	High
Collett Addition	High
Indian Ole Dam	Very High
Round Valley Reservoir	Very High

Susanville Indian Rancheria Asset Name	Zone
Susanville Rancheria Community (admin) Building	Moderate
Church	Moderate
Susanville Rancheria Water Tank	Moderate

State Government Asset Name	Zone
California Highway Patrol Station	High
CalFire Susanville	Very High
Cal Fire 5th & Cedar	Very High

6.4. Qualitative Estimate of Impacts Analysis

This section assesses the risk for the other priority hazards that do not have a hazard footprint or hazard area. In most cases, the hazard footprint is the entire county.

6.4.1. Drought/Water Shortage

A drought is present when a region receives below-average precipitation, resulting in prolonged shortages in its water supply, whether atmospheric, surface, or ground water. A drought can last for months or years, or may be declared after as few as 15 days. The effects of the drought are most visible in the Lassen County when looking at the current capacity of Honey Lake, The majority of the regions watershed flows into Honey Lake.

Climate change has the potential to make drought events more common in California, including within Lassen County. Extreme heat creates conditions more conducive for evaporation of moisture from the ground, increasing the possibility of drought. A warming planet could lead to earlier melting of winter snow packs, leaving lower stream flows and drier conditions in the late spring and summer. Snow packs in northern California are important for water storage and ensuring adequate supply in the summer months when water is most needed. Changing precipitation distribution and intensity have the potential to cause more of the fallen precipitation run-off rather than be stored. The result is an increased potential for more frequent and more severe periods of drought.

Past experience with droughts tells us that impacts are felt first by those most dependent on or affected by annual rainfall – fire departments, ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or other small water systems lacking a reliable water source. Drought and water shortage can happen countywide; and have significant impacts on the populations and the economy. Significant economic impacts on Lassen County's agriculture industry can occur as a result of short- and long-term drought conditions; these include hardships to farmers,

farm workers, packers, and shippers of agricultural products. In some cases, droughts can also cause significant increases in food prices to the consumer due to shortages. Drought can also result in lack of water and subsequent feed available to grazing livestock, potentially leading to risk of livestock death and resulting in losses to the Lassen County's agricultural economy.

Drought can have secondary impacts too. For example, drought is a major determinant of wildfire hazard, in that it creates greater propensity for fire starts and larger, more prolonged conflagrations fueled by excessively dry vegetation, along with reduced water supply for firefighting purposes.

6.4.2. Energy Shortage and Energy Resilience

Energy disruptions are considered a form of lifeline system failure. Disruptions can be the consequence of another hazard, or can be the primary hazard, absent of an outside trigger. Lassen County, including the City of Susanville and the Susanville Indian Rancheria, receives power from Lassen Municipal Utility District (LMUD). LMUD is connected to the California's electrical grid in Westwood, CA (Lassen County). LMUD is supplied its electrical power from Pacific Gas & Electric Company (PG&E). PG&E is connected to LMUD with two (2) PG&E owned transmission lines: 1) the Caribou line and the 2) Hat Creek line. The Hat Creek line is only used as a back-up line and does not have the capacity to support all of LMUD's customers.

Climate change considerations indicate that as the weather conditions change, there could be an increase in energy needs. This could be from both potential increase in heat and cold. These predicted increases in heat waves, as well as, increasingly severe winter storms will put ever greater strain on LMUD and PG&E.

There are two (2) components to consider: 1) increased demand within Lassen County itself; and, 2) increased demand elsewhere. Because Lassen County replies on power supplied by PG&E, increases in other parts of their territory could curtail the energy available to LMUD. This vulnerability is compounded by the reality that our communities have become more reliant on power for gadgets and appliances to perform basic daily activities. The loss of power will not only be an inconvenience but could become a life-threatening experience. Many citizens rely on power to operate medical machinery to survive (i.e., oxygen tanks, dialysis machines).

While Lassen County has not experienced a population growth, changes to daily life styles and weather have contributed to a heavy demand for power over recent years. In the event of a significant energy shortage it will have a significant impact on the population, built environment, lifeline infrastructure, and the economy.

6.4.3. Severe Storms

Severe storms are defined as thunder and lightning, hail, snow, fog, and high winds. These hazards are common throughout most parts of Lassen County, but some are more prevalent in some areas than others (i.e., high winds along 395 corridor).

As can be expected, these events will only become more frequent and severe when factoring in climate change considerations. This could include both the increase of frequency as well as, the increase in intensity. A case could also be made that the increase of one (1) of these events could trigger the increase of another.

These severe storms have the capability of being of long duration too. These longer duration storms could have just as much impact as shorter, more powerful events. Prolonged periods of high snow fall could create issues as it could be difficult to move around the area and/or could cave in roofs from snow weight. The prolonged snow and high winds could also create issues with powerlines; combining the hazard of severe storms with power outage.

While most of these hazards are short-duration storms they can have significant impact on the population, built environment, lifeline infrastructure, or the economy.

6.4.4. Hazardous Materials Release

Hazardous material release incidents can occur during production, storage, transportation, use or disposal of hazardous materials. Communities can be at risk if a chemical is used unsafely or released in harmful amounts into the environment. Hazardous materials can cause death, serious injury, long lasting health effects, and damage to buildings, the environment, homes, and other property.

Although these incidents can happen almost anywhere, certain areas of the County are at higher risk, such as near roadways that are frequently used to transport hazardous materials and locations with industrial facilities that use, store, and/or dispose of such materials. Transportation routes that are crossed by railways, waterways, airways, and pipelines also have increased potential for mishaps. The existence of a major rail line that transports oil through the county is of particular concern. A train accident resulting in a major oil spill has the potential to cause fire ignitions as well as public health and environmental consequences.

Climate change usually does not play a direct role in increased events but can be factor into the cause (i.e., slippery roads due to heavy snow).

The release of hazardous materials into the environment can cause a multitude of problems for the population, built environment, lifeline infrastructure, environment, and the economy.

Section 7. Mitigation Strategy

7.1. Overview

The Lassen County multijurisdictional mitigation strategy is derived from the in-depth review of the existing vulnerabilities and capabilities outlined in previous sections of this plan, combined with a vision for creating a disaster resistant and sustainable community for the future. This vision is based on informed assumptions, recognizes both mitigation challenges and opportunities, and is demonstrated by the goals and objectives outlined below. The mitigation actions identified and adopted in the 2011 Local Hazard Mitigation Plan (LHMP) were updated to reflect current status and additional mitigation actions were proposed and prioritized for inclusion in the 2017 LHMP. Lastly, an implementation plan for each of the mitigation actions is presented to provide each of the participating jurisdictions with a roadmap forward.

7.2. Mitigation Goals and Objectives

The goals and objectives in the existing LHMP were reviewed by a planning team composed of Steering Committee members representing each of the participating jurisdictions (Lassen County, City of Susanville, and Susanville Indian Rancheria). Based on current hazard profiles and knowledge of existing vulnerabilities and capabilities, appropriate revisions were made to both the goals and objectives. The revised set of goals and objectives were then presented to the full Steering Committee where additional comments and suggested revisions were proposed, and subsequently incorporated into the final adopted goals and objectives outlined below:

GOAL 1: Minimize life loss and injuries

Objective 1.1 Improve understanding of the locations, potential impacts, and linkages between hazards, vulnerability, and measures needed to protect life safety and health.

Objective 1.2 Provide updated information about hazards, vulnerabilities, and mitigation processes to all levels of governmental jurisdictions, the private sector, and the public.

Objective 1.3 Strive to implement applicable federal/state regulations and local ordinances designed to protect life safety.

Objective 1.4 Identify and modify high risk and target hazard structures to meet life safety standards.

Objective 1.5 Incorporate mitigation measures into repairs, major alterations, new development, and redevelopment projects in areas subject to substantial life safety risks.

Objective 1.6 Improve emergency response communications and public warning systems.

Objective 1.7 Develop policies and procedures to better serve disadvantaged and vulnerable populations.

GOAL 2: Minimize damage to structures, property, infrastructure, and essential services

Objective 2.1 Encourage new development to occur in locations that avoid or minimize exposure to hazards

Objective 2.2 Encourage property protection measures for all communities and structures located in hazard areas.

Objective 2.3 Develop and adopt enhanced land use, design, and construction policies designed to reduce property loss due to flood, fire, earthquake, and other identified hazards

Objective 2.4 Encourage hazard mitigation programs by non-governmental and private sector organizations that own or operate key community facilities.

Objective 2.5 Protect vital records to minimize post-disaster disruption and facilitate short-term and long-term recovery.

Objective 2.6 Protect critical infrastructure from fire, flood, earthquake and other identified hazards.

Objective 2.7 Minimize economic loss and disruption to agriculture (crops/animals/timber) and recreation resources from natural and manmade hazards.

Objective 2.8 Coordinate, develop and maintain a digital inventory of areas and critical assets exposed to identified hazards.

GOAL 3: Protect the environment

Objective 3.1 Implement mitigation and watershed protection strategies that reduce loss of wildlife, habitat, and water.

Objective 3.2 Protect cultural, historic and environmental resources from natural and manmade hazards.

GOAL 4: Promote integration, coordination and public outreach efforts across governmental agencies, the private sector and the general public

Objective 4.1 Promote general public understanding of the risks associated with hazards, individual preparedness activities, and the benefits of hazard mitigation.

Objective 4.2 Continually build operational coordination between hazard mitigation, disaster preparedness, and recovery programs within the public and private sectors.

Objective 4.3 Establish and maintain partnerships between all levels of local government, the private sector, the business community, community groups, and institutions of higher learning that improve and implement methods to protect life and property.

GOAL 5: Improve Emergency Services/Management Capability

Objective 5.1 Continue to coordinate jurisdictional responsibilities to various hazards through County and Community Disaster/Emergency Response Plans and Exercises.

Objective 5.2 Identify the need for, and acquire, any special emergency services and equipment to enhance response capabilities for specific hazards

Objective 5.3 Review and improve, if necessary, emergency traffic and evacuation routes; communicate such routes to the public and communities.

7.3. Mitigation Progress

As part of the LHMP update process, FEMA requires that the mitigation plan describe the status of hazard mitigation actions included in the previous plan by identifying those that have been completed or not completed. For actions that have not been completed, the plan must either indicate that the action is no longer relevant or continue to include it as part of the updated action plan.

An interactive meeting of the Steering Committee was held to review each of the 40 mitigation actions included in the 2011 plan. Four (4) status categories were used to describe the status of each mitigation action for each of the participating jurisdictions (completed, underway/planned, still being considered, and no longer relevant). During the status update process, wording of several existing mitigation actions were revised to reflect current conditions.

The following table (**Table 7-1**) indicates the status of each of the 2011 Mitigation Actions. Those actions that have been completed by all relevant jurisdictions and those considered no relevant for any of the jurisdictions will be deleted from this plan update. Mitigation actions identified by the Steering Committee as underway/planned or still being considered are carried forward in this 2017 plan update.

Table 7-1. Status of 2011 Mitigation Actions

2011 Mitigation Action	Completed	Underway/ Planned	Still Being Considered	No Longer Relevant
1. Continue the fuels/vegetation management programs to reduce the wildfire hazard throughout County.		County City Rancheria		
2. Continue to enforce the weed abatement requirements to mitigate the risk of wildfires in the County.		County City Rancheria		
3. Identify areas vulnerable to wildfire due to inadequate water supply for firefighting and implement improvements (e.g., expansion of water supply, storage hydrants, etc.).		County		City Rancheria

2011 Mitigation Action	Completed	Underway/ Planned	Still Being Considered	No Longer Relevant
4. Create a backbone for fire protection in Johnstonville, as identified in the Lassen County Feasibility Study.			City	County
5. Implement the Cady Springs Booster Station and Main line protection project, as identified in the City of Susanville Feasibility Study.		City		
6. To increase firefighting capabilities, increase the water storage capacity by constructing a 200,000 gallon storage tank.	Rancheria			
7. Implement the spring rehabilitation program via the installation of spring boxes to protect the spring water from contamination (from surface runoff or contact with human and animals) and to provide a point of collection and a place for sedimentation.			City Rancheria	
8. Retrofit the Herlong Gymnasium to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.				County
9. Retrofit the school gymnasiums in the City of Susanville (Lassen High School, Diamond View, Meadowview, and McKinley) to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.			City	
10. Retrofit the Veterans Memorial Building to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.		County		

2011 Mitigation Action	Completed	Underway/ Planned	Still Being Considered	No Longer Relevant
11. Retrofit the Joaquin Memorial Gymnasium to accommodate emergency shelter (Generator, Emergency Supply and Kitchen expansion). Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc	Rancheria			
12. Identify and designate Domestic Animal evacuation centers.			County City	
13. To ensure a continual power supply, install backup generators at essential key facilities (EOC's, Emergency Services Buildings, Shelters, Water Facilities, etc).	Rancheria	City County		
14. Add a redundant fuel system for the (primary and secondary) 911 center backup generator to be both diesel and natural gas.	County			
15. To improve the consistency of emergency communications and facilitate timely response, implement Firenet/Lawnet Lassen Emergency communication equipment upgrades (backup power, additional repeaters, radios, etc.).		County		
16. Purchase snowplows/blowers and Snow CATs to mitigate the hazards associated with severe storm and snow.			County City	
17. To facilitate storage for emergency response equipment and resources (e.g., salt, sand, heavy equipment) construct or purchase a dry storage facility.	Rancheria		County City	
18. To mitigate the impacts of severe storms and subsequent flooding, construct levee upgrades to provide lake shore protection along Honey Lake.				County

2011 Mitigation Action	Completed	Underway/ Planned	Still Being Considered	No Longer Relevant
19. To mitigate the impacts of severe storms and subsequent flooding, implement levee upgrades for waterways throughout the County, including Irrigation Canals.			County City	
20. To mitigate the impacts of severe storms and subsequent flooding, implement upgrades to reservoirs/dams to increase storage capacity.				County City Rancheria
21. To reduce the potential for flooding, develop a levee integrity program that includes inspection and maintenance.			County City	
22. To mitigate future flood losses, implement the Carol Street Project Flood Prevention Project, which includes constructing a retaining wall and rip rap and/or property acquisition of Carol Street houses.			City	
23. Develop a standardized operational area evacuation plan to streamline emergency response efforts.			County City Rancheria	
24. Develop and distribute Wildfire public education materials to increase public awareness of wildfire hazards.				County City
25. Conduct EOC mock exercises and incident management position training to prepare for emergency response.		County City Rancheria		
26. Implement City of Susanville Fire Training Center structural upgrades (e.g., installation of propane props, water supply, etc.) to providing training for emergency response, including wildfire and rescue operations.		City		
27. Implement a public notification system (e.g., reverse 911) to increase alert the public to potential emergency situations and hazards.	County City Rancheria			

2011 Mitigation Action	Completed	Underway/ Planned	Still Being Considered	No Longer Relevant
28. Evaluate flooding areas and implement drainage improvements to reduce the potential for residential flooding.		County City		
29. Implement water shortage contingency measures during drought periods to conserve water supply.	City Rancheria			County
30. Consider developing on-stream or off-stream water storage to store flood water (e.g., detention basin during periods of high flow) to store water for use during drought conditions.				County City Rancheria
31. Develop additional potable water supplies in communities that currently do not have adequate water supply and storage.			County City	Rancheria
32. Train First Responders in hazardous materials (HazMat) response field operations and decontamination, including conducting mock exercises.		County City Rancheria		
33. Develop a commodity flow study to determine flow of hazardous materials through the county.		County City		
34. Assess and implement flexible piping joints at above ground storage reservoirs, as appropriate. Also, ensure new reservoirs are designed with seismic flexible piping joints.		City Rancheria		
35. Consider evaluating all pipelines (water, sewer, gas) for seismic event reliability and determining a capital improvements schedule, considering materials of constructing and the age of the pipeline.			County City	Rancheria
36. Provide training on the Pandemic Response Plan to prepare for pandemic events.		County	Rancheria	
37. Purchase pandemic equipment and supplies to prepare for pandemic events.		County	Rancheria	

2011 Mitigation Action	Completed	Underway/ Planned	Still Being Considered	No Longer Relevant
38. Conduct terrorism training and awareness courses to prepare for terrorism events.		County City Rancheria		
39. Update the Lassen County, City of Susanville, and Susanville Indian Rancheria websites to include natural hazard preparedness information and posting the final Hazard Mitigation Plan for public education.			County City Rancheria	
40. During the County and Susanville General Plan Update, and Rancheria Master Plan Update, consider reviewing mitigation strategies for new buildings and incorporating those strategies that prevent building in identified hazard areas.	City		County Rancheria	

Based on this review, the results of the hazard and vulnerability assessments, and discussions of newly initiated and/or planned mitigation activities identified during the course of the planning process, a revised list of mitigation actions was prepared for review and prioritization by the Steering Committee. In developing the final list of mitigation actions, consideration was given to the priority hazards previously identified during the planning process, and deficiencies discovered during the capability assessment. Various types of actions/projects were discussed including: Prevention, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services, and Structural Projects. Given the limited potential for new development discussed in Section 4, the majority of structural and non-structural mitigation action included in this Plan focus on existing structures. Any new development or redevelopment that occurs within the three jurisdictions will be subject to current codes and standards, including relevant hazard ordinances, design requirements, and environmental review.

7.4. Mitigation Prioritization

The Steering Committee used the STAPLEE Criteria (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) to evaluate the feasibility of each of the mitigation actions being considered for inclusion in the 2017 Plan. The STAPLEE criteria as proposed by FEMA include the following:

Social

- Is the proposed action socially acceptable to the community?

- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the general plan, or must the general plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential sources (public, non-profit, and private)?
- How will this action affect the fiscal capability of the community?
- What burden will this action place on the tax base or local economy?

- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide?

Environmental

- How will the action affect the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

Each proposed mitigation action was assigned a number for each STAPLEE criteria based on a scale of 1–5 where 5 is favorable/beneficial or NO major issues/opposition; 3 is middle of the road, and 1 is unfavorable/not beneficial or major issues/opposition. The scores assigned to each STAPLEE criteria were then totaled for each mitigation action.

This evaluation is intended to assist the participating jurisdictions to focus their efforts on those projects with the greatest potential for implementation, including benefit to cost considerations. However, it is recognized that the ranking scale is not weighted; therefore, some criteria were considered more important than others in determining the final prioritization of individual mitigation actions. For example, the urgency of implementing a mitigation action to address a high priority hazard, or the current availability of funding to initiate a mitigation action affected the final priority assigned to each mitigation action. The Steering Committee engaged in an interactive consensus building exercise to assign a priority rating of High, Medium or Low to each of the mitigation actions under consideration. The final list of mitigation actions, the STAPLEE score assigned and the final priority ranking are presented in the next section. The highest possible score any mitigation action could receive, based on the scoring criteria is 35. The scores assigned range from a low of 20 to a high of 31.

7.5. Mitigation Actions

The table below (**Table 7-2**) represents the proposed mitigation actions as identified by the Steering Committee. As mentioned earlier, the focus of the mitigation actions are focused primarily on the "high" priority hazards (Earthquake, Flood, Wildfire, Drought, Energy Shortage, Severe Weather, and Hazardous Material Spills); however, some mitigation actions do address other hazards.

Table 7-2. Proposed Mitigation Actions

Mitigation Action	Hazard Addressed	STAPLEE Score	Priority H/M/L
1. Continue the fuels/vegetation management programs to reduce the wildfire hazard throughout County.	Wildfire	28	H
2. Continue to enforce the weed abatement requirements to mitigate the risk of wildfires in the County.	Wildfire	27	H
3. Identify areas vulnerable to wildfire due to inadequate water supply for firefighting and implement improvements (e.g., expansion of water supply, storage hydrants, etc.).	Wildfire	26	H
4. Install necessary infrastructure for fire protection in Johnstonville, as identified in the Lassen County Feasibility Study.	Wildfire	26	H
5. Implement the Cady Springs Booster Station and Main line protection project, as identified in the City of Susanville Feasibility Study.	Multi-hazard	27	H
6. Reduce residential densities in Very High Fire Hazard zones within the City of Susanville by changing mult-family zoning to single family zoning.	Wildfire	27	M
7. Implement the spring rehabilitation program via the installation of spring boxes to protect the spring water from contamination (from surface runoff or contact with human and animals) and to provide a point of collection and a place for sedimentation.	Drought	31	L
8. Retrofit the school gymnasiums in the City of Susanville (Lassen High School, Diamond View, Meadowview, and McKinley) to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.	Multi-hazard	24	H
9. Retrofit the Veterans Memorial Building to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.	Multi-hazard	24	H
10. Identify and designate Domestic Animal evacuation centers.	Multi-hazard	25	M
11. To ensure a continual power supply, install backup generators at essential key facilities (EOC's, Emergency Services Buildings, Shelters, Water Facilities, etc).	Multi-hazard	28	H

Mitigation Action	Hazard Addressed	STAPLEE Score	Priority H/M/L
12. To improve the consistency of emergency communications and facilitate timely response, implement Firenet/Lawnet Lassen Emergency communication equipment upgrades (backup power, additional repeaters, radios, etc.).	Multi-hazard	25	M
13. Purchase snowplows/blowers and Snow CATs to mitigate the hazards associated with severe storm and snow.	Severe Storms	23	H
14. To facilitate storage for emergency response equipment and resources (e.g., salt, sand, heavy equipment) construct or purchase a dry storage facility.	Multi-hazard	24	H
15. To mitigate the impacts of severe storms and subsequent flooding, implement levee upgrades for waterways throughout the County, including Irrigation Canals.	Severe Storms	23	H
16. To reduce the potential for flooding, develop a levee integrity program that includes inspection and maintenance.	Flood	20	H
17. To mitigate flood losses, develop and implement a plan to address Carol Street repetitive flooding.	Flood	23	H
18. Develop a standardized operational area evacuation plan to streamline emergency response efforts.	Multi-hazard	28	H
19. Conduct EOC mock exercises and incident management position training to prepare for emergency response.	Multi-hazard	27	H
20. Implement City of Susanville Fire Training Center structural upgrades (e.g., installation of propane props, water supply, etc.) to providing training for emergency response, including wildfire and rescue operations.	Wildfire	26	H
21. Evaluate flooding areas and implement drainage improvements to reduce the potential for residential flooding.	Flood	23	L
22. Develop additional potable water supplies in communities that currently do not have adequate water supply and storage.	Drought	28	M
23. Train First Responders in hazardous materials (HazMat) response field operations and decontamination, including conducting mock exercises.	Hazardous Materials	30	M
24. Develop a commodity flow study to determine flow of hazardous materials through the county.	Hazardous Materials	27	M
25. Assess and implement flexible piping joints at above ground storage reservoirs, as appropriate. Also, ensure new reservoirs are designed with seismic flexible piping joints.	Earthquake	28	M

Mitigation Action	Hazard Addressed	STAPLEE Score	Priority H/M/L
26. Consider evaluating all pipelines (water, sewer, gas) for seismic event reliability and determining a capital improvements schedule, considering materials of constructing and the age of the pipeline.	Earthquake	23	H
27. Provide training on the Pandemic Response Plan to prepare for pandemic events.	Pandemic	25	H
28. Purchase pandemic equipment and supplies to prepare for pandemic events.	Pandemic	22	H
29. Conduct terrorism training and awareness courses to prepare for terrorism events.	Terrorism	25	L
30. Update the Lassen County, City of Susanville, and Susanville Indian Rancheria websites to include natural hazard preparedness information and posting the final Hazard Mitigation Plan for public education.	Multi-hazard	28	H
31. During the County and Susanville General Plan Update, and Rancheria Master Plan Update, consider reviewing mitigation strategies for new buildings and incorporating those strategies that prevent building in identified hazard areas.	Multi-hazard	30	H
32. Harden spring locations for security.	Drought	27	M
33. Explore options for increasing energy assurance.	Energy Shortage	28	M
34. Remap 100 year flood map to reflect Piute Creek Mitigation Project	Flood	27	L
35. Develop, adopt and implement dangerous building ordinance.	Multi-hazard	22	L
36. E. Develop public education campaigns for high priority hazards.	Multi-hazard	28	M
37. Implement Diamond Mountain Watershed and Forest Restoration Project.	Wildfire	29	H
38. Implement Hazardous Fuel Reduction Program (Day Road, Little Valley).	Wildfire	29	H
39. Prepare Storm Water Resource Plan.	Drought	28	M
40. Develop and implement projects to help protect, restore, enhance and benefit National Forest System lands in Lassen County (including fire prevention, pest management, watershed restoration, forest health).	Wildfire	29	H
41. Determine feasibility and implementation plan for interconnection to the Nevada Energy line.	Energy Shortage	26	H

Mitigation Action	Hazard Addressed	STAPLEE Score	Priority H/M/L
42. Participate in the HERO Property Assessed Clean Energy Program to support homeowner energy and water efficiency improvements.	Energy Shortage	28	L
43. Develop a Groundwater Sustainability Plan	Drought	28	L

7.6. Implementation Plan

The following table (**Table 7-3**) reflects the implementation plan is the key to a successful planning effort. The implementation strategy identifies which of the participating jurisdictions is committed to the mitigation action, which departments or agencies are responsible for the action, the estimated cost and/or potential funding source to support the action, and the proposed timeframe for completion.

Table 7-3. Proposed Mitigation Actions- Implementation Plan

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
1. Continue the fuels/vegetation management programs to reduce the wildfire hazard throughout County.	County City Rancheria	• Cal Fire • BLM Fire • USFS Fire • Lassen County Fire Officers Association • Rancheria Public Works	Varies/ Annual Budget Grants	Ongoing
2. Continue to enforce the weed abatement requirements to mitigate the risk of wildfires in the County.	County City Rancheria	• County Ag Commission • Big Valley Pest Abatement • BLM • County Special Weed Abatement Team • Rancheria Natural Resource Department • CalTrans • City and County Departments • USFS • Cal Fire • Fish & Wildlife	Varies/ Annual Budget Grants	Ongoing

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
3. Identify areas vulnerable to wildfire due to inadequate water supply for firefighting and implement improvements (e.g., expansion of water supply, storage hydrants, etc.).	County	• Community Service Districts (Leavitt Lake, Westwood, Adin, Clear Creek) • Herlong Public Utility District • County Service Area #1 • Cal Fire	Varies/ Annual Budget Capital Improvement Funds Grants	Ongoing
4. Install necessary infrastructure for fire protection in Johnstonville, as identified in the Lassen County Feasibility Study.	City	• Susanville Fire Department • Susan River Fire Protection District • Susanville Public Works	TBD/ Annual Budget See Feasibility Study	Short-term
5. Implement the Cady Springs Booster Station and Main line protection project, as identified in the City of Susanville Feasibility Study.	City	• Susanville Public Works	$1.9 million/ Prop. 84 funds	Short-term
6. Reduce residential densities in Very High Fire Hazard zones within the City of Susanville by changing mult-family zoning to single family zoning.	City	• Susanville Planning	TBD/ Annual Budget	Ongoing
7. Implement the spring rehabilitation program via the installation of spring boxes to protect the spring water from contamination (from surface runoff or contact with human and animals) and to provide a point of collection and a place for sedimentation.	City Rancheria	• Susanville Public Works • Rancheria Natural Resources Department	TBD/ Grants BIA-EPA Grants	Ongoing

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
8. Retrofit the school gymnasiums in the City of Susanville (Lassen High School, Diamond View, Meadowview, and McKinley) to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.	City	• Susanville School District • Lassen High School District • County Health & Social Services	TBD/ Grants	Long-term
9. Retrofit the Veterans Memorial Building to accommodate emergency shelter. Also, continue to identify and maintain adequate level of emergency inventory materials including food, blankets, etc.	County	• County Public Works • County Health & Social Services	TBD/ Grants	Long-term
10. Identify and designate Domestic Animal evacuation centers.	County City	• County Ag Commissioner • County Emergency Services	TBD/ Annual Budget	Short-term
11. To ensure a continual power supply, install backup generators at essential key facilities (EOC's, Emergency Services Buildings, Shelters, Water Facilities, etc).	County City	• County Emergency Services • County Public Works • Susanville Public Works • County Health & Social Services	TBD/ Annual Budget Grants	Long-term

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
12. To improve the consistency of emergency communications and facilitate timely response, implement Firenet/Lawnet Lassen Emergency communication equipment upgrades (backup power, additional repeaters, radios, etc.).	County	• County Emergency Services • County Sheriff • Firenet Lassen • County Health & Social Services	TBD/ Grants JPA Fees	Ongoing
13. Purchase snowplows/blowers and Snow CATs to mitigate the hazards associated with severe storm and snow.	County City	• County Public Works • Susanville Public Works	TBD/ Annual Budget Grants	Long-term
14. To facilitate storage for emergency response equipment and resources (e.g., salt, sand, heavy equipment) construct or purchase a dry storage facility.	County City	• County Public Works • Susanville Public Works	TBD/ Annual Budget Grants	Short-term
15. To mitigate the impacts of severe storms and subsequent flooding, implement levee upgrades for waterways throughout the County, including Irrigation Canals.	County City	• County Public Works • Susanville Public Works • Fish & Wildlife • Resource Conservation Districts	TBD/ Grants	Long-term
16. To reduce the potential for flooding, develop a levee integrity program that includes inspection and maintenance.	County City	• County Public Works • Susanville Public Works	TBD/ Grants	Long-term

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
17. To mitigate flood losses, develop and implement a plan to address Carol Street repetitive flooding.	City	• Susanville Public Works • Fish & Wildlife	$1.5 million/ Grants	Long-term
18. Develop a standardized operational area evacuation plan to streamline emergency response efforts.	County City Rancheria	• County Sheriff • Susanville Police Department • Tribal Police • Highway Patrol • Sierra Depot Police • County Emergency Services • County Health & Social Services	TBD/ Annual Budget Grants	Ongoing
19. Conduct EOC mock exercises and incident management position training to prepare for emergency response.	County City Rancheria	• County Emergency Services • Susanville Fire Department • Rancheria Emergency Services	TBD/ Annual Budget Grants	Ongoing
20. Implement City of Susanville Fire Training Center structural upgrades (e.g., installation of propane props, water supply, etc.) to providing training for emergency response, including wildfire and rescue operations.	City	• City Fire Department • Lassen County Fire Officers Association	TBD/ Grants	Short-term
21. Evaluate flooding areas and implement drainage improvements to reduce the potential for residential flooding.	County City	• County Public Works • City Public Works	TBD/ Annual Budget Capital Improvement Funds Grants	Ongoing

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
22. Develop additional potable water supplies in communities that currently do not have adequate water supply and storage.	County City	• County Planning & Building • City Public Works	TBD/ Grants	Long-term
23. Train First Responders in hazardous materials (HazMat) response field operations and decontamination, including conducting mock exercises.	County City Rancheria	• Lassen County Fire Officers Association • County Emergency Services • Rancheria Emergency Services • County Ag Commissioner	TBD/ Annual Budget Grants	Ongoing
24. Develop a commodity flow study to determine flow of hazardous materials through the county.	County City	• County Emergency Services • Susanville Fire Department • County Environmental Health	TBD/ Grants	Short-term
25. Assess and implement flexible piping joints at above ground storage reservoirs, as appropriate. Also, ensure new reservoirs are designed with seismic flexible piping joints.	City Rancheria	• City Public Works • Rancheria Public Works	TBD/ Grants	Long-term
26. Consider evaluating all pipelines (water, sewer, gas) for seismic event reliability and determining a capital improvements schedule, considering materials of constructing and the age of the pipeline.	County City	• County Public Works • Susanville Public Works • Susanville Sanitary District	TBD/ Grants Capital Improvement Funds	Long-term

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
27. Provide training on the Pandemic Response Plan to prepare for pandemic events.	County Rancheria	• County Public Health • Rancheria Health Clinic	TBD/ Annual Budget Grants	Ongoing
28. Purchase pandemic equipment and supplies to prepare for pandemic events.	County Rancheria	• County Public Health • Rancheria Health Clinic	TBD/ Annual Budget Grants	Ongoing
29. Conduct terrorism training and awareness courses to prepare for terrorism events.	County City Rancheria	• County Emergency Services • County Sheriff • Susanville Fire Department • Susanville Police Department • Rancheria Emergency Services • California Highway Patrol	TBD/ Annual Budget Grants	Ongoing
30. Update the Lassen County, City of Susanville, and Susanville Indian Rancheria websites to include natural hazard preparedness information and posting the final Hazard Mitigation Plan for public education.	County City Rancheria	• County Administration • City Administration • Tribal Administration	TBD/ Annual Budget	Ongoing
31. During the County and Susanville General Plan Update, and Rancheria Master Plan Update, consider reviewing mitigation strategies for new buildings and incorporating those strategies that prevent building in identified hazard areas.	County City Rancheria	• County Planning & Building • Susanville Planning • Tribal Board Council	$300–$800,000/ Annual Budget	Short-term

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
32. Harden spring locations for security.	City	• Susanville Public Works	TBD/ Grants Capital Improvement Funds	Long-term
33. Explore options for increasing energy assurance.	County City Rancheria	• County & City Administration • Lassen Municipal Utility District • Rural Electric • Surprise Valley Electric • Pacific Gas & Electric	TBD/ Grants	Long-term
34. Remap 100 year flood map to reflect Piute Creek Mitigation Project	City	• Susanville Planning	TBD/ Grants	Long-term
35. Develop, adopt and implement dangerous building ordinance.	County City	• County Planning & Building • Susanville Planning	TBD/ Annual Budget	Ongoing
36. E. Develop public education campaigns for high priority hazards.	County City Rancheria	• County Emergency Services • Susanville Fire Department • Rancheria Emergency Services • Administrative Departments	TBD/ Annual Budget Grants	Ongoing
37. Implement Diamond Mountain Watershed and Forest Restoration Project.	County	• Lassen County Fire Safe Council • Cal Fire • BLM • Lassen & Plumas National Forests • Honey Lake Valley RCD • Susan River FPD • Private Landowners	$1.3 million/ Grants	Ongoing

Mitigation Action	Participating Jurisdictions	Departments/ Agencies	Cost/Funding Source	Timeframe
38. Implement Hazardous Fuel Reduction Program (Day Road, Little Valley).	County	• Lassen County Fire Safe Council • Cal Fire • Pacific Gas & Electric	$100,000/ Grants	Ongoing
39. Prepare Storm Water Resource Plan.	County	• Honey Lake Resource Conservation District	TBD/ Grant	Short-term
40. Develop and implement projects to help protect, restore, enhance and benefit National Forest System lands in Lassen County (including fire prevention, pest management, watershed restoration, forest health).	County	• Lassen County Resource Advisory Committee • U.S. Forest Service	$280,000/ Grants	Short-term
41. Determine feasibility and implementation plan for interconnection to the Nevada Energy line.	County LMUD	• Lassen Municipal Utility District	TBD/ Grants	Short-term
42. Participate in the HERO Property Assessed Clean Energy Program to support homeowner energy and water efficiency improvements.	City	• City of Susanville • Renovate America • Private Homeowners	TBD/ HERO PACE	Short-term
43. Develop a Groundwater Sustainability Plan	County	• County Planning & Building	$1 million/ Grant	Long-term

Section 8. Plan Maintenance

The County of Lassen, City of Susanville, and the Susanville Indian Rancheria are committed to reviewing this plan on a regular basis. The City of Susanville Fire Department will lead the effort and will be responsible for ensuring that this plan is being monitored over the next five (5) years. The City of Susanville will leverage existing meetings at the city, county, and tribal level to review and to discuss progress on the mitigation actions set forth in this plan. While there is not a confirmed meeting schedule, the City of Susanville will ensure that at a minimum there is an annual meeting of the Steering Committee and other interested stakeholders to discuss the HMP. The first annual meeting will occur one (1) year from the date of FEMA approval. Information obtained from these meetings will be captured by the City of Susanville and made available for the next HMP update. If appropriate, the City of Susanville, Lassen County, and the Susanville Indian Rancheria representatives will report the outcomes of the meetings to their individual governing bodies (City of Susanville City Council, Lassen County Board of Supervisors and Susanville Indian Rancheria Tribal Council).

In addition to the annual meeting and leveraging other meetings, the City of Susanville will also ensure that the HMP is an agenda item during any preparation of any After Action Report for a disaster event occurring within the county. This will provide the jurisdictions with an opportunity to evaluate the value of any implemented mitigation actions and validate the needs for others.

Upon adoption, the HMP will be incorporated by reference into the Lassen County and City of Susanville Safety Elements, and relevant plans maintained by the Susanville Indian Rancheria (i.e., Housing Plan). This will ensure that future planning efforts and capital projects are influenced by the findings of this Plan. The HMP will also be utilized and referenced for the Lassen County Operational Area Emergency Operations Plan update which is currently underway.

The County of Lassen, City of Susanville, and the Susanville Indian Rancheria are also committed to updating this plan at least once every five (5) years, as required by the Disaster Mitigation Act of 2000. To ensure that this update occurs in a timely fashion, after completion of the third year following plan adoption, the Steering Committee will undertake the following activities:

- Thoroughly analyze and update the risk of natural and human-caused hazards in the Planning Area.
- Complete a new Annual Review Questionnaire and review previous questionnaires.
- Provide a detailed review and revision of the mitigation strategy.
- Prepare a new mitigation action plan.
- Prepare an updated draft HMP and submit it to Cal OES and FEMA for preliminary review.
- Submit the updated draft HMP to the Board of Supervisors for adoption.
- Submit the updated HMP to FEMA for final approval.

The City of Susanville Planning Department will ensure the public will continue to be involved whenever the plan is updated and as appropriate during the monitoring and evaluation process. Prior to adoption of updates, the City of Susanville Fire Department will provide multiple opportunities for the public to comment on the plan and revisions, as was done during the preparation of this update.

A public notice will be published announcing the start of the update process, outlining the public comment period, and identifying meeting locations.

8.1. Point of Contact

Comments or suggestions regarding this plan may be submitted at any time to Chief James Moore, City of Susanville Fire Department using the following information:

James Moore, Chief
City of Susanville Fire Department
1505 Main Street, Susanville, CA 96130

jmoore@cityofsusanville.org (email)

(530) 257-5152 (telephone)

Appendix A- Resolutions

NAME	AGENCY	DEPARTMENT	Nov-16	Jan-17	Mar-17	May-17	Jun-17	Jul-17
Craig Hemphill	County of Lassen	Agricultural Commissioner			X			X
Craig Sanders	City of Susanville	Planning	X	X	X	X	X	X
Cort Cortez	Lassen Municipal Utility District	Operations		X	X	X		
Dan Newton	City of Susanville	Public Works	X		X	X		X
Danny Cluck	US Forest Service		X					
Dean Growden	County of Lassen	Sheriff			X			
Ed Merrill	Bureau of Land Management		X					
Eric Ewing	County of Lassen	OES	X			X		X
Gaylon Norwood	County of Lassen	Planning & Building					X	X
Ian Sims	Honey Lake Valley RCD				X			
James L Mackey	Susanville Indian Rancheria	Tribal Administration	X	X				
James McCabe	Susanville Indian Rancheria	Emergency Services				X	X	
James Moore	City of Susanville	Fire	X	X	X	X	X	X
Jessica Jones	County of Lassen	Public Health		X				
Jim Uptegrove	City of Susanville	Police	X				X	
John King	City of Susanville	Police			X			X
Lori Pin	Cal OES	Region 3				X	X	
Maryann Kair	County of Lassen	Public Health		X	X			X
Matt May	County of Lassen	Planning & Building	X	X		X		
Matt McFarland	County of Lassen	Sheriff			X			
Matt Wood	City of Susanville	Police	X	X				
Michael Struve	County of Lassen	Public Health		X	X	X		
Nancy McAllister	County of Lassen	Planning & Building	X	X	X	X	X	X
Pete Heimbigner	County of Lassen	Public Works						X
Sara Chandler	County of Lassen	Environmental Health	X		X	X		X
Stefano Richichi	County of Lassen	Planning & Building			X			
Andy Petrow	Consultant		X			X	X	
Paula Schulz	Consultant			X	X	X	X	X
John Rowden	Consultant							
Hope Seligson	Consultant							

Lassen County, City of Susanville, & Susanville Indian Rancheria

Hazard Mitigation Plan Update

Steering Committee Kickoff Meeting

November 2016

Agenda

- Introductions
- Purpose of the Meeting
- Goal of the Project
- Objective of Hazard Mitigation Plans (HMPs)
- Update Requirements
- Available Resources
- Role of the Steering Committee
  - *Role of Consultant*
- Proposed HMP Update Methodology
- 2011 Lassen County HMP review
- Next Steps
- Questions

Introductions

- Susanville, City of (lead)
- Steering Committee
- Consultant team

Purpose of the Meeting

- Gain understanding of effort
  - What needs to be done
  - Why it needs to be done
  - When it needs to be done
- Agree on update process
  - How will it be done
  - Who is responsible
- Start the review process
- Set expectations for next meeting

Goals of the Project

- Update HMP
  - Updated every 5 years to remain eligible to receive Hazard Mitigation Assistance grants
  - Last approved in 2011
- Ensure regional coordination
- Encourage regional mitigation strategies
- Provide technical assistance

Objective of HMPs

- Utilize a comprehensive approach
  - Multi-hazards
  - Engage the public and others
- Understand capabilities and vulnerabilities
- Identify projects and actions
- Integrated with other planning efforts
- Meet eligibility requirements to receive HMA grants

Update Requirements

- OES review/FEMA approval/local adoption

What are they looking for……

- Proper documentation of planning process (Element A)
- Current community, hazard, and impact information (Element B)
- Validation/Identification of projects and actions (Element C)
- Method for plan review (updating) and implementation (Element D)
- Verification plan was adopted (Element E)

Available Resources

- Guides
  - Local Mitigation Plan Review Guide
  - Multi-Hazard Mitigation Planning Guides (Blue Books)
    - Local Mitigation Handbook
    - Mitigation Ideas
  - Comprehensive Preparedness Guide (CPG) 101
  - General Plan Guidelines
  - Climate Adaptation
- Plans
  - Local General Plan and specific plans
  - Other Local plans
  - California State HMP
  - Lassen County 2011 HMP
  - Safeguarding California Plan
- Websites

Role of the Steering Committee

- Validate approach
- Provide information
- Primary liaison with community and stakeholders
  - Promote public participation
- Collaborate with other Steering Committee members
- Update and review sections
- Address Federal/State comments
- Oversee the adoption of the plan
  - Consultant focused on:
    - Documentation of planning process
    - Earthquake and flood vulnerabilities
    - Mitigation projects and actions
    - Technical support/reviewing updates
    - Working with Federal and State counterparts

Proposed Update Methodology

Proposed Update Methodology

- Steering Committee meetings to update plan
  - Kickoff (Nov 2016)
  - Capabilities (Dec 2016)
  - Risk Assessment (Feb 2017)
  - Actions and Projects- (Mar 2017)
  - Review final draft plan (Jun 2017)
- Public Outreach Efforts
  - Project kickoff (Dec 2016)
  - Risk Assessment (Mar 2017)
  - Draft plan (Jun 2017)

2011 Lassen County HMP

HMP structure

- Reduce size; make more user-friendly
- Possibly create Annexes or Volume 2
- Slight reorganize the plan
  - Reduce Executive Summary
  - Add Introduction with Adoption Resolution
  - Expand Planning Area (Community) Profile to include other aspects
  - Divide Risk Assessment into two (2) chapters- Hazard Assessments and Vulnerability Assessment (Loss Estimation)
  - Move Asset Inventory from Risk Assessment
  - Move Capability Assessment from Mitigation Strategies

2011 Lassen County HMP

Planning Process

- Agreement on proposed process
- Need the Steering Committee to reach out to public
  - Press Release of update process
- Need to understand Steering Committee local efforts
  - document their process

2011 Lassen County HMP

Planning Area (Community) Profile

- Restructure section
  - Increase area profile to include other areas- economy, climate, physical features
  - New section on Administrative and Technical Capacity- government structure, role of departments
  - Move Capability Assessment into this section
  - Move Asset Inventory into this section
  - New section on Fiscal Resources
- Need to update/validate Asset Inventory list
- Need information on:
  - governmental structure/role of departments in mitigation
  - fiscal resources
- Need maps and/or graphics

2011 Lassen County HMP

Hazards Profile

- Deeper analysis at later meetings
- Consider list of hazards while providing information
- Would be good to understand which hazards are of significant concern right now

Next Steps

- Start collecting list of hazard event information since 2011
- Submit relevant material and plans
  - Planning Process
  - Community profile
- Engage the public
  - Local planning teams
- Prepare for next Steering Committee meeting (Dec 2016)
- Review draft sections
  - Planning Process
  - Community profile

Questions

- Craig Sanders
  - (530) 252-5104
  - csanders@cityofsusanville.org
- Andy Petrow
  - (818) 294-5472
  - petrowa@msn.com
- Paula Schulz
  - (707) 217-2112
  - schulzpa@aol.com
- John Rowden
  - (530) 927-8179
  - jvrowden@gmail.com

Lassen County, City of Susanville, & Susanville Indian Rancheria

Hazard Mitigation Plan Update

Steering Committee Meeting #2

January 2017

Agenda

- Roll Call
- Call for Questions or Additional agenda items
- Recap of Meeting #1
- Discussion Topics for Meeting #2
- Next Steps
- Questions

Recap of Meeting #1

- Goal of the project
- HMPs and Update requirements
- Available resources
- Role of the Steering Committee
- Proposed HMP update methodology (phases)
- HMP format reorganization

Discussion Topics for Meeting #2

- FEMA Review Tool (*distributed via email*)
- Table of Content (*distributed via email*)
- Draft Section 3- Planning Process (*distributed via email*)
- Section 4- Capability Assessment
- State hazards (*distributed via email*)
- Earthquake and Flood scenarios
- Identify target dates for Public Outreach meeting #1

FEMA Review Tool

OES review/FEMA approval/local adoption

What are they looking for……

- Proper documentation of planning process (Element A)
- Current community, hazard, and impact information (Element B)
- Validation/Identification of projects and actions (Element C)
- Method for plan review (updating) and implementation (Element D)
- Verification plan was adopted (Element E)

Revise Table of Content

- Better organize
- Eliminate redundancy
- Reduce excess information
- More user-friendly
- Easier for FEMA/OES review and approval

Section 3- Planning Process

- Plan update process we will follow
- Who was involved

Section 4- Capability Assessment

- Reorganizing; new structure
- Purpose
  - Provide overview of area
  - Provide summary of resources
- Missing information

State Hazards

- Ca. State identified 31 hazards
- County list should not include a hazard not on the list
- Do not need to include all hazards on list; just hazards that existing in county

Earthquake and Flood Scenarios

- Using HAZUS to get results
- Will provide maps of areas with:
  - heavy shaking (earthquake)
  - Inundation (flood)
- Purpose to provide understanding of impacts
- Possibly help identify actions to:
  - Reduce impacts
  - Accommodate results

Public Outreach

- Understanding of the HMP update process
- Get feedback on hazards in the community
- Encourage participation

Next Steps

- Provide comments and information to consultant
  - List of hazard events since last update
- Review draft Section 4
- Schedule Steering Committee Meeting #3 (hazards)
- Start planning for Public Outreach meeting #1

Questions

- Craig Sanders
  - (530) 252-5104
  - csanders@cityofsusanville.org
- Andy Petrow
  - (818) 294-5472
  - petrowa@msn.com
- Paula Schulz
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  - jvrowden@gmail.com

Lassen County, City of Susanville, & Susanville Indian Rancheria

Hazard Mitigation Plan Update

Steering Committee Meeting #3

March 2017

AGENDA

- Roll Call
- Call for Questions or Additional agenda items
- Recap of Meeting #2
- Discussion Topics for Meeting #3
- Next Steps
- Questions

RECAP OF MEETING #2

- FEMA Review Tool (*distributed via email*)
- Table of Content (*distributed via email*)
- Draft Section 3- Planning Process (*distributed via email*)
- Section 4- Capability Assessment
- State hazards (*distributed via email*)
- Earthquake and Flood scenarios
- Planning for Public Outreach meeting #1

TOPICS FOR MEETING #3

- Draft Section 4 – Capability Assessment
  - Comments
  - Asset Inventories
  - Maps
- Winter Storms Update
- Hazards Review and Ranking
- Public Outreach Meeting Plan

SECTION 4 – CAPABILITY ASSESSMENT

- Comments:
  - Overview & Land Use
  - Administrative/Technical Capacity (Depts/Staffing/Roles)
  - Policies, Plans and Programs
  - Fiscal Resources
- Asset Inventories
  - Summary for Capability Assessment
  - Full Table for Exposure/Vulnerability Analysis
  - Assets located within jurisdictional boundaries regardless of ownership
- Maps
  - Overview Map of County with Jurisdictional Boundaries & Towns
  - Land Use Maps for each jurisdiction
  - No Area Plan Maps unless significant development planned

WINTER STORMS UPDATE - IMPACTS

- Lassen County
- City of Susanville
- Susanville Indian Rancheria

HAZARD REVIEW (20 OF 31 IN SHMP)

- Earthquake
- Flood & Levee Failure
- Wildfire (including Bark Beetle)
- Landslides and Other Earth Movement
- Avalanche
- Drought and Water Shortage
- Energy Shortage and Energy Resilience
- Extreme Heat
- Freeze
- Severe Weather and Storms
- Volcano
- Agricultural Pests and Disease
- Dam Failure
- Epidemic/Pandemic/Vector Borne Disease
- Hazardous Materials (including Oil Spills and Rail Accidents)
- Natural Gas Pipelines
- Terrorism
- Cyber Threats
- Airline Crash
- Civil Disturbance

HAZARDS RANKING

SAMPLE DEFINITIONS:

CATEGORY	PROBABILITY	IMPACT
HIGH	Highly Likely/Likely	Catastrophic/Critical: Major loss of function, downtime, and/or evacuations
MEDIUM	Possible	Limited: Some loss of function, downtime and/or evacuations
LOW	Unlikely	Negligible: Minimal loss of function, downtime and/or evacuations
NONE	None	None: No loss of function, downtime and/or evacuations

HAZARDS RANKING

Rank	High Impact	Medium Impact	Low Impact
High Probability			
Medium Probability			
Low Probability			

PUBLIC OUTREACH MEETING

- Welcome and Introductions
- Purpose and Objectives
- DMA 2000 and Mitigation Planning
- Planning Process and Schedule
- Countywide Hazards Description & Discussion
- Facilitated Discussion
- Next Steps in Process

NEXT STEPS

- Continue to provide comments and information to consultant
  - Hazard Events since 2011
  - Asset Inventories
- Consultant to prepare additional plan sections
  - Section 1 – Introduction
  - Section 2 – Plan Purpose and Authority
  - Section 5 – Hazard Assessment
- Consultant and Project Manager to meet with GIS staff

QUESTIONS

- Craig Sanders
  - (530) 252-5104
  - csanders@cityofsusanville.org
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Lassen County, City of Susanville, & Susanville Indian Rancheria

Hazard Mitigation Plan Update

Steering Committee Meeting #4

May 2017

Agenda

- Roll Call
- Call for Questions or Additional agenda items
- Recap of Meeting #3
- Discussion Topics for Meeting #4
- Next Steps
- Questions

Recap of Meeting #3

- Draft Section 4 – Capability Assessment
  - Comments
  - Asset Inventories
  - Maps
- Winter Storms Update
- Hazards Review and Ranking
- Public Outreach Meeting

Topics for Meeting #4

- Hazard Ranking Results
- Hazard Profile Review
- Exposure/Vulnerability
  - HAZUS Results
  - Asset Exposure
- Review Goals & Objectives

Hazard Ranking

Hazards	Lassen, County of	Susanville, City of	Susanville Indian Rancheria
Earthquake			
Flooding and Levee Failure			
Wildfire			
Landslide/Other Earth Movements			
Avalanche			
Drought/Water Shortage			
Energy Shortage and Outages			
Extreme Heat			
Freeze			
Severe Storms			
Volcanoes			
Agricultural Pests and Disease			
Dam Failure			
Infectious Disease			
Hazardous Materials (incl. Oil Spill/Rail)			
Natural Gas Pipeline Rupture/Storage Accident			
Terrorism			
Cyber Threat			
Airline Crash			
Civil Disturbance			

Hazard Ranking (*cont.*)

Hazards	Lassen, County of	Susanville, City of	Susanville Indian Rancheria
Earthquake			
Flooding and Levee Failure			
Wildfire			
Landslide/Other Earth Movements			
Avalanche			
Drought/Water Shortage			
Energy Shortage and Outages			
Extreme Heat			
Freeze			
Severe Storms			
Volcanos			
Agricultural Pests and Disease			
Dam Failure			
Infectious Disease			
Hazardous Materials (incl. Oil Spill/Rail)			
Natural Gas Pipeline Rupture/Storage Accident			
Terrorism			
Cyber Threat			
Airline Crash			
Civil Disturbance			

Hazard Profile Review

- Twenty (20) hazards
- Leveraged previous HMP, State HMP, technical reports and studies
- Format
  - Description of Hazard
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations

Hazard Profile Review (*cont.*)

Earthquake

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - None

Hazard Profile Review (*cont.*)

Flood

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Wildfire

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Landslides and other Earth Movements

- Good
  - Description of Hazard
  - Climate Change Considerations
- Questions
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County

Hazard Profile Review (*cont.*)

Avalanche

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County
  - Probability of Occurrence in County

Hazard Profile Review (*cont.*)

Drought and Water Shortage

- Good
  - Description of Hazard
  - Climate Change Considerations
- Questions
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County

Hazard Profile Review (*cont.*)

Energy Shortage/Outages

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Extreme Heat

- Good
  - Description of Hazard
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - Location and Extent of Hazard in County
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Freeze

- Good
  - Description of Hazard
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - Location and Extent of Hazard in County
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Severe Storms (*Lightning/Thunder, High Winds, Snow, Hail, Fog*)

- Good
  - Description of Hazard
  - Climate Change Considerations
- Questions
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County

Hazard Profile Review (*cont.*)

Volcano

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Agricultural Pest/Disease Infestation

- Good
  - Location and Extent of Hazard in County
  - Climate Change Considerations
- Questions
  - Description of Hazard
  - History of Hazard in County
  - Probability of Occurrence in County

Hazard Profile Review (*cont.*)

Dam/Reservoir Failure

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Infectious Disease

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Hazardous Material Release

- Good
  - Description of Hazard
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - Location and Extent of Hazard in County
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Natural Gas Pipeline Rupture & Storage /Distribution Accidents

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - History of Hazard in County

Hazard Profile Review (*cont.*)

Terrorism

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - None

Hazard Profile Review (*cont.*)

Cyber Security Threat

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - None

Hazard Profile Review (*cont.*)

Aircraft Crashes

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - None

Hazard Profile Review (*cont.*)

Civil Disturbance

- Good
  - Description of Hazard
  - Location and Extent of Hazard in County
  - History of Hazard in County
  - Probability of Occurrence in County
  - Climate Change Considerations
- Questions
  - None

Exposure/Vulnerability

- Exposure
  - Presences of a Hazard
  - Does not estimate damage
- Vulnerability
  - Exposure + Susceptibility
  - Estimates damage

Exposure/Vulnerability (cont.)

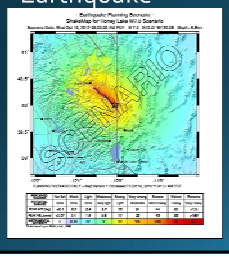
- Exposure
  - Will be done by comparing assets against hazards with a footprint
  - Need list of assets and address
  - Added benefit if replacement cost and content value
  - Can be done for Wildfire, Dam Inundation, Landslide, Volcanoes, Earthquake and Flood

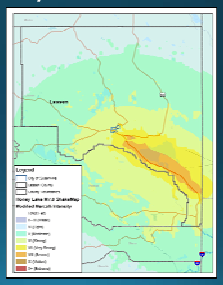
Exposure/Vulnerability (cont.)

- Vulnerability
  - Done by modeling (Hazus)
  - Uses default information
    - # of buildings (12,481)
    - Type of buildings (*residential, commercial, industrial, other*)
    - Cost of buildings (*replacement*- $3 billion/ *content*- $1.8 billion)
    - Also looks at *Transportation* (highways, railways, bus, airports)- 308 locations; replacement value $2.5 billion
    - Also looks at *Lifeline* (water, wastewater, natural gas, oil, electric, communications)- 6 locations; replacement value $396 million
  - We adjusted Hazus "essential facilities" information (*fire, law, medical*)
  - Can be done for Earthquake and Flood

Exposure/Vulnerability (cont.)

Earthquake





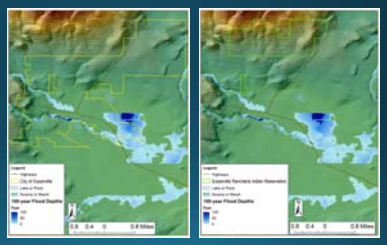
Exposure/Vulnerability (cont.)

Earthquake

- Damage- $120 million (buildings $78 million / contents $24 million, other 17.8 million)
- Casualties- 32 day / 31 night; possible 1 death during day
- Shelter- 34 displace households / 24 people needing shelter
- Debris- 24,000 tons

Exposure/Vulnerability (cont.)

Flood



Exposure/Vulnerability (cont.)

Flood

- Damage- $33.7 million (buildings $16.1 million / contents $16.9 million, other less than $1 million)
- Casualties- does not estimate
- Shelter- 475 displace households / 770 people needing shelter
- Debris- 2,000 tons

Review Goals and Objectives

- Significantly reduce life loss and injury
- Minimize damage to structures and property, as well as disruption of essential services and human activity.
- Protect the environment
- Promote public outreach.
- Improve Emergency Services/Management Capability
- Maintain eligibility for, and pursue, multi-objective funding opportunities wherever possible

Next Steps

- Steering Committee to continue to provide comments on Sections 4 & 5
- Steering Committee to review mitigation strategies and provide status
- Set date for Steering Committee Meeting #5
- Plan for Public Review Meeting #2

Questions

- Craig Sanders
  - (530) 252-5104
  - csanders@cityofsusanville.org
- Andy Petrow
  - (818) 294-5472
  - petrowa@msn.com
- Paula Schulz
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Lassen County, City of Susanville, & Susanville Indian Rancheria

Hazard Mitigation Plan Update

Steering Committee Meeting #5

June 2017

Agenda

- Roll Call
- Call for Questions or Additional Agenda Items
- Recap of Meeting #4
- Discussion Topics for Meeting #5
- Next Steps
- Questions

Recap of Meeting #4

- Draft Section 5 – Hazard Assessment
  - Hazard Identification
  - Hazard Screening and Prioritization
  - Hazard Profile (description, location, history, probability)
- Draft Section 6- Vulnerability Assessment
  - Hazus Results
  - Asset Exposure discussion
- Discussion of Goals

Topics for Meeting #5

- Revisit Vulnerability
  - Hazus Results
  - Asset Exposure Results
- Validate Hazard Ranking
- Review Revised Goals/Objectives
- Mitigation Actions/Projects
  - Status of previous (old) project/actions
  - Proposed (new) projects/actions

Revisit Vulnerability

- Hazus (default) Data
  - # of buildings (12,481)
  - Cost of buildings (replacement- $3 billion/ content- $1.9 billion)
  - Transportation (highways, railways, bus, airports)- 308 locations; replacement value $2.6 billion
  - Lifeline (water, wastewater, natural gas, oil, electric, communications)- 6 locations; replacement value $396 million
- Asset Exposure Data
  - City = 39 data points
  - County = 99 data points
  - Rancheria = 7 data points

Revisit Vulnerability- Earthquake

Hazus Earthquake Results – Honey Lake M7.0 Scenario

- Building Damage- $120 million
  - $78 million buildings
  - $24 million contents
  - other $18 million
- Casualties
  - 32 day (including 1 potential fatality)
  - 31 night
- Shelter
  - 34 displaced households
  - 24 people needing public short-term shelter
- Debris- 24,000 tons

Revisit Vulnerability- Earthquake

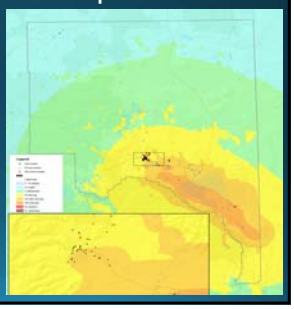
Hazus Earthquake Results (cont.)

General Building Type	Damage State					Total
	None	Slight	Moderate	Extensive	Complete	
Concrete	96	28	20	6	1	151
Manufactured Housing	866	451	578	282	52	2,229
Precast Concrete	75	21	20	7	1	124
Reinforced Masonry	196	34	30	9	1	270
Steel	99	27	25	7	1	159
Unreinforced Masonry	21	8	5	2	1	37
Wood Frame (other)	86	28	12	1	-	127
Wood Frame (Single Family)	6,954	1,872	521	31	9	9,387
Total	8,393	2,469	1,211	345	66	12,484

Revisit Vulnerability- Earthquake

Asset Exposure Results

	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	>8.0	TOTAL
City Assets	0	0	19	19	1	39
County Assets	12	14	16	34	16	92
Rancheria Assets	0	0	5	2	0	7
Total	12	14	40	55	17	138



Revisit Vulnerability- Flood

Hazus Flood Results– 100-year flood scenario

- Building Damage- $33.7 million
  - $16.1 million buildings
  - $16.9 million contents
  - other less than $1 million
- Casualties
  - Hazus flood does not estimate casualties
- Shelter
  - 475 displaced households
  - 770 people needing public short-term shelter
- Debris- 2,000 tons

Revisit Vulnerability- Flood

Hazus Flood Results (cont.)

Occupancy	Damage State							Total
	None	1-10%	11-20%	21-30%	31-40%	41-50%	Substantial	
Single Family Homes	92	61	49	9	8	2	3	224
Manufactured Homes	16	2	2	2	0	1	9	32
Commercial	2	0	0	0	0	0	0	2
Total	110	63	51	11	8	3	12	258

Revisit Vulnerability- Flood

Asset Exposure Results

	A	AE	D	X (0.2)	X (min)	Total
City Assets	0	7	0	2	30	39
County Assets	53	0	1	0	38	92
Rancheria Assets	0	0	0	0	7	7
Total	53	7	1	2	75	138

A/AE- 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage

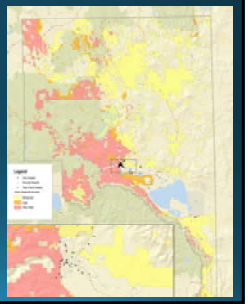
D- Areas with possible but undetermined flood hazards.

X- Areas of moderate/minimal flood hazard

Revisit Vulnerability- Wildfire

Asset Exposure Results

	Moderate	High	Very High	Total
City Assets	0	0	11	11
County Assets	16	6	10	32
Rancheria Assets	2	0	0	2
Total	18	6	21	45



Validate Hazard Ranking

Hazards	Lassen, County of	Susanville, City of	Susanville Indian Rancheria
Earthquake			
Flooding and Levee Failure			
Wildfire			
Landslide/Other Earth Movements			
Avalanche			
Drought/Water Shortage			
Energy Shortage and Outages			
Extreme Heat			
Freeze			
Severe Storms			
Volcanos			
Agricultural Pests and Disease			
Dam Failure			
Infectious Disease			
Hazardous Materials (incl. Oil Spill/Rail)			
Natural Gas Pipeline Rupture/Storage Accident			
Terrorism			
Cyber Threat			
Airline Crash			
Civil Disturbance			

Review Goals and Objectives

1. Minimize life loss and injuries
2. Minimize damage to structures, property, infrastructure, and essential services
3. Protect the environment
4. Promote integration, coordination and public outreach efforts across governmental agencies, the private sector and the general public
5. Improve Emergency Services/Management Capability

Mitigation Actions/Projects

- Status of previous projects/actions
  - Completed
  - Under Way/Planned
  - Still Being Considered
  - No Longer Relevant

Mitigation Actions/Projects

- Proposed (new) projects/actions
  - Priority Hazards (in Red on chart)
    - Earthquake
    - Flood
    - Wildfire
    - Drought/Water Shortage (County only)
    - Energy Shortage
    - Severe Weather
    - Hazardous Material Spills
  - Other Hazards

Mitigation Actions/Projects

- Proposed (new) projects/actions (cont.)
  - Consider
    - Vulnerability
    - Capabilities (Governance)
    - Goals
  - Categories
    - Prevention
    - Property Protection
    - Public Education and Awareness
    - Natural Resource Protection
    - Emergency Services
    - Structural Projects

Next Steps

- Complete Section 6- Vulnerability Assessment
- Complete Section 7- Mitigation Actions/Projects
- Plan for Public Review Meeting #2
- Steering Committee #6
  - Prioritize Actions and Implementation Strategy
- Review draft LHMP
  - May send out chapter by chapter because of size

Questions

- Craig Sanders
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- Andy Petrow
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Lassen County, City of Susanville, & Susanville Indian Rancheria

Hazard Mitigation Plan Update

Steering Committee Meeting #6

July 2017

Agenda

- Roll Call
- Call for Questions or Additional Agenda Items
- Recap of Meeting #5
- Discussion Topics for Meeting #6
- Next Steps
- Questions

Recap of Meeting #5

- Vulnerability Results
- Validate Hazard Ranking
- Review Revised Goals/Objectives
- Mitigation Actions/Projects
  - Status of previous (old) project/actions
  - Proposed (new) projects/actions

Topics for Meeting #6

- Review/Adopt Mitigation Projects List
- Review Draft Project Ranking (STAPLEE)
- Establish Project Priorities
- Validate Implementation Plan
- Plan for Public Review Meeting #2

Mitigation Projects/Actions

- Project Status Summary
  - Completed Projects 4 (deleted)
  - Underway/Planned 16
  - Still Being Considered 15
  - No Longer Relevant 5 (deleted)
  - Status Still Unknown 8
  - Added at Last Meeting 5 (new)
  - Added by Team 6 (new)

Federal Requirements

For each hazard ranked as high, each jurisdiction must include at least one mitigation project!

- Earthquake (All)
- Flooding and Levee Failure (County/City)
- Wildfire (All)
- Drought/Water Shortage (County)
- Energy Shortages and Outages (All)
- Severe Storms (All)
- Hazardous Materials (All)

Project Ranking

- No set method
  - FEMA introduces STAPLEE in guidance material
- Can adopt existing method
  - How you identify Capital Improvement projects
  - How you establish the annual budget
  - Other

Project Ranking Using STAPLEE

- Social
  - Community Acceptance
  - Adverse Affects to Population
- Technical
  - Technical Feasibility
  - Long-Term Solution
  - Secondary Impacts
- Administrative
  - Staffing
  - Funding Allocated
  - Maintenance/Operations
- Political
  - Political Support
  - Local Champion or Proponent
  - Public Support

Project Ranking Using STAPLEE (Cont'd)

- Legal
  - State/Local Authority
  - Subject to Legal Challenge by Opponents
- Economic
  - Benefit of Project
  - Cost of Project
  - Outside Funding Required
- Environmental
  - Consistent with state/federal/local laws
  - Effect on natural resources
  - Consistent with Community Environmental Goal
- Ranking Scale (1 – 5, low to high)

STAPLEE SCORING

- 1- 5 scoring
  - 5 is favorable/beneficial or NO major issues/opposition
    - can also mean something in place to aide (technology, structure, staff, tools)
  - 4
  - 3 is middle of the road
  - 2
  - 1 is unfavorable/not beneficial or major issues/opposition
    - can also mean nothing is in place to aide (technology, structure, staff, tools)
- The higher the score the easier to implement/fewer challenges
- Used an equal weight for each topic area

Implementation Plan

- For each Mitigation Project/Action
  - Identify Participating Jurisdiction
  - Identify Responsible Agencies/Departments
  - Estimate Cost
  - Potential Funding Source
  - Projected Timeframe for Completion

Next Steps

- Review Section 6- Vulnerability Assessment
- Finalize Section 7- Mitigation Strategy
- Plan for Public Review Meeting #2
  - August 8, 2017
  - Disseminate Flyer
- Review draft LHMP

Questions

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PUBLIC INVITATION

PUBLIC MEETING SCHEDULED TO GATHER LOCAL PUBLIC INPUT FOR THE UPDATE OF THE LASSEN COUNTY, CITY OF SUSANVILLE, AND SUSANVILLE INDIAN RANCHERIA HAZARD MITIGATION PLAN.

Contact: Craig Sanders (530) 252-5104
James Moore (530) 257-5152

A public meeting to introduce the purpose of the plan and gather local input on updating the Multi-Jurisdictional Hazard Mitigation Plan (LHMP) is scheduled for Tuesday, March 7 from 5:30 to 7:30 in the Susanville Fire Department at 1505 Main St. in Susanville.

The purpose of the LHMP is to identify natural hazards that have the potential to occur in Lassen County such as flooding, seismic events, severe storms, etc. and identify ways to prepare for and reduce the impacts of those hazards when they occur.

During the meeting, the public is invited to make comments or suggestions as to which hazards are of the most concern throughout the county including the frequency and severity of the hazards. City, County, Tribal, and emergency management officials will be on hand to answer any questions. All comments received from the public will be documented and considered for inclusion into the plan.

The LHMP is undergoing a 5 year review by officials from Lassen County, City of Susanville, Susanville Indian Rancheria, Lassen OES, and other members of critical infrastructure such as LMUD, SSD, etc. When local officials and the public approve, the LHMP is submitted to California Office of Emergency Services (OES) for review and approval. Upon successful approval at Cal OES the LHMP is submitted to the Federal Emergency Management Agency (FEMA) for final review and approval.

Lassen County Multijurisdictional Hazard Mitigation Plan

Public Outreach Meeting
March 7, 2017

Agenda

- 5:30 Welcome and Introductions
- 5:45 Purpose and Objectives
- 6:00 DMA 2000 and Mitigation Planning
- 6:15 Planning Process and Schedule
- 6:30 Break
- 6:45 Hazard Description & Discussion
- 7:15 Next Steps in Process

Purpose and Objectives

- To introduce workshop participants to the Lassen County Multijurisdictional Hazard Mitigation Planning Process
- To obtain input from workshop participants about concerns and suggestions for reducing their risk from identified hazards
- To meet federal DMA 2000 planning process requirements

DMA 2000 and Mitigation Planning

- In accordance with the federal Disaster Mitigation Act of 2000, every community must have an approved hazard mitigation plan as a condition to receive federal hazard mitigation assistance.
- Mitigation Planning is a ***process*** for local governments to identify policies, activities, and tools to implement mitigation actions. Mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

What is a Hazard Mitigation Plan?

- Road map for reducing impacts to the community from hazards
- Components include:
  - Public input process
  - Identify and profile hazard
  - Assess vulnerability
  - Develop mitigation strategies
  - Implementation actions
  - Formal adoption

Benefits of Mitigation

- Saved lives
- Reduced damage to property
- Reduced economic losses
- Minimized social disruption
- Local government to resume operations quickly
- Shorter recovery period for the community

Planning Process Requirements

- Opportunity for public comment
- Opportunity for involvement from other local, regional, state, federal agencies, academia, businesses, private and non-profit interests
- Incorporation of existing plans, studies, reports, and technical information
- Documentation of the planning process

Update Methodology

Potential Hazards

- Earthquake
- Flood & Levee Failure
- Wildfire (including Bark Beetle)
- Landslides and Other Earth Movement
- Avalanche
- Drought and Water Shortage
- Energy Shortage and Energy Resilience
- Extreme Heat
- Freeze
- Severe Weather and Storms
- Volcano
- Agricultural Pests and Disease
- Dam Failure
- Epidemic/Pandemic/Vector Borne Disease
- Hazardous Materials (including Oil Spills and Rail Accidents)
- Natural Gas Pipelines
- Terrorism
- Cyber Threats
- Airline Crash
- Civil Disturbance

Hazards Ranking

SAMPLE DEFINITIONS:

CATEGORY	PROBABILITY	IMPACT
HIGH	Highly Likely/Likely	Catastrophic/Critical: Major loss of function, downtime, and/or evacuations
MEDIUM	Possible	Limited: Some loss of function, downtime and/or evacuations
LOW	Unlikely	Negligible: Minimal loss of function, downtime and/or evacuations
NONE	None	None: No loss of function, downtime and/or evacuations

Discussion

- What hazards are you most concerned about?
- What have you experienced?
- What do you think could be done to reduce impacts?

What's Next?

- Draft plan completed in June 2017
- Public Input Meeting in June 2017
- Public Review Period in July 2017
- State and Federal Review
- Formal Adoption by
  - Lassen County
  - City of Susanville
  - Susanville Indian Rancheria

PUBLIC INVITATION

PUBLIC MEETING SCHEDULED TO GATHER LOCAL PUBLIC INPUT FOR THE UPDATE OF THE LASSEN COUNTY, CITY OF SUSANVILLE, AND SUSANVILLE INDIAN RANCHERIA HAZARD MITIGATION PLAN.

Contact: Craig Sanders (530) 252-5104
James Moore (530) 257-5152

A public meeting to gather local input on proposed hazard mitigation actions to be included in the updated Multi-Jurisdictional Hazard Mitigation Plan (LHMP) is scheduled for Tuesday, August 8 from 5:30 to 7:30 in the Susanville Fire Department at 1505 Main St. in Susanville.

The purpose of the LHMP is to identify natural hazards that have the potential to occur in Lassen County such as flooding, seismic events, severe storms, etc. and identify ways to prepare for and reduce the impacts of those hazards when they occur.

During the meeting, the public is invited to make comments or suggestions as to what mitigation actions should be taken to reduce the communities vulnerability to high priority hazards including wildfire, flood, earthquake, energy shortage and hazardous materials. City, County, Tribal, and emergency management officials will be on hand to answer any questions. All comments received from the public will be documented and considered for inclusion into the plan.

The LHMP is undergoing a 5 year review by officials from Lassen County, City of Susanville, Susanville Indian Rancheria, Lassen OES, and other members of critical infrastructure such as LMUD, SSD, etc. When local officials and the public approve, the LHMP is submitted to California Office of Emergency Services (OES) for review and approval. Upon successful approval at Cal OES the LHMP is submitted to the Federal Emergency Management Agency (FEMA) for final review and approval.

LASSEN COUNTY MULTIJURISDICTIONAL HAZARD MITIGATION PLAN

Public Outreach Meeting #2
August 8, 2017

Agenda

- Welcome and Introductions
- Purpose and Objectives
- Mitigation Planning Process
- Priority Hazards
- Priority Mitigation Actions
- Next Steps in Process
- Questions

Purpose and Objectives

- To update workshop participants on the Lassen County Multijurisdictional Hazard Mitigation Planning Process
- To obtain input from workshop participants about concerns and suggestions for reducing their risk from high priority hazards and priority mitigation actions
- To meet federal DMA 2000 planning process requirements

DMA 2000 and Mitigation Planning

- In accordance with the federal Disaster Mitigation Act of 2000, every community must have an approved hazard mitigation plan as a condition to receive federal hazard mitigation assistance.
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What is a Hazard Mitigation Plan?

- Road map for reducing impacts to the community from hazards
- Components include:
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  - Assess vulnerability
  - Develop mitigation strategies
  - Implementation actions
  - Formal adoption

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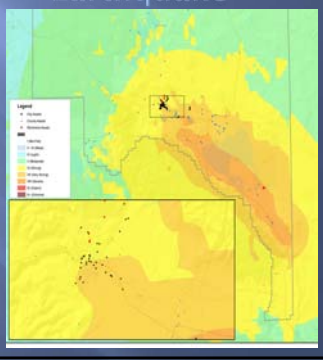
Potential Hazards

- Earthquake
- Flood & Levee Failure
- Wildfire (including Bark Beetle)
- Landslides and Other Earth Movement
- Avalanche
- Drought and Water Shortage
- Energy Shortage and Energy Resilience
- Extreme Heat
- Freeze
- Severe Weather and Storms
- Volcano
- Agricultural Pests and Disease
- Dam Failure
- Epidemic/Pandemic/Vector Borne Disease
- Hazardous Materials (including Oil Spills and Rail Accidents)
- Natural Gas Pipelines
- Terrorism
- Cyber Threats
- Airline Crash
- Civil Disturbance

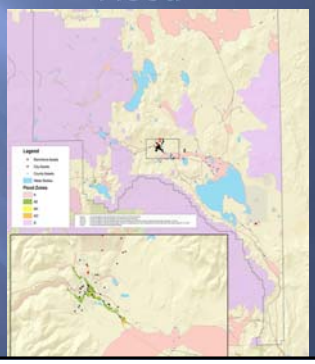
Hazard Ranking

Hazards	Lassen, County of	Susanville, City of	Susanville Indian Rancheria
Earthquake			
Flooding and Levee Failure			
Wildfire			
Landslide/Other Earth Movements			
Avalanche			
Drought/Water Shortage			
Energy Shortage and Outages			
Extreme Heat			
Freeze			
Severe Storms			
Volcanos			
Agricultural Pests and Disease			
Dam Failure			
Infectious Disease			
Hazardous Materials (incl. Oil Spill/Rail)			
Natural Gas Pipeline Rupture/Storage Accident			
Terrorism			
Cyber Threat			
Airline Crash			
Civil Disturbance			

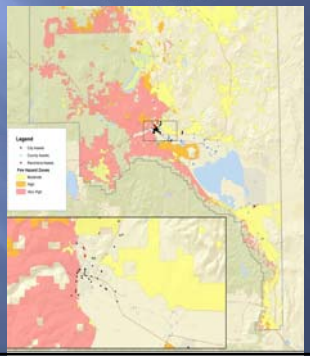
Key Asset Exposure Earthquake



Key Asset Exposure Flood



Key Asset Exposure Wildfire



Federal Requirements

For each hazard ranked as high, each jurisdiction must include at least one mitigation project!

- Earthquake (All)
- Flooding and Levee Failure (County/City)
- Wildfire (All)
- Drought/Water Shortage (County)
- Energy Shortages and Outages (All)
- Severe Storms (All)
- Hazardous Materials (All)

Mitigation Actions

- Categories
  - Prevention
  - Property Protection
  - Public Education and Awareness
  - Natural Resource Protection
  - Emergency Services
  - Structural Projects

Mitigation Actions

Total Proposed Mitigation Actions: 45

Multi-Hazard	14
Earthquake	2
Flood	4
Wildfire	9
Drought	6
Energy Shortage	3
Severe Storms	2
Hazardous Materials	2
Other	3

Priority Mitigation Actions

- 25 of 45 Mitigation Actions are High Priority
  - 9 Multi-Hazard
  - 8 Wildfire
  - 2 Flood
  - 2 Severe Storms
  - 1 Earthquake
  - 1 Energy Shortage
  - 2 Other (Pandemic)

Implementation Plan

For each Mitigation Project/Action

- Identify Participating Jurisdiction
- Identify Responsible Agencies/Departments
- Estimate Cost
- Potential Funding Source
- Projected Timeframe for Completion
- Assign Priority (H/M/L)

What's Next?

- Draft plan completed - August 2017
- Public Review Period – September 2017
  - County/City/Rancheria Websites & Offices
- State and Federal Review – October 2017
- Formal Adoption by
  - Lassen County
  - City of Susanville
  - Susanville Indian Rancheria

Questions

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