Modoc County
Local Hazard Mitigation Plan Update
March 2016



Public Review Draft

Foster Morrison

Executive Summary

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Modoc County developed this Local Hazard Mitigation Plan (LHMP) update to make the County and its residents less vulnerable to future hazard events. This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 so that Modoc County would be eligible for the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation and Hazard Mitigation Grant programs.

The County followed a planning process prescribed by FEMA, which began with the formation of a hazard mitigation planning committee (HMPC) comprised of key County representatives, and other regional stakeholders. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the County, assessed the County's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The County is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Floods, levee failures, wildfires, and severe weather are among the hazards that can have a significant impact on the County.

Based on the risk assessment, the HMPC identified goals and objectives for reducing the County's vulnerability to hazards. The goals and objectives of this multi-hazard mitigation plan are:

Goal 1: Minimize risk and vulnerability of Modoc County to the impacts of natural hazards. The primary goal is to protect lives; reduce damages and losses to property and critical infrastructure; maintain services; maintain the economic base; and protect the environment.

- Provide for safety of residents, public, contractors, and responders
- Provide for continuity of critical infrastructure and services
- Minimize impacts to both existing and future development from all hazards
- Minimize impacts to natural and cultural resources
- Prevent and reduce the potential for catastrophic loss due to wildfire
- Prevent and reduce flood risk and related damages

Goal 2: Increase communities' capabilities to mitigate losses and to be prepared for, respond to, and recover from a disaster event.

- Continued enhancements to Emergency Services' capabilities to integrate new technologies and use of shared resources to reduce losses and save lives
- Improve interagency (local, state, & federal) emergency coordination, planning, training, exercising, and communication to ensure effective community preparedness, response and recovery
- Identify, fund, and implement community mitigation projects
- Improve interagency coordination with respect to implementation of multi-jurisdictional mitigation activities
- Continue to support first responders

Goal 3: Improve public awareness, education, and preparedness programs for all hazards

- Increase public knowledge of various hazards and recommend actions that will protect lives and reduce losses
  - ✓ In particular, to make aware of the probable consequences of Severe Winter Weather Events (e.g., the need for 72 hours of food and fuel reserves, the possibility of CO_2 poisoning, frozen pipes or power outages, etc.)
  - ✓ To build awareness of ongoing actions that reduce hazards. For example signage for burn restrictions or emergency warnings, recognition of hazardous vegetation, utilization of water conservation measures, necessity of ditch maintenance, importance of flood insurance, plans for evacuation and sheltering, etc.

Actions to support these goals are shown on Table ES-1.

Table ES-1 Modoc County Planning Area Mitigation Actions

Mitigation Action Title	Lead Jurisdiction	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Modoc County/ City of Alturas* Planning Departments			
Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Modoc County/ City of Alturas* Planning Departments			X
East Warner Mountains Fuel Break (WF-7 Create Defensible Space Around Structures and Infrastructure)	Modoc County Fire Safe Council	X	X	
Dredge Sons of Pioneer Lake and Install Dry Hydrant (W-8 Conduct Maintenance to Reduce Risk/Water Quality/Quantity)	Modoc County Fire Safe Council	X	X	X
Construct a new Hospital and Clinic outside the floodplain (including access roads) (F-12 Remove Existing Structures from Flood Hazard Areas)	Modoc County in coordination with Last Frontier Healthcare District	X	X	X
Relocate Jail (MU-12 Protect Structures)	Modoc County Sherriff's Office	X	X	X
Complete Levee Flood Assessment Response Plan and Exercise it (F-2 Form Partnerships to Support Floodplain Management)	Modoc County Planning Department	X	X	X
Pit River Levee Bypass Channel and Restricted Orifice (F-13 Improve Stormwater Drainage System Capacity)	Modoc County Public Works / City of Alturas*	X	X	X

Mitigation Action Title	Lead Jurisdiction	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Pit River Levee Dredging and Silt Removal (F-14 Conduct Regular Maintenance for Drainage systems and Flood Control Structures)	Modoc County Public Works / City of Alturas*	X	X	X
City of Alturas Storm Drainage (F-13 Improve Stormwater Drainage System Capacity)	Modoc County Public Works / City of Alturas*	X	X	X
Alternate Dispatch (MU-12 Protect Structures)	Modoc County Sherriff's Office	X	X	
Fireproof Radio Tower Sites (11)(MU-13 Protect Infrastructure and Critical Facilities)	Modoc County Office of Emergency Services	X	X	
Communications Redundancy: Intranet Link of 11 Radio Towers (MU-13 Protect Infrastructure and Critical Facilities)	Modoc County Office of Emergency Services and Public Health	X	X	
GIS Coordinator (MU-2 Map Community Risk)	Modoc County	X	X	
Improve the outreach and enrollment in the Support and Aid For Everyone program. (MU – 14 Increase Hazard Education and Risk Awareness; MU – 15 Improve Household Disaster Preparedness)	Modoc County Public Health	X	X	
Construct a new skilled nursing facility outside the floodplain (including access roads) (F-12 Remove Existing Structures from Flood Hazard Areas)	Modoc County in coordination with Last Frontier Healthcare District	X	X	X
Rock scaling on Co Rd 64 (Pitt River Canyon/Jess Valley Road) and 91 (Lookout) to prevent road damage and traffic disruptions from landslides (LS-3 Prevent Impacts to Roadways)	Modoc County Roads Department	X	X	
Bridge Abutment Repair on Co Rd 75 (Pitt River); Co Rd 58 (Parker Creek); culvert replacement for Co Rd 2 and Rd 118 in Davis Creek (F-1 Incorporate Flood Mitigation in Local Planning)	Modoc County Roads Department	X	X	X
Tree Removal on Co Rd 1 (Surprise Valley) (SW-4 Protect Power Lines and Infrastructure; WW-4 Reduce Impacts to Roadways)	Modoc County Office of Emergency Services	X	X	
Outlet Allotment Riparian Juniper Cutting (F-14 Conduct Regular Maintenance for Drainage Systems and Flood Control Structures)	Modoc County Office of Emergency Services	X	X	

*Specifics for these actions for the City of Alturas may be found in its annex to this plan.

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Chapter 1 Introduction

1.1 Purpose

Modoc County prepared this Local Hazard Mitigation Plan (LHMP) to guide hazard mitigation planning to better protect the people and property of the County and participating jurisdictions from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed so the County and participating jurisdictions can be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, and the Flood Mitigation Assistance (FMA) program.

1.2 Background and Scope

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This plan documents the County's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County will use to decrease vulnerability and increase resiliency and sustainability in the community.

The Modoc County LHMP is a multi-jurisdictional plan that geographically covers the entire area within Modoc County's jurisdictional boundaries (hereinafter referred to as the planning area). The following jurisdictions participated in the planning process and are seeking approval of this LHMP plan update:

- Modoc County
- City of Alturas

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act (DMA) or DMA 2000.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). This planning effort also follows FEMA's most current Plan Preparation and Review Guidance. Because the planning area is subject to many kinds of hazards, access to these programs is vital.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The planning area has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

1.3 Plan Organization

Modoc County's Local Hazard Mitigation Plan is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Community Profile
- Chapter 3: Planning Process
- Chapter 4: Risk Assessment
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption
- Chapter 7: Plan Implementation and Maintenance
- Annex A: City of Alturas
- Appendices

Chapter 2 Community Profile

2.1 Planning Area Profile

Modoc County is located in the northeastern corner of northern California and is contiguous to the States of Oregon and Nevada. The County is bordered by Klamath and Lake Counties to the north; Washoe County to the east; and Lassen, Shasta, and Siskiyou Counties to the south, southwest, and west, respectively. The City of Alturas serves as the County seat. Reno is located approximately 180 miles to the south-southeast. There are 2.25 persons per square mile, making this one of the most sparsely populated counties in California. In 2014, the Department of Finance total estimated population of the County was 9,377, of which 6,667 lived in the unincorporated areas and 2,710 lived in the City of Alturas. Population in the County has remained relatively level in recent years.

California Department of Finance information data indicates that 27% of the county is in farms; alfalfa, potatoes, and cattle are the top three commodities. The Bureau of Land Management and U.S. Forest Service control 87% of the land base of the County. The area is served by State Highways 139, 299 and 395, several County roads, and a network of City streets. In addition, bus service, provided by Greyhound Bus Lines, is available at the City of Alturas; Amtrak connections are available in Klamath, Oregon and Reno, Nevada; and the City of Alturas has a municipal airport.

Modoc County includes one incorporated city (the City of Alturas) and several unincorporated rural communities. 15 separate rural communities are located within the unincorporated area of the County. Figure 2-1 illustrates Modoc County's location.

A large portion of Modoc County is federal land, as shown in Figure 2-2. Several federal agencies, including the United States Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and the United States Fish and Wildlife Service, have employees assigned to the area, and their operations are a significant part of the economy and services in this rural area.

Figure 2-1 Modoc County Base Map

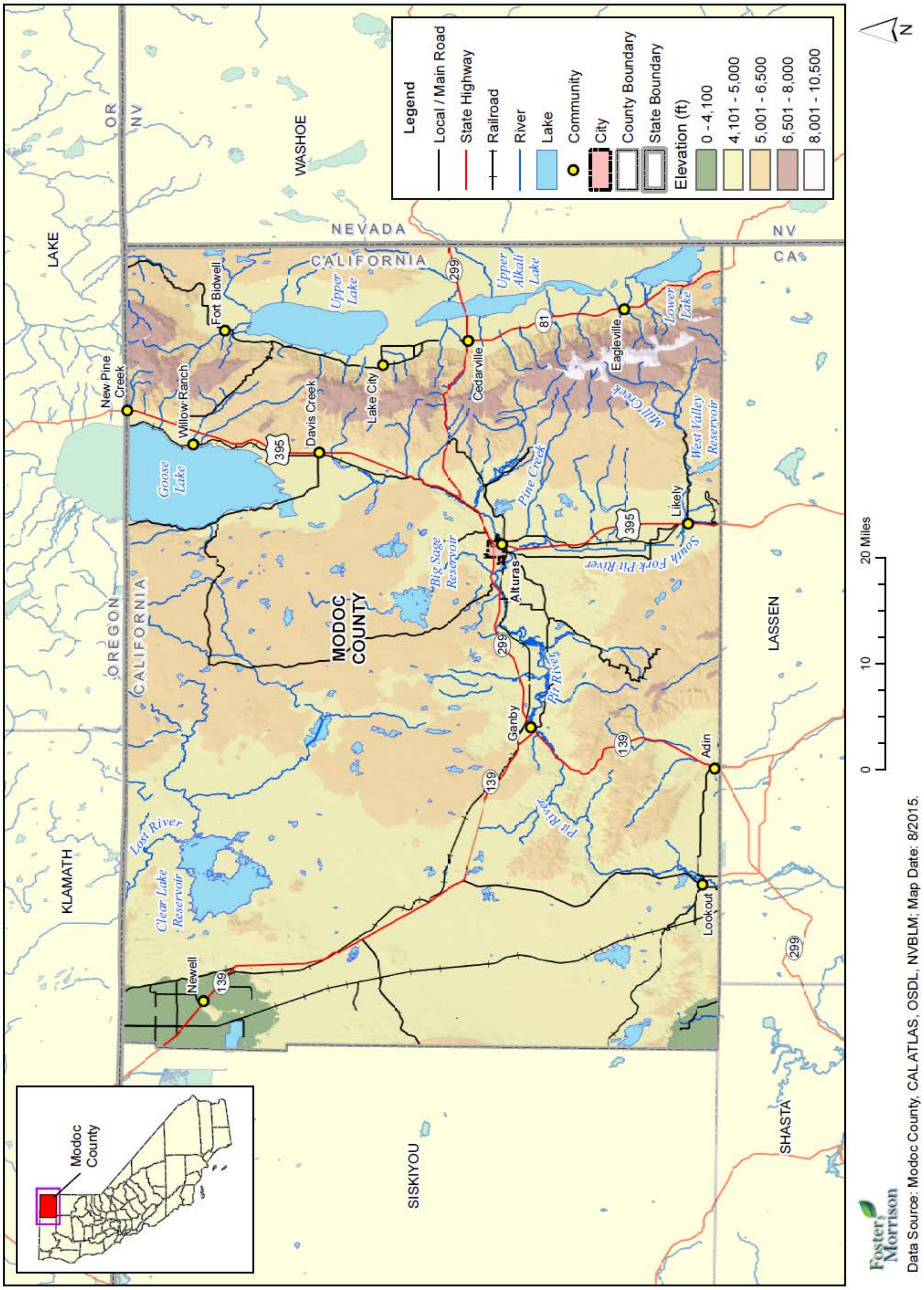
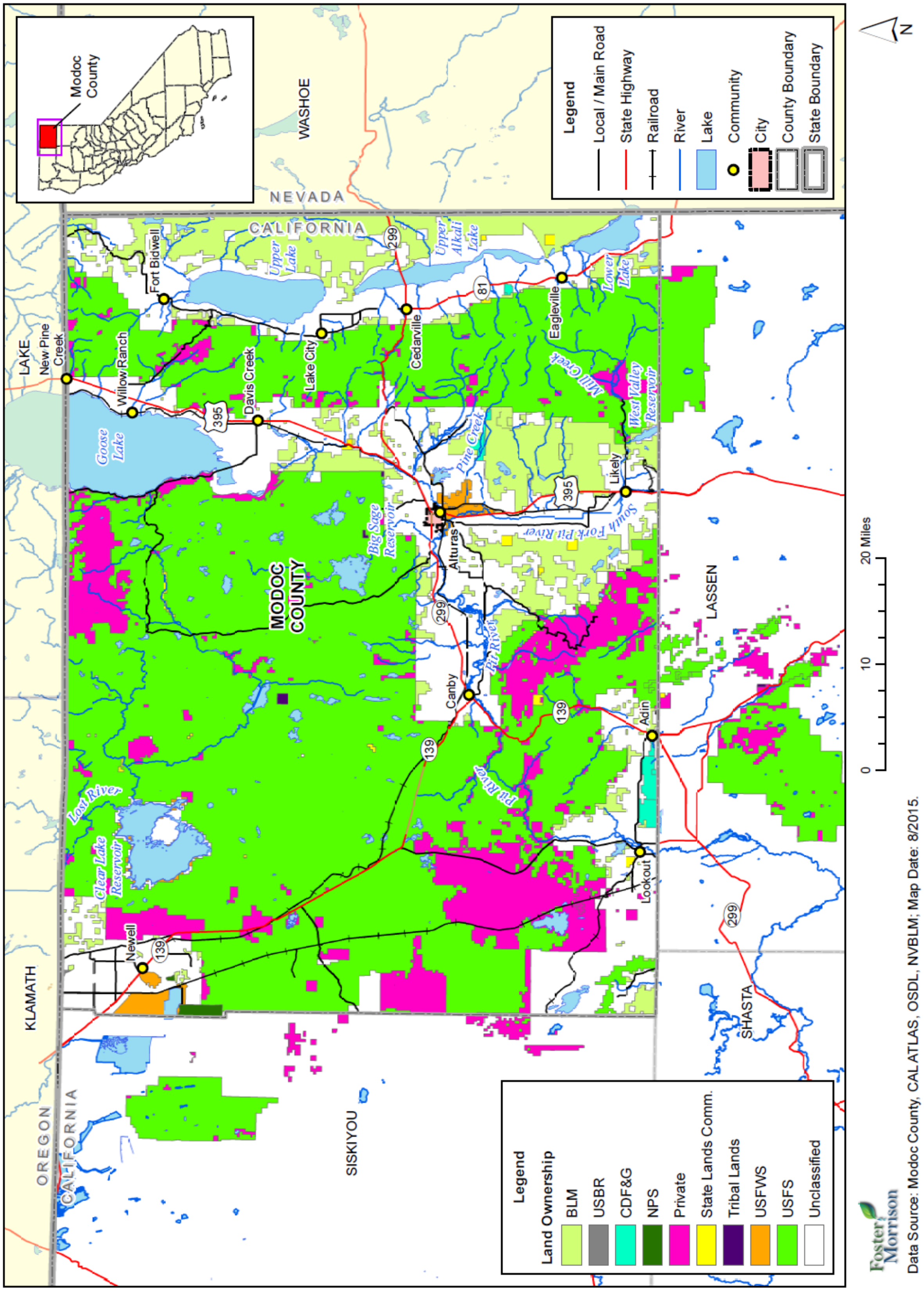


Figure 2-2 Modoc County Land Ownership Map



2.2 History

Prior to the arrival of Europeans in the region, varying cultures of Native Americans inhabited the county for thousands of years. At the time of European encounter, the Modoc people lived in what is now northern California, near Lost River and Tule Lake. The county was named after them. The Achumawi (or Pit River Indians, for which the Pit River is named), and the Paiute also lived in the area. To the north were the Klamath in present-day Oregon. The first European explorers to visit Modoc County were the American John C. Frémont and his traveling party (including Kit Carson) in 1846, who had departed from Sutter's Fort near the confluence of the American and Sacramento Rivers.

The northern boundary of California, and eventually Modoc County, had been established as the 42nd parallel since the time of Mexican possession. In the absence of a reliable survey of the 120th meridian, the eastern boundary of northern California was a subject of contention before Modoc County formed. The Territory of Utah requested jurisdiction to the summit of the Sierra Nevada. At the time, the Warner Mountains were believed to be a part of the Sierra Nevada, so this would have included Surprise Valley, but California denied the request.

In 1856, the residents of Honey Lake Valley reckoned the 120th meridian to be west of their valley, placing them in Utah territory, and attempted to secede and form a territory they called Nataqua. Nataqua would have included Modoc County. In 1858, the Territory of Nevada, with its capital now in Carson City, successfully seceded from Utah, and assumed jurisdiction to the summit of the Sierra Nevada until the 120th meridian was surveyed in 1863.

After Nevada was granted statehood in 1864, the region of current Modoc County was placed within jurisdiction of Shasta County, California, and Siskiyou County was, in turn, generated from Shasta County in 1852. Increasing traffic on the emigrant trail, unprovoked militia raids on innocent Modoc, and a cycle of retaliatory raids increased a cycle of violence between settlers and the tribes in the area. In 1864, the Klamath, Modoc and Yahooskin band of the Shoshone signed a treaty ceding lands in both Oregon and California, and the tribes were collocated on the Klamath Reservation. Harassed by the Klamath, traditional competitors, a band of Modoc led by Captain Jack returned to California and the Tule Lake area.

The Modoc War (or Lava Beds War) of 1872-73 brought nationwide attention to the Modoc during the protracted battles. From strong defensive positions in the lava tubes, 52 Modoc warriors held off hundreds of US Army forces, who called in artillery to help. Peace talks in 1873 stalled when the Modoc wanted their own reservation in California. Warriors urged killing the peace commissioners, thinking that the Americans would then leave, and Captain Jack and others shot and killed General Edward Canby and Rev. Eleazer Thomas, and wounded others. More Army troops were called in to lay siege to Captain Jack's Stronghold. Dissension arose, and some Modoc surrendered. Finally most were captured, and those responsible for the assassinations were tried and executed. More than 150 Modoc were transported to Indian Territory as prisoners of war. The area has since been designated the Lava Beds National Monument.

Settlement of the county began in earnest in the 1870s, with the timber, gold, agriculture, and railroad industries bringing most of the settlers into the area. The County was a crossroads for the Lassen Applegate Trail, which brought settlers north from Nevada to the Oregon Trail and south to trails leading into

California's central valley. Early settlers included the Dorris, Belli, Essex, Scherer, Trumbo, Flournoy, Polander, Rice and Campbell families.

Modoc County was formed when Governor Newton Booth signed an Act of the California Legislature on February 17, 1874 after residents of the Surprise Valley region lobbied for the creation of a new county from eastern Siskiyou County land. The county residents considered naming the newly formed county after General Edward Canby, who had been killed the year before at peace talks in an ambush by Modoc. The idea of naming the county "Summit" was also considered, but the populace eventually settled on "Modoc"; the war was over and 153 of Captain Jack's band had been transported to Indian Territory as prisoners.

The Dorris Bridge post office opened in 1871, was renamed Dorrisville in 1874; due to its central location, Dorrisville became the county seat when Modoc County formed that year, although both Adin and Cedarville were larger towns. In 1876, it was renamed Alturas, which means "The Heights" in Spanish. The census of 1880 showed a population of 148. Settlement continued over the next two decades, until the city was officially incorporated on September 16, 1901; the county's only incorporated city.

2.3 Geography and Climate

The county is very diverse geographically. The northwestern edge of the county is dominated by the Medicine Lake Highlands, the largest shield volcano on the U.S. West Coast. The Lava Beds National Monument lies partly within the northwest corner of the County. Also along the western edge of the county is the massive Glass Mountain lava flow. The southwestern corner of the County is a unique ecosystem of isolated hardwoods (oaks) and volcanic mountains with intermountain river valleys. The northern half of the county is the Modoc Plateau, a 1-mile high expanse of lava flows, cinder cones, juniper flats, pine forests, and seasonal lakes, plus the alkaline Goose Lake. Nearly 1 million acres of the Modoc National Forest lie on the plateau between the Medicine Lake Highlands in the west and the Warner Mountains in the east.

The Lost River watershed, which later drains into the Klamath River basin, drains the north part of the plateau, while southern watersheds either collect in basin reservoirs or flow into the large Big Sage Reservoir, which sits in the center of the county, which later flows into the Pit River. Below the rim of the Plateau is Big Valley in the extreme southwest corner of the county, and the large Warm Springs Valley that forms the bottom of the Pit River watershed that runs through the county. The north fork and south fork of the Pit River come together just south of Alturas. The River collects hundreds of other small creeks as it flows south towards Lake Shasta, where it joins the Sacramento River and drains into the San Francisco Bay. The eastern edge of the county is dominated by the Warner Mountains. The Pit River originates in this mountain range. Hundreds of alpine lakes dot the range, all of which are fed by snow-melt and natural springs. East of the Warner Range is Surprise Valley and the western edge of the Great Basin.

The climate in the area is characterized as high desert, with cold, wet winters and warm, dry summers. The average high and low temperatures for January are 40°F and 16°F, respectively, while for July they are 88°F and 45°F, respectively. Regional precipitation varies from approximately 8 inches in the low valley areas to approximately 35 inches in the higher mountain areas.

2.4 Economy

Logging and mining were early endeavors in the area, and the lumber industry remains as one of the most important present-day focuses of the local economy, second only to agricultural. Ranching activities have spread out in the Big Valley region adding to the economic base, and recent impetus has been given to rejuvenating the long-dormant gold-mining industry. Several federal agencies, including the United States Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and the United States Fish and Wildlife Service, have employees assigned to the area, and their operations are a significant part of the economy and services in this rural area. These are shown in Table 2-1.

Table 2-1 Modoc County Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	605	16.6%
Construction	222	6.1%
Manufacturing	113	3.1%
Wholesale trade	11	0.3%
Retail trade	385	10.6%
Transportation and warehousing, and utilities	163	4.5%
Information	62	1.7%
Finance and insurance, and real estate and rental and leasing	9	0.2%
Professional, scientific, and management, and administrative and waste management services	231	6.4%
Educational services, and health care and social assistance	940	25.9%
Arts, entertainment, and recreation, and accommodation and food services	356	9.8%
Other services, except public administration	165	4.5%
Public administration	373	10.3%

Source: US Census Bureau American Community Survey 2013 Estimates

The largest employers in the County are shown in Table 2-2.

Table 2-2 Modoc County Largest Employers

Employer	Number of Employees
County of Modoc	541
Modoc Joint Unified School District	220
USDA Forest Service	185
Modoc Medical Center	165
Surprise Valley Community Hospital	60
Bureau of Land Management	51
Environment Alternatives	45

Employer	Number of Employees
CAL FIRE	30
ISOT Canby Family Clinic	30
Alturas Casino	28
Rite Aid	24
Alturas Ranches	12

Source: Modoc County 2009 Housing Element

2.5 Population

The California Department of Finance Demographics Research Unit 2014 estimates for population of the County and its jurisdictions are shown in Table 2-3.

Table 2-3 Modoc County Population by Jurisdiction

Jurisdiction	Total Population
Modoc County	6,667
Alturas	2,710
Total	**9,337**

Source: California Department of Finance, Demographics Research Unit – E-1: City/County Population Estimates with Annual Percent Change

Chapter 3 Planning Process

Requirements §201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
1) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Modoc County recognized the need and importance of a Local Hazard Mitigation Plan (LHMP) and initiated its development. After receiving a grant from the Federal Emergency Management Agency (FEMA), which served as the primary funding source for this plan, the County contracted with Foster Morrison Consulting Ltd. (Foster Morrison) to facilitate and develop the plan. Jeanine Foster, a professional planner with Foster Morrison, was the project manager and lead planner in charge of overseeing the planning process and the development of this LHMP. Foster Morrison's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA),
- Meet the DMA requirements as established by federal regulations and following FEMA's planning guidance,
- Support objectives under the National Flood Insurance Program's Community Rating System and the Flood Mitigation Assistance program,
- Facilitate the entire planning process,
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in facilitating the public input process,
- Produce the draft and final plan documents, and
- Coordinate the California Office of Emergency Services (Cal OES) and FEMA Region IX plan reviews.

3.1 Local Government Participation

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC
- Detail areas within the planning area where the risk differs from that facing the entire area

- Identify potential mitigation actions
- Formally adopt the plan

For the Modoc County planning area's HMPC, "participation" meant the following:

- Attending and participating in the HMPC meetings;
- Providing facilities for meetings;
- Completing and returning the Foster Morrison data collection worksheets;
- Collecting and providing other requested data (as available);
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts;
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan;
- Advertising, coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the plan by the governing boards.

The County and the City of Alturas seeking FEMA approval met all of these plan participation requirements. Multiple representatives for each participating jurisdiction attended the HMPC meetings described in Table 3-2 and also brought together a local planning team to help collect data, identify mitigation actions and implementation strategies and review and provide data on plan drafts. Appendix A provides additional information and documentation of the planning process.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for the Modoc County Local Hazard Mitigation Plan using the DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

1. Organize Resources
2. Assess Risks
3. Develop the Mitigation Plan
4. Implement the Plan and Monitor Progress

Into this process, Foster Morrison integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, Community Rating System, Flood Mitigation Assistance Program, Severe Repetitive Loss program, and new flood control projects authorized by the U.S. Army Corps of Engineers.

Table 3-1 shows how the modified 10-step process fits into FEMA's four-phase process. The sections that follow describe each planning step in more detail.

Table 3-1 Mitigation Planning Processes Used to Develop the Modoc County Local Hazard Mitigation Plan

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

3.2.1. Phase 1: Organize Resources

Planning Step 1: Organize to Prepare the Plan

With Modoc County's and participating jurisdictions' commitment to participate in the DMA planning process, Foster Morrison worked with the County's Office of Emergency Services to establish the framework and organization for development of the plan. Initial efforts included working with the County and other stakeholders to inform and educate plan participants of the purpose and need for a Local Hazard Mitigation Plan. An initial call was held with the County Office of Emergency Services to discuss the organizational and process aspects of plan development including the need to organize a Hazard Mitigation Planning Committee. (HMPC).

The initial kick-off meeting of the HMPC was held on May 14, 2015. Invitations to this kickoff meeting were extended to representatives from key County and City departments, representatives from special districts in the planning area, as well as to other federal, state, and local stakeholders that might have an interest in participating in the planning process. The list of initial invitees is included in Appendix A, with additional invitations extended as appropriate throughout the planning process. Invitations to the HMPC meetings are also included in Appendix A. In addition to emailed invitations, meeting invites were extended through phone calls, face to face meetings, and via social media mechanisms. The HMPC was established as a result of these efforts. The HMPC, which included key County, City, and other local government and stakeholder representatives, developed the plan with leadership from the County's Office of Emergency Services and facilitation by Foster Morrison. Each participating jurisdiction seeking FEMA approval of the plan had representation on the HMPC. The following participated on the HMPC:

Modoc County

- Office of Emergency Services
- Board of Supervisors
- Administration
- Agriculture Department
- Assessor's Office
- Auditor's Office
- Building Department
- Child Support Department
- Humane Society
- Health Services
- Information Technology
- Library
- Planning Department
- Public Works Department
- Public Health Department
- Roads Department
- Treasurer
- Watermaster

City of Alturas

- Administration
- Office of Emergency Services
- Fire Department
- Public Works Department

Other Local Stakeholders

- Cedarville Rancheria
- Cedarville Fire Protection District
- City of Likely Fire Protection District
- Fort Bidwell Fire Protection District
- Fort Bidwell Rancheria
- Hot Spring Valley Irrigation
- Modoc County Fire Safe Council
- Modoc Medical Center
- Modoc National Wildlife Refuge
- Modoc Resource Conservation District
- South Fork Irrigation District

Other Government and Stakeholder Representatives

- Bureau of Land Management
- California Department of Fish and Wildlife
- Modoc National Forest

- North Cal-Neva Resource Conservation & Development Council
- United States Forest Service, Modoc District

A list of participating HMPC representatives is included in Appendix A. This list details all HMPC members that attended one or more HMPC meetings detailed in Table 3-2 Each participating jurisdiction also utilized the support of many other staff in order to collect and provide requested data and to conduct timely reviews of draft documents. Note, that the core HMPC group was also supplemented by input from other government and stakeholder representatives that contributed to the planning process as identified in Planning Step 3: Coordinate with Other Department and Agencies.

Meetings

The planning process officially began with a kick-off meeting held in Alturas on May 14th, 2014 at 10 am followed by a public kick-off meeting held the same day at 7 pm. The meetings covered the scope of work and an introduction to the DMA planning requirements. During the HMPC kick-off meeting participants were provided with data collection worksheets to facilitate the collection of information necessary to support development of the plan. Using FEMA guidance, Foster Morrison designed these worksheets to capture information on past hazard events, identify hazards of concern to the jurisdiction, quantify values at risk to identified hazards, inventory existing capabilities, and record possible mitigation actions. A copy of the data collection worksheets for this project are included in Appendix A. The County, City of Alturas, and others completed and returned the worksheets to Foster Morrison for incorporation into the plan document.

During the planning process, the HMPC communicated through face-to-face meetings, email, and telephone conversations. DropBox was used to transfer large data files and to provide initial drafts of the plan document to the HMPC. The Public Review Draft was also posted on the Modoc County website so that the HMPC members and other governmental and public stakeholders could easily access and review them. The HMPC met four times during the planning period (May 2015-February 2016). The dates and purposes of these meetings are described in Table 3-2. The final meeting was conducted via conference call; the others were face-to-face meetings. Agendas and handouts for each of the meetings and sign-in sheets are included in Appendix A.

Table 3-2 HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date(s)
HMPC #1 Kickoff Meeting	Kick-off meeting: introduction to DMA, the planning process, and hazard identification.	May 14, 2016
HMPC #2 Risk Assessment/Mitigation Strategy Meeting	Risk assessment overview and work session. Development of mitigation goals and objectives.	October 22, 2015
HMPC #3 Assessment/Mitigation Strategy Meeting	Finalization of mitigation goals and objectives. Development and prioritization of mitigation recommendations.	October 23, 2016

Meeting Type	Meeting Topic	Meeting Date(s)
HMPC #4 Final Review/Input to LHMP	Review and public and final team comments	March 23, 2016

Planning Step 2: Involve the Public

Early discussions with the Modoc County Office of Emergency Services established the initial plan for public involvement. Public outreach was initiated at the beginning of the plan development process with an informational press release to inform the public of the purpose of DMA and the hazard mitigation planning process for the Modoc County planning area and to invite the public to an informational meeting held on May 14 2015. At the planning kick-off meeting, the HMPC discussed additional options for public involvement and agreed to an approach using established public information mechanisms and resources within the community. Public involvement activities included press releases, website postings, public meetings, and the collection of public comments on the draft plan. Mediums used to advertise the public meeting are listed below.

- Ad in Local Newspaper: The Modoc County Record
- Public Service Announcements on Local Radio Station: KCNO/KICFJ
- Announcement on Modoc County OES Facebook
- Phone calls
- Emails

A public meeting was held during the draft-plan development process to collect public comments on the plan prior to finalization and submittal to Cal OES/FEMA. Stakeholder and public input was solicited through a number of ways. The original stakeholder involvement included Modoc County and City of Alturas departments, 13 fire districts, 2 hospital districts, 5 tribes, 8 water districts, 3 school districts, local utilities, 9 community organizations, and 13 local departments of state and federal agencies. A complete draft of the plan was provided to the HMPC in January 2016, with a public review draft following in early February 2016. Because of the size of the document, information was presented to this group of over 110 individuals by email and a link to the County of Modoc's, County Sheriff's, and City of Alturas' websites. Local radio station KCNO public service announcements solicited public input during March of 2016 and advertised the websites. A hard copy of the LHMP draft was placed in the following offices: Alturas City Hall, County Clerk of the Board of Supervisors, Library and Planning Departments. In addition to stakeholder notifications, the process was also reviewed through Disaster Council quarterly meetings in July of 2015, and January and April of 2016. The County Fire Chiefs were also included in the final review at their bi-annual meeting in March of 2016.

The public meetings held for this LHMP development process are detailed in Table 3-3. Documentation to support public outreach efforts including the final public meeting can be found in Appendix A and are on file with the Modoc County Office of Emergency Services. In addition to advertisement for public participation, notices of meetings were sent directly to all persons on the HMPC contact list and also to other agency and key stakeholders with an interest in the Modoc County planning area. (see Figure 3-1 for an example of the press releases). The plan is available online at http://www.modocsherriff.us and www.co.modoc.ca.us.

Table 3-3 Public Meetings

Meeting Topic	Meeting Dates	Meeting Locations
Introduction to DMA, mitigation planning and the LHMP development process	May 14, 2015	Modoc County Sheriff's Office, Sheriff's Annex Meeting Room
Draft plan overview and solicitation of public comments	INSERT	INSERT

Figure 3-1 Example of Press Release Used to Involve the Public

Mike Poindexter
SHERIFF-CORONER

Ken Richardson
Undersheriff

SHERIFF'S OFFICE
MODOC COUNTY

P.O. Drawer 460
211 East 1st Street
Alturas, CA 96101
(530) 233- 4416

May, 2015

FOR IMMEDIATE RELEASE

MODOC COUNTY INVITES PARTICIPATION IN HAZARD MITIGATION PLAN

Modoc County is kicking off efforts to develop a Local Hazard Mitigation Plan (LHMP) for the County and participating communities. The purpose of this LHMP is to assess risk to natural hazards such as floods, wildfires, drought and other severe weather events; implement actions to reduce future losses; and establish eligibility for federal mitigation funds in accordance with the Disaster Mitigation Act of 2000.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disasters. Some disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated through hazard mitigation planning.

The Modoc County Office of Emergency Services (OES) will be hosting a meeting to kick off the LHMP development process. Officials from Modoc County; City of Alturas; special districts, state and local agencies; members of the public and other interested stakeholders are invited to participate in this planning effort. A hazard mitigation planning committee will be established as part of the plan development process.

The project kickoff meeting will be held on:

May 14, 2015, at 7:00 p.m., in the Sheriff's Annex
211 East 1st Street, Alturas, CA 96101

The purpose of the kickoff meetings is to inform the planning committee, participating jurisdictions, and other interested stakeholders about the purpose and process of the plan and to describe how to participate and the benefits of doing so.

Modoc County OES is taking the initiative to develop this plan utilizing the expertise of consultants with Foster Morrison Consulting, LLC, a firm that specializes in hazard mitigation and emergency management. Please come to the kickoff meeting to learn more about hazard mitigation and the LHMP process.

For more information on this project and how you can be involved, contact A.J. McQuarrie at 530-233-4416 or ajm@modocsheriff.us.

Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, the HMPC determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their landowner status in the County, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the HMPC:

- Adin and Lookout Fire Protection District
- Alturas City Fire
- Alturas Indian Rancheria
- Alturas Rural FPD
- Army Corps of Engineer
- Ash Creek Wildlife Area
- BLM
- Cal DWR
- CAL FIRE
- Cal Pines CSD-Canby Fire Protection District
- Cal OES
- Cedarville Fire Protection District
- Cedarville Rancheria
- Cedarville Water District
- Central Resource Conservation District
- Davis Creek Fire Protection District
- Eagleville Fire Protection District
- Farm Bureau
- Fish and Wildlife
- Fort Bidwell Fire Protection District
- Fort Bidwell Rancheria
- Goose Lake Resource Cons
- Hot Spring Valley Irrigation
- Lake City Fire Protection District
- Lava Beds-Butte Valley Regional Conservation District
- Likely Fire Protection District
- Lookout Rancheria
- Modoc County Office of Ed
- Modoc Fire Safe Coun.
- Modoc Joint USD
- Modoc Medical Center
- Modoc Nat. Wildlife Refuge
- Newell County Water
- South Fork Irrigation District
- Surprise Valley Electric
- Surprise Valley Hospital
- Surprise Valley USD
- Tulelake Irrigation District

- Tulelake USD
- USDA-FSA
- USDA-Natural Res. Cons
- USDA-Rural Develop.
- USFS
- Willow Ranch Fire Protection District

The HMPC also used technical data, reports, and studies from the following agencies and groups:

- CAL FIRE
- Cal OES
- California Department of Finance.
- California Department of Fish and Game.
- California Department of Forestry and Fire Protection.
- California Department of Parks and Recreation Office of Historic Preservation.
- California Department of Water Resources.
- California Geological Survey
- California Natural Diversity Database.
- California Register of Historic Places.
- Farm Service Agency.
- FEMA
- National Climatic Data Center
- National Institute of Building Science Multi-Hazard Mitigation Council.
- National Inventory of Dams.
- National Levee Database.
- National Oceanic and Atmospheric Administration National Climatic Data Center.
- National Performance of Dams Program.
- National Register Information System.
- National Register of Historic Places.
- National Resource Conservation Service
- National Response Center
- National Weather Service
- The Library of Congress
- U.S. Army Corps of Engineers
- U.S. Bureau of Land Management
- U.S. Center for Disease Protection
- U.S. Department of Agriculture Census of Agriculture
- U.S. Department of Agriculture Secretarial Disaster Declarations.
- U.S. Drought Impact Reporter
- U.S. Drought Monitor
- U.S. Fish and Wildlife Service Sacramento Office
- U.S. Forestry Service
- U.S. Geological Survey.
- US Census Bureau
- US Geological Survey
- Western Regional Climate Center.

Coordination with key agencies, organizations, and advisory groups with an interest in the Modoc County planning area allowed the HMPC to identify and obtain best available data; to review common problems, development policies, and mitigation strategies; as well as to ensure consistency with regional mitigation policies, plans, programs, and regulations. Agency coordination efforts began at the beginning and continued throughout the planning process. Coordination efforts involved contacting these agencies through a variety of mechanisms and informing them on how to participate in the plan update process and if they had any expertise or assistance they could lend to the plan development process or specific mitigation strategies. Coordination with these groups included, holding face-to-face meetings, sending outreach emails, making phone calls, and accessing agency data through websites. All of these groups and agencies were solicited for their input and data and invited to participate as part of the HMPC. Further as part of the HMPC and public outreach processes, all groups were invited to review and comment on the plan prior to submittal to Cal OES and FEMA.

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is paramount to the success of this plan. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Modoc County uses a variety of comprehensive planning mechanisms, such as general plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- City of Alturas General Plan
- Lassen-Modoc-Plumas Unit Strategic Fire Management Plan
- Modoc County Emergency Operations Plan
- Modoc County Fire Safe Council-Community Wildfire Protection Plan
- Modoc County Flood Insurance Study.
- Modoc County General Plan
- Modoc County Housing Element

A key example of coordinating with other planning efforts is the coordination of this LHMP with the Modoc County Fire Safe Council-Community Wildfire Protection Plan and the Lassen-Modoc-Plumas Unit Strategic Fire Management Plan. This is important for several reasons. First, wildfire-prone areas and wildfires don't stop at jurisdictional boundaries. Second, with the large amounts of federally-owned land in the County, coordinating mitigation and response efforts is imperative to protecting resources and reducing losses during a wildfire event. Finally, a successful mitigation strategy requires that these planning efforts be coordinated with all potential mitigation partners.

Another example of coordinating with other planning efforts is the coordination of this LHMP with the Modoc County Emergency Operations Plan (EOP). Initially, as part of this LHMP development, the list of hazards and their descriptions from the EOP were used as a starting point for the identification and profiling of hazards for this plan. Likewise, information developed for this LHMP is also being used to inform and enhance the County EOP. Specifically, the critical facility definition developed to support analysis for this

LHMP was incorporated by amendment into the EOP during this plan development process to ensure consistency among plans and programs.

These and other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, the Risk Assessment. Appendix B References identifies additional documents and community planning efforts utilized in the development of this plan.

3.2.2. Phase 2: Assess Risks

Planning Steps 4 and 5: Identify the Hazards and Assess the Risks

Foster Morrison led the HMPC in an exhaustive research effort to identify and document all the hazards that have, or could, impact the planning area. The HMPC relied on information from the County EOP, the 2013 State of California Hazard Mitigation Plan, and other sources to establish the hazards list for this LHMP. Data collection worksheets were developed and used in this effort to aid in determining hazards and vulnerabilities and where risk varies across the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. The HMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk and vulnerability from hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. Using this information, Foster Morrison developed the risk assessment portion of the plan, which contained the hazard identification, the vulnerability assessment, and the capability assessment. A more detailed description of the risk assessment process and the results are included in Chapter 4 Risk Assessment.

3.2.3. Phase 3: Develop the Mitigation Plan

Planning Steps 6 and 7: Set Goals and Review Possible Activities

Foster Morrison facilitated brainstorming and discussion sessions with the HMPC that described the purpose and the process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 5 Mitigation Strategy. Additional documentation on the process the HMPC used to develop the goals and strategy is in Appendix C: Mitigation Strategy.

Planning Step 8: Draft an Action Plan

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, Foster Morrison produced a complete first draft of the plan. This complete draft was posted for HMPC review and comment on the project Dropbox site. HMPC and agency comments were integrated into the second public review draft, which was advertised and distributed to collect public input and comments. Foster Morrison integrated comments and issues from the public and stakeholders, as appropriate, along with additional agency and other stakeholder internal review comments and produced a final draft for the Cal OES and FEMA Region IX to review and approve, contingent upon final adoption by the governing boards of each participating jurisdiction.

3.2.4. Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the plan, the plan was adopted by the governing boards of each participating jurisdiction using the sample resolution resolutions contained in Appendix D: Adoption Resolution.

Planning Step 10: Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the planning process, all of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 7 Plan Implementation and Maintenance.

Finally, there are numerous organizations within the Modoc County planning area whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the ongoing success of this plan and mitigation in Modoc County and is addressed further in Chapter 7. A plan update and maintenance schedule and a strategy for continued public involvement are also included in Chapter 7.

Chapter 4 Risk Assessment

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

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

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

This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment into a four-step process:

1. Identify hazards
2. Profile hazard events
3. Inventory assets
4. Estimate losses

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1 Hazard Identification**: Natural Hazards identifies the natural hazards that threaten the Planning Area and describes why some hazards have been omitted from further consideration.
- **Section 4.2 Hazard Profiles** discusses the threat to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Section 4.3 Vulnerability Assessment** assesses the County's total exposure to natural hazards, considering assets at risk, critical facilities, and future development trends.
- **Section 4.4 Capability Assessment** inventories existing mitigation activities and policies, regulations, and plans that pertain to mitigation and can affect net vulnerability.

This risk assessment covers the entire geographical extent of the Modoc County Planning Area, including the City of Alturas and special districts. Since this plan is a multi-jurisdictional plan, the Hazard Mitigation Planning Committee (HMPC) is required to evaluate how the hazards and risks vary from each jurisdiction. While these differences are noted in this chapter, they are expanded upon in the City of Alturas's annex. If no additional data is provided in an annex, it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for the entire Modoc County Planning Area.

4.1 Hazard Identification: Natural Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

The Modoc County HMPC conducted a hazard identification study to determine the hazards that threaten the Planning Area.

4.1.1. Methodology and Results

Using existing natural hazards data and input gained through the kickoff planning meeting, the HMPC agreed upon a list of natural hazards that could affect Modoc County. Hazards data from the California Office of Emergency Services (Cal OES), FEMA, the National Oceanic and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the Planning Area. Significance of each identified hazard was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future.

As a starting point, the updated 2013 California State Hazard Mitigation Plan was consulted to evaluate the applicability of State hazards of concern to the Planning Area. Building upon this effort, hazards from the Modoc County EOP were also identified and considered.

The worksheet below was completed by the HMPC to identify, profile, and rate the significance of identified hazards. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment. Table 4-1 in Section 4.2.18 Natural Hazards Summary provides an overview of these significant hazards.

Table 4-1 Modoc County Hazard Identification Worksheet

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance
Agriculture Hazards	Extensive	Highly Likely	Catastrophic	High
Avalanche	Limited	Unlikely	Negligible	Low
Dam Failure	Significant	Occasional	Critical	Medium
Drought and Water Shortage	Extensive	Likely	Catastrophic	High
Earthquake	Extensive	Occasional	Catastrophic	Medium
Erosion	Extensive	Highly Likely	Limited	Medium
Flood: 100/500 year	Significant	Occasional	Limited	Medium
Flood: Localized Stormwater Flooding	Extensive	Highly Likely	Limited	Medium
Landslide, Mudslides, and Debris Flows	Significant	Highly Likely	Critical	Medium
Levee Failure	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Cold, Freeze, Winter Weather	Extensive	Highly Likely	Critical	High
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)	Extensive	Highly Likely	Critical	High
Severe Weather: High Winds/Tornadoes	Extensive	Highly Likely	Limited	High
Volcano	Extensive	Unlikely	Critical	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High
Hazardous Materials Transport	Limited	Occasional	Limited	Medium

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

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

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

4.1.2. Disaster Declaration History

One method to identify hazards based upon past occurrence is to look at what events triggered federal and/or state disaster declarations within the Planning Area. Disaster declarations are granted when the severity and magnitude of the event's impact surpass the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, following the local agency's declaration, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state government's capacity is exceeded, a federal disaster declaration may be issued allowing for the provision of federal disaster assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors. This section focuses on state and federal disaster and emergency declarations.

Modoc County has experienced 9 federal and 15 state declarations since 1950. 6 of the federal declarations were associated with flood events. Of the 3 remaining federal declarations, 2 were related to fire, and 1 to severe storm/flood. 9 of the state declarations were associated with flood events. Of the 6 remaining state disasters, 2 were related to drought, 1 was related to severe storm, 1 was related to wildfire, 1 was related to earthquake, and 1 was related to freeze. A summation of federal and state disaster declarations is shown in Table 4-2.

Table 4-2 Modoc County Disaster Declaration History 1950 to 2014

Hazard Type	Disaster Name	Disaster Number	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Costs
Flood	1962 Floods and Rains	–	10/17/62, 10/25/62, 10/30/62, & 11/4/62	10/24/1962	–	–	$4,000,000
Flood	1964 Storms	DR-183	12/22/64, 12/23/64, 12/28/64, 1/5/65, & 1/14/65	12/29/1964	–	–	$213,149,000
Flood	1969 Storms	DR-253	1/23/69, 1/25,69, 1/28/69, 1/29/69, 2/8/69, 2/10/69, 2/16/69, 3/12/69	1/26/1969	47	61	$300,000,000

Hazard Type	Disaster Name	Disaster Number	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Costs
Flood	1970 Northern California Flooding	DR-283	1/27/1970, 2/3/1970, 2/10/1970, 3/2/1970	2/16/1970	–	–	$27,657,478
Freeze	1972 Freeze	–	4/17/72, 5/22/72, 5/31/72	–	–	–	$111,517,260
Fire	Scarface Fire	FS-2028	–	8/1/1977	–	–	–
Flood	1986 Storms	DR-758	2/18-86 - 3/12/86	2/18/86	13	67	$407,538,904
Fire	1987 Wildland Fires	GP	9/10/87, 9/3/87	–	3	76	$18,000,000
Flood	1992 Late Winter Storms	DR-979	1/7/93 - 2/19/93	1/15/1993	20	10	$226,018,111
Earthquake	1993 Klamath Earthquake	–	10/93	–	–	–	–
Severe Storm/ Flood	Late Winter Storms	DR-1044	–	1/10/95	17	–	$1.1 billion
Flood	January 1997 Floods	–	01/03/97	–	8	–	$1.8 billion
Drought	Modoc/ Siskiyou Drought	GP 2001-03	5/4/2001	–	–	–	$14,858,480
Flood	Rain and Flooding (Modoc)	GP 2005-04	5/1/2004	–	–	–	$295,809
Flood	Modoc Storms	GP 2008-04	–	–	–	–	$909,499
Storms	Modoc Jan 2011 Storms	GP 2011-01	03/03/2011	–	–	–	$385,788
Drought	California Drought	GP 2014-13	1/17/2014	–	–	–	–
Wildfire	Day Fire	FM-5070		8/3/2014	–	–	–

Source: Cal OES, FEMA

Smaller events have been handled by the County. Modoc County keeps a record of OES activations since 1995. Many of these activations were due to natural hazards. These are shown on Table 4-3.

Table 4-3 Modoc County OES Activations, 1995 to 2015

Incident: Date	Hazard Type	Declaration	Expenditures
2014: Drought: Modoc County	Drought	Disaster Proclamation 3/11/14 Governor's Executive Order # B-29-15	
2014 Day Fire, July 31 - August 7, 2014	Wildfire	Modoc County Declaration 8/1/14	FMAG pending: Approximately $22,000
2014 Gulch Fire, July 3-7, 2014 (USFS)	Wildfire	No	In house overtime
Barry Fire, August 6-16, 2012	Wildfire	No	In house overtime
2011: January - March Storms	Landslide	DR#2011-01 Cal EMA 049-00000	$385,788.00
2008 Winter Storms	Floods	Disaster Proclamation 2/8/08 (No CA Gov. Proc.) (CDAA Granted)	$909,499.00
2005 Spring Storms, Began May 5, 2005	Floods	Disaster Proclamation 5/9/05 (No CA Gov. Proc.) (CDAA Granted)	Estimate: $1,248,712
2001 - 2003 Drought Tulelake-Newell Area	Drought	No: Natural Disaster Assistance Act (NDAA) Project #01-11	Estimate: $25,000 locally; Overall Cost $14,858,480
2001 Blue Fire (USFS)	Wildfire	Disaster Proclamation 8/10/01	In house overtime
2000 Freeze, May 30 - June 1, 2000	Freeze	Disaster Proclamation 8/1/2000 (CDAA Requested)	
2000 Hazmat Spill, 4/18/2000	Hazmat	No	In house overtime
1998 Flood, Jess Valley, Spring	Floods	No	
1997 Flood, Surprise Valley,1/10/1997	Floods	No (CDAA Requested)	Estimate: $22,000
1995 Flood,3/14/1995	Floods	Disaster Proclamation 3/14/1995	Estimate: $355,500

Source: Modoc County OES

4.2 Hazard Profiles

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The hazards identified in Section 4.1 Hazard Identification Natural Hazards, are profiled individually in this section. In general, information provided by planning team members is integrated into this section with information from other data sources. These profiles set the stage for Section 0 Vulnerability Assessment, where the vulnerability is quantified, as data allows, for each of the priority hazards.

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the Modoc County Planning Area. Where known, this includes information on the hazard extent, seasonal patterns, speed of onset/duration, and magnitude and/or any secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. The extent or location of the hazard within or near the Modoc County Planning Area is also included here. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.
- **Likelihood of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a experiencing a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
  - ✓ **Highly** Likely—Near 100 percent chance of occurrence in next year or happens every year
  - ✓ **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
  - ✓ **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
  - ✓ **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.
- **Climate Change**—This section contains the effects of climate change (if applicable). The possible ramifications of climate change on the hazard are discussed.

Section 4.2.18 Natural Hazards Summary provides an initial assessment of the profiles and assigns a level of significance or priority to each hazard. Those hazards determined to be of medium or high significance were characterized as priority hazards that required further evaluation in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the Planning Area were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the Planning Area, enabling the County to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Hazard Identification. Given that most disasters that affect the Planning Area are directly or indirectly related to severe weather events, severe weather hazards begins this section, and the individual hazard profiles follow alphabetically.

4.2.1. Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs in the Modoc County Planning Area as localized storms that bring heavy rain, hail, lightning, and strong winds.

The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 190 severe weather events that occurred in Modoc County between January 1, 1950, and December 31, 2014. Table 4-4 summarizes these events.

*Table 4-4 NCDC Weather Events for Modoc County, 1950 to December 31, 2014**

Event Type	Number of Events	Deaths	Injuries	Property Damage	Crop Damage
Avalanche	0	0	0	$0	$0
Blizzard	2	0	0	$0	$0
Cold/Wind Chill	4	0	0	$0	$0
Extreme Cold/Wind Chill	24	0	0	$0	$0
Flash Flood	2	0	0	$0	$0
Flood	4	0	0	$332,500,000	$0
Frost/Freeze	46	0	0	$0	$0
Hail	4	0	0	$0	$60,000
Heavy Snow	42	0	0	$0	$0
High Wind	33	0	0	$30,000	$0
Lightning	1	0	0	$0	$0
Strong Wind	2	0	0	$0	$0
Thunderstorm Wind	3	0	0	$36,000	$0
Wildfire	10	0	0	$1,000,000	$0
Winter Storm	3	0	0	$0	$0
Winter Weather	7	0	0	$0	$0
Total	**190**	**0**	**0**	**$333,566,000**	**$60,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, not just Modoc County

The NCDC table above summarizes severe weather events that occurred in Modoc County. Only a few of the events actually resulted in state and federal disaster declarations.

It is interesting to note that different data sources capture different events during the same time period, and often display different information specific to the same events. While the HMPC recognizes these inconsistencies, they see the value this data provides in depicting the County's big picture hazard environment.

As previously mentioned, most all of Modoc County's state and federal disaster declarations have been a result of severe weather and related flooding. For this plan, severe weather is discussed in the following subsections:

- Extreme Cold, Freeze, and Winter Weather
- Extreme Heat
- Heavy Rains and Storms

- High Wind/Tornadoes

4.2.2. Severe Weather: Extreme Cold, Freeze, and Winter Weather

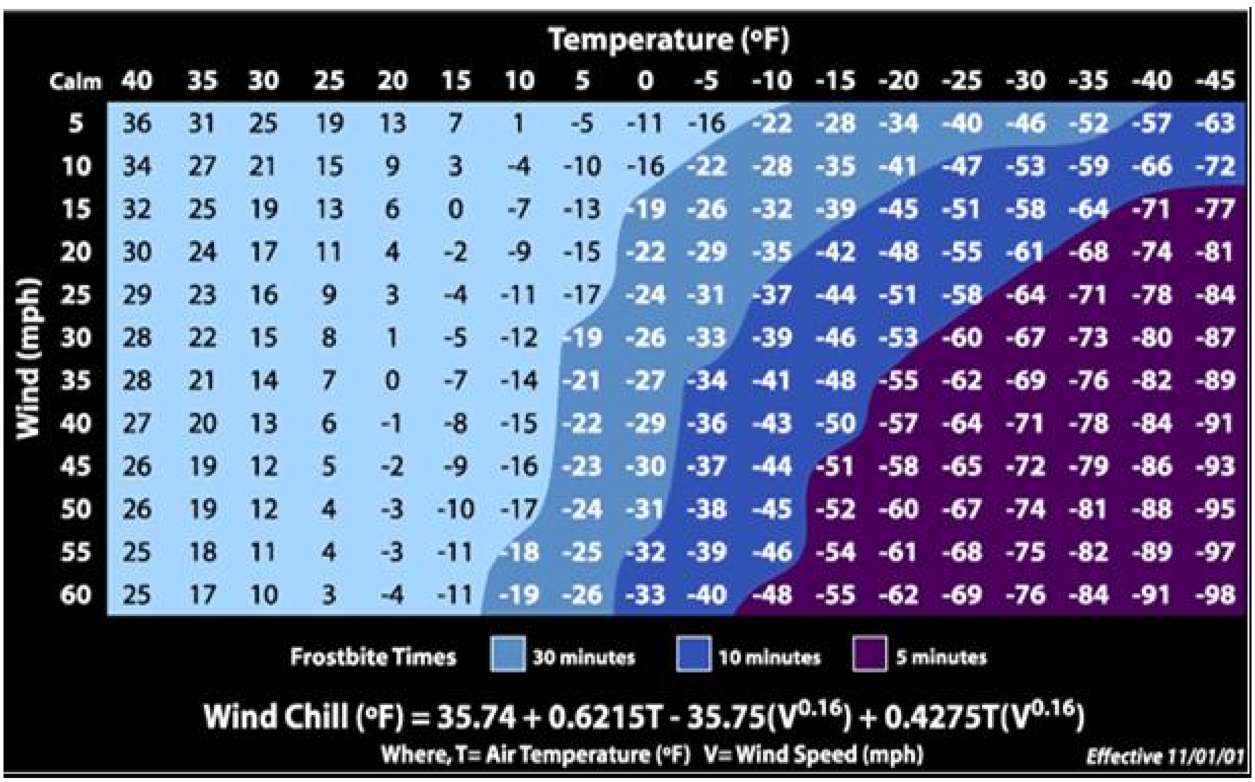
Hazard/Problem Description

Extreme Cold and Freeze

According to the National Weather Service (NWS), extreme cold and freeze often accompanies a winter storm or is left in its wake. It is most likely to occur in the winter months of December, January, and February. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Extreme cold can disrupt or impair communications facilities. Extreme cold can also affect the crops grown in Modoc County.

In 2001, the NWS implemented an updated Wind Chill Temperature index, which is reproduced in Figure 4-1. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 4-1 Wind Chill Temperature Chart



Temperature (°F)

Wind (mph) / Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

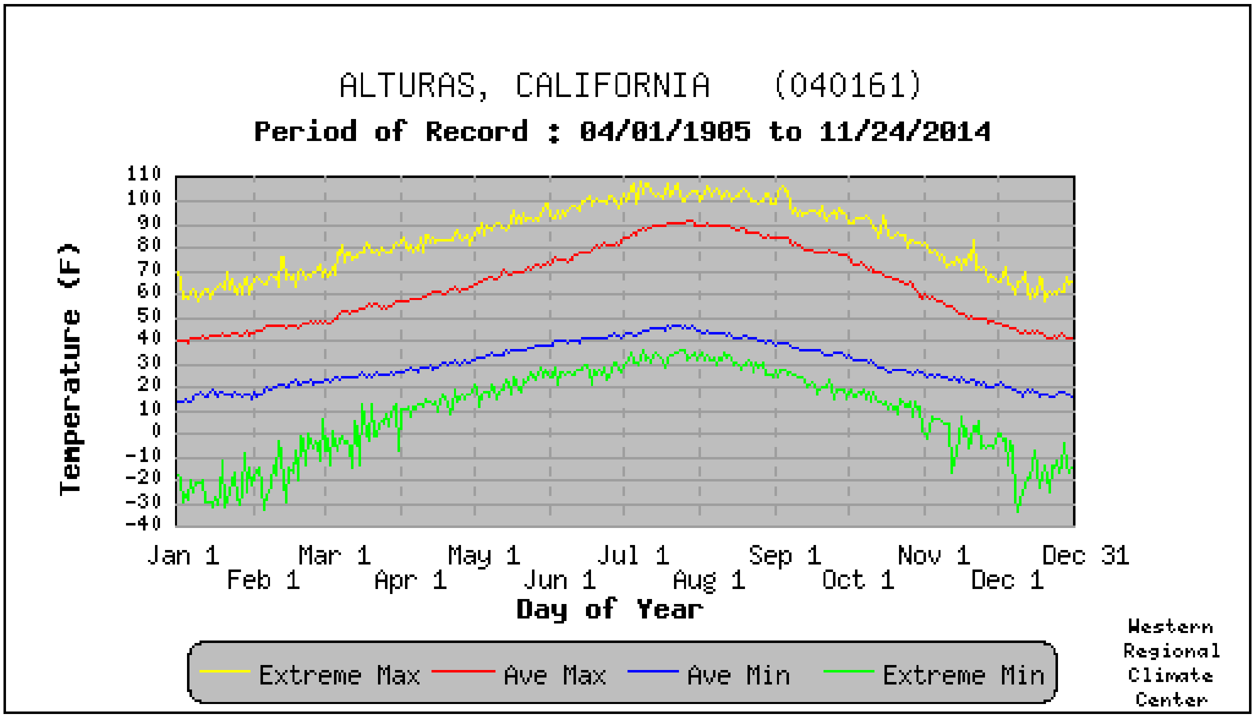
Source: National Weather Service

There are seven COOP weather stations in the County. Information from the Alturas weather station (the oldest and most complete data) is summarized below and in Figure 4-2.

Modoc County – Alturas Ranger Weather Station, Period of Record 1905 to 2014

In Modoc County, the NWS COOP station monthly average low temperatures in the coldest months (November through April) range from the mid-teens to the upper 20s. The lowest recorded daily extreme was -34°F on December 9, 1972. In a typical year, minimum temperatures fall below 32°F on 203.8 days and below 0°F on 7.7 days. Average and low temperatures are shown in Figure 4-2. Details of monthly low temps are shown in Table 4-5.

Figure 4-2 Modoc County Extreme Temperatures 1905 to 2014



Source: Western Regional Climate Center

Table 4-5 Record Low Temperatures – Alturas Ranger Station

Month	Temperature	Date	Month	Temperature	Date
January	-32°	1/20/1907	July	28°	7/2/1956
February	-33°	2/5/1910	August	24°	8/30/1912
March	-29°	3/2/1971	September	15°	9/15/1911
April	7°	4/28/1934	October	1°	10/17/1905
May	15°	5/7/1916	November	-17°	11/14/1916
June	21°	6/28/1934	December	-34°	12/10/1932

Source: Western Regional Climate Center

Winter Storms

According to the NWS in Medford OR, winter snow storms in Northern California can include heavy snow, ice, and blizzard conditions. Heavy snow can immobilize a region, stop the flow of supplies, and disrupt emergency and medical services. Accumulations of snow can collapse roofs and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. The cost of snow removal, damage repair, and business losses can have a tremendous impact on cities and towns.

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days until the damage can be repaired. Power outages can have a significant impact on communities, especially critical facilities such as public utilities. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Strong winds accompanying these intense storms and cold fronts can also knock down trees, utility poles, and power lines. Blowing snow can reduce visibility to only a few feet in areas where there are no trees or buildings. Serious vehicle accidents with injuries and deaths can result.

Extensive utility outages and road closures have been short-lived, giving a certain sense of confidence to residents. Modoc County has a high degree of reliable power; historically within Modoc County, few outages lasting more than one day. Due to the high reliability of the available electric power, the community is unprepared for prolonged outages. Realistically, a severe winter storm could easily isolate numerous residents and take out power and telephones for several days. The California Pines Hill Units are particularly susceptible but no area of the county is immune.

In addition, with propane, kerosene, wood stoves, and electricity as a primary heating sources, residents can find themselves stranded without sufficient reserves to outlast the storm. This is especially true of low income residents, who may not have sufficient resources to fill their propane tanks during winter months. According to the HMPC, severe winter blizzards often result in road closures, which isolate the community. This is one of the greatest hazard related issues in the Planning Area. Not only can unprepared residents run out of fuel, but the community’s propane storage may also run out during a prolonged winter storm event. With limited food stores in the community and the potential isolation of entire areas, food supplies can also run low and become an issue during a significant event.

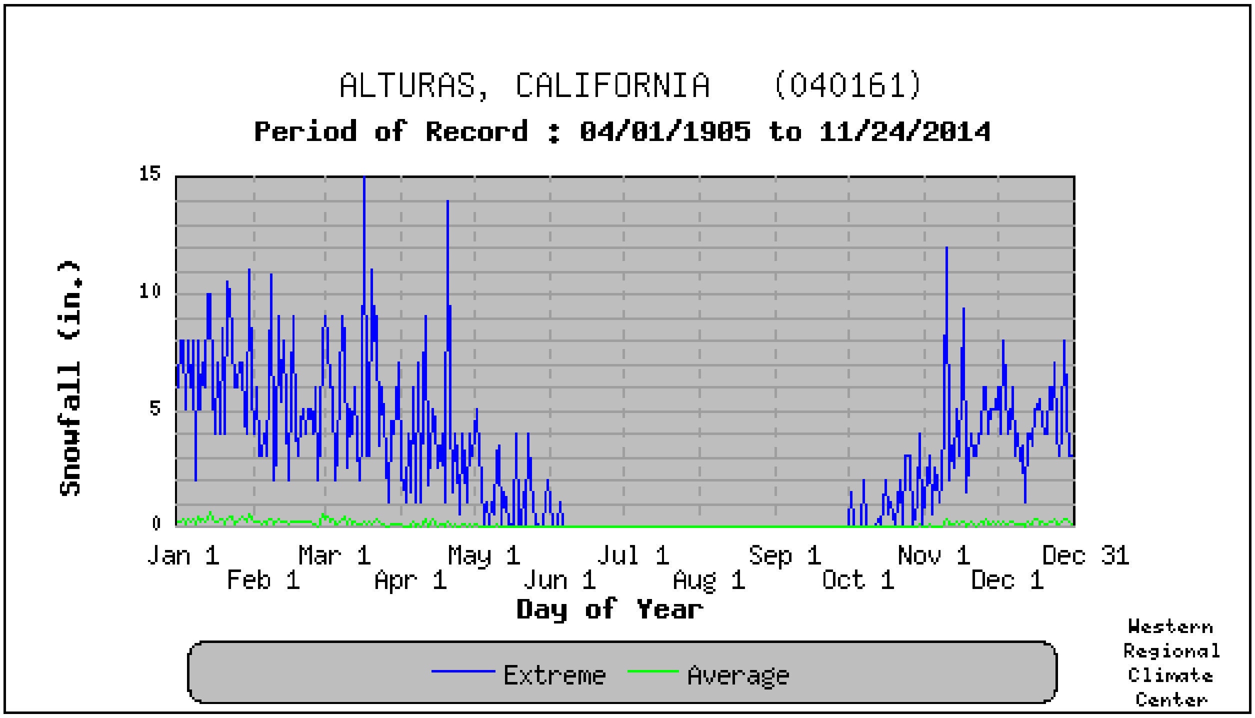
The HMPC noted that power outages can also result in a loss of drinking water to residents of the County. Many residents use domestic wells for drinking water which rely on power to pump water. Extended power outages could leave residents with limited water supplies.

Information on snowfall and snowdepths from the Alturas Ranger Station introduced previously is summarized below.

Modoc County – Alturas Ranger Weather Station, Period of Record 1905 to 2014

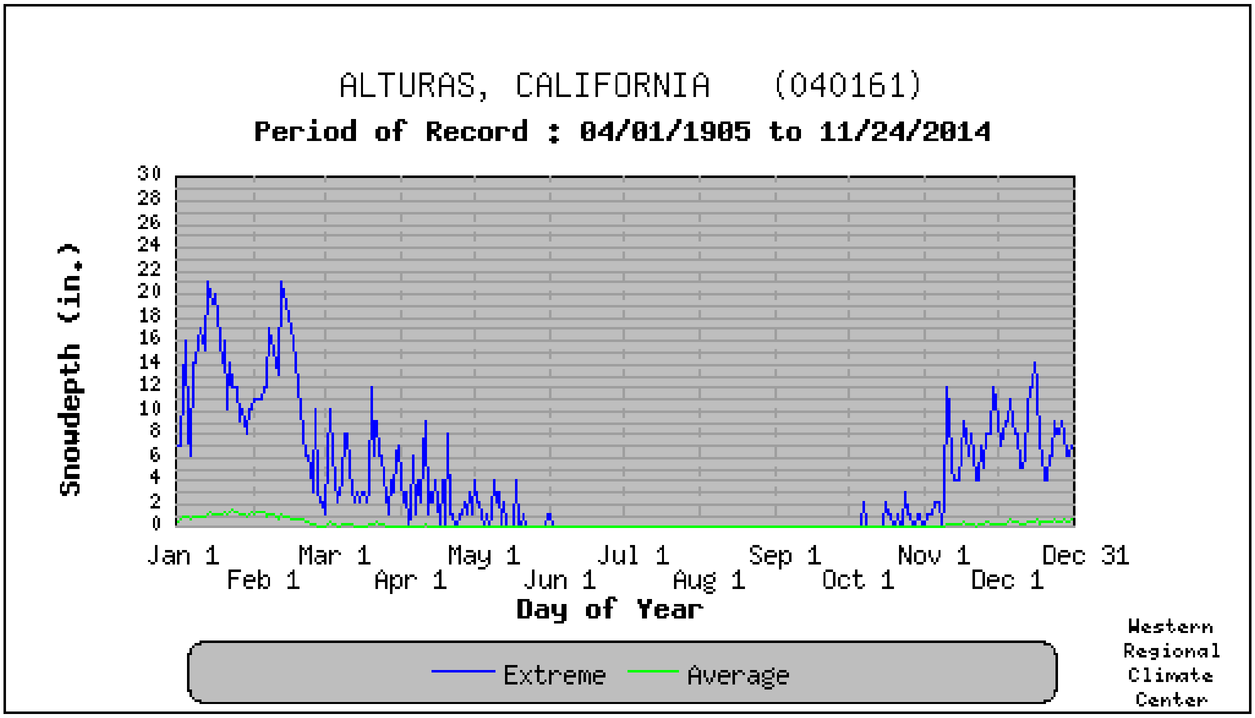
Information from the Western Regional Climate Center shows that between the period from 1905 to 2014, the annual average snowfall in the County was 30.2 inches of snow. The highest annual snowfall on record for the County was 85.5 inches occurring in 1952. Figure 4-3 illustrates the daily snowfall average and extreme for the Alturas Ranger Weather Station. Figure 4-4 illustrates the daily snowdepth average and extreme for the Alturas Ranger Weather Station.

Figure 4-3 Alturas Ranger Station Daily Snowfall and Extreme



Source: Western Regional Climate Center

Figure 4-4 Alturas Ranger Station Daily Snowdepth and Extreme



Source: Western Regional Climate Center

Past Occurrences

The NCDC database shows 131 extreme cold, freeze, and winter storm events. These are shown in Table 4-6.

Table 4-6 Extreme Cold, Freeze, and Winter Storm Events in Modoc County 1993 to 12/31/2014

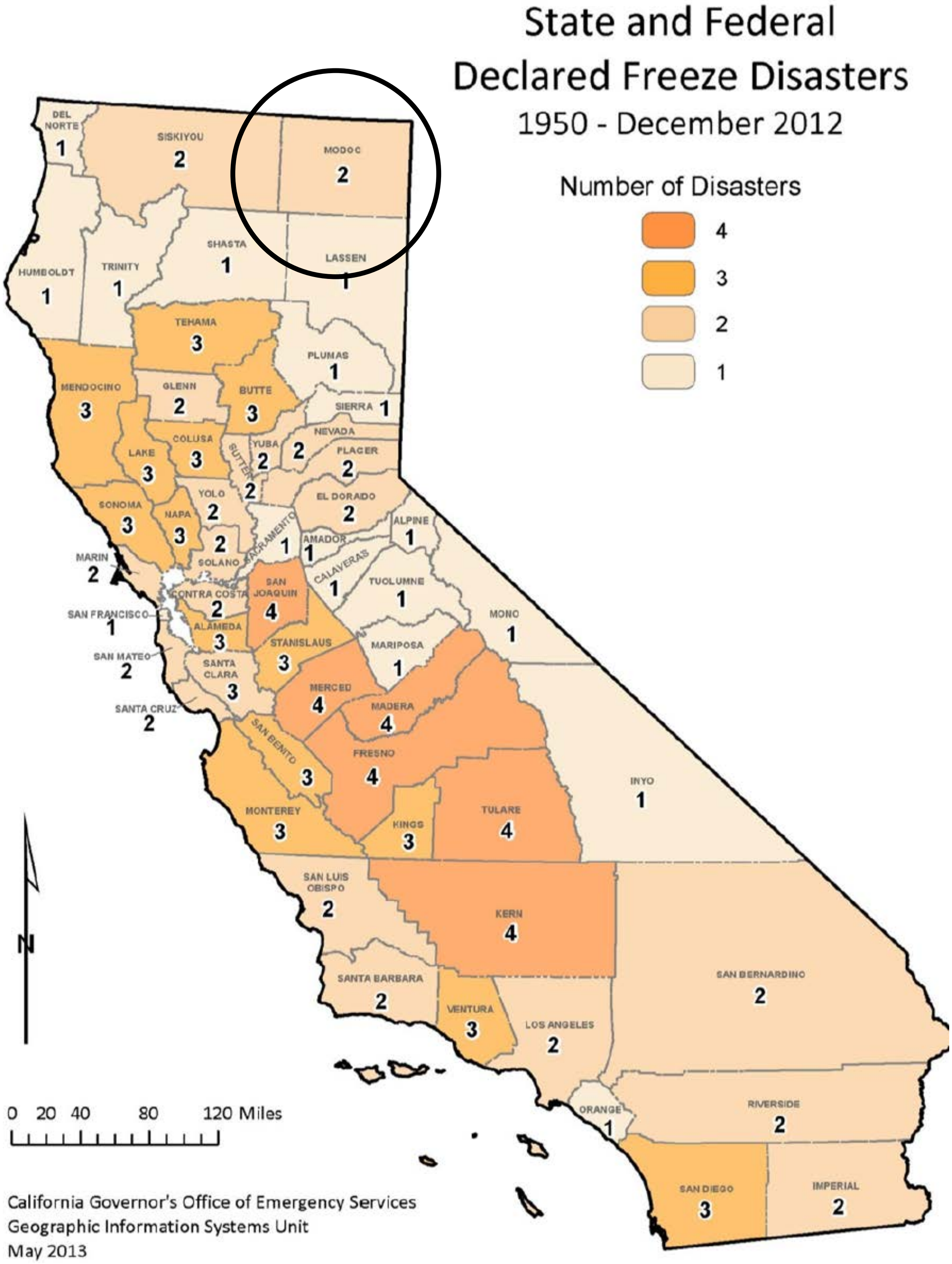
Event	# of Events	Deaths	Injuries	Property Damage	Crop Damage
Blizzard	2	0	0	$0	$0
Cold/Wind Chill	4	0	0	$0	$0
Extreme Cold/Wind Chill	27	0	0	$0	$0
Frost/Freeze	46	0	0	$0	$0
Heavy Snow	42	0	0	$0	$0
Winter Storm	3	0	0	$0	$0
Winter Weather	7	0	0	$0	$0
	131	**0**	**0**	**$0**	**$0**

Source: NCDC

In addition to the NCDC, the HMPC interviewed citizens in the County on recollections of severe low temps, freezes, and winter storms. Citizens recall severe low temperatures and winters in 1938, 1948, 1949, and 1952. In 1938, 20' snowbanks were measured and reported. In 1952, for 21 days the temperature never got above 0°F.

Although freezes are infrequent during growing months, a freeze can severely affect agriculture in Modoc County. Figure 4-5 from the 2013 State of California MHMP shows disaster declarations due to freeze in the County. The greatest concentrations are in the Central Valley of California. The disaster declarations for Modoc County were both issued in 1972 – one state and one federal disaster declaration.

Figure 4-5 State and Federal Declared Freeze Disasters



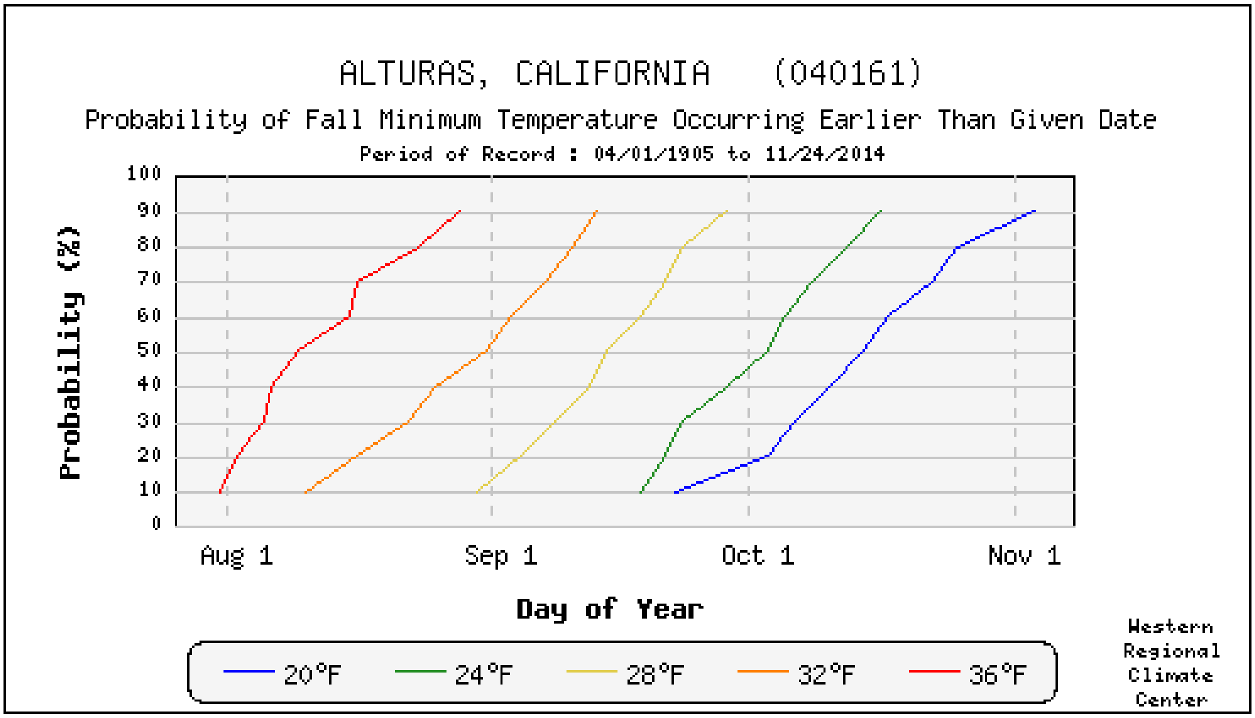
Source: 2013 California Multi-Hazard Mitigation Plan

Likelihood of Future Occurrence

Highly Likely—131 winter storm and freeze events occurred in Modoc County over 22 years (1993-2014) of record keeping which equates to 5.95 events every year, on average, and a 100 percent chance of winter storm or extreme cold occurring in any given year.

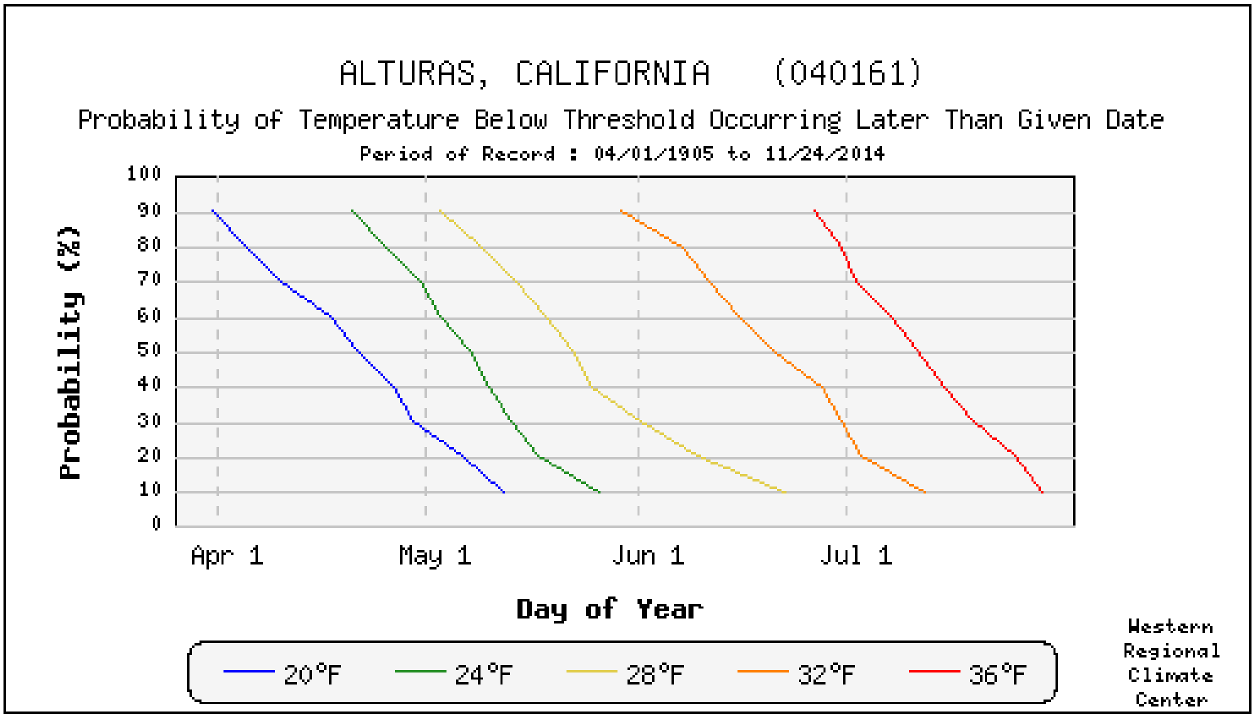
Temperature extremes and severe winter weather is likely to continue to occur annually in the Modoc County Planning Area. Figure 4-6 and Figure 4-7, from the Western Regional Climate Center, indicate the likelihood of freezing temperatures in the County in the fall and the spring.

Figure 4-6 Alturas Ranger Station Fall Freeze Probability



Source: Western Regional Climate Center

Figure 4-7 Alturas Ranger Station Fall Freeze Probability



Source: Western Regional Climate Center

Climate Change and Freeze

According to the California Climate Adaptation Study (CAS), freezing spells are likely to become less frequent in California as climate temperatures increase; if emissions increase, freezing events could occur only once per decade in large portion of the state by the second half of the 21st century. According to a California Natural Resources Report in 2009, it was determined that while fewer freezing spells would decrease cold related health effects; too few freezes could lead to increased incidence of disease as vectors and pathogens do not die off.

4.2.3. Severe Weather: Extreme Heat

Hazard/Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the NWS, among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat. In the heat wave of 1980, more than 1,250 people died.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop. Elderly persons, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails.

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios. While heat waves are obviously less dramatic, they are potentially more deadly. According to the 2010 California State Hazard Mitigation Plan, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths. Severe heat in California often causes rolling blackouts. These blackouts have occurred in the past (namely 2001 and 2002) and can increase the risk of injury or death.

Figure 4-8 and Figure 4-9 show the Heat Index (HI) as a function of heat and relative humidity. The Heat Index describes how hot the heat-humidity combination makes it feel. 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 HI rises, so do health risks.

- When the HI is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity.
- When it is 90°-105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity.
- When it is 105°-129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity.
- When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

Figure 4-8 Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	118	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	126	130					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Streuous Activity

Caution   Extreme Caution   Danger   Extreme Danger

Source: National Weather Service

Note: Since HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Figure 4-9 Possible Heat Disorders by Heat Index Level

Heat Index	Category	Possible heat disorders for people in high risk groups
130°F or higher	Extreme Danger	Heatstroke risk extremely high with continued exposure.
105° - 129°F	Danger	Sunstroke, Heat Cramps and Heat Exhaustion likely, Heatstroke possible with prolonged exposure and/or physical activity.
90° - 105°F	*Extreme Caution*	*Sunstroke, Heat Cramps and Heat Exhaustion possible with prolonged exposure and/or physical activity.*
80° - 90 °F	Caution	Fatigue possible with prolonged exposure and/or physical activity.

Source: National Weather Service

The NWS has in place a system to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for the issuance of excessive heat alerts is when the maximum daytime high is expected to equal or exceed 105°F and a nighttime minimum high of 80°F or above is expected for two or more consecutive days. The NWS office in Eureka can issue the following heat-related advisory as conditions warrant.

- **Excessive Heat Outlook**: are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to Heat Index forecast map for the contiguous United States those who need considerable lead time to prepare for the event, such as public utilities, emergency management and public health officials.
- **Excessive Heat Watch**: is issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A Watch is used when the risk of a heat wave has increased, but its occurrence and timing is still uncertain. A Watch provides enough lead time so those who need to prepare can do so, such as cities that have excessive heat event mitigation plans.
- **Excessive Heat Warning/Advisory**: are issued when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurring. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

There are seven COOP weather stations in the County. Information from the Alturas weather station (the oldest and most complete data) is summarized below and was shown in Figure 4-2 in Section 4.2.2.

Modoc County – Alturas Ranger Weather Station, Period of Record 1905 to 2014

In Modoc County, the Western Regional Climate Center shows that monthly average high temperatures in the warmest months (July through September) range from the mid to upper 80s. The highest recorded daily extreme was 108°F on July 8, 2007. In a typical year, maximum temperatures exceed 90°F on 36.2 days. Average and high temperatures for the County were shown in Figure 4-2 in Section 4.2.2. Details of monthly high temps are shown in Table 4-7.

Table 4-7 Record High Temperatures – Alturas Ranger Station

Month	Temperature	Date	Month	Temperature	Date
January	69°	1/20/1907	July	108°	7/2/1956
February	75°	2/5/1910	August	106°	8/30/1912
March	82°	3/2/1971	September	106°	9/15/1911
April	87°	4/28/1934	October	93°	10/17/1905
May	98°	5/7/1916	November	83°	11/14/1916
June	102°	6/28/1934	December	72°	12/10/1932

Source: Western Regional Climate Center

Past Occurrences

The NCDC database reported no extreme heat events for the County. This is most likely due to underreporting of extreme heat events. Table 4-7 shows that extreme heat events do occur in the County. A preliminary search of an alternate database (SHELDUS) showed one event in 1992 that affected all of California. No deaths, injuries, or damages due to that heat event were shown to have occurred in the County.

These databases may not give a full and accurate depiction of extreme heat in Modoc County. Generally extreme heat events in Modoc County are short lived, thus the effects of extreme heat to area residents can be managed through public education activities and the use of area cooling centers. However, extreme heat can be a significant concern to the agricultural industry in the County.

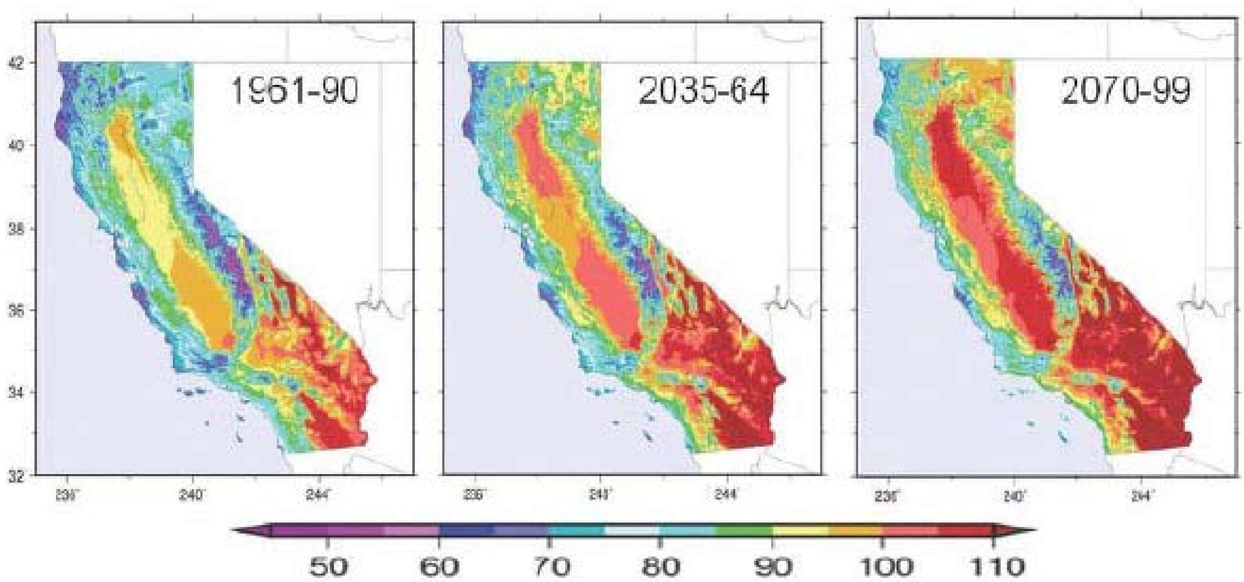
Likelihood of Future Occurrence

Highly Likely—Although only one past event was recorded in national databases, data from the Western Regional Climate Center (shown in Table 4-5) indicates that high temperatures will continue to occur in the Planning Area on an annual basis; thus the likelihood of future occurrence is highly likely.

Climate Change and Extreme Heat

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat. This is shown in Figure 4-10.

Figure 4-10 California Historical and Projected Temperature Increases – 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

As temperatures increase, California and Modoc County residents will face increased risk of death from dehydration, heat stroke, heat exhaustion, heart attack, stroke and respiratory distress caused by extreme heat. According to the CAS report and the 2010 State of California Hazard Mitigation Plan, by 2100, hotter temperatures are expected throughout the state, with projected increases of 3-5.5°F (under a lower emissions scenario) to 8-10.5°F (under a higher emissions scenario).

4.2.4. Severe Weather: Heavy Rains and Storms (thunderstorms, hail, lightning)

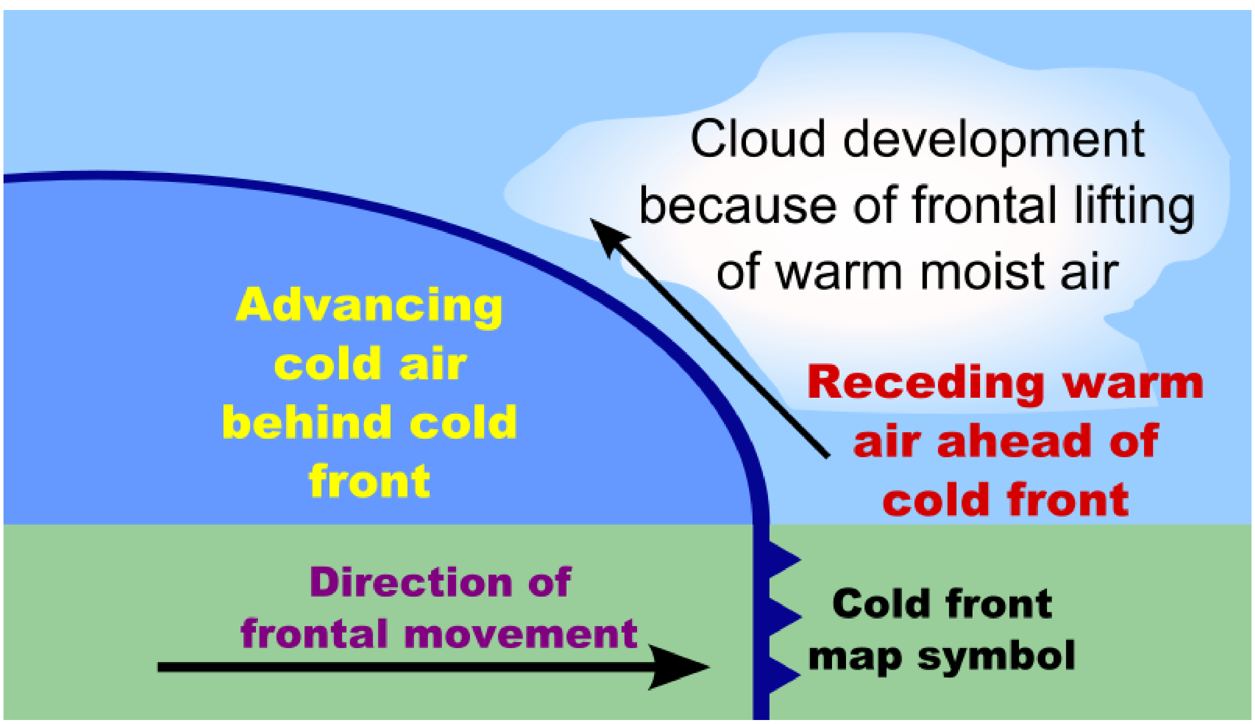
Hazard/Problem Description

According to the NWS Office in Medford, storms in the Modoc County Planning Area are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the Modoc County area falls mainly in the fall, winter, and spring months.

Heavy Rain and Thunderstorms

Thunderstorms result from the rapid upward movement of warm, moist air (see Figure 4-11). They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, its cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

Figure 4-11 Formation of a Thunderstorm



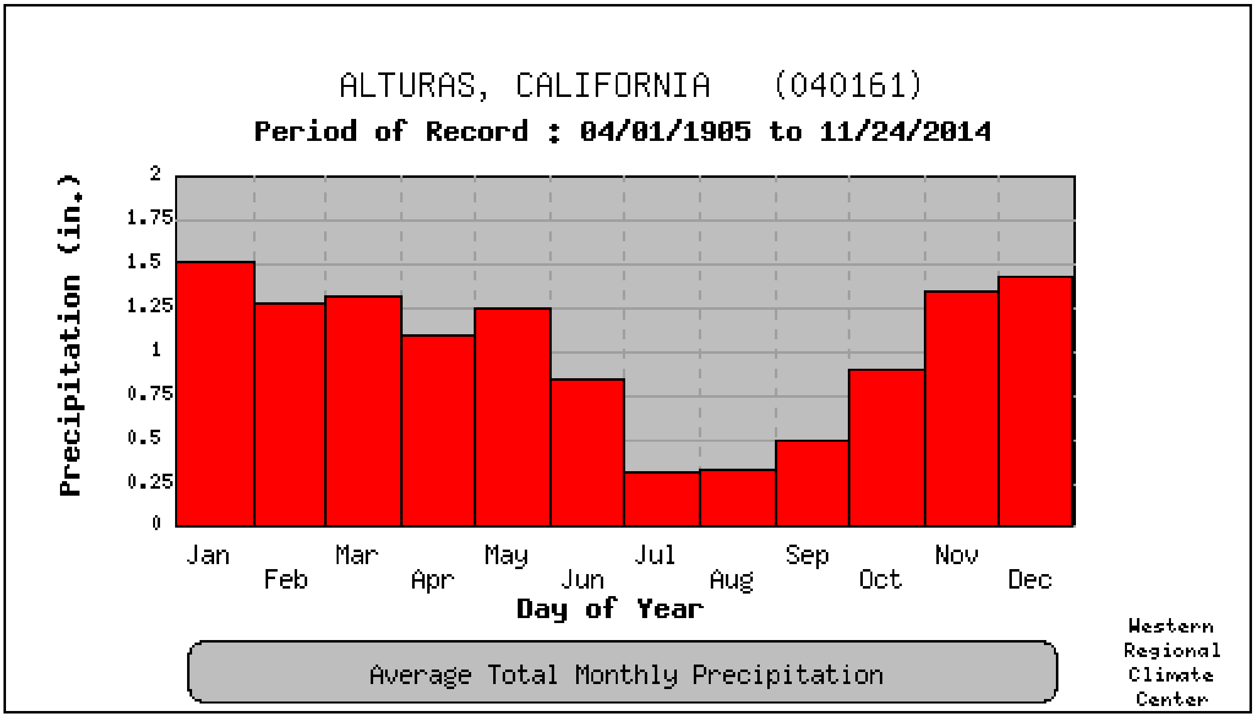
Source: NASA.

Information from the Alturas Ranger Station regarding rainfall and precipitation is summarized below.

Alturas Ranger Station Weather Station, Period of Record 1905 to 2014

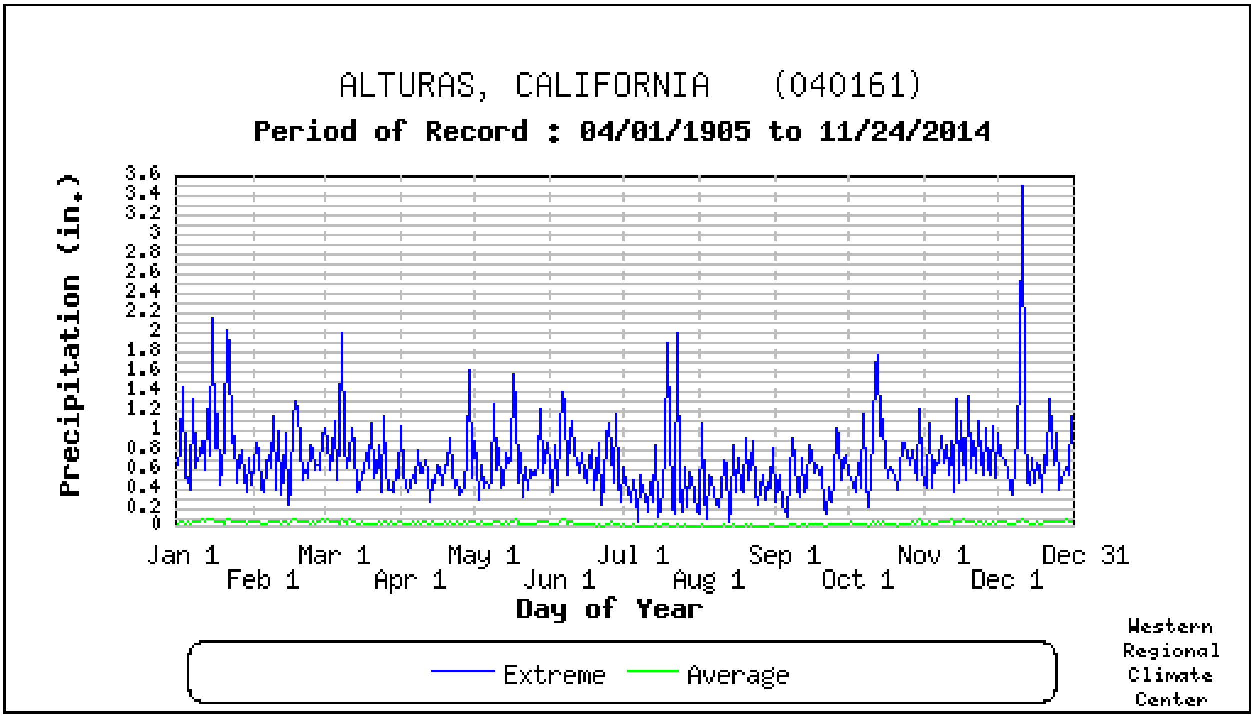
Average annual precipitation at the Alturas Ranger Station is 12.32 inches per year. While this number is on the lower side, it doesn't include the 30.2 inches of average snowfall. The highest recorded annual precipitation is 20.9 inches in 1998; the highest for a 24 hour period is 3.51 inches on December 11, 1937. The lowest recorded annual precipitation was 6.54 inches in 1976. The highest amount of precipitation to fall in one day was on December 11, 1937 when 3.51 inches of rain fell. Average monthly precipitation totals for this station are shown in Figure 4-12. Precipitation extremes for this station are shown in Figure 4-13.

Figure 4-12 Alturas Ranger Station Monthly Average Total Precipitation



Source: Western Regional Climate Center

Figure 4-13 Alturas Ranger Station Daily Precipitation Average and Extremes



Source: Western Regional Climate Center

Hail

According to the NWS, hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hail is sometimes associated with severe storms within the Modoc County Planning Area. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops.

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-8 indicates the hailstone measurements utilized by the National Weather Service.

Table 4-8 Hailstone Measurements

Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball

Average Diameter	Corresponding Household Object
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

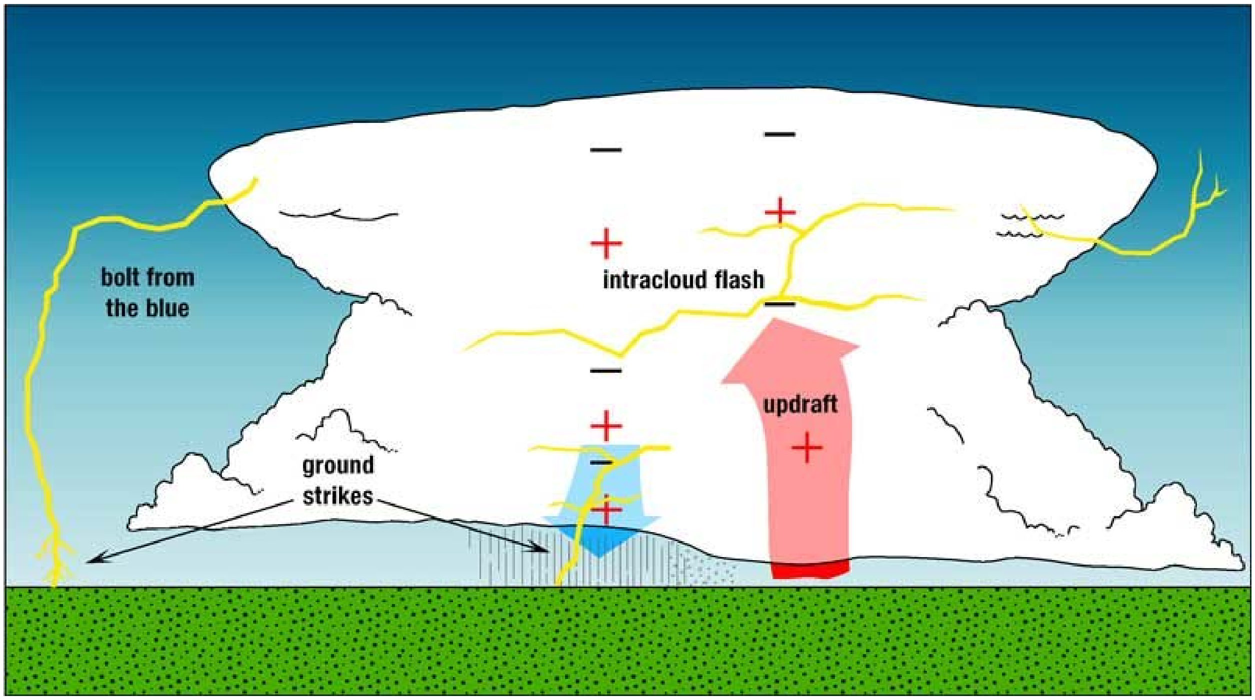
Lightning

Lightning is defined by the NWS as any and all of the various forms of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Or, damage may be indirect, when the current passes through or near an object, which generally results in less damage.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel, similar to a cloud-to-ground flash, can be visible for many miles.

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 4-14). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 4-14 Cloud to Ground Lightning



Source: National Weather Service

Heavy rains and severe storms occur in the Planning Area primarily during the late fall, winter, and spring (i.e., November through April). Damaging winds often accompany winter storm systems moving through the area. Tornadoes may also occur. Wind and tornado are discussed in Section 4.2.5.

According to the HMPC, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees.

Past Occurrences

The NCDC data recorded 5 hail, heavy rain, and lightning incidents for Modoc County since 1993. A summary of these events are shown in Table 4-9

Table 4-9 NCDC Severe Weather Events in Modoc County 1950-12/31/2014

Date	Event	Deaths	Injuries	Property Damage	Crop Damage
7/23/1958	Hail	0	0	$0	$0
6/11/1997	Hail	0	0	$0	$60,000
7/23/2003	Hail	0	0	$0	$0
8/4/2003	Hail	0	0	$0	$0
9/3/2003	Lightning	0	0	$0	$0
Total		**0**	**0**	**$0**	**$60,000**

Source: NCDC

The HMPC noted the following heavy rain events in the County:

- 1962 – 6 inches of rain fell in 3 days;
- 1964 – similar amounts of rains as in 1962;
- 1973 – $300K in FEMA money as a result of heavy rains and flooding. Water running down the streets.
- 1977/78 – Shasta Lake was down 300 feet from 1976 drought, but was filled in 6 weeks due to high rains.

Likelihood of Future Occurrence

Highly Likely — The NCDC database doesn't report all heavy rain, hail, and lightning events. Severe weather, is a well-documented seasonal occurrence that will continue to occur annually in Modoc County.

Climate Change and Heavy Rains and Storms

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

4.2.5. Severe Weather: High Winds and Tornadoes

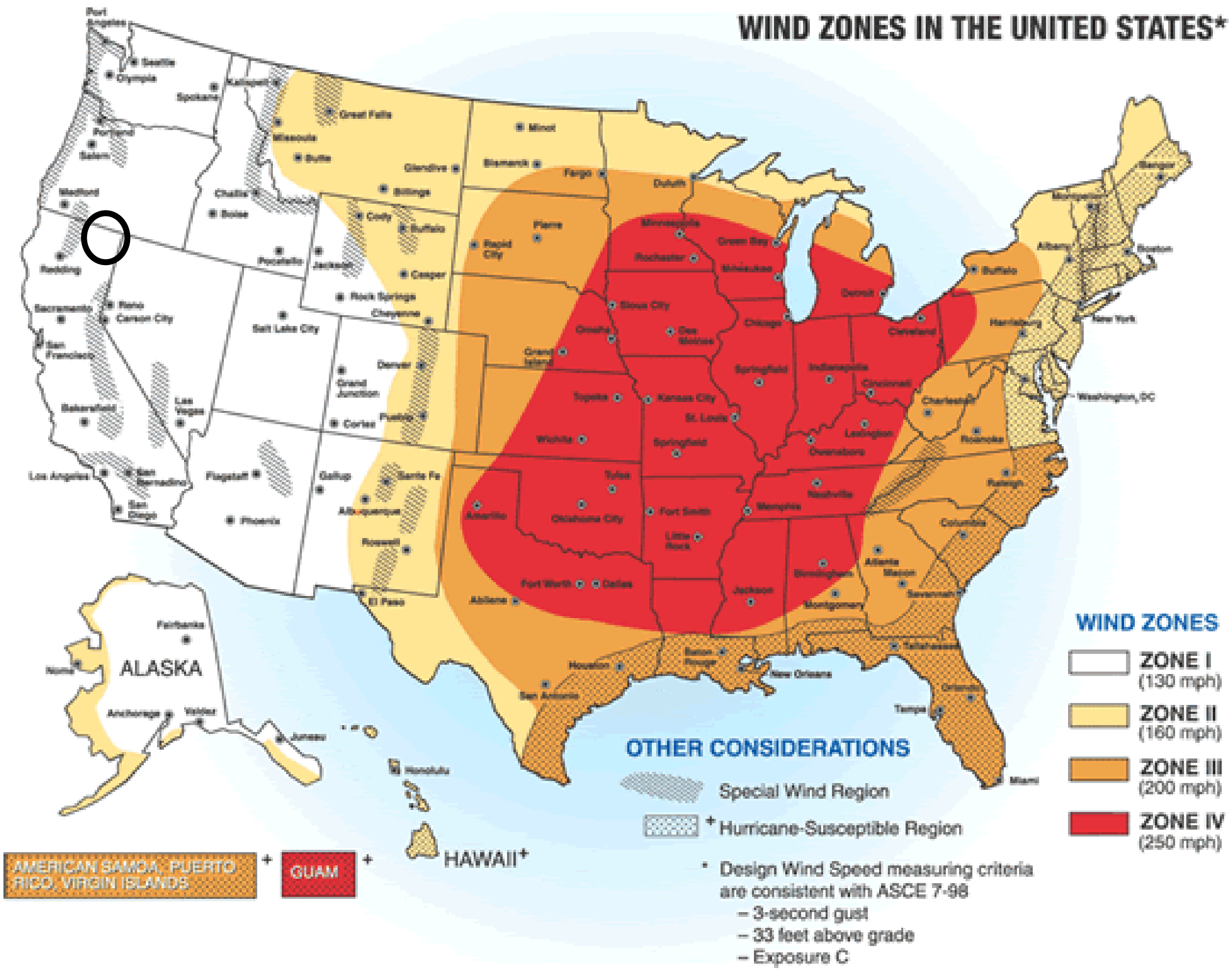
Hazard/Problem Description

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

Modoc County is primarily subject to significant, non-tornadic (straight-line), winds. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. Straight-line winds may also exacerbate existing weather conditions by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snow storms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel around the region, and increasing the ferocity of exiting fires. These winds may damage crops, push automobiles off roads, damage roofs and structures, and cause secondary damage due to flying debris.

Figure 4-15 depicts wind zones for the United States. The map denotes that Modoc County falls into Zone I, which is characterized by high winds of up to 130 mph.

Figure 4-15 Wind Zones in the United States

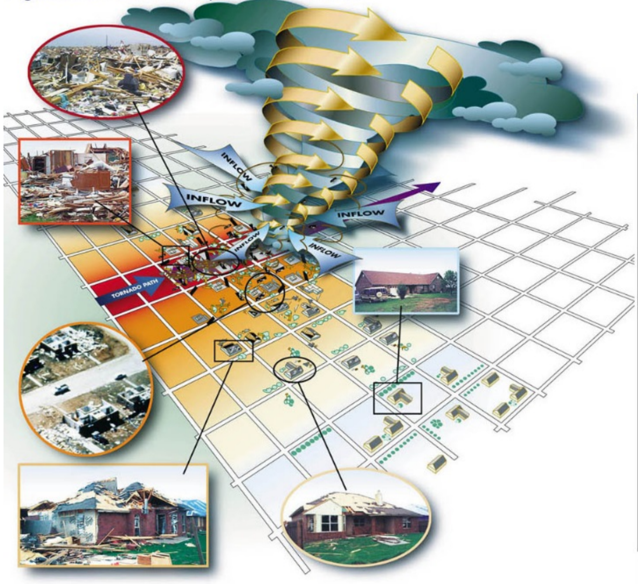


Source: Federal Emergency Management Agency

The highest speed straight line winds in Modoc County come from microbursts. A microburst is a downdraft (sinking air) in a thunderstorm that is less than 2.5 miles in scale. Some microbursts can pose a threat to life and property, but all microbursts pose a significant threat to aviation. Although microbursts are not as widely recognized as tornadoes, they can cause comparable, and in some cases, worse damage than some tornadoes produce. In fact, wind speeds as high as 150 mph are possible in extreme microburst cases.

Tornadoes and funnel clouds can also occur during these types of storms. Tornadoes are another severe weather hazard that can affect the County, primarily during the rainy season in the late fall and early spring. However, past tornadic activity within the County has been limited. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300 mile wide hurricanes. Figure 4-16 illustrates the potential impact and damage from a tornado. Figure 4-16 Potential Impact and Damage from a Tornado.

Figure 2-2 Potential impact of a tornado



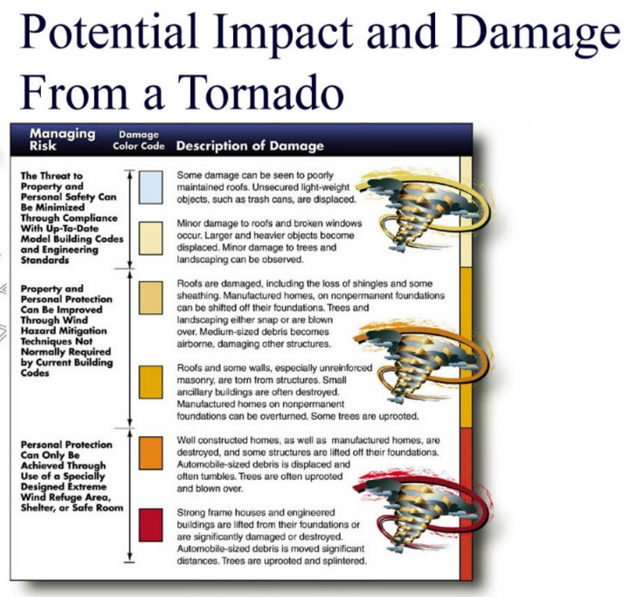


Figure 2-2 Potential damage table for impact of a tornado

Source: FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 4-10 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4-11 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 4-10 Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4-11 Enhanced Fujita Scale

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

High Winds, Microbursts, and Tornados can cause damage to property and even loss of life. While most damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Past Occurrences

The NCDC data recorded 38 high wind incidents for Modoc County since 1993. No tornado incidents were recorded for Modoc County in the NCDC database. A summary of these wind events are shown in Table 4-9 Specific events in the NCDC database showing damages, deaths, or injuries are detailed below the table. HMPC details are captured below the table as well.

Table 4-12 NCDC Wind and Tornado Events in Modoc County 1993-12/31/2014

Event Type	Number of Events	Deaths	Injuries	Property Damage	Crop Damage
High Wind	33	0	0	$30,000	$0
Strong Wind	2	0	0	$0	$0
Thunderstorm Wind	3	0	0	$36,000	$0
Total	**38**	**0**	**0**	**$66,000**	**$0**

Source: NCDC

- **July 13, 1999** – The Klamath Falls Herald and News reported that strong winds struck Alturas. The winds, probably caused by a microburst associated with a thunderstorm, damaged the roofs of the Alturas Middle School and the Alturas Municipal swimming pool. Numerous downed trees and power lines were also reported. Additionally, a trained spotter reported damage that he observed when visiting Alturas. He reported that roof damage to a shed at the airport. The debris from the roof damaged a cyclone fence, and he estimated that the damaging winds were from the northwest at greater than 60 mph. This same gust broke three 4"x4" posts that were supporting a balcony at a residence 5 miles northwest of the airport. No deaths or injuries were reported. Damages were estimated at $16,000.
- **November 16, 2003** – High winds occurred in Modoc County. Roof and fence damage occurred, and tree limbs were downed across Surprise Valley. There was a report of roof damage on an airport hangar.

Sheds were blown over and power outages were reported. No deaths or injuries were reported. Damages were estimated at $10,000.

- **February 7, 2008** – A cold front that moved through the northern Sierra brought strong damaging winds to the area. A person living one mile southeast of Eagleville reported very strong winds the morning of February 7th. This person's home weather station recorded wind gusts of 65 to over 90 mph. The strongest gust was reported to be 105 mph. Localized damage occurred in the area. A barbeque grill was picked up by the wind and thrown through a glass sunroom. A 500-gallon diesel fuel tank was blown off of its pedestal. Shingles were peeled from roofs and branches were broken off trees. No deaths or injuries were reported. Damages were estimated at $3,000
- **February 14, 2011** – Winds gusted between 60 and 66 mph in Surprise Valley the morning of the 14th and then between 65 to 71 mph on the 15th. A few barns and outbuildings were damaged due to winds and power was out from the evening of the 15th to the morning of the 16th. Finally, UPS deliveries were interrupted on the 15th due to the danger of delivery trucks being blown over. No deaths or injuries were reported. Damages were estimated at $15,000.
- **July 6, 2011** – The Modoc County Record reported that strong winds came down from Cedar Pass and snapped a 30-inch and a 16-inch diameter tree near Cedarville. A building on one ranch had a 20 foot by 34 foot piece of roof blown off. Large farm equipment (swather) was pushed and numerous 110 pound bales of hay were rolled or knocked over in the winds. The highest measured gust was 55 mph at Surprise Valley. No deaths or injuries were reported. Damages were estimated at $20,000

Likelihood of Future Occurrence

Highly Likely – Based on NCDC data and HMPC input, 38 wind incidents over a 22-year period (1993-2014) equates to a severe storm event every year and a 100 percent chance of a severe storm in any given year. This database doesn't report all and wind and tornado events. Severe weather, is a well-documented seasonal occurrence that will continue to occur annually in the County.

Climate Change and Winds/Tornadoes

According to the CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual thunderstorm events is likely to increase during the 21st century. This may bring stronger thunderstorm winds. The amount of tornadoes is not projected to change.

4.2.6. Agricultural Hazards

Hazard/Problem Description

According to the HMPC, Modoc County Agricultural Commissioner's Office, and USDA agricultural production in Modoc County is the most significant contributor to the local economy. The USDA estimated agricultural products value at $107 million in 2012. In addition to the $107 million in annual production value, there are hundreds of jobs directly tied to that production and thousands more that are impacted indirectly in the production, processing, transportation, and marketing of those commodities. It is estimated that there is approximately a four to one ratio for crops grown in this region, so $107 million in production value is actually a $408 million impact on the local economy.

According to data from the HMPC and the Agriculture Commissioner, Modoc County ranks 37th out of 50 California counties in terms of the gross value of agriculture production. In 2011, statewide, it ranked 4th in potato and cattle production; 5th in grain/hay. The leading commercial crops are hay, cattle (cow/calf production), potatoes, and other grain and hay crops. 2012 was the third year in a row for record high cash receipts from cattle operations. The county might be sparse in population, but not in agricultural product. Impacts to the agriculture industry in Modoc County will also have a significant impact to the State of California. The HMPC also noted that if anything impacts this industry, there is a significant secondary impact to the entire community. This is essentially the County's only industry so there is no other industry to fall back on.

According to the US Department of Agriculture (USDA), every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include: contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature.

In addition to natural disasters, Modoc County is at risk from many insects and plants that, under the right circumstances, can cause severe economic, environmental, or physical harm. Invasive pest species affecting crop production can result in economic disasters in a very short period of time. These hazards can have a major economic impact on farmers, farm workers, packers, and shippers of agricultural products.

They can also cause significant increases in food prices to the consumer due to increases in production cost and shortages. Under some conditions, pest species that have been present, and relatively harmless, can become invasive hazards. For example, severe drought conditions can weaken tree and vine crops and make them more susceptible to insect attack and disposing them to secondary microbial attack.

This hazard addresses the issues related to natural hazards, as well as pests and plants that pose a concern to the County. The Ag Commissioner and the HMPC both noted that Modoc County is also at risk to noxious weeds that can affect both waterways and agricultural crops. These hazards can have major impact on farmers, farm workers, packers, and shippers of products, as well as those who use waterways for recreation or for water supply.

Past Occurrences

The USDA tracks Secretarial Disaster Designations. Recent declarations affecting Modoc County from their database include:

- S3268 (drought) – Issued 7/12/2012; covering periods 2/21/2012 to 5/14/2012
- S3283 (drought) – Issued 7/12/2012; covering periods from 2/7/2012 and continuing
- S3285 (drought) – Issued 7/12/2012; covering periods from 4/1/2012 to 6/11/2012
- S3462 (drought – fast track) – Issued 1/9/2013; covering periods 9/1/2012 and continuing
- S3491(drought – fast track) – Issued 2/27/2013; covering periods 1/1/2013 to 2/25/2013
- S3565 (drought – fast track) – Issued 8/14/2013; covering periods from 6/18/2013 to 8/12/2013
- S3567 (drought – fast track) – Issued 8/14/2013; covering periods from 6/18/2013 to 8/12/2013
- S3631 (drought – fast track) – Issued 4/30/2014; covering periods 9/1/2013 and continuing

- S3637 (drought – fast track) – Issued 1/23/2014; covering periods 1/14/2014 and continuing
- S3684 (drought – fast track) – Issued 1/23/2014; covering periods 3/1/2014 and continuing
- S3743 (drought – fast track) – Issued 9/17/2014; covering periods 1/1/2014 and continuing
- S3784 (drought – fast track) – Issued 2/4/2015; covering periods 1/14/2015 and continuing
- S3789 (drought – fast track) – Issued 2/4/2015; covering periods 9/1/2014 and continuing
- S3813 (drought – fast track) – Issued 4/8/2015; covering periods 4/1/2015 and continuing

In addition, the HMPC noted a frost in 1937 that caused crop damages in the Tulelake Basin.

Likelihood of Future Occurrence

Highly Likely – The HMPC noted that the County has been under drought declarations for most of the last 10 years. Currently the County is at 50% of normal moisture, which has strained agricultural production in the County.

Climate Change and Agricultural Hazards

According to the CAS, climate change may cause increased heat, and the droughts that can accompany it can affect the crops, timber industry, and livestock that reside in the County. This could have economic impacts to the County's $107 million agricultural industry.

4.2.7. Avalanche

Hazard/Problem Description

According to the Sierra Avalanche Center, avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common. The vast majority of avalanches occur during or shortly after storms. This hazard generally affects a small number of people, such as snowboarders, skiers, and hikers, who venture into backcountry areas during or after winter storms. Roads and highway closures, damaged structures, and destruction of forests are also a direct result of avalanches. The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement creates avalanches. Areas prone to avalanche hazards include hard to access areas deep in the backcountry. Avalanche hazards exist in eastern Modoc County where combinations of the above criteria occur. Primary area of concern is Cedar Pass area where an avalanche could impact a state route. The HMPC noted that there are possible impact on Adin Pass area from avalanche, but it is unlikely.

Past Occurrences

The NCDC database shows no past occurrences of avalanche in the County. This is not to say that avalanche has not occurred. It may have occurred and not been recorded in the database, or it may have occurred in an area of the County that is not populated.

Likelihood of Future Occurrence

Unlikely – Injuries and loss of life from an avalanche are usually due to people recreating in remote areas at the wrong time. Given the population, topography, and amount of snow falling in populated areas, avalanches and resulting damages, including injuries and loss of life, are unlikely to occur. Impacts to roads and transportation in the County may occur.

Climate Change and Avalanche

According to the CAS, climate change may exacerbate the avalanche hazard in the County. Avalanches stemming from a weather pattern of heavy snowfalls followed by thawing may increase – a dangerous combination that can be expected with climate change.

4.2.8. Dam Failure

Hazard/Problem Description

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

Dam failures can also result from any one or a combination of the following causes:

- Earthquake;
- Inadequate spillway capacity resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity;
- Improper design;
- Improper maintenance;
- Negligent operation; and/or
- Failure of upstream dams on the same waterway.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill; earth and rockfill; and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail suddenly; the flood wave builds up rapidly to a peak then gradually declines. An earthfill or rockfill dam gradually fails due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. A concrete gravity dam can fail suddenly or gradually with a corresponding buildup and decline of the flood wave.

Dams and reservoirs have been built throughout California to supply water for agriculture and domestic use, to allow for flood control, as a source of hydroelectric power, and to serve as recreational facilities. The storage capacities of these reservoirs range from a less than a hundred acre feet to 4.5 million acre-feet. The water from these reservoirs eventually makes its way to the Pacific Ocean by way of several river systems.

The California Department of Water Resources (Cal DWR) Division of Safety of Dams assigns hazard ratings to large dams within the State. They follow the guidelines set forth by FEMA for dam hazard potential. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in three categories that identify the potential hazard to life and property:

- High hazard indicates that a failure would most probably result in the loss of life
- Significant hazard indicates that a failure could result in appreciable property damage
- Low hazard indicates that failure would result in only minimal property damage and loss of life is unlikely

According to data provided by Modoc County and Cal OES, there are 83 dams in Modoc County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 84 dams, 6 are rated as High Hazard, 11 as Significant Hazard, and 30 as Low Hazard. 37 dams in the County are not rated by the Division of Safety of Dams.

There are several dams, which, if they fail, may impact the people and resources of Modoc County. Failure of any one of these dams would flood downstream areas and could cause loss of life and property. Both unincorporated and incorporated areas of the County are identified on dam failure inundation maps prepared for the County. The inundation areas for each of the dams are generally downstream and include large rural and urban areas on the valley floor below the dams. This is discussed in more detail in Section 4.3.4.

Table 4-13 identifies the 83 dams located in the Modoc County Planning Area. Figure 4-17 illustrates the locations of identified dams.

Table 4-13 Modoc County Dam Inventory

Name	Federal Hazard Classification	River	Nearest City to Dam and Distance	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
A and C	L	South Fork of Willow Creek	–	13	800
Baseball	–	–	–	–	–
Bayley Res	L	Crooks Canyon	Bayley 5 miles	20	2,390
Beeler	–	–	–	–	–
Big Dobe North	L	Rattlesnake Creek	Big Sage Reservoir 3 miles	9	6,530
Big Dobe South	L	Tributary of Rattlesnake Creek	Big Sage Reservoir 3 miles	11	3,860
Big Johnson	L	Tributary of Lost River	Clear Lake 2 miles	18	410
Big Sage	H	Rattlesnake Creek	Canby 24 miles	49	77,000
Blue Lake	–	–	–	–	–
Boggs And Warren	L	East Sand Creek	–	12	1,058
Boles Meadow	–	–	–	–	–
Buchanan	–	–	–	–	–
Burger	L	Tributary of Upper Lake	Fort Bidwell 2 miles	47	161
Carpenter Wilson	L	Cooley Gulch	Canby 2 miles	21	93
Clarke	L	Tributary of North Fork of Pit River	Davis Creek 3 miles	17	70
Clear Lake	–	–	–	–	–
Cloverswale	L	Tributary of Witcher Creek	Canby 6 miles	21	4,620
Crowder Mountain	–	–	–	–	–
Cummings Res No 1	S	–	–	11	400
Cummings Res No 2	–	–	–	–	–
Danhauser	H	Tributary of South Fork of Pit River	Alturas 4 miles	17	1,258
Davis Creek Orchard	L	Roberts Creek	Davis Creek 2 miles	17	1,841
Deadhorse	–	–	–	–	–
Deadhorse Flat	–	–	–	–	–

Name	Federal Hazard Classification	River	Nearest City to Dam and Distance	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Donovan	S	Rye Grass Swale	Canby 10 miles	28	1,234
Dorris	–	Stockdill Slough	–	26	20,690
Duncan	S	–	–	19	2,575
Emigrant Springs	–	–	–	–	–
Enquist	L	Tributary of Oliver's Canyon	Davis Creek 17 miles	12	185
Everly	–	–	–	–	–
Fairchild	–	–	–	–	–
Four Mile Val 4	–	–	–	–	–
Graven	L	Tributary of Canyon Creek	Alturas 20 miles	15	1,100
Green Springs	–	–	–	–	–
Green Tank	–	–	–	–	–
Hackamore Res	–	–	–	–	–
Halls Meadows	L	Couch Creek	Surprise 7 miles	13	580
Hines Brothers	L	Tributary of Pit River	Lookout 5 miles	14	200
Householder	–	–	–	–	–
Huffman Antelope	L	Clover Swale	Canby 20 miles	15	1,550
Ingals Swamp	L	Ingals Swamp	Big Sage Reservoir 5 miles	23	2,850
Jack's Swamp Dam #2	S	West Fork of Rock Creek	Canby 25 miles	11	1,013
Jacks Butte	–	–	–	–	–
James Porter	H	Tributary of Parker Creek	–	21	106
Janes Flat	–	–	–	–	–
Junkers Reservoir	L	Tributary of Pit River	Alturas 6 miles	11	71
Kramer	S	Widow Valley Creek	Pittville 30 miles	31	118
Lauer	–	–	–	–	–
Leonard Johnson	L	Dry Creek	Davis Creek 6 miles	18	120
Leonard #2	–	Dry Creek	–	26	187
Lindauer Concrete	–	–	–	–	–

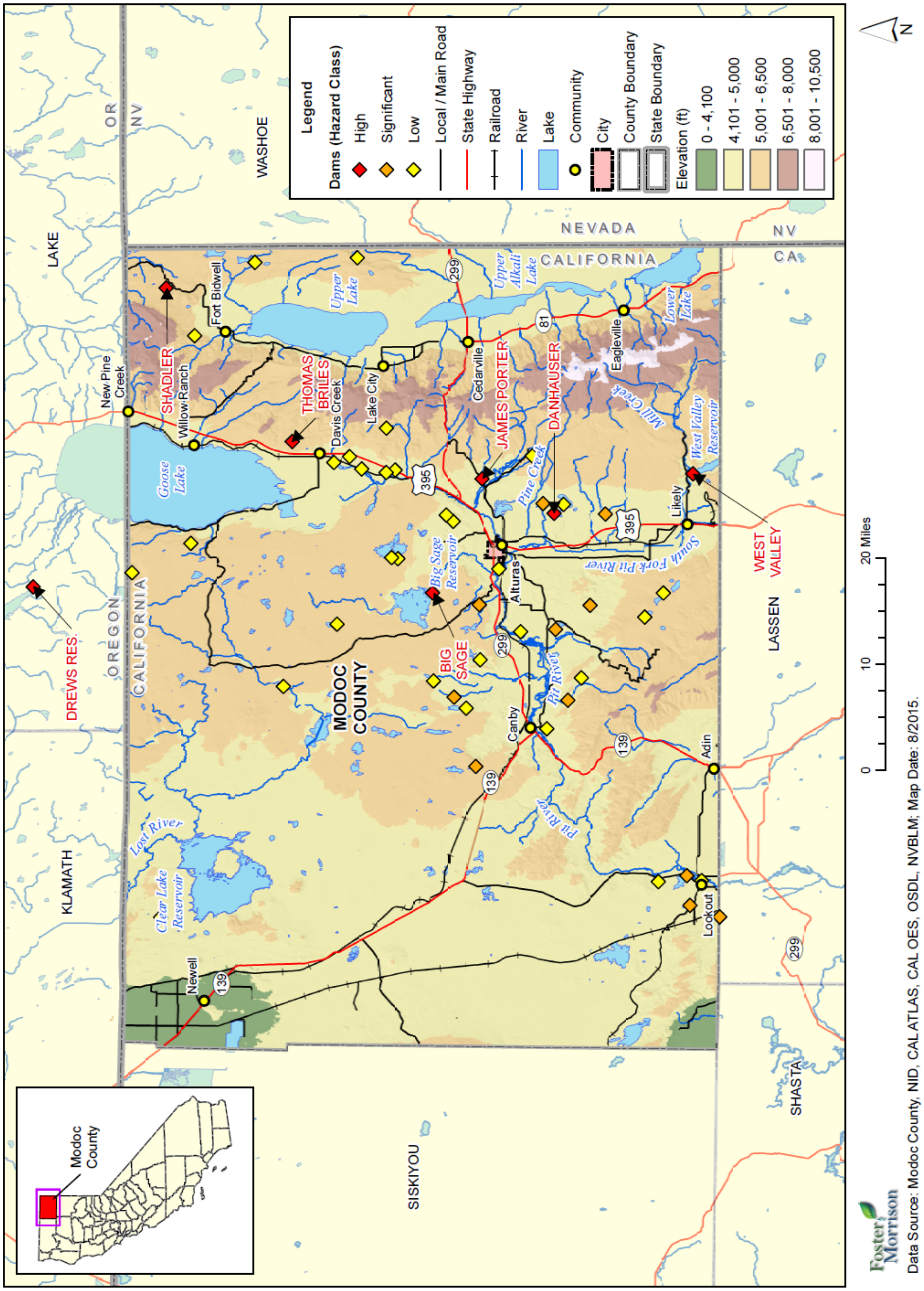
Name	Federal Hazard Classification	River	Nearest City to Dam and Distance	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Little Juniper	S	Juniper Creek	Mcarthur 5 miles	22	1,370
Lookout	L	Pit River	Lookout 1 mile	11	430
Mason-Capik	L	–	–	–	–
Mcbrien	L	Pit River	Canby 12 miles	12	1,367
Mcginty	–	Mud Creek	–	–	–
Mill Pond	–	–	–	–	–
Mud Lake	L			10	300
Nine Mile Reservoir	–	–	–	–	–
Payne	L	Tributary of North Fork of Pit River	Alturas 5 miles	12	2,850
Plum Canyon	L	Plum Creek	Alturas 10 miles	26	354
Poison Springs	L	Rock Creek	Fort Bidwell 6 miles	43	7,120
Porter Dam #1	–	–	–	–	–
Renner Sibley Cr	L	Sibley Creek	Renner Lake, Or 2 miles	28	65
Reservoir C	–	–	–	–	–
Reservoir M	–	–	–	–	–
Reservoir N	–	–	–	–	–
Roberts	S	Tributary of Pit River	Lookout 1 mile	17	5,500
Rye Grass Swale	S	Tributary of Canyon Creek	Canby 20 miles	20	530
S-X	L	Tributary of Pit River	Canby 15 miles	45	4,225
Schadler	H	Eight Mile Creek	–	39	205
Shedd	L	Tributary of Pit River	Surprise 4 miles	22	100
South Mountain	–	–	–	–	–
Spaulding 3	–	–	–	–	–
Sworinger	–	–	–	35	4,050
Surveyors Valley	–	–	–	–	–
Taylor Cr No 1	S	Taylor Creek	Bieber 12 miles	34	1,500

Name	Federal Hazard Classification	River	Nearest City to Dam and Distance	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Telephone Flat	–	–	–	–	–
Thomas Briles	H	Tributary of Goose Lake	Davis Creek 2 miles	23	209
Toreson	S	Toms Creek	Canby 5 miles	55	1,140
Upper Pasture	S	Yankee Jims Slough	Alturas 5 miles	15	250
West Valley	H	West Valley Creek	Likely 5 miles	65	23,000
White	L	Tributary of Pit River	Canby 7 miles	16	290
Wildhorse	–	–	–	–	–

Source: Modoc County and California Division of Safety of Dams

*One Acre Foot=326,000 gallons

Figure 4-17 Modoc County Inventory and Dams of Concern



In addition to the dams in the County, there is one dam outside the County that, should it fail, has the ability to impact Modoc County. These were shown in Figure 4-17 and are detailed in Table 4-14.

Table 4-14 Dams of Concern Outside Modoc County

Name	Federal Hazard Classification	River	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Drews Reservoir	H	Drews Creek	63	65,000

Source: Modoc County and California Division of Safety of Dams
*One Acre Foot=326,000 gallons

Past Occurrences

The National Performance of Dams Program (NPDP) database was searched for dam failure incidents in Modoc County.

1932 – There was a dam failure incident at the Mud Lake dam on a tributary of the Pit River. The dam washed out on both sides of rock masonry structure located in fill. The breached section on each side was backfilled. Leakage along face of masonry probably caused breach in dam.

1952 – There was a dam failure at the Huffman Antelope Dam on the Clover Swale River. The dam failed by breaching during period of heavy snow melt runoff. The dam was not overtopped. The breach occurred approximately in the center of the dam.

1953 – There was a dam failure on the Toreson Dam on Tom's Creek. The dam failed by breaching. The failure happened very fast. The cause of the failure was unknown. This incident also appears in "Lessons from Dam Incidents, USA" ASCE/USCOLD. According to this reference, the cause of the failure was chemical drainage corrosion outlet pipe.

1982 – There was a dam failure incident at the Mud Lake dam on a tributary of the Pit River. This was the second incident to occur at this dam (the other in 1932). There was a breach, but there was no evidence of overtopping. According to NPDP Ref No 1883, most likely cause of failure was erosion of the upstream slope and crest by wave action.

Likelihood of Future Occurrence

Occasional – While the NPDP program shows past dam failures, the last failure to occur happened over 30 years ago. Strengthened regulation of dams has cut failure rates in California and in Modoc County. It is unlikely a dam failure will occur in the future.

Climate Change and Dam Failure

According to the CAS and the HMPC, increases in both precipitation and heat causing snow melt could increase the potential for dam failure and uncontrolled releases in Modoc County.

4.2.9. Drought and Water Shortage

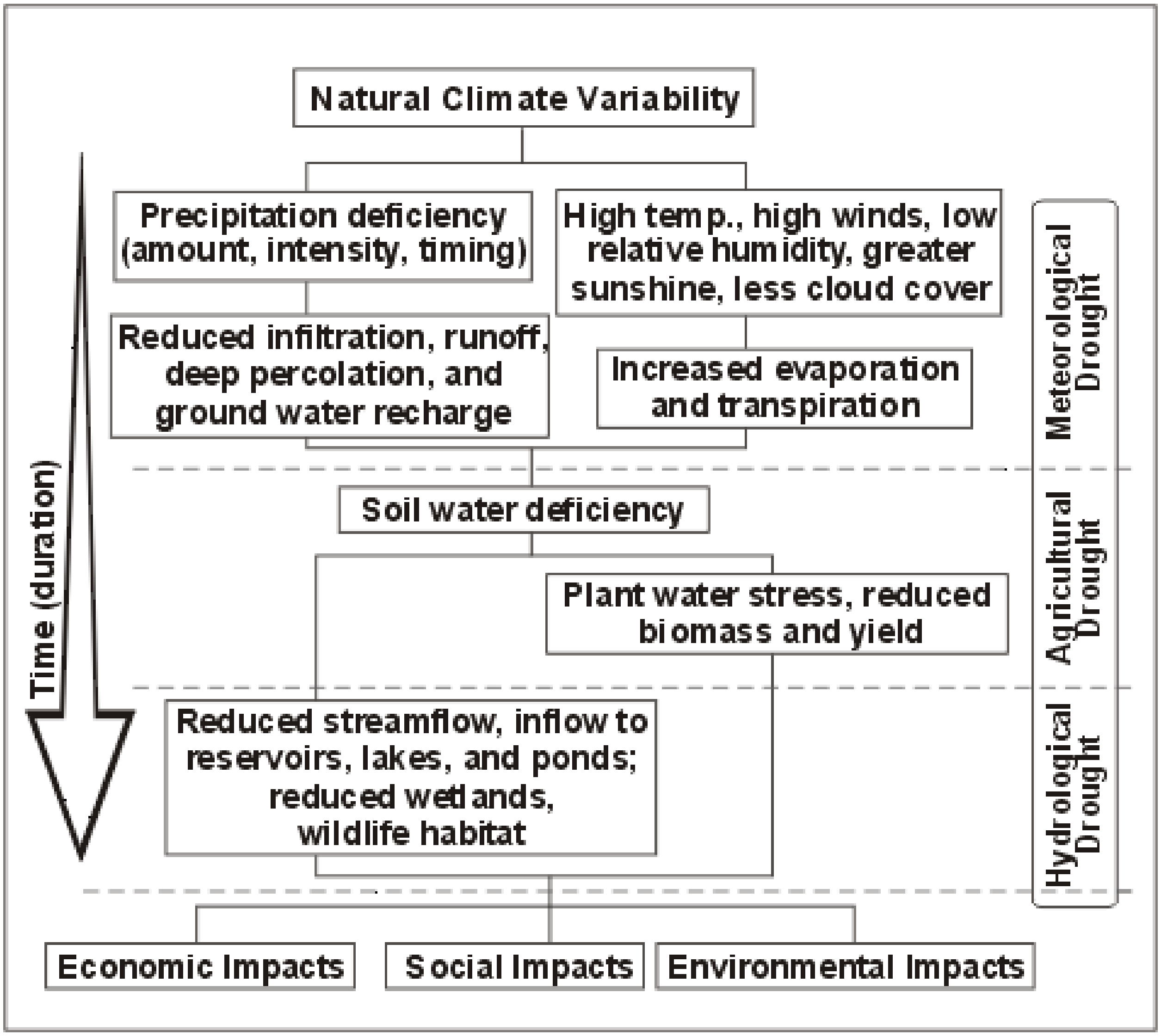
Hazard/Problem Description

The National Drought Mitigation Center states that drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Water districts normally require at least a 10 year planning horizon to implement a multiagency improvement project to mitigate the effects of a drought and water supply shortage.

Drought is a complex issue involving (see Figure 4-18) many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- Meteorological drought is usually defined by a period of below average water supply.
- Agricultural drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- Hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

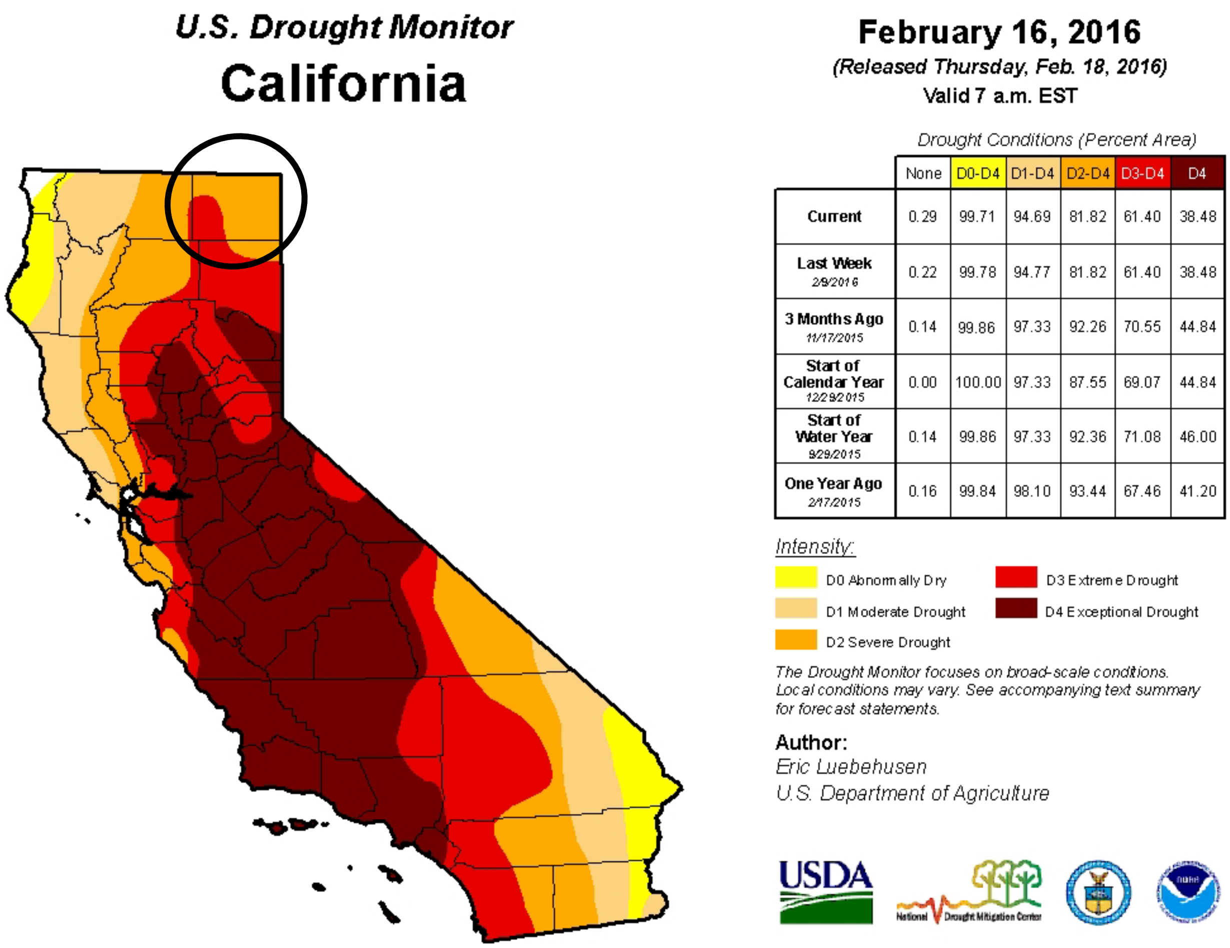
Figure 4-18 Causes and Impacts of Drought



Source: National Drought Mitigation Center

Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the drought conditions in California and the Planning Area can be found in Figure 4-19.

Figure 4-19 Current Drought Status in Modoc County



Source: US Drought Monitor

The California Department of Water Resources (DWR) says the following about drought:

> *One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.*

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between farming and federally protected fish habitats in California is part of this issue

Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern California where drought impacts are delayed for most of the population by the wealth of stored surface and ground water. The drought complications normally appear more than a year after a drought begins. In most areas of California, including Modoc County, ranchers that rely on rainfall to support forage for their livestock are the earliest and most affected by drought. Even below normal water years could affect ranchers depending on the timing and duration of precipitation events. It is difficult to quantitatively assess drought impacts to Modoc County because not many county-specific studies have been conducted. Some factors to consider include the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in Modoc County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Some communities in higher elevations with shallow bedrock do not have a significant source of groundwater.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Also, during a drought, allocations go down and water costs increase, which results in reduced water availability. Voluntary conservation measures are a normal and ongoing part of system operations and actively implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding and erosion.

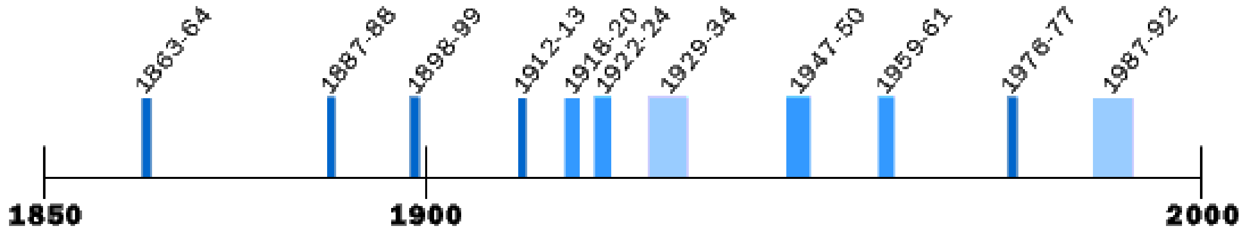
Water Shortage

Northern California counties, including Modoc County, generally have sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past century. Many other areas of the State, however, also place demands on these water resources during severe drought. For example, Northern California agencies, including those from Modoc County, were participants in the Governor's Drought Water Bank of 1991, 1992, and 1994. Water sources in the County vary. Agricultural users who irrigate use pivot wells and wheel lines as well as flood irrigation. Outside of the City of Alturas, many people are on domestic wells.

Past Occurrences

Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. The driest single year of California's measured hydrologic record between 1850 and 2000 was 1977. Figure 4-20 depicts California's Multi-Year Historical Dry Periods, 1850-2000.

Figure 4-20 California's Multi-Year Historical Dry Periods, 1850-2000

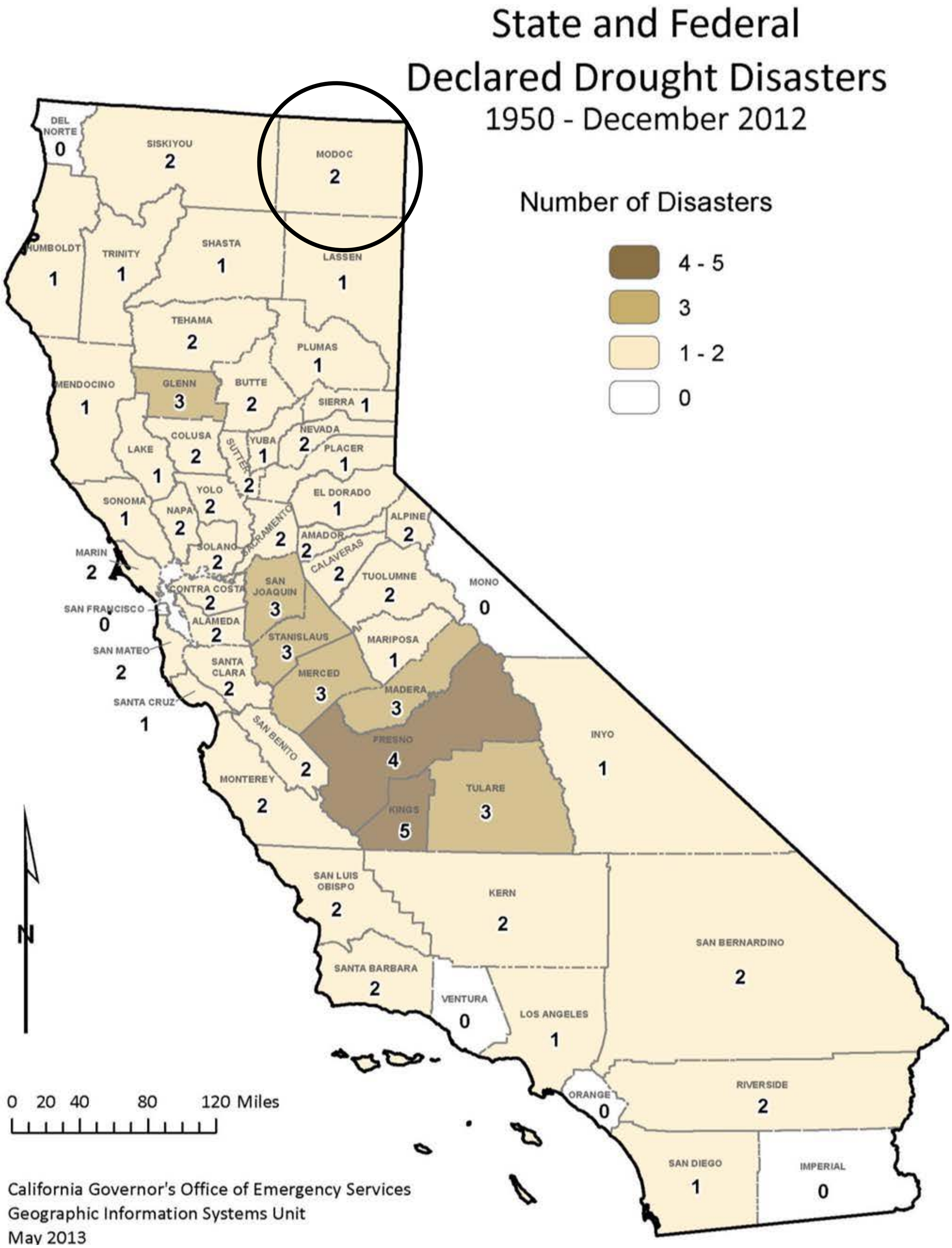


Source: California Department of Water Resources, www.water.ca.gov/

Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

The NCDC database contains no drought events. However, the HMPC noted the 2001 drought hit the Tulelake Basin and Newell significantly. However, according to the 2013 State of California Hazard Mitigation Plan, Modoc County has experienced two droughts that resulted in a state or federal disaster declaration. This can be seen in Figure 4-21.

Figure 4-21 Modoc County Drought Declarations from 1950 to 2012



Since the 2013 State Plan, a drought emergency for the State of California was issued by Governor Brown. On January 17, 2014 the governor declared a State of Emergency for drought throughout California. This declaration came on the heels of a report that stated that California had the least amount of rainfall in its 163 year history. Californians were asked to voluntarily reduce their water consumption by 20 percent. The declaration also:

- Directed state agencies, led by the Department of Water Resources, to execute a statewide campaign to encourage and promote water conservation, with a goal of reducing water usage by 20 percent.
- Required the Department of Forestry and Fire Protection to hire additional seasonal firefighters.
- Urged cities and water districts to update their water management and drought plans.
- Ordered all state agencies to conserve water, including placing a moratorium on new, nonessential landscaping at public buildings and along highways.
- Required state officials to speed approval for voluntary water sales and transfers between willing districts.
- Ordered the Department of Water Resources to accelerate spending on water supply and conservation projects that can break ground this year.

Drought conditions worsened through 2014 and into 2015. On April 1, 2015, following the lowest snowpack ever recorded, Governor Brown announced actions that will 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. The governor directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent. This savings amounts to approximately 1.5 million acre-feet of water through the end of 2015. To save more water now, the order also sought to:

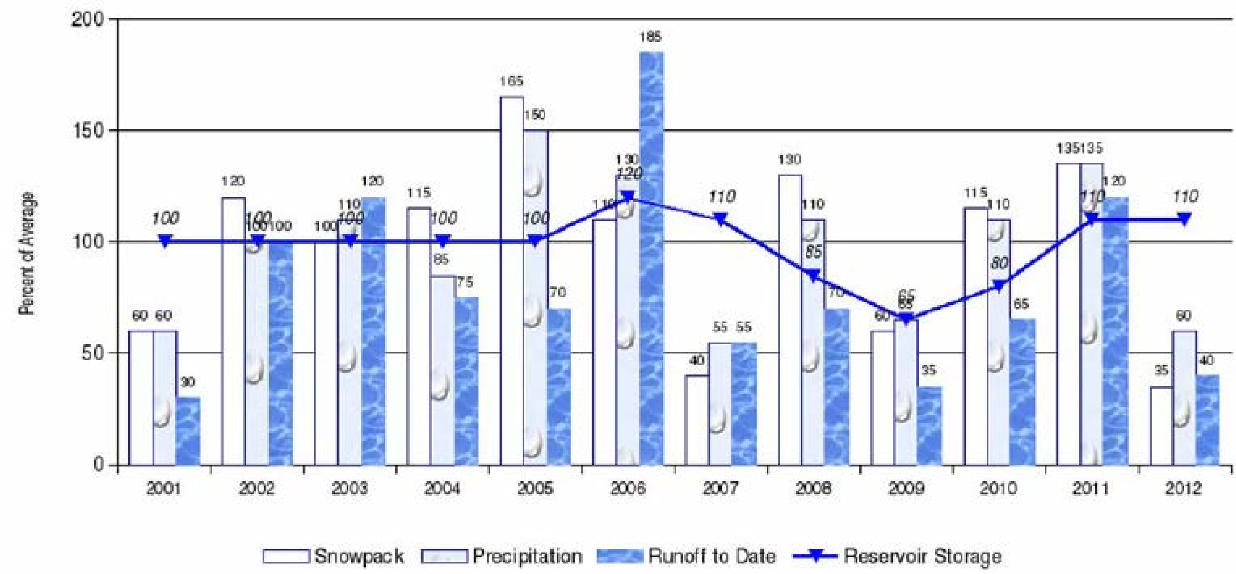
- Replace 50 million square feet of lawns throughout the state with drought tolerant landscaping in partnership with local governments;
- Direct the creation of a temporary, statewide consumer rebate program to replace old appliances with more water and energy efficient models;
- Require campuses, golf courses, cemeteries and other large landscapes to make significant cuts in water use; and
- Prohibit new homes and developments from irrigating with potable water unless water-efficient drip irrigation systems are used, and ban watering of ornamental grass on public street medians.

In March, 2014 Modoc County Board of Supervisor approved a Disaster Proclamation that is currently in effect. The County formed a Drought Task Force to coordinate information and do public outreach and education. This committee is multi-jurisdictional to include Resource Conservation Districts, Water Districts, agriculture and many private and public organizations.

Water Shortage

Figure 4-22 illustrates several indicators commonly used to evaluate water conditions in California. The percent of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 1996 and 2007. The chart illustrates the cyclical nature of weather patterns in California. Snow pack and precipitation increased between 1996 and 1997, began decreasing in 1998, and began to show signs of recovery in 2002, increased in 2005, and decreased sharply in 2007.

Figure 4-22 Water Supply Conditions, 1996 to 2012



Source: 2013 State of California Hazard Mitigation Plan

Since 2012, snowpack levels in California have dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels. Snowpack measurements have been kept in California since 1950 and nothing in the historic record comes close 2015's severely depleted level. The previous record for the lowest snowpack level in California, 25 percent of normal, was set both in 1976-77 and 2013-2014. In "normal" years, the snowpack supplies about 30 percent of California's water needs, according to the California Department of Water Resources. The HMPC noted that the specifics moisture and precipitation for the County is 50 percent of normal. They went on to note that agriculture adjusted to less water availability with multiple measures; a few domestic wells have gone dry and there has been drilling for deeper wells or new wells.

Likelihood of Future Occurrence

Drought

Occasional—Historical drought data for the Modoc County Planning Area and region indicate there have been 3 significant droughts in the last 65 years. This equates to a drought every 21.7 years on average or a 4.6 percent chance of a drought in any given year. Based on this data, droughts will occasionally affect the Planning Area.

Water Shortage

Likely— Recent historical data for water shortage indicates that Modoc County is at risk to both short and prolonged periods of water shortage. Based on this it is likely that water shortages will affect the County. Although some shallow wells have been going dry in the most recent drought and agricultural lands have been adversely affected, the County has sufficient ground and surface water supply for the near future. Since the original Drought Proclamation in March of 2014, the HMPC noted that residents have adjusted to less water but the original situation was greatly modified by heavy rains in May of 2014. The Modoc County Drought Taskforce is remains active to deal with data collection, legislative changes, and monitoring of the drought.

Climate Change and Drought and Water Shortage

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The Climate Adaptation Strategy (CAS) stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that:

> *California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.*

The regional implications of declining water supplies as a long-term public policy issue are recognized in a Southern California Association of Governments July 2009 publication of essays examining climate change topics. In one essay, Dan Cayan observes:

> *In one form or another, many of Southern California's climate concerns radiate from efforts to secure an adequate fresh water supply…Of all the areas of North America, Southern California's annual receipt of precipitation is the most volatile – we only occasionally see a "normal" year, and in the last few we have swung from very wet in 2005 to very dry in 2007 and 2008….Southern California has special challenges because it is the most urban of the California water user regions and, regionwide, we import more than two-thirds of the water that we consume.*

4.2.10. Earthquake

Hazard/Problem Description

According to the California Geological Survey (CGS), an earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter Magnitude Scale is used to quantify the magnitude or strength of the seismic energy released by an earthquake. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4-15). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-15 Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors; by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, and great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

California is seismically active because it sits on the boundary between two of the earth's tectonic plates. Most of the state - everything east of the San Andreas Fault - is on the North American Plate. The cities of Monterey, Santa Barbara, Los Angeles, and San Diego are on the Pacific Plate, which is constantly moving northwest past the North American Plate. The relative rate of movement is about two inches per year. The San Andreas Fault is considered the boundary between the two plates, although some of the motion is taken up on faults as far away as central Utah.

Earthquake Hazards

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

Groundshaking is motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by groundshaking is among the most serious seismic hazards. Damage to structures from this vibration, or groundshaking, is caused by the transmission of earthquake vibrations from the ground to the structure. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and workmanship, earthquake magnitude and location of epicenter, and the character and duration of ground motion. Much of the County is located on alluvium which increases the amplitude of the earthquake wave. The HMPC noted this is especially true in the Surprise Valley. Ground motion lasts longer and waves are amplified on loose, water-saturated materials than on solid rock. As a result, structures located on alluvium typically suffer greater damage than those located on solid rock.

Seismic Structural Safety

Older buildings constructed before building codes were established, and even newer buildings constructed before earthquake-resistance provisions were included in the codes, are the most likely to be damaged during an earthquake. Buildings one or two stories high of wood-frame construction are considered to be the most structurally resistant to earthquake damage. Older masonry buildings without seismic reinforcement (unreinforced masonry) are the most susceptible to the type of structural failure that causes injury or death.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions which affect low-rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include, but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Liquefaction Potential

Liquefaction is a process whereby soil is temporarily transformed to a fluid form during intense and prolonged ground shaking. Areas most prone to liquefaction are those that are water saturated (e.g., where the water table is less than 30 feet below the surface) and consist of relatively uniform sands that are loose to medium density. In addition to necessary soil conditions, the ground acceleration and duration of the earthquake must be of sufficient energy to induce liquefaction.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

Settlement

Settlement can occur in poorly consolidated soils during ground shaking. During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils or improperly founded or poorly compacted fill. These areas are known to undergo extensive settling with the addition of irrigation water, but evidence due to ground shaking is not available.

Other Hazards

Earthquakes can also cause landslides and dam failures. Earthquakes may cause landslides (discussed in Section 4.2.13), particularly during the wet season, in areas of high water or saturated soils. Finally, earthquakes can cause dams to fail (see Section 4.2.8 Dam Failure).

Faults

A fault is defined by the CGS as "a fracture or fracture zone in the earth's crust along which there has been displacement of the sides relative to one another." For the purpose of planning there are two types of faults, active and inactive. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected. Inactive faults show no evidence of movement in recent geologic time, suggesting that these faults are dormant. This does not mean, however, that faults having no evidence of surface displacement within the last 11,000 years are necessarily inactive. For example, the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquake occurred on faults not previously recognized as active. Potentially active faults are those that have shown displacement within the last 1.6 million years (Quaternary). An inactive fault shows no evidence of movement in historic (last 200 years) or geologic time, suggesting that these faults are dormant.

Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without perceptible ground shaking. Sudden fault displacement occurs during an earthquake event and may result in the collapse of buildings or other structures that are found along the fault zone when fault displacement exceeds an inch or two. The only protection against damage caused directly by fault displacement is to prohibit construction in the fault zone.

There are three faults that traverse Modoc County. These are shown in Table 4-16.

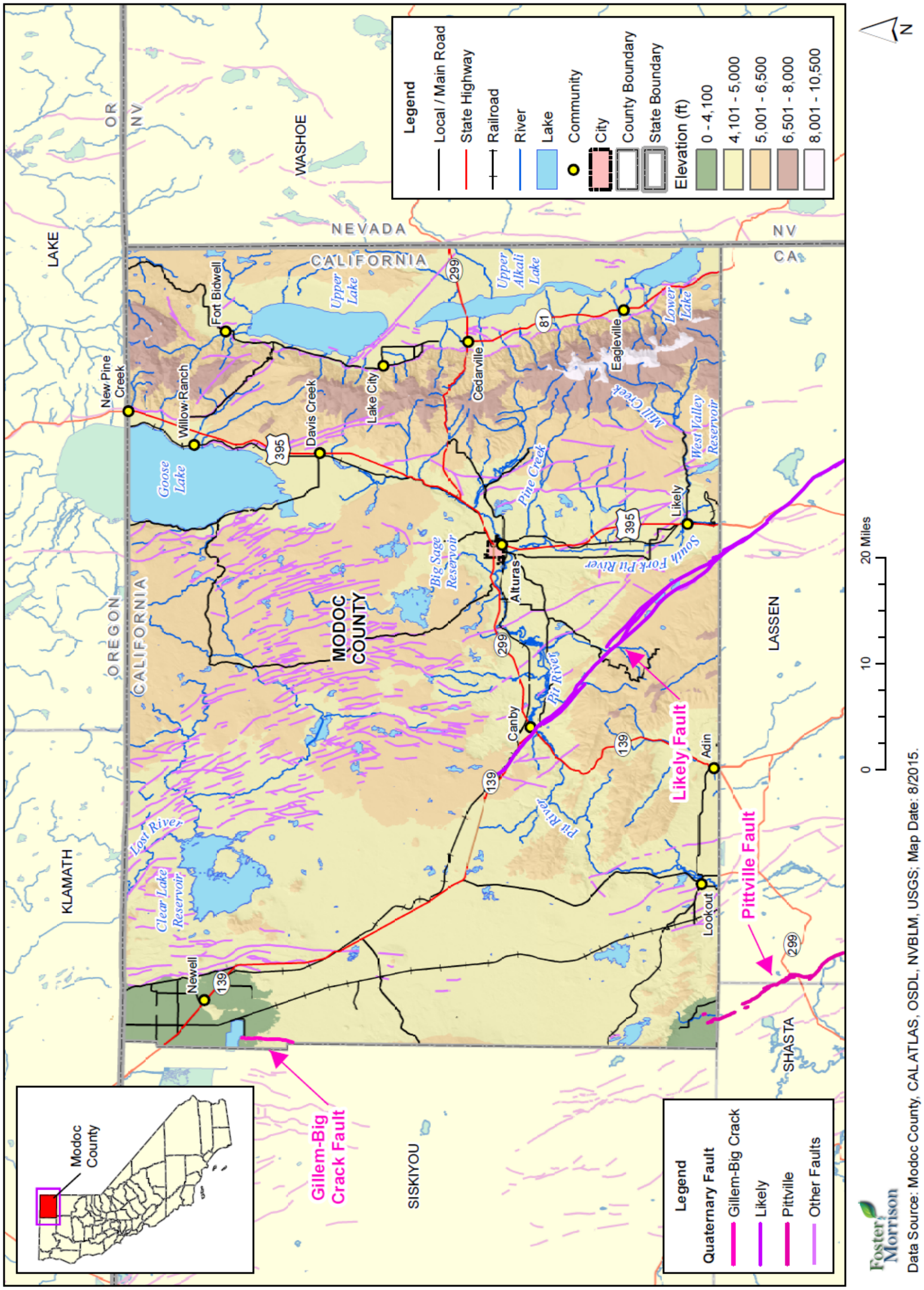
Table 4-16 Modoc County Faults

Name	Length	Most Recent Deformation	Slip-rate category
Gillem-Big Crack fault system (Class A)	36 km	Late Quaternary (<130 ka)	Between 0.2 and 1.0 mm/yr
Likely fault zone (Class A)	92 km	Late Quaternary (<130 ka)	Between 0.2 and 1.0 mm/yr
Pittville fault (Class A)	36 km	Latest Quaternary (<15 ka)	Between 0.2 and 1.0 mm/yr

Source: National Earthquake Information Center

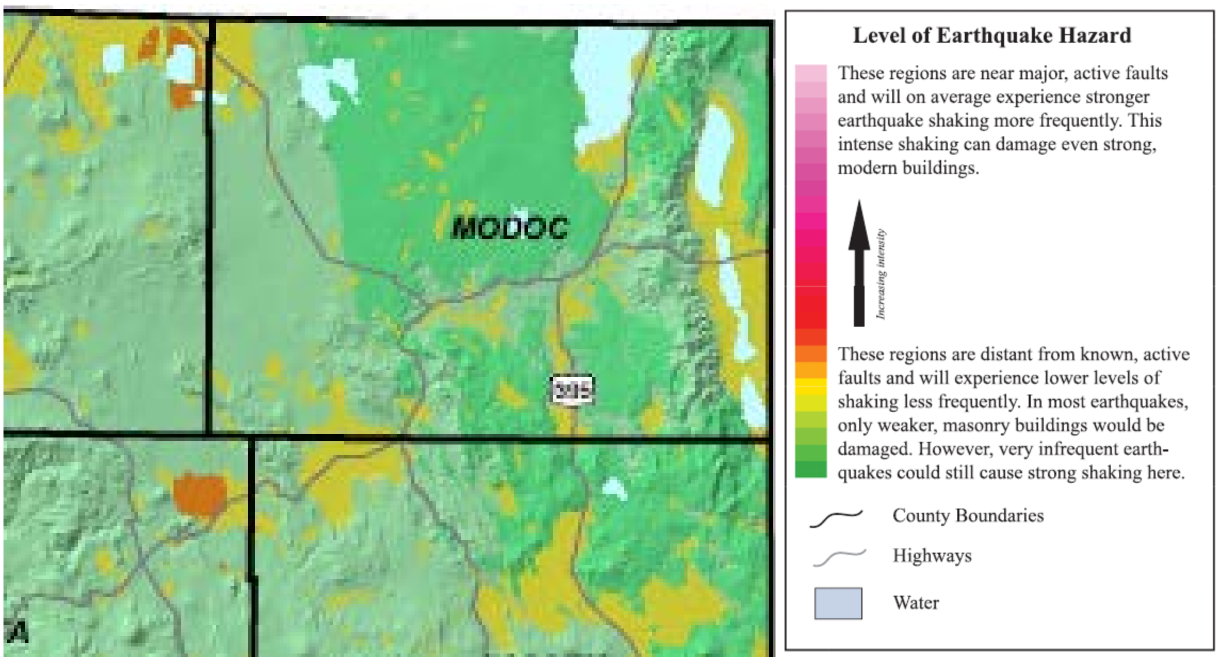
Figure 4-23 is a map of faults in the County with the potential for earthquake shaking sufficiently strong to trigger landslide and liquefaction.

Figure 4-23 Active Faults in the County



Maps indicating the maximum expectable intensity of groundshaking for the County are available through several sources. Figure 4-24, prepared by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2,500 year average repeat time. According to the map, Modoc County is located in an area of low to moderate earthquake shaking. It should be noted however that no region is immune from potential earthquake damage.

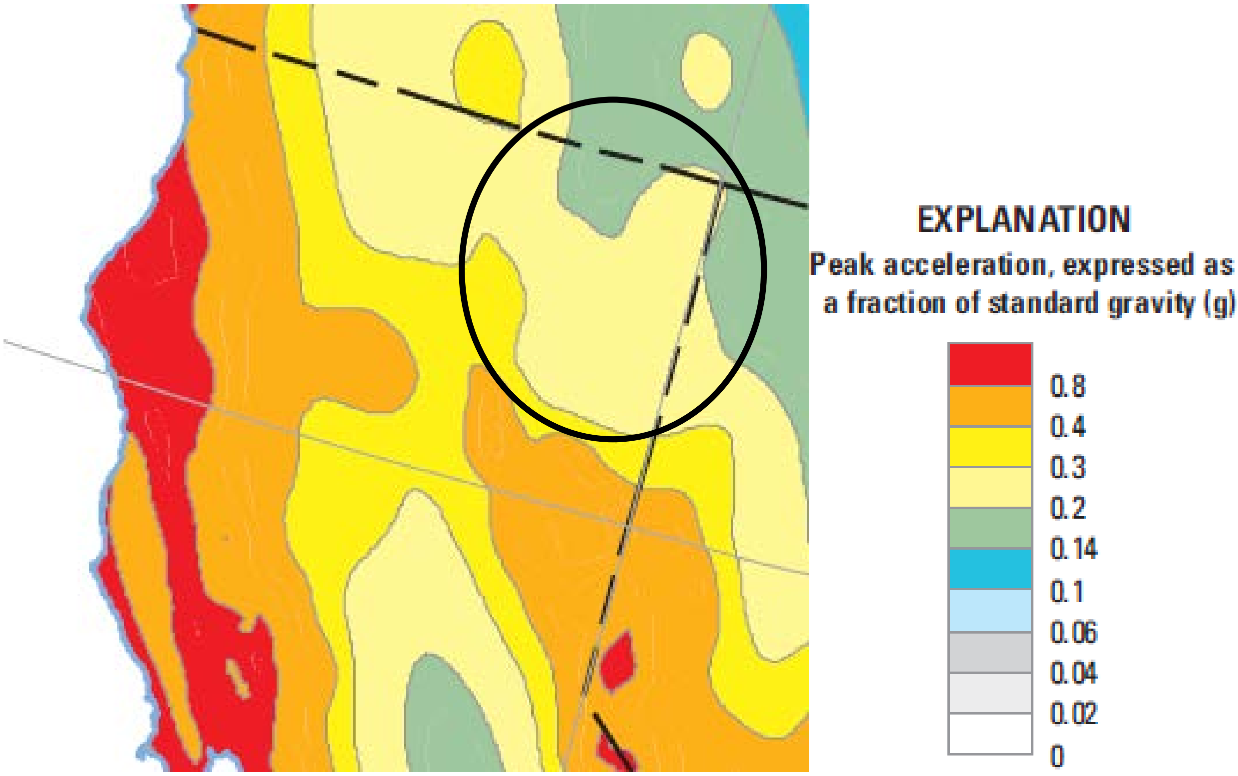
Figure 4-24 Maximum Expectable Earthquake Intensity



Source: California Division of Mines and Geology

The U.S. Geological Survey (USGS) issues National Seismic Hazard Maps as reports every few years. These maps provide various acceleration and probabilities for time periods. The following figures are from the 2014 hazard mapping. Figure 4-25 depicts the peak horizontal acceleration (%g) with 10% probability of exceedance in 50 years (a 500-year event) for the planning region. The figure demonstrates that the County falls in the 0.10%g (light blue) to the in the 0.3%g area (yellow) in the extreme southwestern portion of the County. This data indicates that the expected severity of earthquakes in the region is somewhat limited, as damage from earthquakes typically occurs at peak accelerations of 0.3%g or greater.

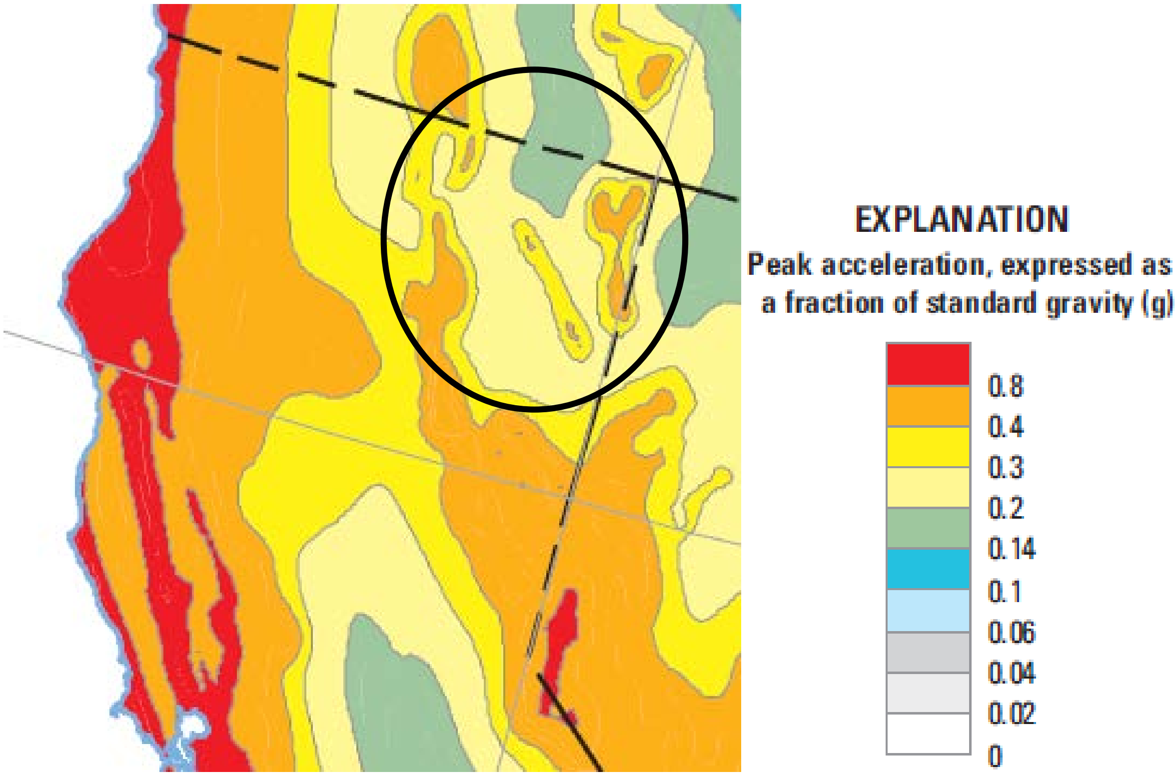
Figure 4-25 Peak Horizontal Acceleration with 10% Probability of Occurrence in 50 Years



Source: USGS National Seismic Hazard Maps

Figure 4-26 depicts the peak horizontal acceleration (%g) with 2% probability of exceedance in 50 years (a 2,500-year event) for the County. The figure demonstrates that the County falls in the 0.1%g (lighter blue) to the 0.4%g area (orange). This data indicates that the expected severity of earthquakes in the region is moderate, as damage from earthquakes typically occurs at peak accelerations of 0.3%g or greater.

Figure 4-26 Peak Horizontal Acceleration with 2% Probability of Occurrence in 50 Years

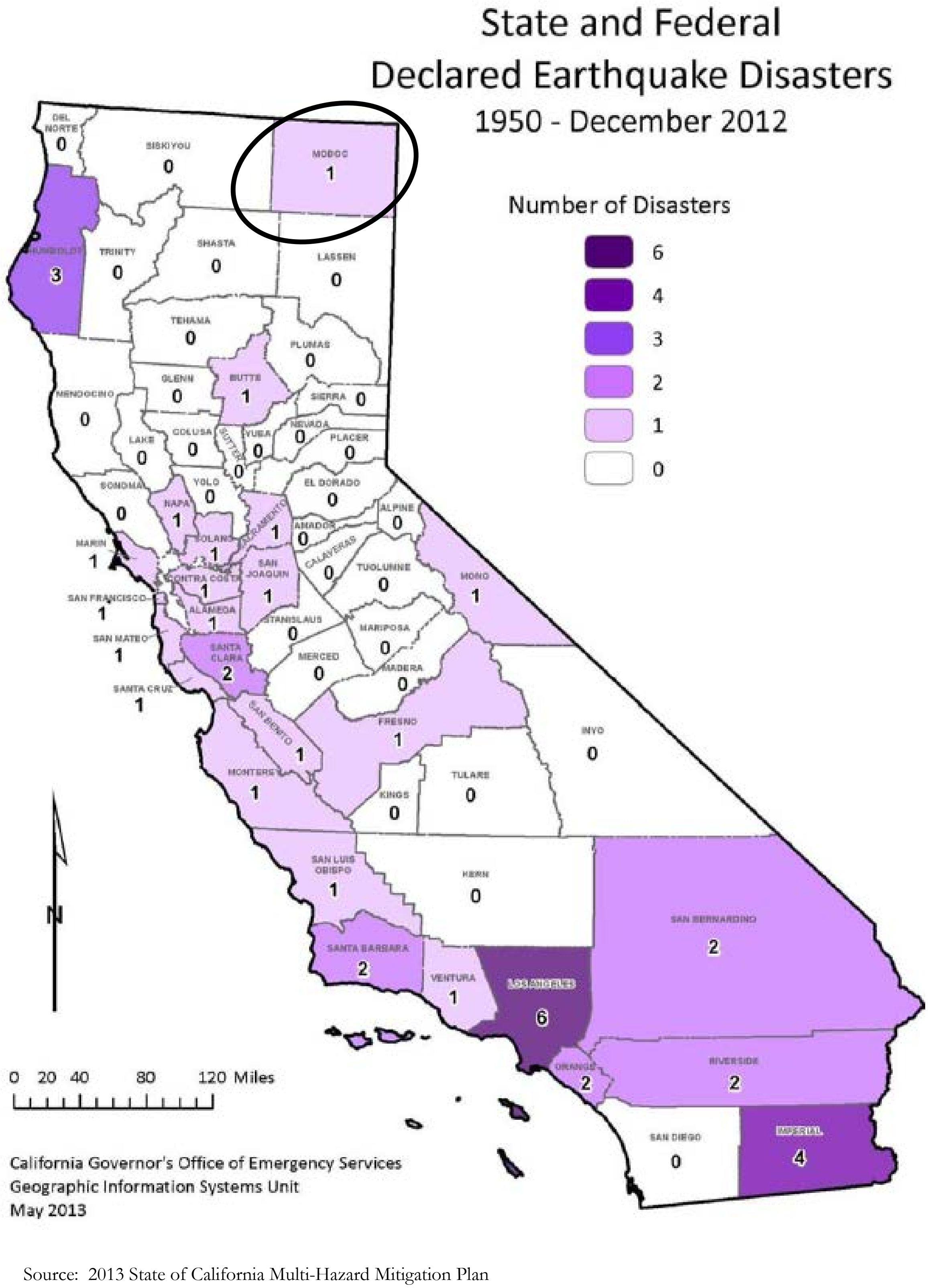


Source: USGS National Seismic Hazard Maps

Past Occurrences

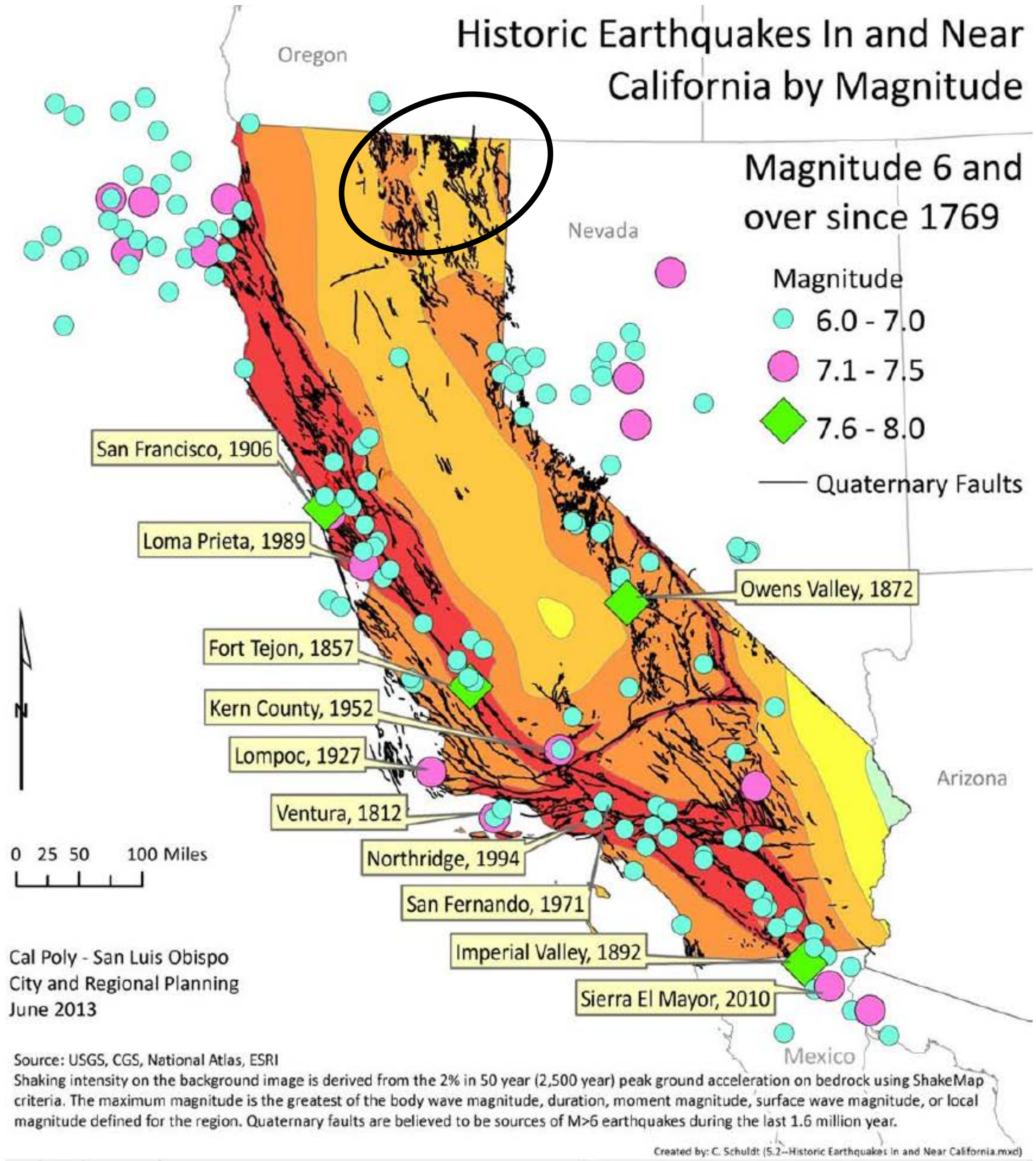
There has been one disaster declaration in the County for the 1993 Klamath earthquake. There was minimal damage in the County. Areas with greatest impacts were the Tule Lake and Newell area. These areas saw ground shaking with damage to grain silos and other miscellaneous structures. This is shown in Figure 4-27. Figure 4-28 shows major historical earthquakes in California from 1769 to 2010.

Figure 4-27 State and Federal Declared Earthquake Disasters



Source: 2013 State of California Multi-Hazard Mitigation Plan

Figure 4-28 Historic Earthquakes in California and Modoc County



MMI	Damage	Effects
X	Very Heavy	Some well-built, wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
IX	Heavy	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.
VIII	Moderate to Heavy	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.
VII	Moderate	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.
VI	Light	Felt by all, many frightened. Some heavy furniture moved; a few instance of fallen plaster. Damage slight.
V	Very Light	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

Source: 2013 State of California Multi-Hazard Mitigation Plan

In addition, the USGS National Earthquake Information Center database contains data on earthquakes in the Modoc County area. Table 4-17 shows the approximate distances earthquakes can be felt away from the epicenter. According to the table, a magnitude 5.0 earthquake could be felt up to 90 miles away. The USGS database was searched for magnitude 5.0 or greater on the Richter Scale within 90 miles of the City of Alturas in Modoc County. These results are shown on Table 4-17.

Table 4-17 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MM)*	Distance Felt (miles)
2.0 - 2.9	I – II	0
3.0 - 3.9	II – III	10
4.0 - 4.9	IV – V	50
5.0 - 5.9	VI – VII	90
6.0 - 6.9	VII – VIII	135
7.0 - 7.9	IX – X	240
8.0 - 8.9	XI – XII	365

*Modified Mercalli Intensity Scale.

Source: United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

Table 4-18 Magnitude 5.0 Earthquakes within 90 Miles of Modoc County*

Date	Richter Magnitude	Location
11/27/1976	5.0	Northern California
8/1/1978	5.1	Northern California
9/21/1993**	5.0	Oregon
9/21/1993**	6.0	Oregon
9/21/1993**	6.0	Oregon
12/4/1993	5.4	Oregon
5/24/2013	5.7	10km WNW of Greenville, California

Source: USGS

*Search dates 19- May 2, 2015

***These are three separate incidents that occurred on the same day.

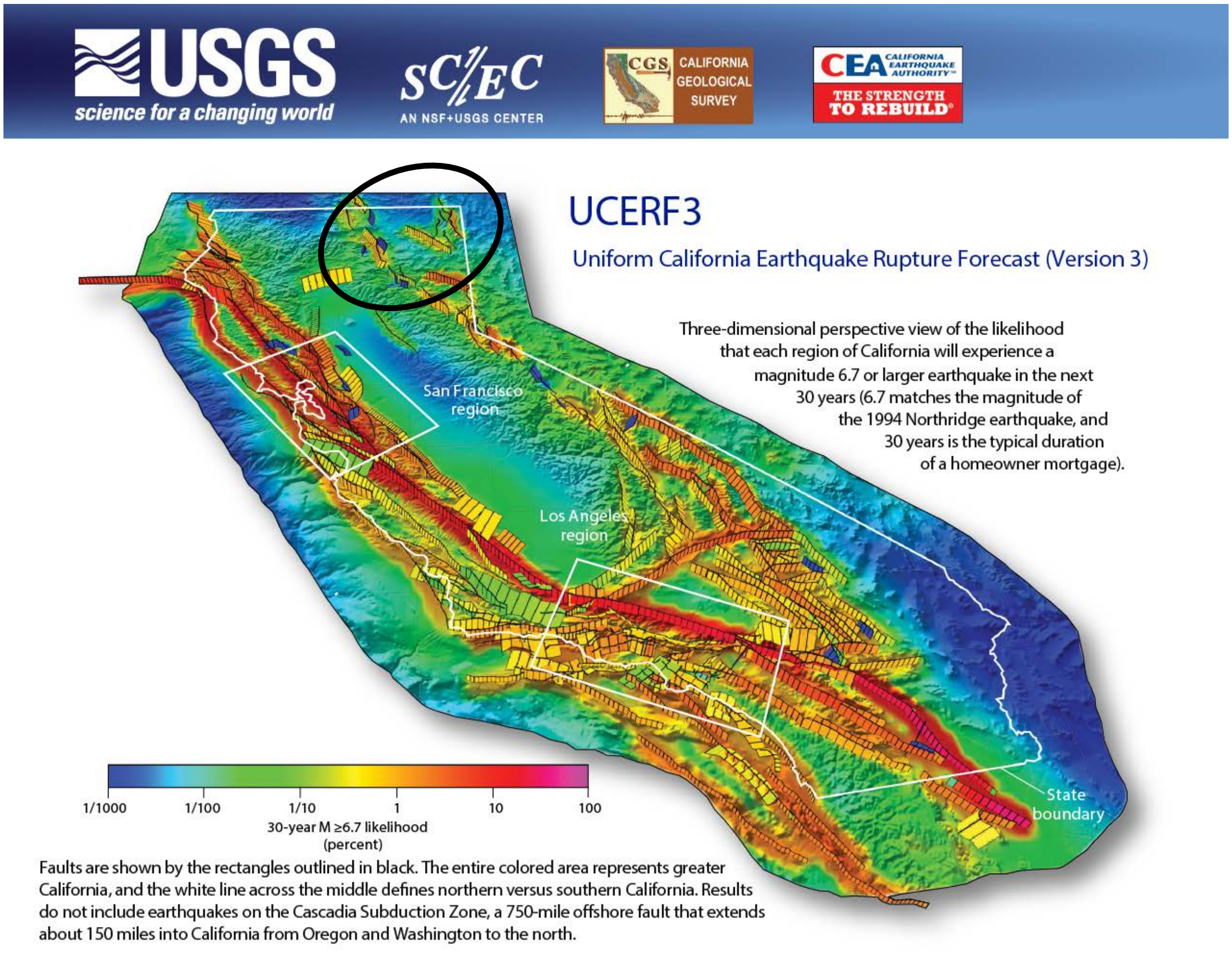
Likelihood of Future Occurrence

Occasional (major earthquake)/Likely (minor earthquake)—No major earthquakes have been recorded within the County; although the County has felt ground shaking from earthquakes with epicenters located elsewhere. Based on historical data and the location of the Modoc County Planning Area relative to active and potentially active faults, the Planning Area may experience a significantly damaging earthquake occasionally. The Surprise Valley area is a statistically active area, but there is little population in that area.

In 2014, the United States Geological Survey (USGS) and the California Geological Survey (CGS) released the time-dependent version of the Uniform California Earthquake Rupture Forecast (UCERF III) model.

The UCERF III results have helped to reduce the uncertainty in estimated 30-year probabilities of strong ground motions in California. The UCERF map is shown in Figure 4-29 and indicates that Modoc County has a low to moderate risk of earthquake occurrence, which coincides with the likelihood of future occurrence rating of occasional.

Figure 4-29 Probability of Earthquake Magnitudes Occurring in 30 Year Time Frame



Source: United States Geological Survey Open File Report 2015-3009

Climate Change and Earthquake

According to the CAS, climate change is unlikely to increase earthquake frequency or strength.

4.2.11. Erosion

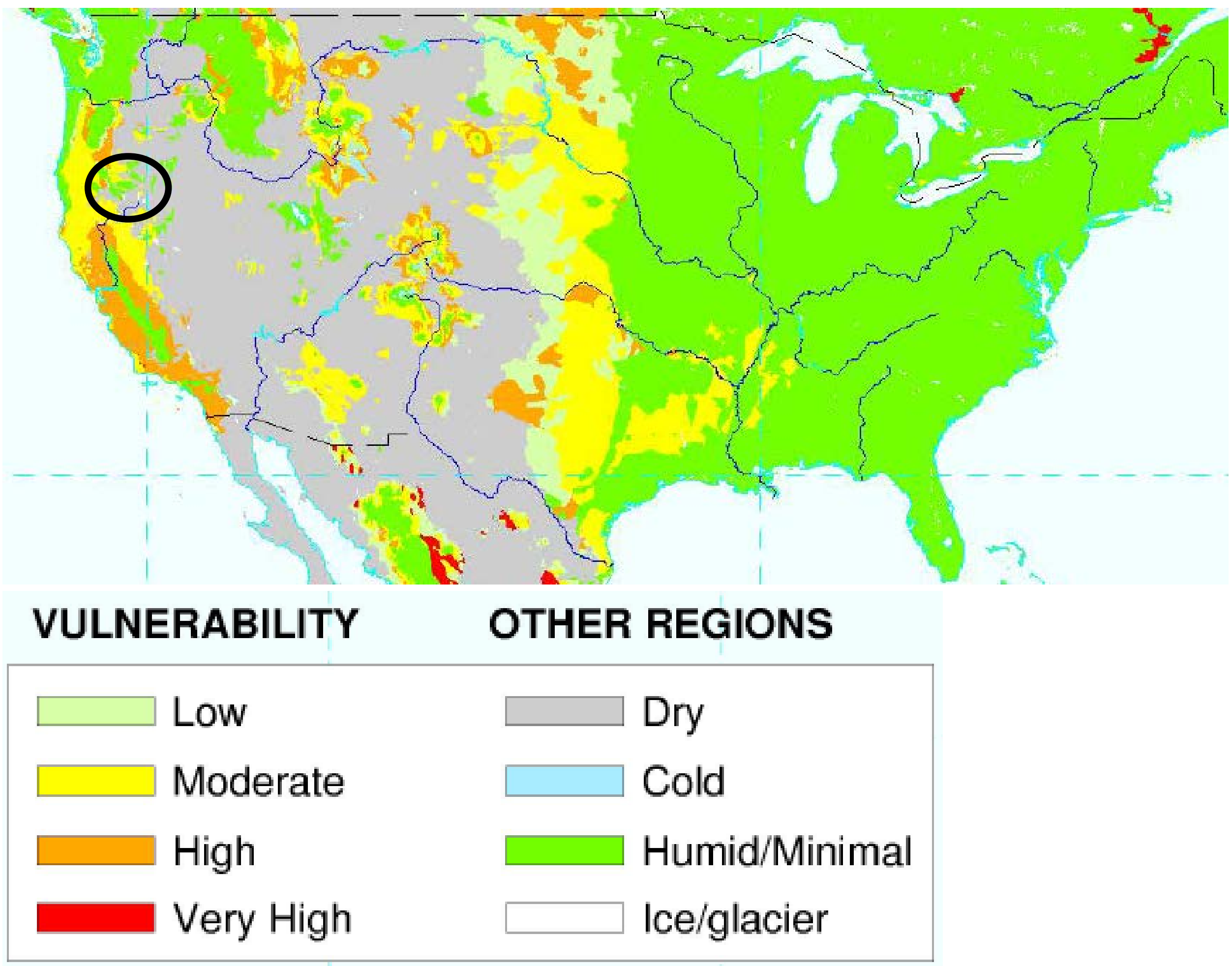
Hazard/Problem Description

According to the CGS, erosion is a two-step process by which soils and rocks are broken down or fragmented and then transported. Aside from natural causes of erosion, including flooding and fire, human activities such as mining, logging, farming, and cattle ranching can also facilitate erosion.

Erosion from Wind and Heavy Rain

A dust storm occurs when fine particles of soil are driven by strong winds into the air. Dust storms are often a result of wind, severe drought and poor soil conservation practices. A dust storm usually arrives suddenly in the form of an advancing wall of dust and debris that can be several miles long and thousands of feet high. Localized dust storms can also occur as a result of agricultural practices. Besides contributing to transportation problems, dust storms are a health and safety hazard to persons and animals, and can foul machinery, HVAC systems, and electronic equipment. Water ditches filled with soil can impact water quality and water carrying capacity. Dust storms can be economically damaging to the agricultural industry, since the most fertile part of the soil is removed during events, reducing productivity and threatening the long term stability of the land. Specific wind erosion areas in Modoc County and the United States as a whole are shown in Figure 4-30. Erosion impacts to the state road system have been minimal in the last ten years. Prior mitigation projects have been effective, and normal maintenance has dealt with erosion from localized storms.

Figure 4-30 Wind Erosion Areas of the United States



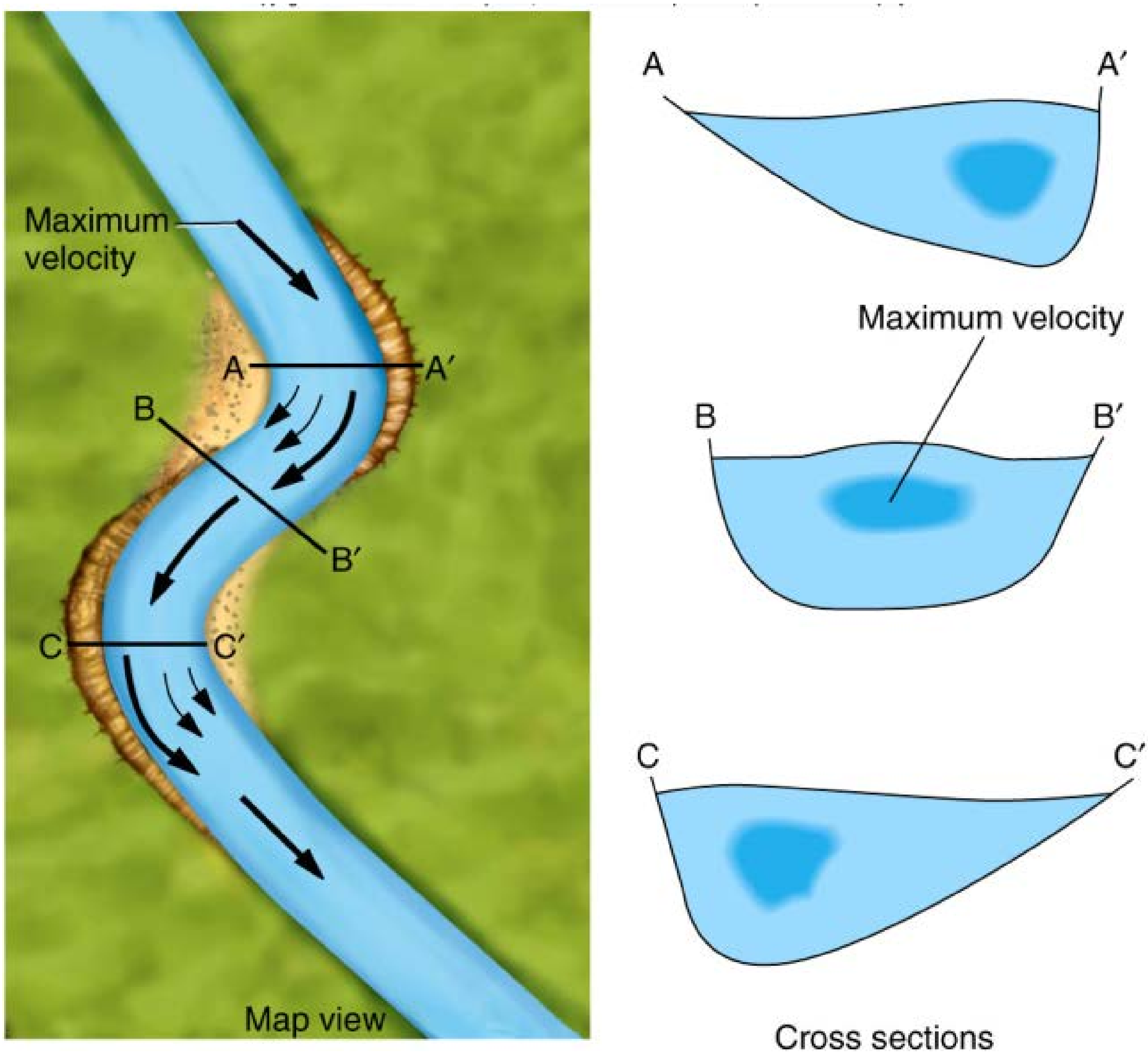
Source: USDA, http://soils.usda.gov/use/worldsoils/mapindex/eroswind.html

Streambank Erosion

According to the DWR, any flowing body of water (brook, creek, stream, river) is a stream. Stream flow is expressed as volume per unit time, usually cubic meters per second, cubic feet per second, sometimes cubic kilometers per second, or acre-feet per second or day. Stream flow varies tremendously with time. Short term controls include rainfall, snowmelt, and evaporation conditions. Long term controls include land use, soil, groundwater state, and rock type.

Streams erode by a combination of direct stream processes, like down cutting and lateral erosion, and indirect processes, like mass-wasting accompanied by transportation. Water tends to move downstream in slugs that extend all the way across a channel as shown in Figure 4-31. When the channel bends, water on the outside of the bend (the cut-bank) flows faster and water on the inside of the bend (the point) flows slower. This distribution of velocity results in erosion occurring on the outside of the bend (cut) and deposition occurring on the inside of the bend.

Figure 4-31 Meanders and Stream flows



Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Stream bank erosion processes, although complex, are driven by two major components: stream bank characteristics (erodibility) and hydraulic/gravitational forces. Many land use activities can affect both of these components and lead to accelerated bank erosion. The vegetation rooting characteristics can protect banks from fluvial entrainment and collapse, and also provide internal bank strength. When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. Stream bank aggradation or degradation is often a response to stream channel instability. Since bank erosion is often a symptom of a larger, more complex problem, the long-term solutions often involve much more than just bank stabilization. Numerous studies have demonstrated that stream bank erosion contributes a large portion of the annual sediment yield.

Determining the cause of accelerated streambank erosion is the first step in solving the problem. When a stream is straightened or widened, streambank erosion increases. Accelerated streambank erosion is part of the process as the stream seeks to re-establish a stable size and pattern. Damaging or removing streamside vegetation to the point where it no longer provides for bank stability can cause a dramatic increase in bank erosion. A degrading streambed results in higher and often unstable, eroding banks. When land use changes occur in a watershed, such as clearing land for agriculture or development, runoff increases. With this increase in runoff the stream channel will adjust to accommodate the additional flow, increasing streambank erosion. Addressing the problem of streambank erosion requires an understanding of both stream dynamics and the management of streamside vegetation.

Erosion and deposition are occurring continually at varying rates over the Planning Area. Swiftly moving floodwaters cause rapid local erosion as the water carries away earth materials. This is especially problematic in leveed areas. Severe erosion removes the earth from beneath bridges, roads and foundations of structures adjacent to streams. By undercutting it can lead to increased rockfall and landslide hazard. The deposition of material can block culverts, aggravate flooding, destroy crops and lawns by burying them, and reduce the capacity of water reservoirs as the deposited materials displace water.

Streambank erosion increases the sediment that a stream must carry, results in the loss of fertile bottomland and causes a decline in the quality of habitat on land and in the stream. High velocity flows can erode material from the outboard or waterside of the levee (see Section 4.2.14), which may lead to instability and failure. Erosion can occur at once or over time as a function of the storm cycle and the scale of the peak storms.

The HMPC noted that there is a rather unique form of streambank erosions that affects the County. When ice breaks up on rivers in the County, it erodes streambanks and levees as it travels downstream. In addition, erosion of dry lake beds like Goose Lake is also a concern. The HMPC noted that burn scar areas in the County are also subject to higher levels of erosion after heavy rains.

Past Occurrences

According to the HMPC, erosion from wind and heavy rains occurs on an annual basis in the County. No database tracks this information. The February 14, 2013 Preliminary FIS noted that during January 1995, a significant storm event was experienced in the area. No flooding occurred; however, there was some channel erosion, sediment deposition, and slope protection damage in the project area. As a result, the USACE performed a rehabilitation project under Public Law 84-99, which included sediment removal and the repair of eroded areas and slope protection. This work was completed in 1996 (USACE, August 1995 and USACE, July 1996).

On April 12 of 2005, erosion and slumping occurred in the County. Areas near County Road 11 washed out and eroded. Damages can be seen on Figure 4-32.

Figure 4-32 2005 Erosion near County Road 11

Source: Modoc County

Likelihood of Future Occurrence

Erosion from Wind and Heavy Rain

Highly Likely – Normal erosion processes are occurring all the time at various points in the County.

River/Stream/Creek bank Erosion

Highly Likely – Due to the high number of linear feet of levees and creek banks within the Modoc County Planning Area, the likelihood of future occurrences of streambank erosion in Modoc County is highly likely.

Climate Change and Erosion

According to the CAS, climate change may affect flooding in Modoc County, which in turn may affect erosion rates. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events.

4.2.12. Flood: 100/500 year and Localized Flooding

Hazard/Problem Description

According to Cal DWR, flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs.

Floodwaters can transport large objects downstream which can damage or remove stationary structures. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utilities lines and interrupt services. Standing water can cause damage to crops, road, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Health Hazards from Flooding

According to FEMA, certain health hazards are also common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one’s home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

100-/500-year Flood

The area adjacent to a river channel is the floodplain. Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP).

There are three types of flood events in the Modoc County area: riverine, flash, and urban stormwater. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reaches.

- **Riverine flooding** is the most common type of flood event and occurs when a watercourse exceeds its "bank-full" capacity. Riverine flooding generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. The duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. The warning time associated with slow rise floods assists in life and property protection.
- The term "**flash flood**" describes localized floods of great volume and short duration. In contrast to riverine flooding, this type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour.
- **Stormwater/Urban flood** events have increased as land has been converted from fields or woodlands to roads and parking lots and lost its ability to absorb rainfall. Urbanization increases runoff by two to six times that of natural terrain.

Other variations of floods include general rain floods, thunderstorm floods, snowmelt and rain on snow floods, dam failure floods, and local drainage floods. This last type of flooding is discussed in greater detail in the discussion of localized stormwater flooding below. Dam failure floods are also discussed. Volume, onset, and duration characteristics for different types of floods are described below:

- **Snowmelt**—Flooding is characterized by moderate peak flows, large volume of runoff, moderate speed of onset, long duration, and marked daily fluctuation of flow.
- **Rain in a general storm system**—Flooding is characterized by high peak flows and moderate speed of onset and duration of flood flows.
- **Rain in a localized intense thunderstorm**—Flooding is characterized by high peak flows, relatively sudden onset, short duration of flow, and smaller volumes of runoff.

The potential for flooding can change and increase through various land use changes and changes to land surface, resulting in a change to the floodplain. Environmental changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

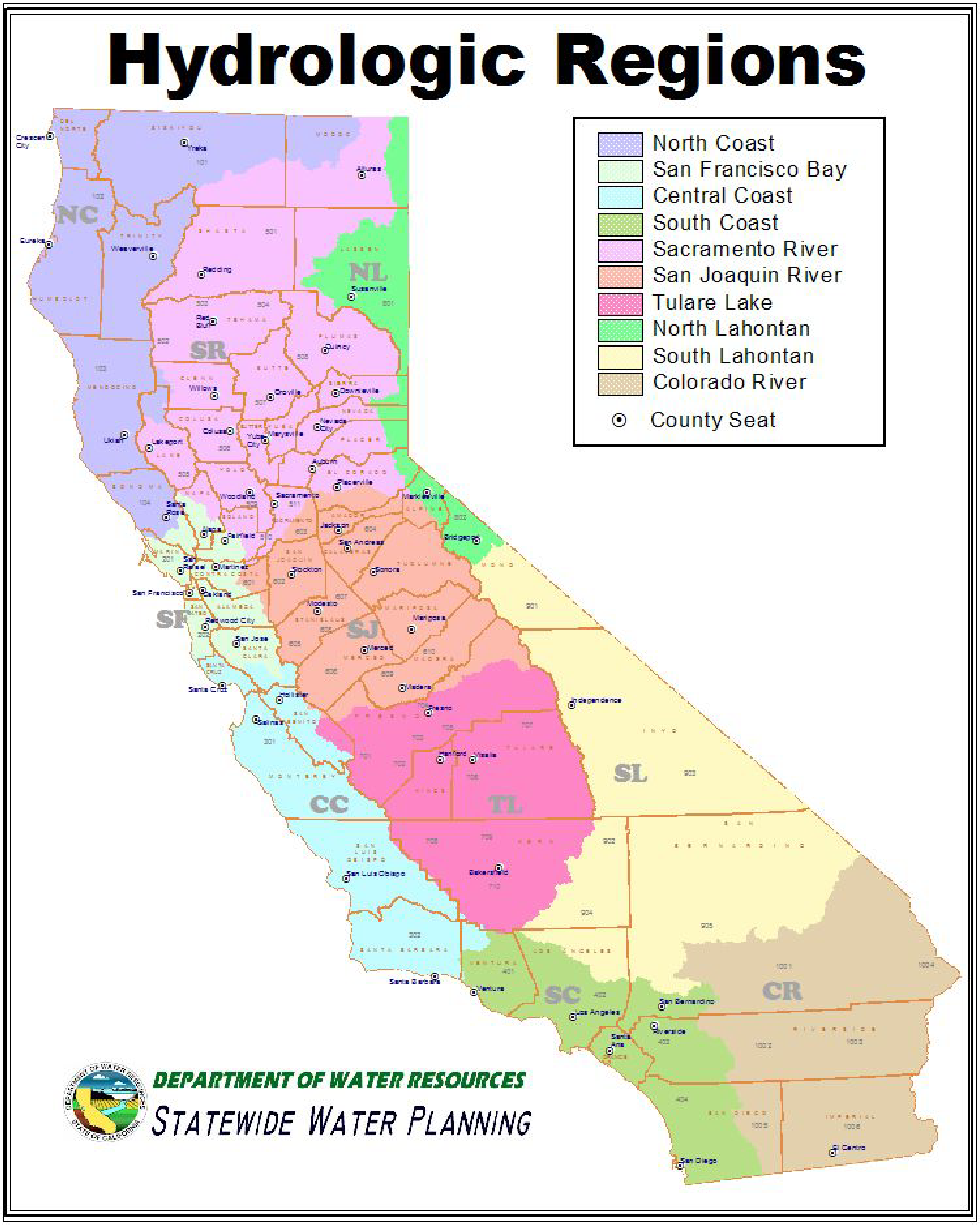
Major Sources of Flooding

According to Cal DWR, California is divided into 10 hydrologic regions, and Modoc County is traversed by three separate hydrologic regions:

- North Coast
- Sacramento River
- North Lahontan

A map of the California's hydrological regions is provided in Figure 4-33.

Figure 4-33 California Hydrologic Regions

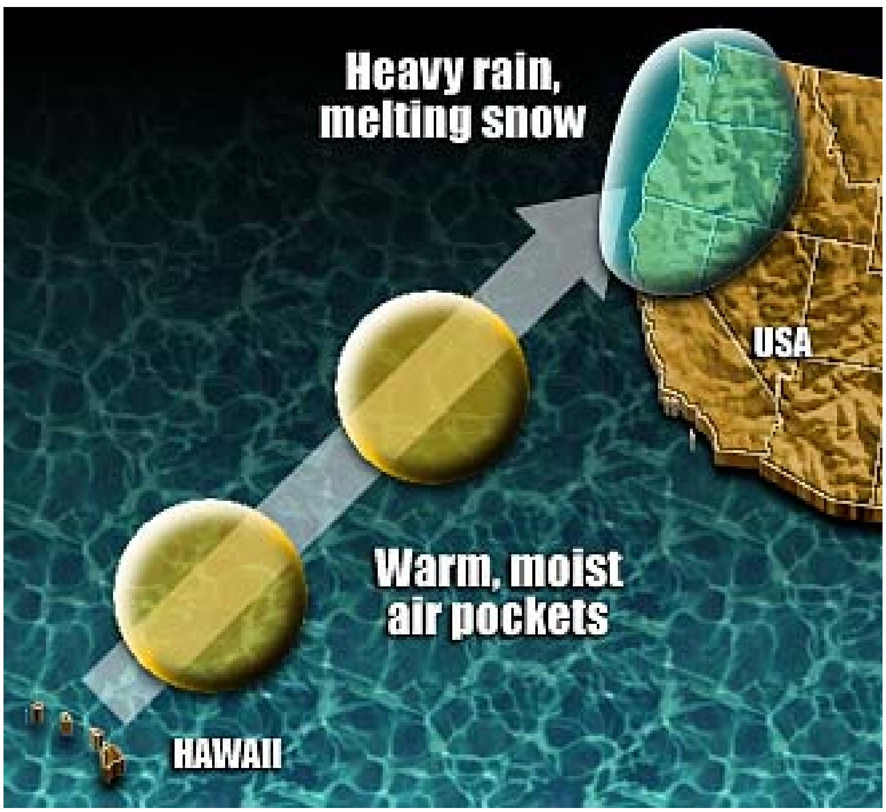


Source: California Department of Water Resources

Modoc County encompasses multiple rivers, streams, creeks, and associated watersheds. Damaging floods in Modoc County, while rare, occur primarily in the developed areas of the County. Flood flows generally follow defined stream channels, drainages, and watersheds. A weather pattern called the "Pineapple Express" contributes to the flooding potential of the area.

Pineapple express brings warm air, rain to West. A relatively common weather pattern brings southwest winds to the Pacific Northwest or California, along with warm, moist air. The moisture sometimes produces many days of heavy rain, which can cause extensive flooding. The warm air also can melt the snow pack in the mountains, which further aggravates the flooding potential. In the colder parts of the year, the warm air can be cooled enough to produce heavy, upslope snow as it rises into the higher elevations of the Sierra Nevada or Cascades. Forecasters and others on the West Coast often refer to this warm, moist air as the "Pineapple Express" because it comes from around Hawaii where pineapples are grown. This is shown in Figure 4-34. This weather pattern is discussed in Section 4.2.12 in the ArkStorm scenario.

Figure 4-34 Pineapple Express Weather Pattern



Source: USA TODAY research by Chad Palmer http://www.usatoday.com/weatherwpinappl.htm

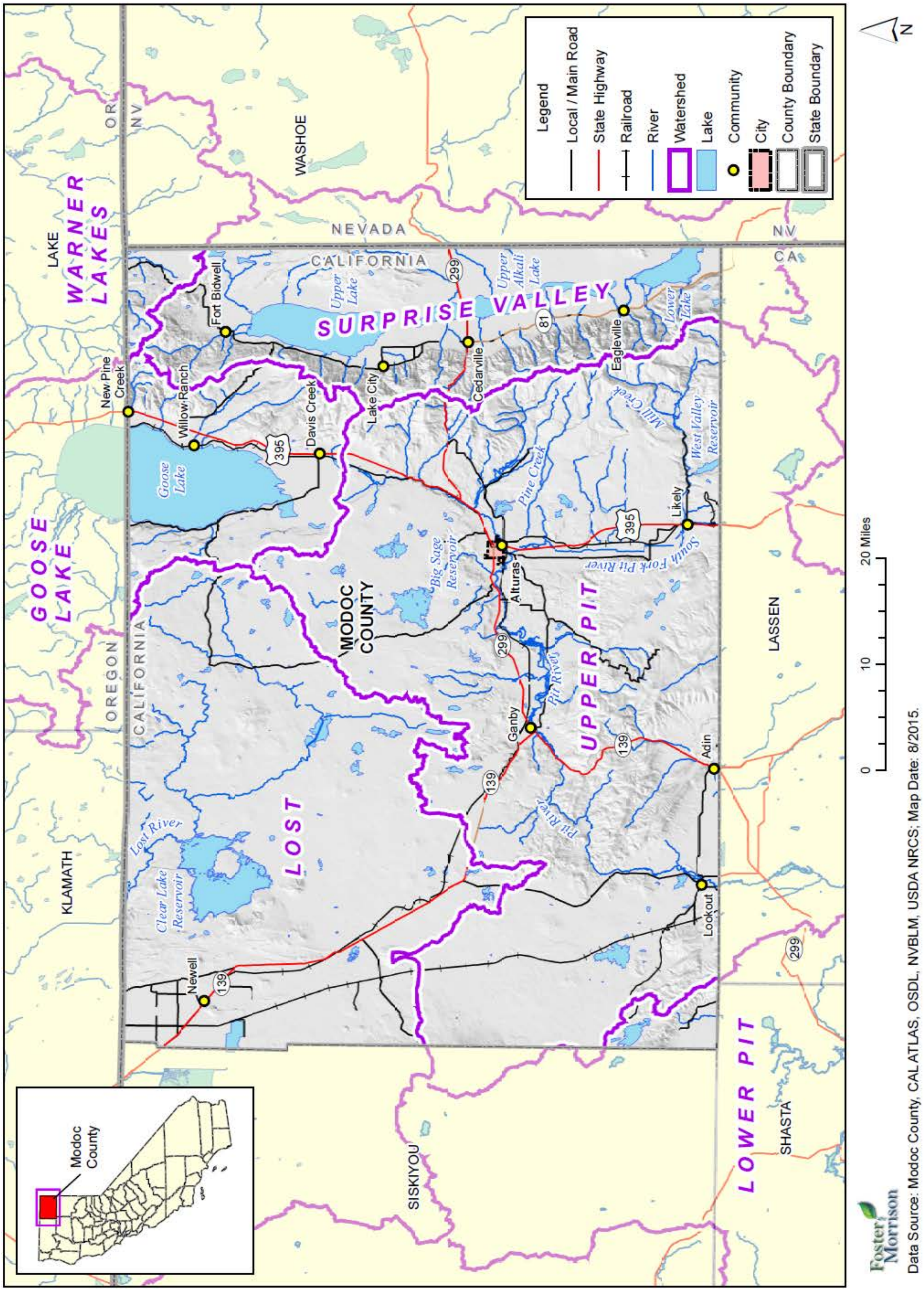
Modoc County Streams and Watersheds

According to mapping done by the California Department of Conservation, Modoc County intersects many watersheds. There are numerous small creeks that are tributaries to the major waterways. Waterways and watersheds in the County are shown in Figure 4-35. The six primary watersheds in the County are:

- Goose Lake

- Lost
- Lower Pit
- Surprise Valley
- Upper Pit
- Warner Lakes

Figure 4-35 Waterways and Watersheds in Modoc County



Data Source: Modoc County, CAL ATLAS, OSDL, NVBLM, USDA NRCS; Map Date: 8/2015.

According to the HMPC, there are four major flood areas: the cities of Alturas and Adin, as well as the communities of Fort Bidwell and Lake City. While many areas of the county are subject to flooding fairly often, few residences and businesses suffer long-term damage as a consequence. The frequency has, no doubt, discouraged development in flood-prone areas. Most flooding in Modoc County occurs along streams and rivers when the channels cannot contain the amount of water. This is most common during spring run-off or thunderstorm activity.

In Modoc County, the Flood Insurance Study (FIS) reports that flooding in the area can occur any time from fall to spring as a result of the occurrence of general rainstorms. General rain floods result from prolonged, heavy rainfall over tributary areas and are characterized by high peak flows and moderate duration and a large volume of runoff. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions, when the ground is frozen and infiltration is minimal, or when rain on snow in the higher elevations adds snowmelt to rain flood runoff. Summer thunderstorms can also lead to flooding. Flooding sources that could affect the County are shown in Figure 4-35.

Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping and associated products is provided in the following paragraphs.

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of the community that will be used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current Modoc County FISs are dated June 4, 2010. A preliminary FIS update was released on February 14, 2013 and was used for this LHMP.

Digital Flood Insurance Rate Maps (DFIRM)

As part of its Map Modernization program, FEMA is converting paper FIRMS to digital FIRMs, DFIRMS. These digital maps:

- Incorporate the latest updates (LOMRs and LOMAs);
- Utilize community supplied data;
- Verify the currency of the floodplains and refit them to community supplied basemaps;
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications; and
- Solicit community participation.

Preliminary DFIRMs for Modoc County, dated February 14, 2013 are used for this plan's flood hazard analysis. It is anticipated that these DFIRMs will be finalized in December of 2015.This is shown in Figure 4-59 in Section 4.3.8.

Department of Water Resource (DWR) Floodplain Mapping

Also to be considered when evaluating the flood risks in Modoc County are various floodplain maps developed by Cal DWR for various areas throughout California, including Modoc County.

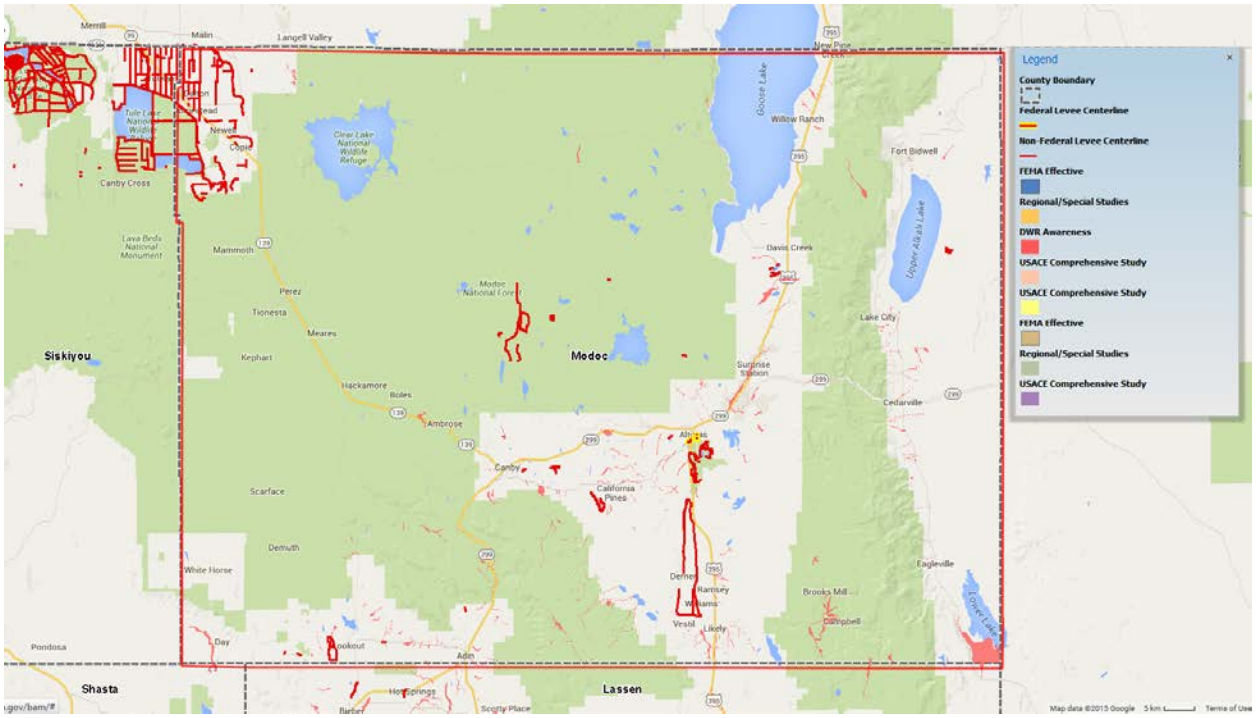
DWR Best Available Maps

The Best Available Maps were developed pursuant to Senate Bill 5 which requires DWR to develop preliminary maps for the 100- and 200-year floodplains located within the Sacramento-San Joaquin Valley watershed. These maps were developed by DWR to better reflect the most accurate information about the flooding potential in a community and were designed to provide a better understanding of the true risk of flooding to public safety and property. SB 5 requires that these preliminary maps be provided as best available information on flood protection to cities and counties in the watershed for: 1) areas protected by State-Federal project levees, and 2) areas outside the protection of project levees.

The new maps, compiled using information from state, local and federal agencies, have no regulatory status for floodplain development and are for information only. They do not replace existing FEMA regulatory floodplain maps (i.e., FIRMs and DFIRMs) and therefore do not make any changes in federal flood insurance requirements for homes and businesses. However, city and county governments will be able to use the maps to identify areas that warrant further study and to help make informed floodplain management and land use decisions. The floodplains shown on these maps delineate areas with potential exposure to flooding for two different storm events: one with storm flows that have a 1 percent chance of being equaled or exceeded in any year (100-year) and one with storm flows that have a 0.5 percent chance of being equaled or exceeded in any year (200-year).

These advisory maps will help communities begin early planning activities to meet SB 5 requirements calling for a minimum of 200-year protection for new development in urban and urbanizing areas. These floodplain maps for Modoc County can be seen in Figure 4-36.

Figure 4-36 Modoc County Best Available Map



Source: California DWR

DWR Awareness Floodplain Maps

The Flood Awareness Maps, developed under the Flood Awareness Mapping Project, are designed to identify all pertinent flood hazard areas by 2015 for areas that are not mapped under the FEMA NFIP and to provide the community and residents an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. The awareness maps identify the 100-year flood hazard areas using approximate assessment procedures. The floodplains are shown on these maps simply as flood prone areas without specific depths and other flood hazard data.

The Flood Awareness Maps are shown in Figure 4-36 above and can be accessed online at: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/awareness_floodplain_maps/modoc/.

Localized Stormwater Flooding

According to the HMPC, localized, stormwater flooding also occurs throughout the County. Urban storm drainpipes and pump stations have a finite capacity. When rainfall exceeds this capacity, or the system is clogged, water accumulates in the street until it reaches a level of overland release. This type of flooding may occur when intense storms occur over areas of development.

Even localized impacts can have dramatic effects under some circumstances. The EOP noted that isolated flooding can cut areas off from emergency response. For example, throughout the County, small stream flooding and erosive landslides have damaged roads in numerous locations, restricting access along several miles of the road for weeks while repairs took place. A secondary effect of flooding is contamination of potable water and wells, overflow of septic systems and treatment facilities, requiring testing and decontamination.

According to the County, numerous parcels and roads throughout the County not included in the FEMA 100- and 500-year floodplains are subject to flooding in heavy rains. These are delineated in Table 4-46 in Section 4.3.9 The City of Alturas has areas within the city that flood due to storm drain backups during heavy rains. In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, mudslides, debris areas, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff.

Past Occurrences

This section deals with past occurrences of both 100-/500-year flooding and localized flooding. The state and federal declarations for storms and flooding were in 1962, 1964, 1969, 1970, 1986, 1992, 1995, 1997, 2004, and 2011.

The NCDC database tracks flooding for Modoc County. Entries into the NCDC database since 1993 for Modoc County are shown in Table 4-19.

Table 4-19 NCDC Flooding Events for Modoc County 1993 to 12/31/2014

Hazard Type	Date	Injuries*	Fatalities*	Property Damage*	Crop Damage*
Flood	1/1/1997	0	0	$330,000,000	$0
Flood	6/12/1998	0	0	$0	$0
Flash Flood	6/27/2004	0	0	$0	$0
Flash Flood	5/6/2005	0	0	$0	$0
Flood	5/8/2005	0	0	$2,250,000	$0
Flood	12/2/2012	0	0	$0	$0
Totals		**0**	**0**	**$332,250,000**	**$0**

Source: NCDC
*Injuries, fatalities, and damage figures are for the event as a whole, and not solely for Modoc County.

Details on recent floods from the NCDC are provided below:

- **January 1 to 17, 1997** – Parts of Surprise Valley California were inundated by heavy rainfall, causing mud and debris from mountain and hill sides to slide into homes in the community of Lake City (north of Cedarville). Also, parts of County Road One were either covered by mud or washed out. Estimated damage to the road was about $1.5 million. Estimated damage to area homes was about $500,000.

Figure 4-37 Quail Valley Ranch near Lookout, January 1997

Source: Modoc County 2004 EOP

- **June 12, 1998** – Thunderstorms with heavy rain and small hail developed early in the afternoon across much of Modoc County. Rainfall rates exceeded an inch and a half per hour in northern Modoc County near Newell. Many cases of small stream flooding with water covering roads were reported countywide. One house was sand-bagged for rising water. No injuries, fatalities, or damages were recorded.
- **June 27, 2004** – Modoc County Highway Department reported water and debris over Highway 1 at Owl Creek between Eagleville and Cedarville. No injuries, fatalities, or damages were recorded.
- **May 6, 2005** – County officials reported that flash flooding was occurring along Thom's Creek and Joseph Creek on the west slopes of the Warner Mountains just below Cedar Pass. As best as can be determined, heavy showers dropped about 2 inches of rain over the Warners in the preceding few days, and this combined with snow melt due to high freezing levels led to high flows on these creeks. Nine homes were isolated by the flood waters, but no damage, deaths, or injuries were reported. However, main stem flooding later occurred on the Pit River, into which these two creeks drain.
- **May 8, 2005** – County officials reported widespread main stem flooding on the Pit River due to heavy rain and snowmelt that occurred in the Warner Mountains several days before. The river was reported to be 1/4 to 1/2 mile in spots with several county roads inundated and closed. A lot of farmland was also submerged, but no structural damage was reported. Extensive road damage occurred and agricultural fields were flooded. Damage was reported to alfalfa crops and sand hill crane nests. In particular, County Roads 69 and 61 were closed due to high water. County Road 58 near Parker Creek had a bridge undermined. 100 yards of County Road 11 in Lake City Canyon was washed out. Several other county roads were flooded or damaged, but were not rendered impassable. Damage to public property and infrastructure was estimated at 2.25 million. No loss of life or injuries were reported.

- **December 2, 2012** – A warm and moist flow off of the Pacific brought strong winds, heavy rain, and high elevation snow (mostly above 7000-7500 feet) in the Sierra on the 2nd and 3rd. A widespread 2 to 5 inches of precipitation fell over eastern California. The heavy rain brought localized areas of debris flows and flooded roads as well as minor flooding (little or no damage) along the Susan River in and near Susanville. Water washed over highway 1 between Cedarville and Fort Bidwell in multiple areas. In some areas, the water was over 20 feet wide. A spotter just northeast of Fort Bidwell reported 1 inch of rain between 0100PST and 0700PST, with 1.5 to 1.8 inches in 24 hours in Cedarville and Fort Bidwell. No injuries, fatalities, or damages were recorded.

The FIS noted and event that took place in January of 1995. A significant storm hit the area. Flooding occurred in areas of the County. No injuries or deaths were reported. Damage estimates were unavailable. A picture of flood effects is shown on Figure 4-38.

Figure 4-38 1995 Flooding

Source: Modoc County

The HMPC noted the following events not captured in the NCDC:

- There was major flooding in December of 1937 in Alturas. 200 families were evacuated when rain fell while snow was melting. Reports of 2' to 5' of water in the middle of the town, which was the worst flooding since 1889.
- There was a major flood in 1938. As in 1937, rain fell on top of snow in March. Highway 195 to Susanville was closed. Cedar Pass was washed out and closed. In total, over $300,000 in federal government reimbursement to the community.

- In the last fifteen years, there were events in 2002, 2005, 2008, and 2011 that resulted in Emergency Declarations and activations of the Emergency Operations Center.
- During the writing of this plan, the HMPC noted an event that occurred in the County near White Horse. On the 19th of May, 2015 (see Figure 4-39). Heavy precipitation from a thunderstorm fell on recently burned areas in southwest Modoc County, leading to localized flash flooding and a mudslide near Day California. This slide was associated with a burn scarred area and affected two houses. A sheriff deputy reported that clogged culverts caused mud and water to overflow the road.

Figure 4-39 Modoc County Flash Flooding and Mudslide – May 2015

Source: Modoc County

According to the EOP, urban flooding occurs when rainfall exceeds capacity of storm drains. 2005, 2008, and 2011 had extensive flooding that activated emergency services.

Likelihood of Future Occurrence

100-/500-year Flood

Occasional—The term "100-year flood" is misleading. It is not the flood that will occur once every 100 years. Rather, the 100-year flood is the flood that has a one percent chance in any given year of being equaled or exceeded. Thus, the 100-year flood could occur more than once in a relatively short period of time.

Localized Stormwater Flooding

Highly Likely—With respect to the localized, stormwater flood issues, the potential for flooding may increase as storm water is channelized due to land development. Such changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. Urban storm drainage systems have a finite capacity. When rainfall exceeds this capacity or systems clog, water accumulates in the street until it reaches a level of overland release. With increasing urbanization of the Modoc County Planning Area, combined with older infrastructure, this type of flooding will continue to occur during heavy rains.

Climate Change and Flood (100/500 year and Localized Flooding)

According to the CAS, climate change may affect flooding in the County. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events.

4.2.13. Landslide, Mudslides, and Debris Flows

Hazard/Problem Description

According to the CGS, a landslide is a general term for a variety of mass-movement processes that generate a down-slope movement of mud, soil, rock, and/or vegetation. For the purposes of this plan, the term landslide includes mudslides, debris flows, and rockfalls that tend to occur suddenly, whereas erosion is a similar process that tends to occur on smaller scales and more gradually.

Natural conditions that contribute to landslide include the following:

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

In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground movement. Human activities contribute to soil instability through grading of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation.

Another hazard related to landslide and erosion is the fall of a detached mass of rock from a cliff or down a very steep slope (rockfall). Weathering and decomposition of geological materials produce conditions favorable to rockfalls. Other causes include ice wedging, root growth, or ground shaking (earthquake). Destructive landslides and rockfalls usually occur very suddenly with little or no warning time and are short in duration.

The HMPC noted that Surprise Valley is at the base of the Warner Mountains – where historically, much of this mountain came down. The EOP noted the greatest impact from landslide will be the isolation of communities due to damage to the transportation and utility infrastructures, including communications, road closures, and subsequent damage.

The General Plan Safety Element noted that there is a direct relation between the degree of slope and associated hazards. As slope increases, so does the potential for conditions hazardous to human life and structures situated in the area. Land having an average slope of 30 percent or greater is generally considered less suitable for intensive development because it is difficult and more costly to develop. Also, level or gently sloping lands completely surrounded by broad ranges of steep slopes would be expensive to develop and serve because of access problems.

Previous Occurrences

Historically, debris flows occurred during winter storms or in burn scar areas. In the spring of 1996, a landslide on Highway 299 caused damages near Cedar Pass.

Figure 4-40 Highway 299 on Cedar Pass, Spring 1996

Source: 2004 Modoc County EOP

In 1997 Powley Canyon closed the road 2 miles north of Lake City. Traditionally, State Highway 299 and County Road 1 are closed annually. Roads can be closed more than 48 hours and both are the single road through an area, thus when closed, communities are isolated.

On April 12 of 2005, erosion and slumping occurred in the County. County Road 9 near Fandango Pass was washed out when flow from a reservoir crossed the road. Damages can be seen on Figure 4-41.

Figure 4-41 County Road 9 Washout, April 12, 2005

Source: Modoc County

In May of 2015, heavy rains, mud, and debris caused damage to a 100 yard section of road in the County. Debris flows came close to two houses. The flooding was a result of heavy rains on the burn scar from recent wildfires. Damage exceeded $10,000 for local Roads Departments (Siskiyou and Modoc Counties). A Disaster Proclamation was requested from Modoc County Board of Supervisors.

Likelihood of Future Occurrences

Highly Likely—Landslides in the form of debris flow, or mudslides, have occurred in the past in Modoc County. The HMPC noted that certain areas of the County see some debris flows yearly (i.e. County Road 1), necessitating the highly likely rating. Rockfalls and landslides occur more frequently in spring months, when high levels of precipitation and runoff combine with saturated soils and/or repeated freezing and thawing, which leads to general slope instability. Landslides often can occur as a result of other hazard events, such as floods, wildfires, or earthquakes. The HMPC has concerns that Day Road is at risk to future occurrence as a result of the Day fire.

Climate Change and Landslide/Debris Flows

According to the CAS, increased precipitation may result from climate change. Increased precipitation makes areas more vulnerable to landslide potential.

4.2.14. Levee Failure

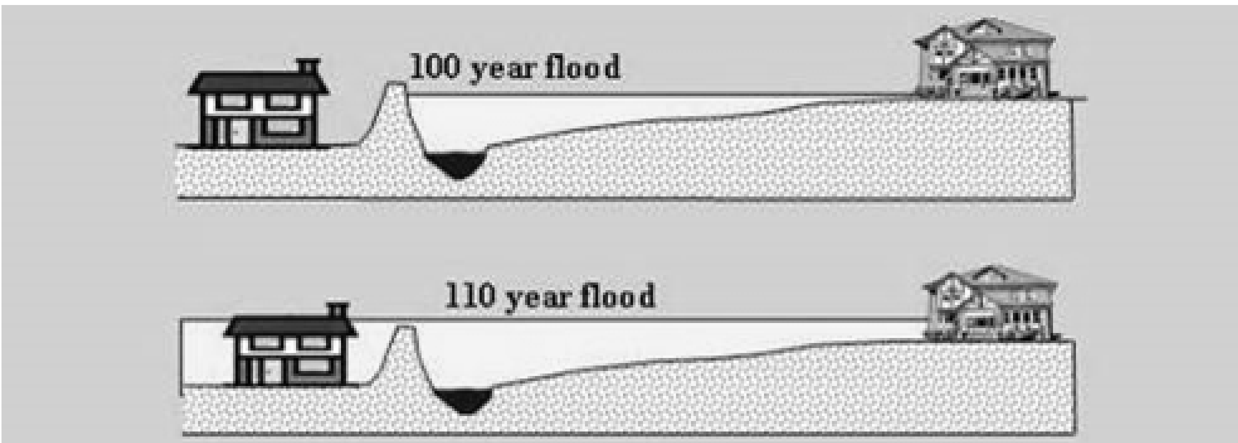
Hazard/Problem Description

The FIS refers to a levee as a raised area that runs along the banks of a river or canal. Levees reinforce the banks and help prevent flooding. By confining the flow, levees can also increase the speed of the water.

Levees can be natural or man-made. A natural levee is formed when sediment settles on the river bank, raising the level of the land around the river. To construct a man-made levee, workers pile dirt or concrete along the river banks, creating an embankment. This embankment is flat at the top, and slopes at an angle down to the water. For added strength, sandbags are sometimes placed over dirt embankments.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events. Levees reduce, not eliminate, the risk to individuals and structure behind them. Overtopping failure occurs when the flood water level rises above the crest of a levee.

Figure 4-42 Flooding from Levee Overtopping



Source: Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.
http://www.floods.org/ace-files/leveesafety/lss_levee_history_galloway.ppt

The 2013 FIS noted that no significant flood problems have been experienced in the City of Alturas since the completion of the USACE channel modification and levee improvement project in 1972. Flood protection measures for the area have been constructed by the USACE. The last major project, which was completed in 1972, included the following (USACE, April 1972):

- Channel excavation from approximately 4,400 feet downstream of the east-west SPRR spur track to approximately 500 feet upstream of the SPRR north-south main track. The total project was approximately 1.9 stream miles.
- New levee constructed and levee improvements at several locations throughout the project area, including the construction of a wing levee upstream of the SPRR north-south main track. The total project was approximately 1.9 stream miles.
- Channel erosion prevention facilities included riprap and sacked concrete slope protection at numerous locations throughout the project.

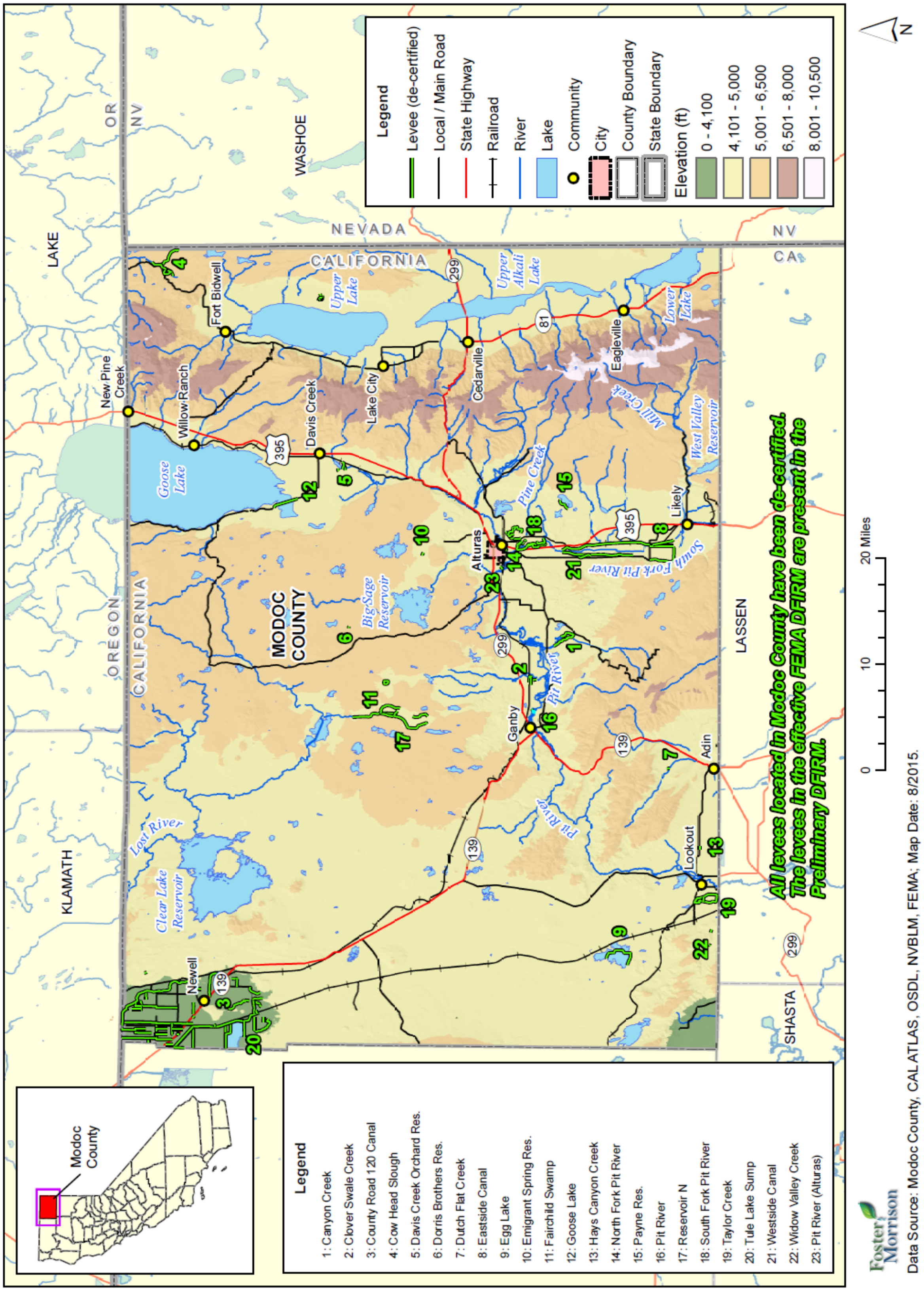
This flood control project is maintained by Modoc County under an agreement with the USACE. The maintenance is performed in accordance with an Operation and Maintenance Manual prepared by the USACE (USACE, February 1973). These activities include channel debris and vegetation removal and maintenance and repair of slope protection and levees. The USACE periodically inspects the project facilities and provides the County with direction regarding maintenance and repair. These inspections are to ensure that the project continues to comply with the USACE standard.

The levees associated with this flood control project are no longer accredited by FEMA as providing protection against the 1-percent-annual-chance flood. The National Levee Database also noted that there are no protecting levees existing within the County. In the 2013 FIS it was also noted that no protecting levees exist within Modoc County.

> *There are numerous levee systems in Modoc County; however none of them are accredited by FEMA as providing protection against the 1-percent-annual-chance flood.*

This means that while some levees are in place in the County and do provide some level of protection, they are not certified to protect against a 100-year flood. Leveed areas are shown on Figure 4-43. The HMPC noted that existing levees have recently been decertified because they were built to pre-1982 standards as not providing protection from the 1% Annual Chance Flood. There are no documented past occurrences of levee failure. There are additional problems with debris removal and rodent damage.

Figure 4-43 Leveed Areas of Modoc County



Past Occurrences

There have been no past occurrences of levee failure.

Likelihood of Future Occurrences

Unlikely – Given that there are no past occurrences of levee failure in the County levee failure is unlikely. However, if the levees are not maintained over time, likelihood of future occurrence may increase.

Climate Change and Levee Failure

According to the CAS, increased precipitation in the County could result in the possible overtopping of levees. This may be truer in Modoc County, where the levees are not certified to provide a 100-year level of protection.

4.2.15. Volcano

Hazard/Problem Description

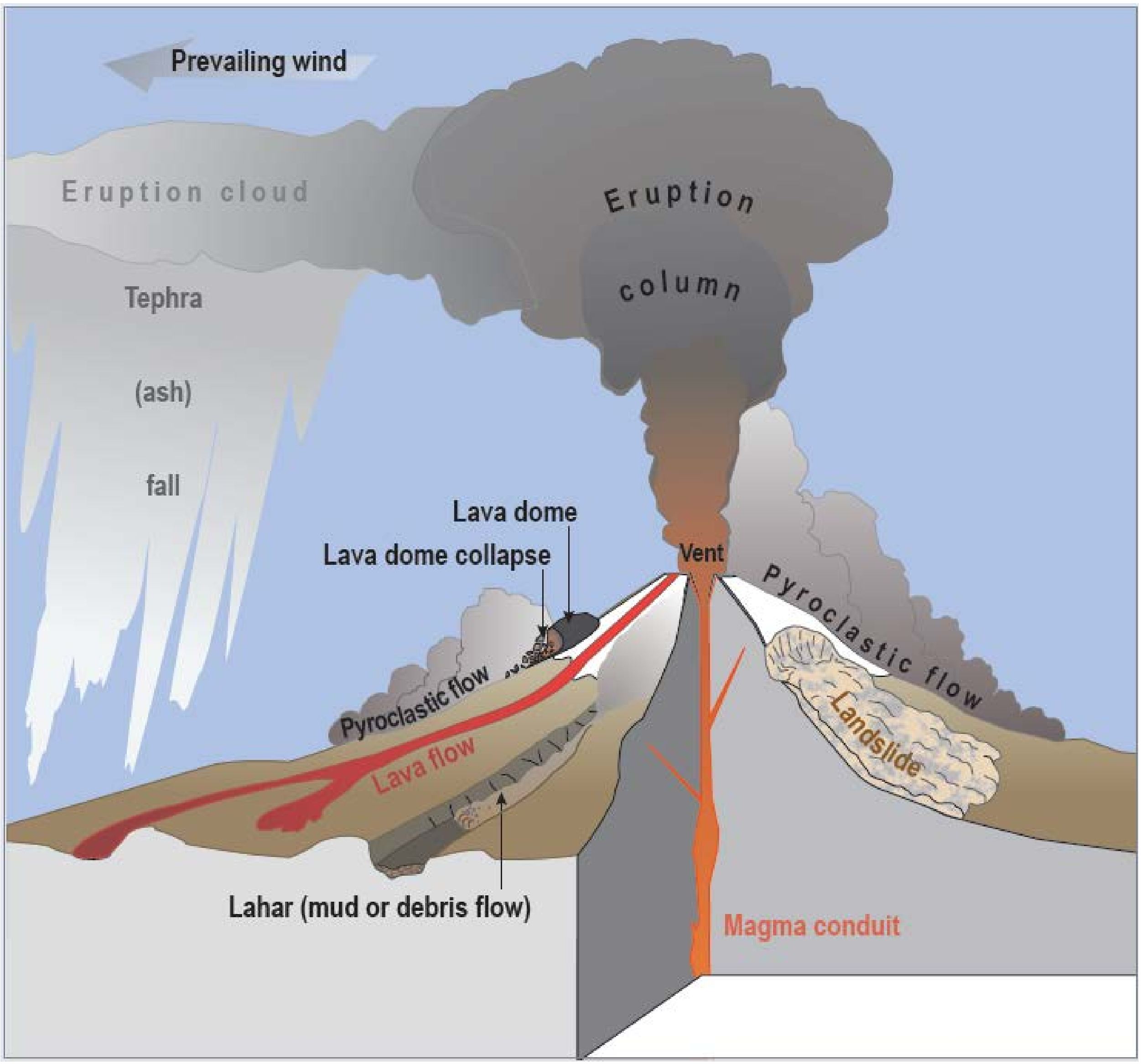
The California State Hazard Mitigation Plan identifies volcanoes as one of the hazards that can adversely impact the State. However, there have been few losses in California from volcanic eruptions. Of the approximately 20 volcanoes in the State, only a few are active and pose a threat. Of these, Medicine Lake, Mount Shasta, and Lassen Peak are the closest to Modoc County. Figure 4-44 shows volcanoes in or near California and their location relative to Modoc County.

Figure 4-44 Active Volcanoes in California and in the Modoc County Area

Source: 2013 State of California Hazard Mitigation Plan

As shown in Figure 4-45, active volcanoes pose a variety of natural hazards. Explosive eruptions blast lava fragments and gas into the air with tremendous force. The finest particles (ash) billow upward, forming an eruption column that can attain stratospheric heights in minutes. Simultaneously, searing volcanic gas laden with ash and coarse chunks of lava may sweep down the flanks of the volcano as a pyroclastic flow. Ash in the eruption cloud, carried by the prevailing winds, is an aviation hazard and may remain suspended for hundreds of miles before settling to the ground as ash fall. During less energetic effusive eruptions, hot, fluid lava may issue from the volcano as lava flows that can cover many miles in a single day. Alternatively, a sluggish plug of cooler, partially solidified lava may push up at the vent during an effusive eruption, creating a lava dome. A growing lava dome may become so steep that it collapses, violently releasing pyroclastic flows potentially as hazardous as those produced during explosive eruptions.

Figure 4-45 Volcanoes and Associated Hazards

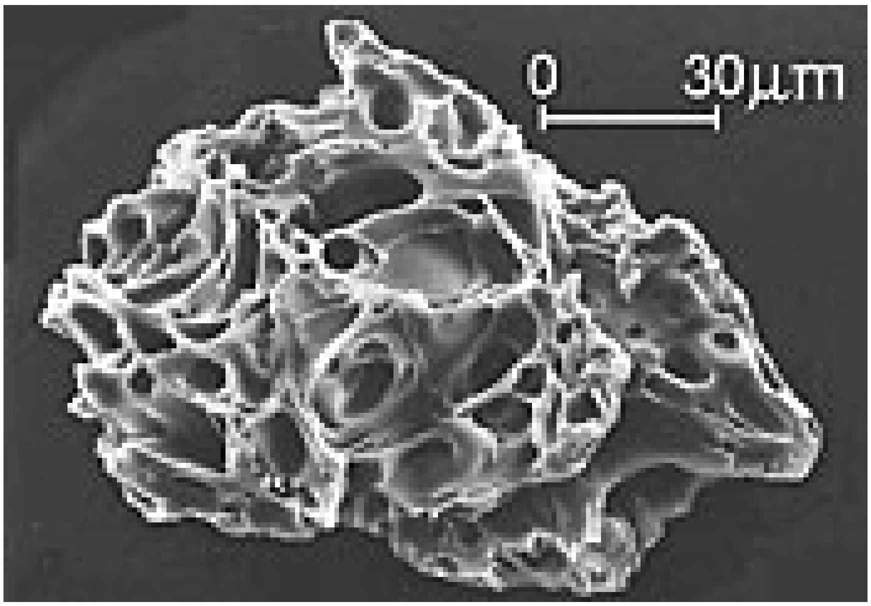


Source: USGS Publication 2014-3120

During and after an explosive or effusive eruption, loose volcanic debris on the flanks of the volcano can be mobilized by heavy rainfall or melting snow and ice, forming powerful floods of mud and rock (lahars) resembling rivers of wet concrete. These can rush down valleys and stream channels as one of the most destructive types of volcano hazards.

Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away and cause problems for aviation. The USGS notes specific characteristics of volcanic ash. Volcanic ash is composed of small jagged pieces of rocks, minerals, and volcanic glass the size of sand and silt, as shown in Figure 4-46. Very small ash particles can be less than 0.001 millimeters across. Volcanic ash is not the product of combustion, like the soft fluffy material created by burning wood, leaves, or paper. Volcanic ash is hard, does not dissolve in water, is extremely abrasive and mildly corrosive, and conducts electricity when wet.

Figure 4-46 Ash Particle from 1980 Mt. St Helens Eruption Magnified 200 Times



Source: US Geological Survey: Volcanic Ash: Effect & Mitigation Strategies. http://volcanoes.usgs.gov/ash/properties.html.

Volcanic ash is formed during explosive volcanic eruptions. Explosive eruptions occur when gases dissolved in molten rock (magma) expand and escape violently into the air, and also when water is heated by magma and abruptly flashes into steam. The force of the escaping gas violently shatters solid rocks. Expanding gas also shreds magma and blasts it into the air, where it solidifies into fragments of volcanic rock and glass. Once in the air, wind can blow the tiny ash particles tens to thousands of miles away from the volcano.

The average grain-size of rock fragments and volcanic ash erupted from an exploding volcanic vent varies greatly among different eruptions and during a single explosive eruption that lasts hours to days. Heavier, large-sized rock fragments typically fall back to the ground on or close to the volcano and progressively smaller and lighter fragments are blown farther from the volcano by wind. Volcanic ash, the smallest particles (2 mm in diameter or smaller), can travel hundreds to thousands of kilometers downwind from a volcano depending on wind speed, volume of ash erupted, and height of the eruption column.

The size of ash particles that fall to the ground generally decreases exponentially with increasing distance from a volcano. Also, the range in grain size of volcanic ash typically diminishes downwind from a volcano (becoming progressively smaller). At specific locations, however, the distribution of ash particle sizes can vary widely.

Past Occurrences

The USGS Volcano Hazards Program contains information on past volcanic activity in California and the rest of the United States. Information on past occurrences for each location is presented below.

Mount Shasta

Mount Shasta has erupted on the average at least once per 800 years during the past 10,000 years, about once per 300 years during the past 3,500 years, and about once per 250 years during the past 750 years. The last known eruption occurred about 200 radiocarbon years ago and may have occurred in 1786 A.D. Evidence for this eruption, recorded from sea by the explorer La Perouse, is somewhat ambiguous, but his description could only have referred to Mount Shasta.

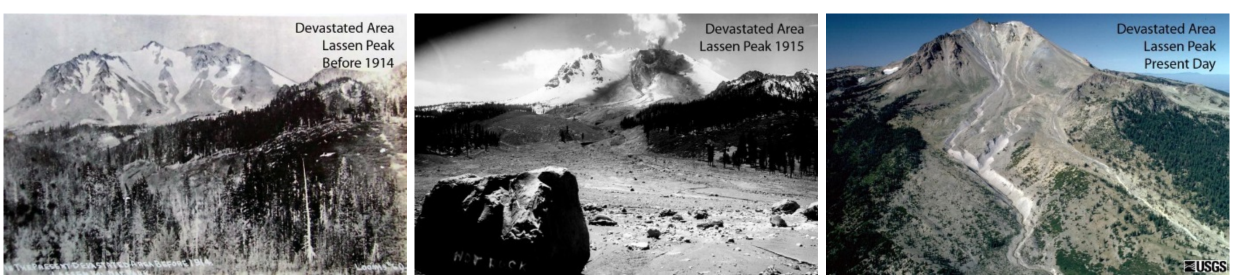
Medicine Lake

At least 17 eruptions have occurred since the end of glaciation at Medicine Lake, or between 1 and 2 eruptions per century on average, although activity appears to be strongly episodic. A significant amount of the area and volume of this stage was generated in the Giant Crater event that occurred just after the end of glaciation. This pulse of mafic volcanism in immediate postglacial time might have been related to pressure release accompanying melting of the volcano's ice burden. Nearly 8,000 years of quiescence followed this early mafic episode before three subsequent closely spaced eruptive episodes occurred. Between 3,000 and 900 years ago, eruptions produced approximately 2.5 km3 (1 mi2) of lava ranging in composition from basalt to rhyolite. Late Holocene lava compositions include basalt and andesite, but silicic lavas dominate.

Lassen

The Lassen Volcanic Center is still active, and three eruptions of Holocene age have occurred: Chaos Crags, Cinder Cone, and the 1914–1917 (see Figure 4-47) eruption at the summit of Lassen Peak. No other eruptions documented to be Holocene have occurred in the Lassen region. The 1914 to 1917 eruptions of Lassen Peak produced a yearlong series of minor steam blasts before a major explosion sent an eruption column 30,000 feet high and unleashed devastating pyroclastic flows and lahars. Windborne ash drifted 275 miles eastward and fell as far away as Elko, Nevada. The climactic phase of the eruption was over in a matter of days, but recurring steam blasts and lahars created hazardous conditions for several years afterwards.

Figure 4-47 Lassen Peak Before and After 1914 Earthquake



Source: USGS Volcano Hazards Program

Likelihood of Future Occurrences

Unlikely—Volcanic eruptions are certain to occur in California in the future and can be neither prevented nor stopped; however, these eruptions are expected to be spaced in large intervals of time. Actions can be taken to limit damage from them. Reduction of risk to life and property can be effected by avoiding threatened areas and by taking protective measures to reduce the effects when and where vulnerable areas cannot be avoided. Monitoring of volcanic precursors generally can identify the locality of impending volcanic activity, even though it often does not pinpoint the nature or timing of an eruption, or even its certainty. Hazard-zonation maps (shown in Figure 4-66) can then be used to guide decisions regarding evacuation and other response activities. Thus, effective monitoring of volcanoes in the State, combined with preparation of contingency plans to deal with future eruptions, can help reduce risk to lives and property.

Climate Change and Volcano

Climate change is unlikely to affect volcanic eruptions.

4.2.16. Wildfire

Hazard/Problem Description

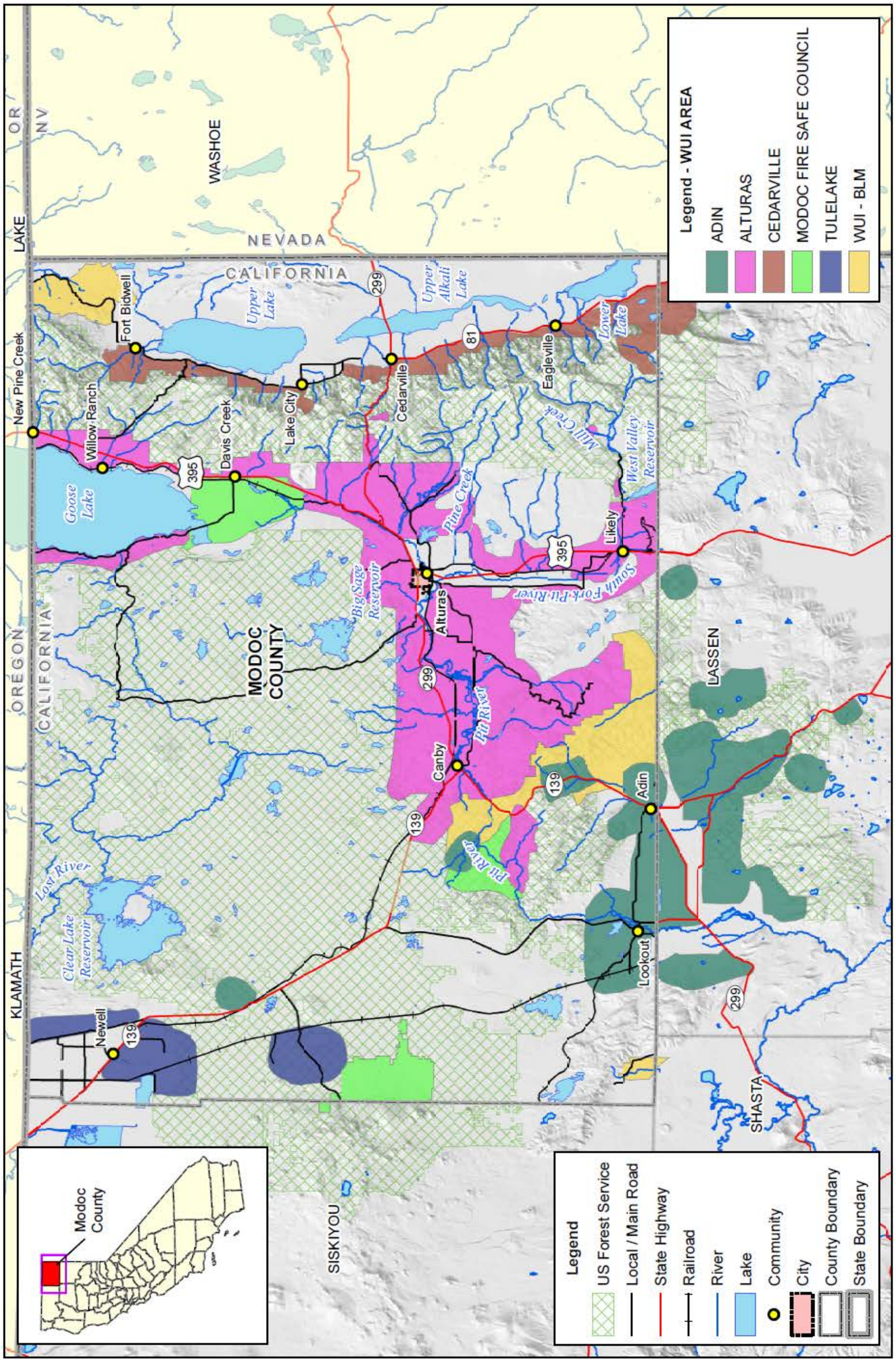
According to the 2012 Lassen-Modoc-Plumas Unit Strategic Fire Plan (Strategic Fire Plan) wildland fire is an ongoing concern for Modoc County. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. Drought may extend the fire season in Modoc County. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds.

Wildland Urban Interface

Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire suppression practices have affected the natural cycle of the ecosystem. While wildfire risk is predominantly associated with wildland urban interface (WUI) areas, significant wildfires can also occur in heavily populated areas. The wildland urban interface is a general term that applies to development adjacent to landscapes that support wildland fire. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them.

WUI fires are the most damaging. WUI fires occur where the natural forested landscape and urban-built environment meet or intermix. Even relatively small acreage fires may result in disastrous damages. The damages can be widely varying, but are primarily reported as damage to infrastructure, built environment, loss of socio-economic values and injuries to people. WUI locations in the County are shown in Figure 4-48.

Figure 4-48 Modoc County WUI Map



Data Source: Modoc County, US Forest Service, CAL ATLAS, OSDL, NVBLM; Map Date: 8/2015.

The pattern of increased damages is directly related to increased urban spread into historical forested areas that have wildfire as part of the natural ecosystem. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern may now burn these newly developed areas. WUI fires can occur where there is a distinct boundary between the built and natural areas or where development or infrastructure has encroached or is intermixed in the natural area. WUI fires may include fires that occur in remote areas that have critical infrastructure easements through them, including electrical transmission towers, railroads, water reservoirs, communications relay sites or other infrastructure assets.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. Also of significant concern to the Planning Area are the secondary impacts associated with a large burn area. Problems occur with landslides, debris flows, erosion, and other issues that lead to a significant loss of watershed. These problems can be compounded by climate conditions.

Consequently, wildland fires that burn in natural settings with little or no development are part of a natural ecological cycle and may actually be beneficial to the landscape. Century old policies of fire exclusion and aggressive suppression have given way to better understanding of the importance fire plays in the natural cycle of certain forest types.

Warning times are usually adequate to ensure public safety, provided that evacuation recommendations and orders are heeded in a timely manner. While in most cases wildfires are contained within a week or two of outbreak, in certain cases, they have been known to burn for months, or until they are completely extinguished by fall rains.

Wildfire in Modoc County

According to the Strategic Fire Plan, wildfire is an ongoing concern for Modoc County. Generally, the fire season extends from early spring to late fall. However, with the ongoing drought (as of the writing of this plan), the fire season has transformed into a year around event. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions when combined with high winds and years of drought increase the potential for a wildfire to occur. Urban wildfires often occur in those areas where development has expanded into the rural areas. A fire along this urban/rural interface can result in major losses of property and structures. Generally, there are three major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, and weather.

- **Fuel**—Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. In addition, "ladder fuels" can spread a ground fire up through brush and into trees, leading to a devastating crown fire that burns in the upper canopy and cannot be controlled. The volume of available fuel is described in terms of fuel loading.

- **Topography**—An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater the wind, the faster a fire will spread and the more intense it will be. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Lightning also ignites wildfires, which are often in backcountry terrain that is difficult for firefighters to reach. Drought conditions contribute to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

The Strategic Fire Plan noted that due to its location, Modoc County features examples of a wide range of challenging topography, fuels, and weather. These naturally occurring elements have a great deal of influence on the nature of wildland fires within its boundaries. The Lassen-Modoc-Plumas Unit is broken into battalions. Information specific to battalions who have responsibility areas in Modoc County are listed below.

- Battalion 3 (Bieber Battalion) is located in the northwest portion of Lassen County, southwest comer of Modoc County and borders to the west along Shasta - Trinity and Siskiyou Units. The communities of Bieber, Nubieber, Day, Lookout, Little Valley and Adin are located within its boundaries. The vegetative cover in the Battalion 3 is predominately standing timber with grass/sage cover. The Big Valley area of the Battalion is agricultural with much of the land committed to the production of hay. Many fires in this Battalion grow quite quickly, due to its remoteness and the lack of roads. Fire weather in Battalion 3 is typically wetter than that of Battalions 1 and 4 that are located in the rain shadow of the Sierra/Cascade Mountains.
- Battalion 4(Alturas Battalion) is located in the northeastern portion of the Lassen- Modoc - Plumas Unit. It is located on the east half of Modoc County with Oregon to the north and Nevada to the east. The southern end of the Battalion is within the northeastern part of Lassen County. The communities of Alturas, Canby, Likely, and Madeline are located within its boundaries. Battalion 4 also services the communities of Davis Creek, New Pine Creek, Willow Ranch, Cedarville, Eagleville, Lake City and Fort Bidwell. The vegetative cover in the Battalion is predominately standing timber in the mountains, with juniper grass/sage cover in the eastern half of the battalion where the terrain is at a lower elevation. Many fires in this Battalion grow quite quickly due to the remoteness of the area and lack of roads. Fire weather in Battalion 4 is drier on average than Battalion 2 and 3 with Battalion 4 being in the rain shadow of the Sierra Cascade/Mountains.

In addition to the Strategic Fire Plan, the 2008 Modoc County Community Wildfire Protection Plan contains information regarding vegetation in the County and its interrelation with wildfires.

> *Vegetation types in Modoc County are largely dependent on the mean annual precipitation received in any given area, generally in the form of snow. Precipitation, in turn, is largely determined by geographic location and the rain shadow effect. In general, higher amounts of precipitation occur on the western side of the county, and*

dropping off rapidly on the eastern side and in the valleys. Areas of higher precipitation and sufficient soil depth, support tree- dominated vegetation types such as mixed conifer and pine forests. The amount of brush and grass associated with these types varies but can be tall and thick, especially in the openings. Within the tree-dominated vegetation types, both the live vegetation and particularly the nonliving by-product of vegetation (leaves, needles, twigs, branches, and standing dead brush and trees) provide fuels for wildfire. According to the Anderson (1982) Fuel Model System, the forested areas comprised of timber and slash fuel complexes would generally predict fire behavior that is difficult to suppress.

In slightly drier zones of the country, the predominant vegetation type is pine or juniper with a grass understory. The density of trees and shrubs is generally much lower in this type of forest. Grass, shrub, and to a lesser degree the timber fuel model complexes are represented in these areas. The amount of burnable fuel in dead material and build-ups of thick and continuous brush and grass can still contribute to and create dangerous fuel and fire behavior conditions. Much of the vegetation in the lower elevations of the county is comprised of shrub-dominated types such as sagebrush and bitterbrush. Trees, if any, are typically juniper, and the distribution of shrubs, grasses, and forbs is variable, often depending on the type of soil. The lower elevations are characterized by the grass and shrub fuel model complexes and generally contribute to fire behavior that is relatively easier to control when compared to tree dominated vegetation types. However, fires in lower elevations can spread quickly and be dangerous and difficult to control, particularly if wind-driven.

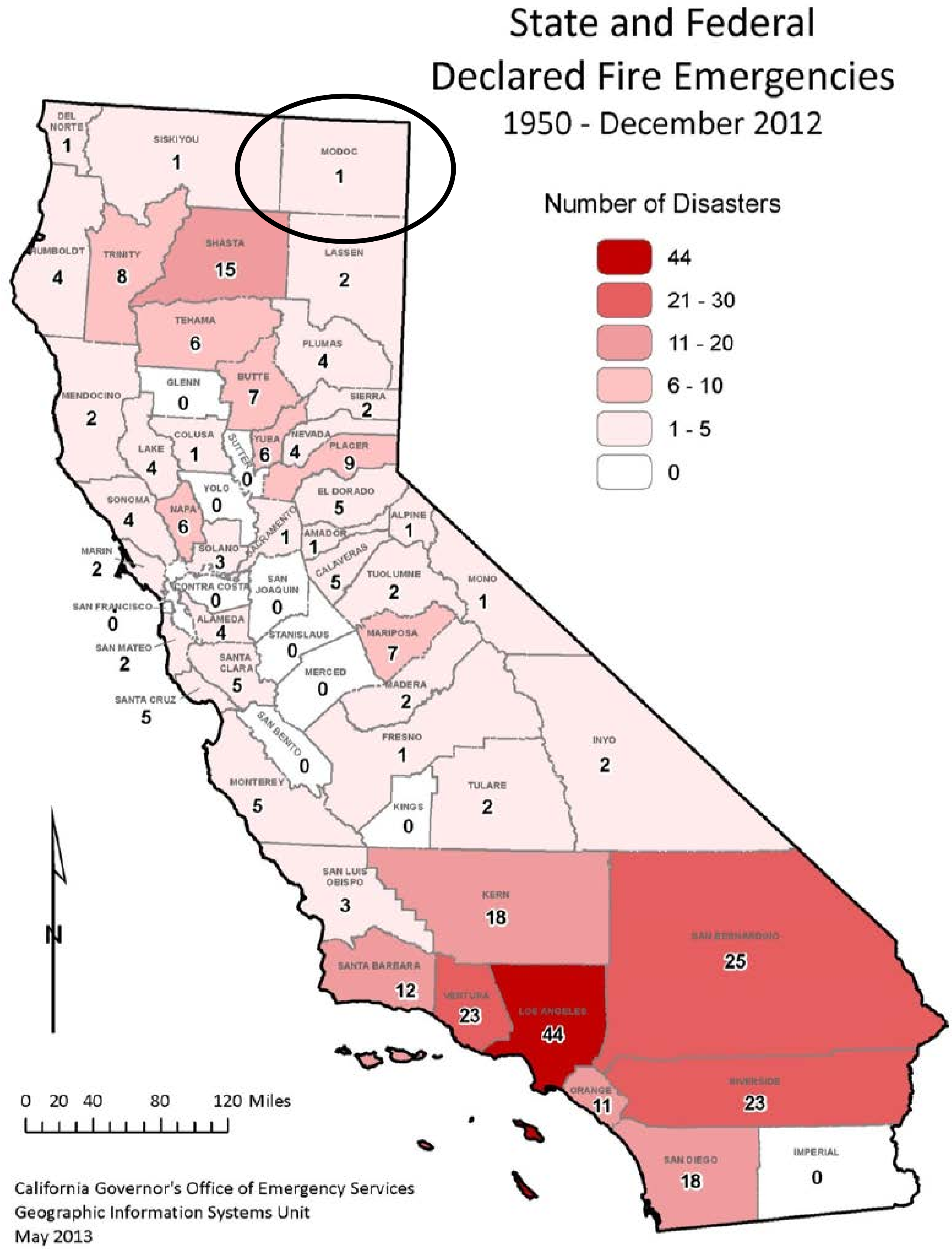
Many other vegetation types are found in smaller pockets within the county. These include riparian areas (generally narrow, dense groves of broadleaved and deciduous trees and shrubs), aspen groves, wetlands, irrigated pastures, grass meadows, and areas of tall chaparral throughout the county. These areas have various uses including agriculture, livestock grazing as well as wildlife habitat and are, with exceptions, generally lower wildfire risk areas. Wildfire plays a critical role in altering vegetation. In the timbered portions of the county, generally east and west of Alturas, areas affected by wildfires are often reduced to early stages of vegetation including grass and brush-fields and/or young timber stands that take long periods of time to recover and regain pre-fire conditions. In the eastern portions of the county, natural postfire recovery is also very slow. The generally dominant bitterbrush and sagebrush component is often succeeded by low value cheat grass and rabbit brush and restoration efforts on these arid vegetation types are particularly difficult and expensive after the devastating effects of wildfire.

The HMPC noted that recent philosophy of fire management is now again on fire suppression. This is largely due to the Sage Grouse habitat areas. Fire officials are suppressing fires in order to protect areas so that the species will not be listed. Fire management should include additional considerations such as renewable vs nonrenewable resources (such as timber) in determining their wildfire management position. Generally, fires deep in the forest have not been a significant issue. It is the fire near the subdivisions and WUI areas that could wipe an entire area out quickly.

Past Occurrences

According to the HMPC and CAL FIRE, wildfires of varying scales occur on an annual basis in Modoc County. Modoc County had received a state disaster declaration for wildfires in 1977. This is shown in Figure 4-49. In addition, the Day Fire in 2014 was declared a federal disaster (FM-5070) on 8/3/2014, after the creation of this map.

Figure 4-49 Modoc County Wildfire Declarations from 1950 to 2012



Source: 2013 California State Hazard Mitigation Plan

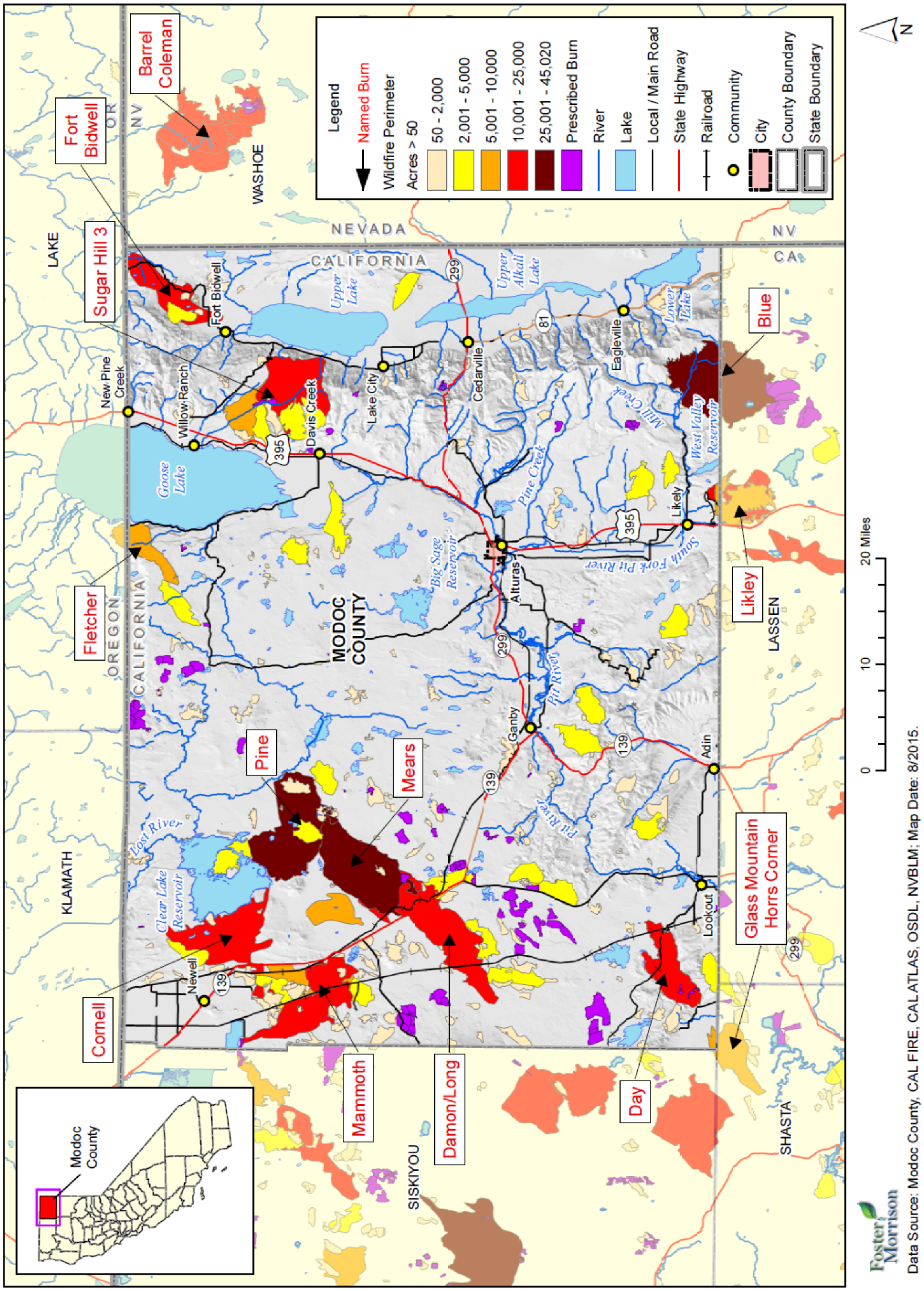
Wildfire History

CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management (BLM), the National Park Service (NPS), Contract Counties and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires back to 1878 (though the first recorded incident for the County was in 1917). For the National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported. CAL FIRE recognizes the various federal, state, and local agencies that have contributed to this dataset, including USDA Forest Service Region 5, BLM, National Park Service, and numerous local agencies.

Fires may be missing altogether or have missing or incorrect attribute data. Some fires may be missing because historical records were lost or damaged, fires were too small for the minimum cutoffs, documentation was inadequate, or fire perimeters have not yet been incorporated into the database. Also, agencies are at different stages of participation. For these reasons, the data should not be used for statistical or analytical purposes.

The data provides a reasonable view of the spatial distribution of past large fires in California. Using GIS, fire perimeters that intersect Modoc County were extracted and are listed in Table F-1 in Appendix F. There are 406 fires recorded in this database for Modoc County. 302 of these burned areas greater than 50 acres. Each of them was tracked by Cal Fire; Cal Fire last updated this database in June 2014. Table F-1 lists each fire's date, cause, name, and calculated acreage. Figure 4-50 shows fire history for the County, colored by the size of the acreage burned. Detailed tables of wildfire are shown in Appendix F.

Figure 4-50 Modoc County Wildfire History



The EOP noted that the Scarface Fire in 1977 was almost 80,000 acres; the Blue Fire burned approximately 34,000 acres in 2001; the Fletcher Fire in 2007 (see Figure 4-51) burned over 8,000 acres near the community of Davis Creek and in 2012, the Barry Fire burned over 80,000 acres for a period of over two weeks. In addition, the EOP noted that subdivisions have grown up in several areas of the county where wildfires are a significant risk. Big Valley Ranchettes, California Pines Hill Units, and Modoc Recreational Estates are only three. All have felt the risk at some point but have been spared so far. Communities can form Fire Safe Councils and work cooperatively with the U.S. Forest Service, Bureau of Land Management, and Cal Fire to create firebreaks and promote fire prevention activities.

Figure 4-51 Fletcher Fire – Near Point Ranch July 31, 2007

Source: Nancy Ballard, Modoc County OES

The HMPC noted the following about wildfires in Modoc County.

- Blue Lake Fire – In August of 2001, the Blue Lake Fire burned areas of Modoc County. It was noted by the HMPC that the fire ran so hot that it killed all vegetation. This has resulted in Manzanita's overrunning the County.
- Berry Point Fire – This fire started in Oregon in August of 2012 and moved down into Modoc County, which then merged with the Fletcher Fire.
- Day Fire, 2014 – The fire burned in July and August of 2014 and left a large burn scar that created potential for mud/debris flows. Heavy rains in May 2015 caused mud, rocks, debris to come down from this area. Two mobile homes were affected up to the door steps, road/shoulder/2 culverts damaged, cattle guard damaged, 100 yard section of the road has 2-3 inches of mud/debris to be removed. Damage assessments were in process during the creation of this plan.

Likelihood of Future Occurrence

Highly Likely—The season when wildfire is most likely to occur generally runs from late April through October. This is due to hot, dry conditions during this time of year.

Climate Change and Wildfire

According to the CAS, warmer temperature can exacerbate drought conditions. Drought often kills plants, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle.

4.2.17. Hazardous Materials Transport

Hazard/Problem Description

According to the EPA, a hazardous material is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Hazardous materials can be present in any form; gas, solid, or liquid. Environmental or atmospheric conditions can influence hazardous materials if they are uncontained.

The U.S. Occupational Safety and Health Administration's (OSHA) definition of hazardous material includes any substance or chemical which is a "health hazard" or "physical hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics.

The Environmental Protection Agency (EPA) incorporates the OSHA definition, and adds any item or chemical which can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment. The EPA maintains a list of 366 chemicals that are considered extremely hazardous substances (EHS). This list was developed under the Superfund Amendments and Reauthorization Act. The presence of EHSs in amounts in excess of a threshold planning quantity requires that certain emergency planning activities be conducted.

A release or spill of bulk hazardous materials could result in fire, explosion, toxic cloud or direct contamination of water, people, and property. The effects may involve a local site or many square miles. Health problems may be immediate, such as corrosive effects on skin and lungs, or be gradual, such as the development of cancer from a carcinogen. Damage to property could range from immediate destruction by explosion to permanent contamination by a persistent hazardous material.

Accidents involving the transportation of hazardous materials could be just as catastrophic as accidents involving stored chemicals, possibly more so, since the location of a transportation accident is not predictable. The U.S. Department of Transportation divides hazardous materials into nine major hazard classes. A hazard class is a group of materials that share a common major hazardous property, i.e., radioactivity, flammability, etc. These hazard classes include:

- Class 1—Explosives
- Class 2—Compressed Gases
- Class 3—Flammable Liquids
- Class 4—Flammable Solids; Spontaneously Combustible Materials; Dangers When Wet Materials/Water-Reactive Substances
- Class 5—Oxidizing Substances and Organic Peroxides
- Class 6—Toxic Substances and Infectious Substances
- Class 7—Radioactive Materials
- Class 8—Corrosives

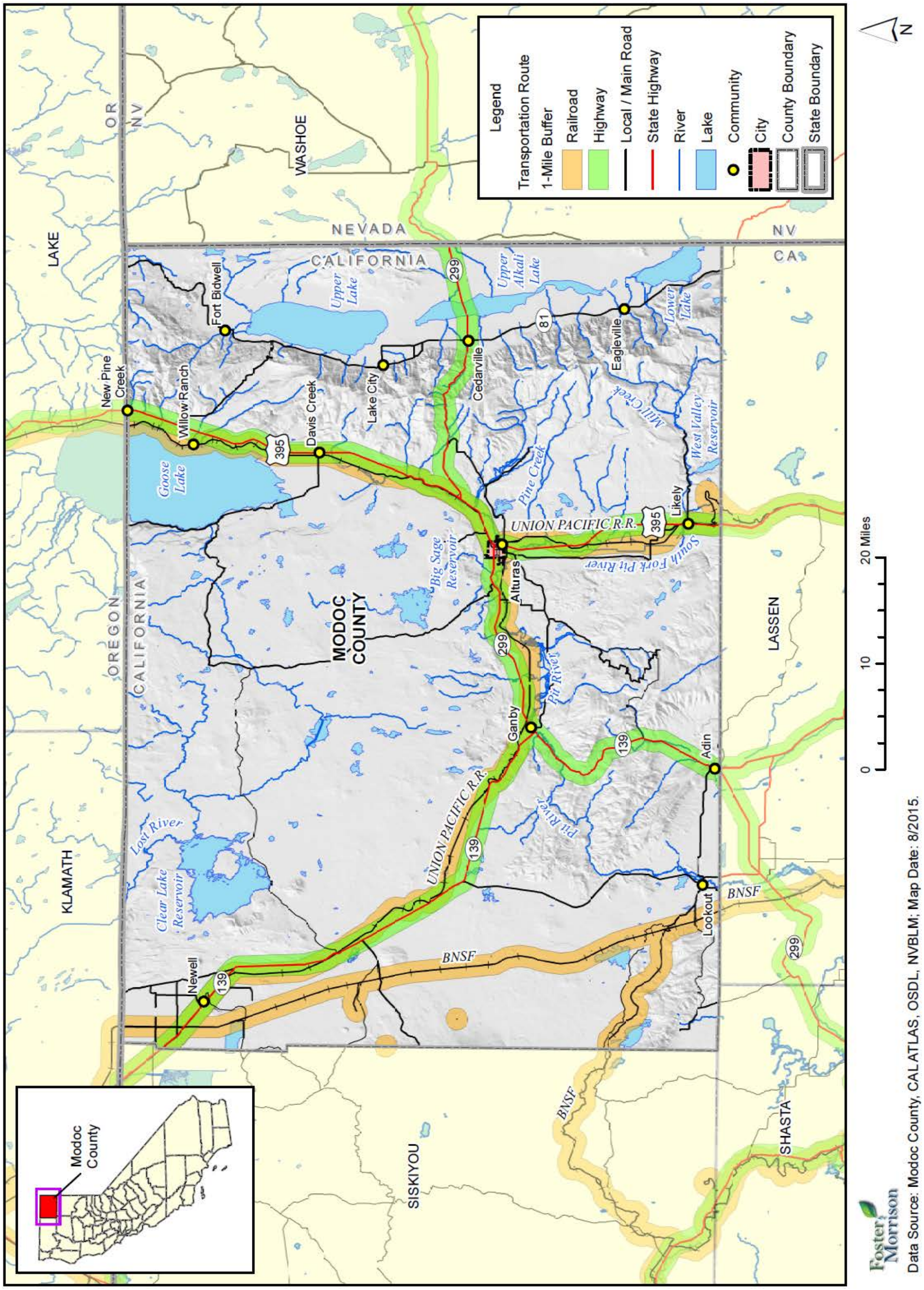
- Class 9—Miscellaneous Hazardous Materials/Products, Substances, or Organisms

Much of the hazardous materials transported through Modoc County are carried by truck on the State Highway or railway systems. Figure 4-52 shows the County roads, city streets, and rail lines that are used to transport locally generated wastes from the source to the regional highway system. The County has not quantified the amount of hazardous materials that are transported through it en route to adjoining counties or states.

Highways and railways constitute a major threat due to the myriad chemicals and hazardous substances, including radioactive materials, transported in vehicles, trucks, and rail cars. Highways 139, 299, and 395 are areas of concern, as are the two Union Pacific railroad tracks that roughly parallel I-80 and Highway 65. The 2004 EOP contained information on hazardous materials that pass through the County. A preliminary commodity flow study indicated that gasoline, diesel, and propane are the predominant materials moving through the County by highway. Two natural gas pipelines run through. Lake County Railroad runs between Alturas and Lakeville, with connections to the northwest. BNSF transports materials through the Tulelake Basin and the western edge of the County

Some of the hazardous materials transported through the County may bypass official hazardous materials routes to reach their destinations. Chemicals supporting local industries, such as agriculture operations and agriculture support operations, may transport hazardous materials to and from the facilities and fields. These are not shown on Figure 4-52.

Figure 4-52 Hazardous Materials Routes in Modoc County



Past Occurrences

The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration's (PHMSA) Office of Hazardous Materials Safety performs a range of functions to support the safe transport of hazardous material. One of these functions is the tracking of hazardous materials incidents in the United States. The database was searched for hazardous materials incidents in Modoc County. Rail and highway incidents since 1970 in the Modoc County Planning Area are shown in Table 4-20. 3 separate events were contained in the database. A summary of these is shown in Table 4-20. More information on these incidents are discussed after the table.

Table 4-20 Modoc County Hazardous Materials Incidents by Jurisdiction and Type

City/Jurisdiction	Highway Incidents	Rail Incidents	Damages
Alturas	2	1	$14,512
Total	**2**	**1**	**$14,512.00**

Source: PHMSA Database – Search dates 01/01/1970 – 06/30/2015

April 4, 1972 – Little is recorded on this event. A gasoline spill occurred near Alturas. Specific location, amounts spilled, clean up costs, and other costs were not available.

February 10, 2004 – While traveling on State Route 299 in Alturas, California a tractor-trailer unit was involved in a vehicle accident. H20 Environmental of Sparks Nevada was dispatched to perform the cleanup. Upon investigation by H20 Environmental, two leaking one gallon metal pails were discovered. Approximately one and one-half gallons of a caustic alkali liquid was released. H20 Environmental neutralized the free product. No injuries or exposures were reported. Damages and clean-up costs were estimated at $6,611.

August 28, 2006 – A rail spill of sulfuric acid occurred at milepost 44.7 on the BNSF rail. A BNSF conductor walking along side of his train after closing a switch noticed product dripping down the side of a train car. The BNSF train crew set out the car in the siding at the discovery location for mitigation response and investigation. BNSF responders inspected the car the morning of 8/29 after placing a catch receptacle under this tank car. Responders reported finding the closure cap to the liquid eduction line loose and it was tool tightened slowing the leak. BNSF contract responders arrived afterwards and inspected the closure cap finding no sealing material on either the closure cap or eduction pipe threads. Contract responders applied Teflon tape onto the threads reapplied the closure cap and tool tightened the cap. No further leakage evident after closure cap secured. Responders then checked the fill hole. The fill hole securement and its gasket were good. The product outage was checked and it was approximately six inches which equated to a little more than a 2% outage. A vacuum truck that was ordered previously to this location (in case product reduction was necessary) was not used and released after responders concluded that ACFX 73462 was not overfilled. The frangible disc was also checked and it was intact but the rupture disc housing cover hinge was broken and BNSF mechanical personnel were informed of this defect. Contract responders neutralized all spillage on the shell of the train car and also any ground impact areas that were discovered. 2 gallons were estimated to have spilled. Damages and clean-up costs of $7,901 were recorded.

Likelihood of Future Occurrence

Occasional – Given that 3 hazardous materials incidents have been reported in transport through the County in the past 45 years, a hazardous materials incident will occasionally occur in Modoc County.

Climate Change and Hazardous Materials Transport

Climate change is unlikely to affect hazardous materials transportation incidents.

4.2.18. Natural Hazards Summary

Table 4-21 summarizes the results of the hazard identification and hazard profile for the Modoc County Planning Area based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 4.2, this table includes the likelihood of future occurrence and whether the hazard is considered a priority hazard for the Modoc County Planning Area.

Table 4-21 Hazard Identification and Determination of Priority Hazard: Modoc County Planning Area

Hazard	Likelihood of Future Occurrence	Priority Hazard
Agriculture Hazards	Highly Likely	Y
Avalanche	Unlikely	N
Dam Failure	Unlikely	Y
Drought and Water Shortage	Highly Likely	Y
Earthquake	Occasional	Y
Erosion	Highly Likely	Y
Flood: 100/500 year	Occasional	Y
Flood: Localized Stormwater Flooding	Highly Likely	Y
Landslide, Mudslides and Debris Flows	Likely	Y
Levee Failure	Likely	Y
Severe Weather: Extreme Cold, Freeze, Winter Weather	Highly Likely	Y
Severe Weather: Extreme Heat	Highly Likely	N
Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)	Highly Likely	Y
Severe Weather: High Winds/Tornadoes	Highly Likely	Y
Volcano	Unlikely	Y
Wildfire	Highly Likely	Y
Hazardous Materials Transport	Occasional	Y

4.3 Vulnerability Assessment

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With Modoc County's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each priority hazard would have on the County. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses.

This vulnerability assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses*. The vulnerability assessment first describes the total vulnerability of the Modoc County Planning Area and values at risk and then discusses vulnerability by hazard.

Data used to support this assessment included the following:

- County GIS data (hazards and base layers)
- Modoc County Assessor's Data
- Statewide GIS datasets from other agencies such as Cal OES, FEMA, USGS, CGS, Cal Atlas, and others
- CAL FIRE GIS datasets
- USFS GIS datasets
- Modoc County staff
- City of Alturas staff
- Written descriptions of inventory and risks provided by Modoc County and City of Alturas
- Existing plans and studies
- Personal interviews and discussions with planning team members and staff from Modoc County and City of Alturas.

4.3.1. Modoc County's Vulnerability and Assets at Risk

As a starting point for analyzing the Planning Area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster was to occur in the Planning Area, this section describes significant assets at risk in the Planning Area. Data used in this baseline assessment included:

- General County Vulnerability
- Total County assets at risk;
- County critical facilities;
- Cultural, historical, and natural resources; and
- Growth and development trends.

General County Vulnerability

The EOP noted that the single most important characteristic of disasters in Modoc County is that individuals and communities become isolated and must depend upon themselves in the early stages of an emergency. All mitigation and preparedness must rest upon readiness of individuals and communities to wait out the initial isolation. Five distinct areas of the County can be defined in anticipation of becoming isolated from one another. They rarely suffer incidents all at the same time and each is subject to different hazards.

- Day lies in the southwest corner of the county, separated by the Big Valley Mountains. It relies on the McArthur Fire Department and Mayer's Memorial Ambulance from Shasta County for emergency services. A single road provides access to more than 10 miles of the Day Bench area including portions of four counties with residences in Lassen, Shasta, and Modoc. Wildfire presents a significant hazard to this area.
- Big Valley lies along the Pit River between the Big Valley Mountains and the Adin Mountains. Two volunteer fire departments and one ambulance service are located in the area. Flooding is the most common hazard. Wildfire is also a significant threat.
- The Tulelake Basin lies in the northwest corner of Modoc County, adjacent Siskiyou County, and north into Oregon. The Tulelake Fire Department covers areas of both Modoc and Siskiyou County. Basin Ambulance, out of Merrill, Oregon, serves the area. Heavily dependent on irrigated farming, droughts and unseasonable freezes have significant effects on agriculture in the Basin. A volcanic eruption of the Medicine Lake Highlands, while not likely, would impact this area more than other areas of the county.
- Surprise Valley lies east of the Warner Mountains on the Nevada border. It has four volunteer fire departments and one hospital with ambulance service. Most settlement lies along the west side of the valley close to the Surprise Valley Fault Line. Events, including flooding and severe storms, tend to close access to the Valley from the west.
- Alturas, the county seat, and the neighboring communities from Willow Ranch south to Likely and west to Canby, make up the central area of the county with over two-thirds of the population. Seven volunteer fire departments and one hospital with ambulance service cover the area. Flooding is the most frequent event impacting the area. Much of the hazardous materials shipped by truck through the county pass through Alturas.
- The City of Alturas is the only incorporated area in the county. About 31% of the total population lives within the city. About 19% of the population lives in the communities along the north and south forks

of the Pit River, Goose Lake, and in the Warm Springs Valley west of Alturas. Surprise Valley communities are home to about 15%; Day Road to about 1%; Big Valley to 8%, and Newell to 9%. The remaining 16% live outside of towns.

Total Assets at Risk

The total assets at risk for Modoc County is intended to capture the values associated with assessed assets located within the Modoc County Planning Area. In developing this information, the 2014 Modoc County Assessor's Office Values, combined with the 2014 GIS parcel layer, was obtained from the County's vendor, Parcel Quest in combination with the Modoc County Sheriff's Office. This data provided by Modoc County represents best available data.

Understanding the total assessed value of Modoc County is a starting point to understanding the overall value of the Planning Area. When the total assessed values are combined with potential values associated with other community assets such as critical facilities, natural resources, cultural and historic resources, and public and private infrastructure, the big picture emerges as to what is potentially at risk and vulnerable to the damaging effects of natural hazards within the County.

Data Limitations and Notations

Although based on best available data, the resulting information should only be used as an initial guide to overall values in the County, due to several limitations associated with the data used.

One data limitation identified was a text table (MOD_NoPolygonswithData.txt) containing 196 records/properties (only 33 with a physical address) which had not been included in the GIS parcel layer, and therefore, were not included in the parcel level analysis for this plan. The total value of these 196 extra records is around $5.9 million and account for about 4,700 acres. These values are not captured in the total asset tables, nor in any hazard-specific analysis.

Another limitation to assessed values within the County is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and, on the whole, does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of greatest concern or at risk to damages. Depending on the type of hazard and resulting damages, the land itself may not be a loss.

Also to be noted with the data utilized for these analyses, within the GIS parcel layer there are 20 right-of-way (ROW) parcels which do not contain assessment values. As such, these parcels are not included in the Total Assets at Risk Tables detailed below and are also excluded from further hazard analyses.

Methodology

The 2014 Modoc County Assessor's data was used as the basis for the inventory of assessed values for all parcels within the Planning Area. The data shows the land value and improved values for each parcel, along with a County Land Use Code (property use type). Each parcel record was attributed with its jurisdiction name (Unincorporated Modoc County or City of Alturas) based on whether its parcel centerpoint fell in or out of those jurisdictional boundaries.

County Use Codes within the parcel layer were used to categorize the parcels into distinct property types, including Agricultural, Commercial, Exempt, Industrial, Institutional, Recreational, and Residential. The Parcel Quest List of Use Codes document was used to translate Use Codes into descriptive use labels, which were grouped into the distinct categories mentioned above based on use description and best judgment. In cases where multiple categories could apply to a single parcel, a single category was assigned based on improvement values and, in a limited number of cases, photo analysis. Once Use Codes were grouped into Property Use categories, the number of total and improved parcels were inventoried by jurisdiction. Values associated with land and structure improvements were identified and summed in order to determine total values at risk in the Modoc County Planning Area and specific to each jurisdiction. In determining values specific to each property, the Land Value is reflected in its own category as well as the Improved Structure Value. Together, the Land Value and the Improved Structure Value make up the total assessed value associated with each identified parcel.

The Modoc County Planning Area, consisting of 32,423 parcels, has a total land value of $445 million. Of the Planning Area's total parcels, 5,307 are improved parcels with an improved value of $385 million, and a total value of $831 million. Unincorporated Modoc County, consisting of 30,493 parcels, has 3,967 improved parcels, a total of total land value of $423 million, improved structure value of $274 million, and total value of $697 million. The City of Alturas has 1,340 improved parcels, a total of total land value of $22 million, improved structure value of $111 million, and total value of $133 million. Table 4-22 shows the 2014 assessor values for the entire Modoc County Planning Area (i.e., the total values at risk) by jurisdiction. The values for unincorporated Modoc County are broken out by property use and are provided in Table 4-23.

Table 4-22 Modoc County Planning Area - Total Exposure by Jurisdiction

Jurisdiction	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
City of Alturas	1,930	$22,158,286	1,340	$111,646,889	$133,805,175
Unincorporated	30,493	$423,327,136	3,967	$274,076,176	$697,403,312
Total	**32,423**	**$445,485,422**	**5,307**	**$385,723,065**	**$831,208,487**

Source: Modoc County 2014 Assessor's Data, Modoc County Parcel Layer 2014

Table 4-23 Unincorporated Modoc County - Total Exposure by Property Use

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Agriculture	3,770	$274,068,313	752	$58,239,716	$332,308,029
Commercial	368	$5,120,830	181	$18,312,206	$23,433,036
Exempt	4,668	$0	0	$0	$0
Industrial	25	$843,778	10	$205,774	$1,049,552
Institutional	14	$51,879	14	$348,694	$400,573

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Recreational	18,742	$82,088,175	1,108	$59,628,090	$141,716,265
Residential	2,906	$61,154,161	1,919	$137,341,696	$198,495,857
Total	**30,493**	**$423,327,136**	**3,984**	**$274,076,176**	**$697,403,312**

Source: Modoc County 2014 Assessor's Data, Modoc County Parcel Layer 2014

Critical Facilities

The term "critical facilities", in general terms, is used to describe all manmade structures or other improvements that, because of their function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if they are destroyed, damaged, or if their functionality is impaired. Critical facilities commonly include all public and private facilities that a community considers essential for the delivery of vital services and for the protection of the community. They usually include emergency response facilities (fire stations, police stations, rescue squads, and emergency operation centers [EOCs]), custodial facilities (jails and other detention centers, long-term care facilities, hospitals, and other health care facilities), schools, emergency shelters, utilities (water supply, wastewater treatment facilities, and power), communications facilities, and any other assets determined by the community to be of critical importance for the protection of the health and safety of the population.

For purposes of this LHMP, Modoc County is using a FEMA Category IV Critical Facility definition for mapping and analysis purposes. Category IV Critical Facilities include: essential facilities such as hospitals, fire and police stations, rescue and other emergency service facilities, power stations, water supply facilities, aviation facilities, and other buildings critical for the delivery of vital services and for the protection of the community.

It should be noted that all of the schools and many churches and other facilities have a memorandum of understanding (MOU) with the County to provide a variety of functions related to sheltering during a disaster and might fall under multiple critical facility categories.

The critical facility inventory for the Modoc County Planning area is shown on Figure 4-53 and detailed in Table 4-24.

Figure 4-53 Modoc County Critical Facilities Inventory

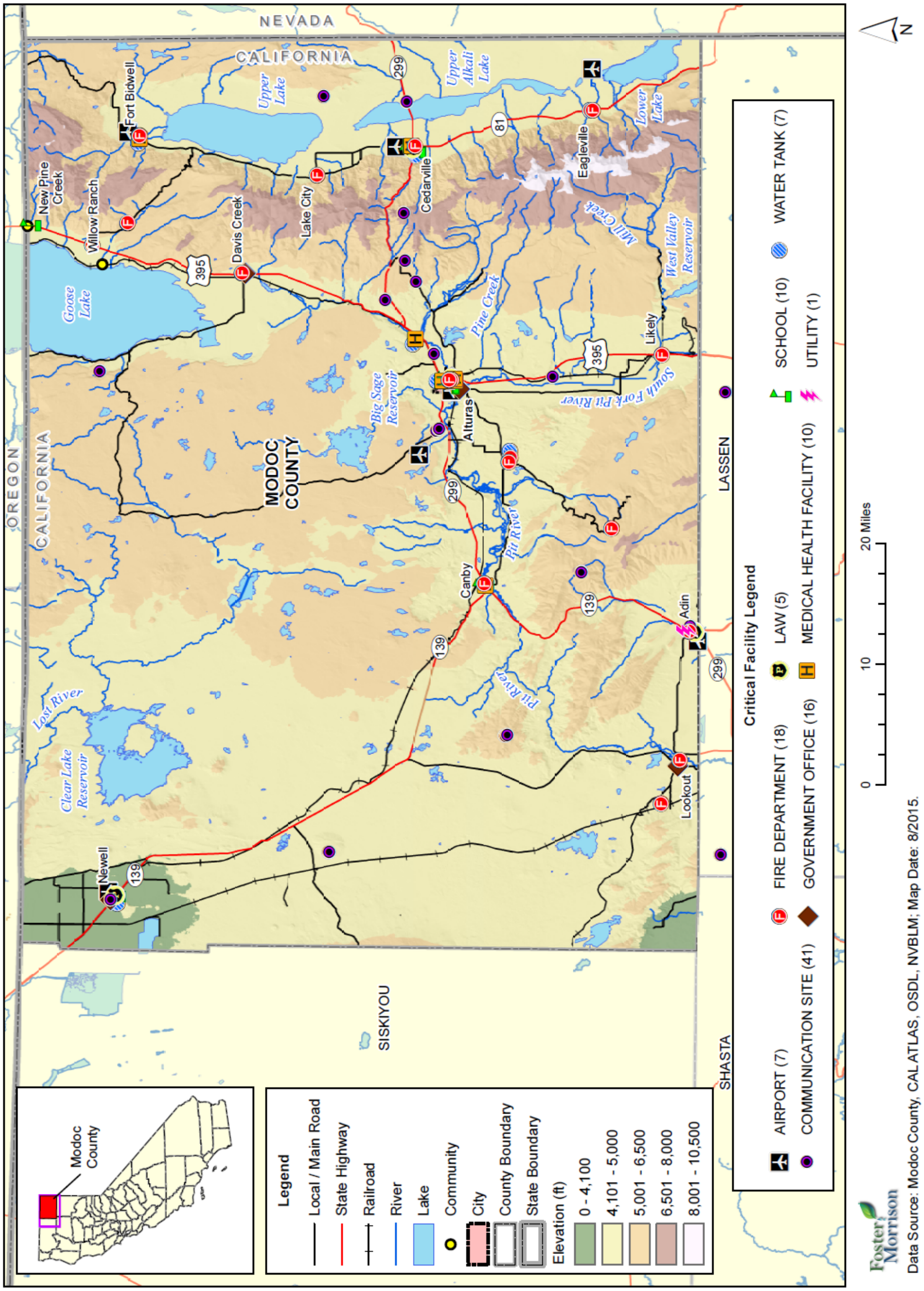


Table 4-24 City of Alturas – Critical Facility Inventory

Category	Type	Facility Count
City of Alturas		
Category IV Critical Facilities	Airport	1
	Communication Site	7
	Fire Department	2
	Government Office	11
	Law	2
	Medical Health Facility	3
	School	4
	Water Tank	2
	Total City of Alturas	**32**
Unincorporated Modoc County		
Category IV Critical Facilities	Airport	6
	Communication Site	28
	Fire Department	16
	Government Office	5
	Law	3
	Medical Health Facility	7
	School	6
	Utility	1
	Water Tank	5
	Total Unincorporated Modoc County	**77**
	Total Planning Area	**109**
Unincorporated Lassen County (outside of area of interest)		
Category IV Critical Facilities	Communication Site	6
	Total Unincorporated Lassen County	**6**
Total Critical Facilities Supporting the Modoc County Area		**115**

Source: Modoc County GIS

Natural, Historical, and Cultural Resources

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

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

Natural Resources

Modoc County's natural resources--its soil, water, agricultural and forest lands, fish and wildlife (and their habitats), mineral, and energy sources are essential for its economic vitality and central to the quality of life for the residents. In addition to providing support for valuable timber, agricultural and mineral production, these resources provide for a wide range of recreational opportunities, including hunting, fishing, and hiking, As California's population continues to expand, particularly the population centers of Northern California such as the Bay area, Sacramento, Chico, and Redding, Modoc County's fish and wildlife resources will continue to grow as an important component of the County's economic base.

A chief attraction of Modoc County is the wide variety and abundance of wildlife, Wildlife habitats and associated plant communities contribute significantly to aesthetic enjoyment, County based recreation and economic gain for local communities and individual landowners. Suitable habitat is the key to maintaining these important resources. Deer, antelope, black bear, and mountain lion are the big game species found in the County. Furbearing and mammalian predators in the county include badger, beaver, bobcat, coyote, gray fox, mink, muskrat, raccoon, spotted skunk, striped skunk, and weasel. Upland game species are also numerous. Ring-necked pheasant, quail, sierra grouse, sage grouse, Indian chukar, and mourning doves constitute too avifaunal upland game species. Rabbits and squirrels are too principal upland game mammals.

Modoc County also supports a significant waterfowl population due to its complex system of lakes, reservoirs, marshes, and grassland agricultural lands. The County has one of the highest breeding populations of waterfowl in California. Goose Lake, the Pit River Valley, Surprise Valley, and Big Valley, along with the Tulelake, Clear Lake, and Modoc National Wildlife Refuge, provide waterfowl breeding and nesting areas. Furthermore, Modoc County lies on the Pacific Flyway, and thus provides an important stopover for spring and fall migrations. Approximately 80 percent of the 5 to 6 million waterfowl using the flyway pass through the Tulelake-Lower Klamath area on their fall and spring migration.

The County is also rich in species not classified as game species, including raptors, wading and shore birds, small mammals, and land-associated non-game birds. Raptors include hawks, owls, eagles, ospreys, and vultures. Included within the large variety of shore birds, wading birds, and non-game birds is the greater sandhill crane, whose California nesting range is limited to the northeastern corner of the state.

The rivers, streams, lakes, wetlands, and reservoirs of the County also provide substantial fisheries resources. Rainbow trout, cutthroat trout, eastern brook trout, and brown trout are the principal cold water sport species. Warm water sport fishing consists of channel catfish, brown bullhead, large-mouthed bass, bluegill, and crappie. Forage and "rough" fishes found in the County include tuichub, speckled dace, bluegill, green sunfish, suckers, and squawfish.

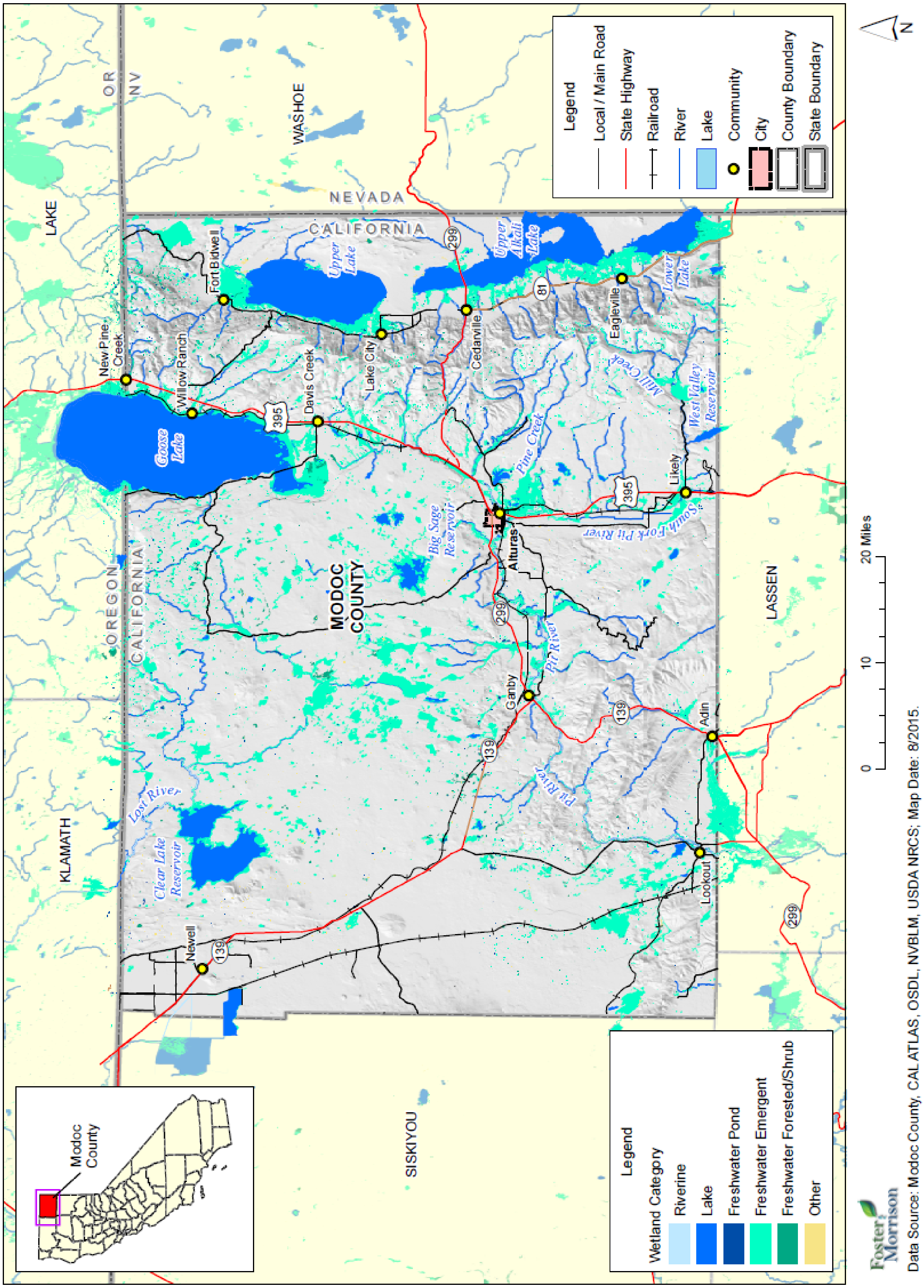
Natural and Beneficial Functions

Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat, filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other natural, human, and economic benefits.

Wetlands provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on wetlands during all parts of their lifecycle for food, overwintering, and reproductive habitat. Other species use wetlands for one or two specific functions or parts of the lifecycle, most commonly for food resources. In addition, wetlands produce substantial plant growth that serves as a food source to herbivores (wild and domesticated) and a secondary food source to carnivores.

Wetlands slow the flow of water through the vegetation and soil, and pollutants are often held in the soil. In addition, because the water is slowed, sediments tend to fall out, thus improving water quality and reducing turbidity downstream. Modoc County wetlands are shown in Figure 4-54.

Figure 4-54 Modoc County – Wetlands



Critical Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the Planning Area. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

There are many federal endangered, threatened, or candidate species in Modoc County. These species are listed in Table 4-25.

Table 4-25 Modoc County Critical Species

Group	Name	Status
Birds	Yellow-billed Cuckoo (*Coccyzus americanus*)	Threatened
Birds	Northern spotted owl (*Strix occidentalis caurina*)	Threatened
Conifers and Cycads	Whitebark pine (*Pinus albicaulis*)	Candidate
Crustaceans	Shasta crayfish (*Pacifastacus fortis*)	Endangered
Fishes	Lost River sucker (*Deltistes luxatus*)	Endangered
Fishes	Modoc Sucker (*Catostomus microps*)	Endangered
Fishes	Shortnose Sucker (*Chasmistes brevirostris*)	Endangered
Fishes	Warner sucker (*Catostomus warnerensis*)	Threatened
Flowering Plants	Slender Orcutt grass (*Orcuttia tenuis*)	Threatened
Flowering Plants	Greene's tuctoria (*Tuctoria greenei*)	Endangered
Mammals	Gray wolf (*Canis lupus*)	Endangered
Mammals	Canada Lynx (*Lynx canadensis*)	Threatened

Source: US Fish and Wildlife Service

Critical or sensitive wildlife habitats in Modoc County, as identified by the California Department of Fish and Game (CDFG), include deer winter range; antelope winter range, kidding grounds, key antelope migration routes and migration corridors, and areas with three or more resources in one location; nesting areas for the endangered bald eagle, threatened Swainson's hawk and sandhill crane; and stream habitats used by the threatened Modoc sucker, and Lost River sucker.

Historic and Cultural Assets

Modoc County has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.
- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

Historical resources included in the programs above are identified in Table 4-26.

Table 4-26 Modoc County – OHP Historical Resources

Name/Landmark Plaque Number	National Register	State Landmark	California Register	Point of Interest	Date Listed	Town
Adin Supply Company (N1972)	X				2/7/1997	Adin (Modoc)
Alturas Passenger Station (P320)				X	1/10/1974	Alturas (MOD)
Anklin Village Archeological Site (N423)	X				6/3/1976	Canby (Modoc)
Applegate-Lassen Emigrant Trail (Fandango Pass) (546)		X			1/27/1956	Fort Bidwell (Modoc)
Battle Of Land's Ranch-1872 (108)		X			3/29/1933	Tule Lake (Modoc)

Name/Landmark Plaque Number	National Register	State Landmark	California Register	Point of Interest	Date Listed	Town
Black Cow Spring (N291)	X				7/9/1974	Canby (Modoc)
Bloody Point (8)		X			6/1/1932	Tule Lake (Modoc)
Bonner Grade (15)		X			6/1/1932	Cedarville (Modoc)
Chimney Rock (109)		X			3/29/1933	Alturas (Modoc)
Core Site (N279)	X				4/8/1974	Canby (Modoc)
Cressler And Bonner Trading Post, 1865 (14)		X			6/1/1932	Cedarville (Modoc)
Cuppy Cave (N295)	X				7/12/1974	Canby (Modoc)
Evans And Bailey Fight-1861 (125)		X			7/6/1933	Canby (Modoc)
Fern Cave Archeological Site (N363)	X				5/29/1975	Tule Lake (Modoc)
First Jail & Office Of First Auditor & Recorder Of Modoc (P182)				X	9/24/1970	Alturas (MOD)
Fort Bidwell (430)		X			3/16/1949	Fort Bidwell (Modoc)
Frémont's Camp (6)		X			6/1/1932	Tule Lake (Modoc)
Infernal Caverns Battleground, 1867 (16)		X			6/1/1932	Likely (Modoc)
Jess Valley Schoolhouse (N2055)	X				5/20/1999	Likely (Modoc)
Lava Beds National Monument Archeological District (N1677)	X				3/21/1991	Tulelake (Modoc)
Madigan Memorial (P368)				X	1/17/1975	Alturas (MOD)
Mildred Ann Archeological Site (N424)	X				6/3/1976	Canby (Modoc)
Modoc County Courthouse (P708)				X	11/22/1988	Alturas (MOD)
NCO Railway Depot (N1349)	X				2/28/1985	Alturas (Modoc)
Nelson Springs (N2183)	X				11/21/2002	Likely (Modoc)

Name/Landmark Plaque Number	National Register	State Landmark	California Register	Point of Interest	Date Listed	Town
Nevada-California-Oregon Railway Co. General Office Building (N299)	X				9/6/1974	Alturas (Modoc)
Old Emigrant Trail (111)		X			3/29/1933	Canby (Modoc)
Petroglyph Point Archeological Site (N364)	X				5/29/1975	Tulelake (Modoc)
Sacred Heart Catholic Church (N1194)	X				6/30/1983	Alturas (Modoc)
Seven Mile Flat Site (N318)	X				12/24/1974	Devil's Garden Ranger District (Modoc)
Skull Ridge (N292)	X				7/9/1974	Canby (Modoc)
Skull Spring (N293)	X				7/9/1974	Canby (Modoc)
Tule Lake Relocation Center (850)		X			1/20/1972	Tule Lake (Modoc)
Tule Lake Segregation Center (N2315)	X				2/17/2006	Newell (Modoc)
Willow Ranch Townsite (P691)				X	8/13/1987	Davis Creek (MOD)

Source: California Office of Historic Preservation

It should be noted that as defined by the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability. Information from the 2009 Modoc County Housing Element and the California Department of Finance (DOF) form the basis of this discussion. More specific information on growth and development in Alturas can be found in its annex.

Past Growth and Current Population

Historically the number of county residents has increased from a population of just over 5,000 in 1900 to currently 9,417 in July of 2014 (including the City of Alturas) as estimated by the California Department of Finance. During this period growth has been cyclical, rising and falling in roughly ten-year increments. Previously these trends were related to job creation and loss. However a population decline through the

1990s and 2000s added outmigration to the list of reasons for population decline. It is important to note that when examining percent changes in population for Modoc County they can appear large because of the small population but actually translate to low numeric figures.

The total net change since 1990 is -2.7 percent, or a loss of 269 people. The period with the greatest growth was from 1990 to 1995, when the population grew from 9,678 to 10,014, the largest population ever recorded in Modoc County. The period with the greatest decline followed soon after, from 1998 to 2000 when the population fell from 10,014, to 9,445. This pattern is consistent with the entire period after World War II when the population of Modoc County was nearly the same as it is today. Coincidentally, the Census Bureau recorded 9,678 people in 1950, very similar to the number that was recorded 64 years later in the 2014 DOF estimates. Population numbers since 1990 are shown in Table 4-27.

Table 4-27 Modoc County Past and Current Populations

Year	Population	Numerical Change	Percent Change
1990	9,678	–	–
1995	10,014	334	3.5%
2000	9,445	-569	-5.6%
2005	9,610	165	1.7%
2010	9,686	76	0.1%
2014	9,417	-269	-2.8%

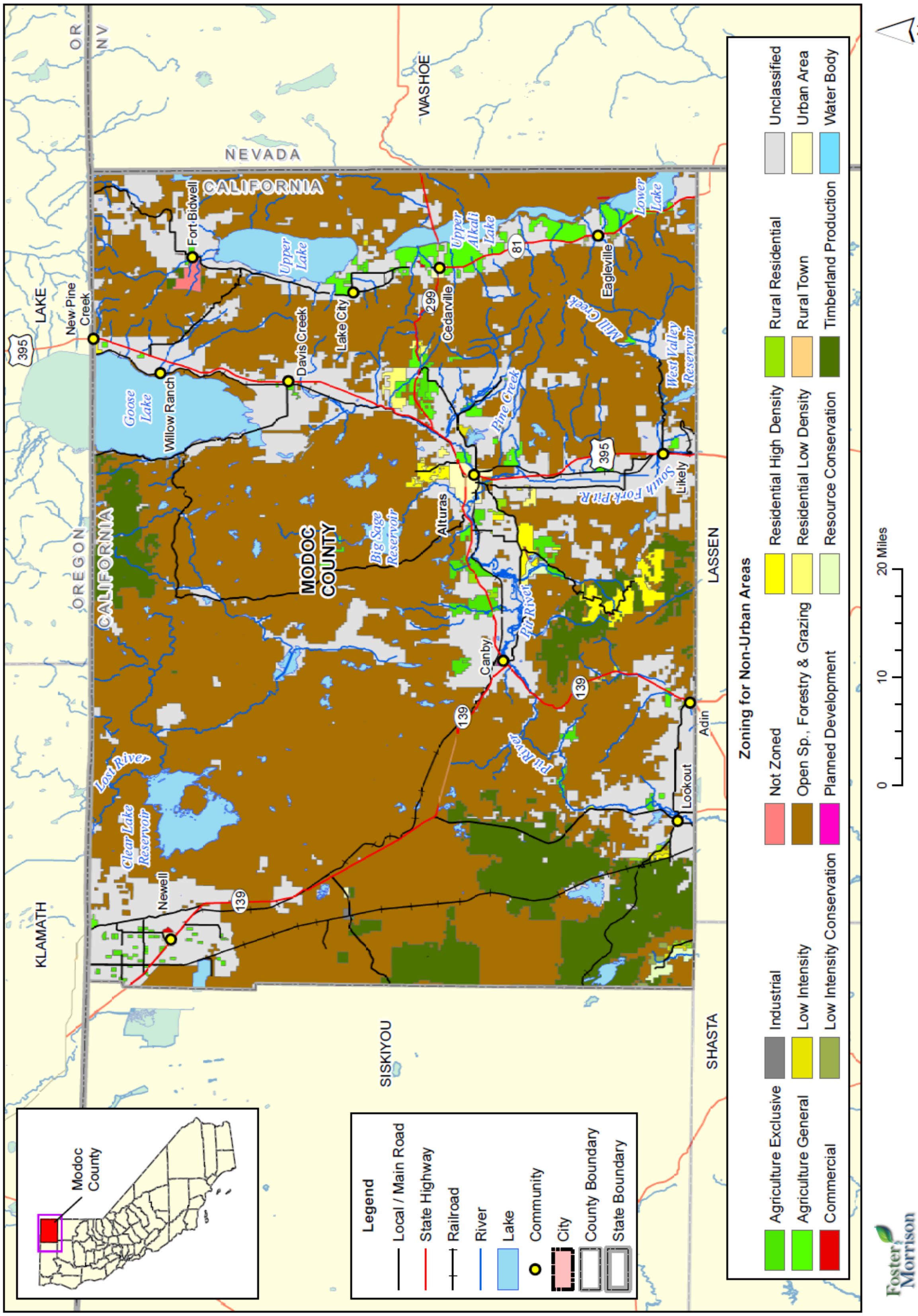
Source: 2009 Modoc County Housing Element, US Census Bureau California Department of Finance

The significance of the population change is not in the total numbers but in the age composition. This demographic growth is almost all from early and near retired persons.

Land Use

Zoning of land in the non-urban areas of the County is shown on Figure 4-55.

Figure 4-55 Modoc County Zoning Map



Data Source: Modoc County, CALATLAS, OSDL, NVBLM; Map Date: 8/2015.

Future Development

The DOF estimates future populations of all Counties within the State. These projections, like all projections, involve the use of assumptions about future events that may or may not occur. Projections for Modoc County are shown in Table 4-28. These projections estimate total population in the County to grow until 2025 and then continue to slowly shrink through 2060.

Table 4-28 Modoc County – Future Population Estimates 2015 to 2060

2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
9,410	9,691	9,866	9,852	9,812	9,770	9,632	9,343	9,113	8,875

Source: California Department of Finance

This mirrors the opinions of the HMPC. The consensus of the committee is that there is a slight decrease in population. In some areas, there is a general appearance of blight: buildings that are condemned are not removed and properties that are abandoned are not maintained.

Future Development GIS Analysis

The Modoc County Planning Department maintains a record of subdivisions that have been approved for development. While development in these subdivisions have been ongoing, non-improved parcels in these areas are considered areas for infill and future development. The non-improved parcels in these subdivisions in the County are shown on Figure 4-56. Table 4-29 gives details by subdivision on each subdivision's size and percentages of subdivisions already improved. As illustrated, many of the approved subdivisions have large areas of unimproved land. While the subdivisions on this table have been approved for development, it should be noted that large tracts of land within the County that are privately owned may also be developed in the future and are not included in this analysis.

Figure 4-56 Unincorporated Modoc County Future Development Areas

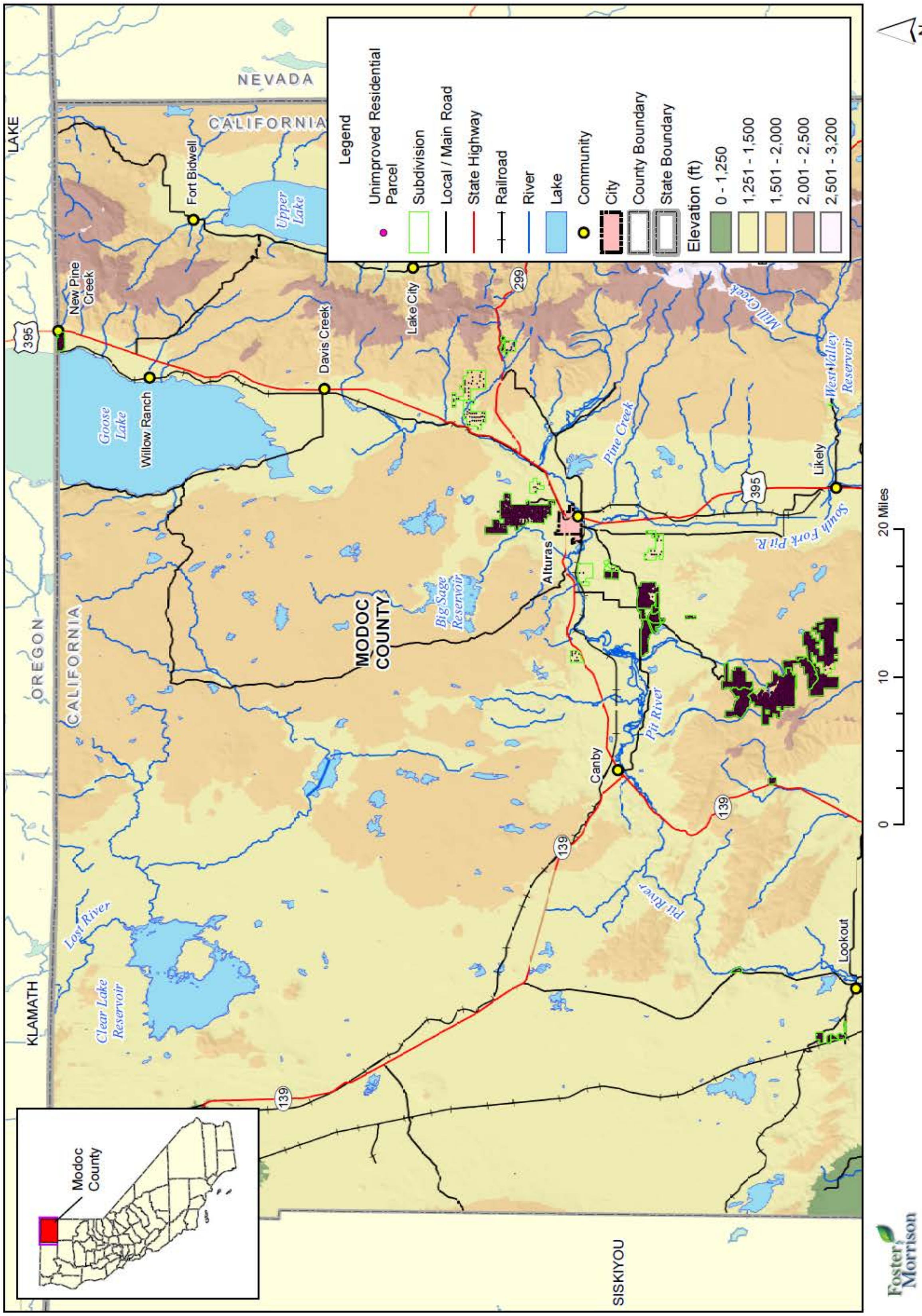


Table 4-29 Unincorporated Modoc County Future Development Detail Table

Subdivision Projects	Total # of Parcels	Improved Parcels	Non-Improved Parcels	% Improved to Total	Land Value	Acres
Big Valley Ranchettes - Unit 1	111	35	76	31.53%	$833,347	192.0
Big Valley Ranchettes - Unit 2	69	23	46	33.33%	$477,831	88.3
Big Valley Ranchettes - Unit 3	56	21	35	37.50%	$410,603	98.1
Big Valley Ranchettes - Unit 4A	25	11	14	44.00%	$173,422	34.3
Big Valley Ranchettes - Unit 4B	46	16	30	34.78%	$355,735	114.5
California Pines-Hill Unit 1	1,221	21	1,200	1.72%	$3,842,628	1,343.7
California Pines-Hill Unit 2	1,315	7	1,308	0.53%	$3,977,686	1,377.4
California Pines-Hill Unit 3	3,445	70	3,375	2.03%	$11,247,128	4,103.3
California Pines-Hill Unit 4	1,235	13	1,222	1.05%	$3,700,508	1,244.0
California Pines-Hill Unit 5	4,203	6	4,197	0.14%	$16,793,229	4,829.0
California Pines-Lake Unit 1A	801	13	788	1.62%	$2,527,819	790.9
California Pines-Lake Unit 1B	778	55	723	7.07%	$2,974,400	191.2
California Pines-Lake Unit 2	1,099	72	1,027	6.55%	$3,933,495	1,398.1
California Pines-Lake Unit 3	161	6	155	3.73%	$564,503	175.0
California Pines-Lake Unit 4	673	51	622	7.58%	$2,628,316	302.0
California Pines-Mobile home Park	360	47	313	13.06%	$881,340	43.1
Castle Rock Estates	81	24	57	29.63%	$744,284	147.3
Cedar Pass Properties	22	10	12	45.45%	$672,091	389.2
Cedar Pass Summerland - 1st Addition	21	7	14	33.33%	$244,366	78.4
Cedar Pass Summerland - Unit A	35	8	27	22.86%	$262,462	44.6
Centerville Estates	8	4	4	50.00%	$283,623	179.2
Conestoga Ranches	20	9	11	45.00%	$912,982	373.7
Goose Lake Estates	201	36	165	17.91%	$1,397,748	411.5
Ivory Ranches	30	16	14	53.33%	$402,938	115.2
Juniper Acres	17	16	1	94.12%	$140,458	10.7
Modoc Farms	13	11	2	84.62%	$628,879	798.9
Modoc Farms Too	10	10	-	100.00%	$280,903	62.4
Modoc Recreational Estates	1,864	327	1,537	17.54%	$10,890,451	3,970.9
Pit River Ranchos	25	4	21	16.00%	$215,064	124.8
Pit River Rec. Estate - T-12	94	4	90	4.26%	$425,961	161.9
Pit River Rec. Estates - T-10, U-1	123	12	111	9.76%	$536,247	162.8
Pit River Rec. Estates - T-10, U-2	132	2	130	1.52%	$256,665	158.4
Rimrock Ranches	31	26	5	83.87%	$1,119,437	396.9
Rush Creek Subdivision	105	33	72	31.43%	$949,078	145.6

Subdivision Projects	Total # of Parcels	Improved Parcels	Non-Improved Parcels	% Improved to Total	Land Value	Acres
Thoms Creek Estates - Unit 1	59	24	35	40.68%	$1,393,744	1,177.1
Thoms Creek Estates - Unit 2	81	47	34	58.02%	$2,469,089	1,690.9
Wildlife Estates	58	40	18	68.97%	$1,686,862	952.3
Total	**18,628**	**1,137**	**17,491**	**–**	**$81,235,322**	**27,877**

Source: Modoc County Planning Department

4.3.2. Modoc County's Vulnerability to Specific Hazards

The Disaster Mitigation Act regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the County's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.18 Natural Hazards Summary. The priority hazards evaluated further as part of this vulnerability assessment include:

- Agriculture Hazards
- Dam Failure
- Drought and Water Shortage
- Earthquake
- Erosion
- Flood: 100/500 year
- Flood: Localized Stormwater Flooding
- Landslide, Mudslides, and Debris Flows
- Levee Failure
- Severe Weather: Extreme Cold, Freeze, Winter Weather
- Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)
- Severe Weather: High Winds/Tornadoes
- Volcano
- Wildfire
- Hazardous Materials Transport

An estimate of the vulnerability of the County to each identified hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

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

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of County critical facilities, historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information conveys the impact, or vulnerability, of that area to that hazard.

The HMPC identified five hazards in the Planning Area for which specific geographical hazard areas have been defined and for which sufficient data exists to support a quantifiable vulnerability analysis. These five hazards are earthquake, flood, landslide, wildfire, and hazardous materials. Because these hazards have discrete hazard risk areas, their risk varies by jurisdiction. For flood, landslide, and wildfire, the HMPC inventoried the following, to the extent possible, to quantify vulnerability in identified hazard areas:

- General hazard-related impacts
- Assets at risk
- Population at risk
- Critical facilities at risk
- Development trends within the identified hazard area

HMPC used FEMA's loss estimation software, HAZUS-MH, to analyze the County's vulnerability to earthquakes.

For hazardous materials, general hazard related impacts, populations at risk, critical facilities at risk, and development trends were analyzed.

While dam failure does also have a quantifiable mapped hazard area, due to privacy concerns, no analysis of dam inundation was performed.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analysis are discussed here in more general terms.

4.3.3. Agriculture Hazards Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—High

According to the US Department of Agriculture (USDA), every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include: contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature. Specific impacts by hazard are listed below:

- Drought's most severe effects on agriculture include water quality and quantity issues. Other impacts include decreased crop yields, impact to feed and forage, and altered plant populations.
- Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on agricultural production and the environment. These impacts could include loss of harvest or livestock and destruction of irrigation systems and other agricultural infrastructure.
- Extreme cold may result in loss of livestock, increased deicing, downed power lines, and increased use of generators. Deicing can impact agriculture by damaging local ecosystems and contaminating water bodies. Downed power lines cause people to run generators more often, which can release harmful air pollutants.
- Hot weather and extreme heat can worsen ozone levels and air quality as well as leading to drought conditions. Excessive heat and prolonged dry or drought conditions can impact agriculture by creating worker safety issues for farm field workers, severely damaging crops, and reducing availability of water and food supply for livestock.
- Wildfires can spread quickly and devastate thousands of acres of land, which may include agricultural lands. This devastation could lead to large losses in crops, forestry, livestock, and agricultural infrastructure.
- Flooding causes many impacts to agricultural production, including water contamination, damage to crops, loss of livestock, increased susceptibility of livestock to disease, flooded farm machinery, and environmental damage to and from agricultural chemicals.
- Landslides and debris flows occur in all 50 states and commonly occur in connection with other major natural disasters such as earthquakes, volcanoes, wildfires, and floods. Some of the threats from landslides and debris flow include rapidly moving water and debris that can cause trauma; broken electrical, water, gas, and sewage lines; and disrupted roadways and railways. This can lead to agricultural impacts including contamination of water, change in vegetation, and harvest and livestock losses.
- High Winds and microbursts can appear without much warning and have the potential to devastate an area very quickly. This devastation can impact agriculture by contaminating water and destroying crops, livestock, and other farm property.

According to Modoc County Agriculture Department, the two areas facing an economic threat are: 1) The lack of water in the Tulelake Basin; and 2) the groundwater situation in Big Valley and Surprise Valley.

Future Development

Future development in the County is not likely to have an impact on agricultural hazards in Modoc County.

4.3.4. Dam Failure Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely
Vulnerability—High

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall, flooding, or earthquake. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility or critical infrastructure and associated revenues that accompany those functions.

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the Planning Area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use (such as water treatment). Large flood events can affect crops and livestock as well as lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

The EOP noted that the Dorris Reservoir, West Valley Reservoir, Big Sage Reservoir, Bayley Reservoir, and Lower Roberts Reservoir could threaten residences if their dams gave way. Details of these specific dams is shown on Table 4-29.

Table 4-30 Modoc County Dams of Concern

Name	Federal Hazard Classification	River	Nearest City to Dam and Distance	Structural Height of Dam (ft)	Maximum Storage of Dam (acre-ft)
Bayley Res	L	Crooks Canyon	Bayley 5 miles	20	4,780
Big Sage	H	Rattlesnake Creek	Canby 24 miles	49	123,900
Dorris	–	Stockdill Slough	–	26	20,690
Roberts	S	Tributary of Pit River	Lookout 1 mile	17	9,000
West Valley	H	West Valley Creek	Likely 5 miles	65	35,300

Source: Modoc County and California Division of Safety of Dams
*One Acre Foot=326,000 gallons

Inundation maps are on file for West Valley, Big Sage, and Bayley and Lauer Dam. Dorris and Lauer Dams have an emergency response plan maintained by the federal government. Maps for West Valley, Big Sage, and Bayley Reservoirs indicate that they are not located in densely populated areas but there are residences within a three mile radius. A complete breach of Dorris Reservoir presents a definite risk to ranches and businesses downstream of the dam, as well as areas within the City of Alturas. The City of Alturas lies within the 100 year flood zone and such an occurrence would necessitate evacuations. Exact impacts to any specific location are not predictable due to other circumstances such as weather and infrastructure that would affect the total outcome.

The HMPC noted that the valley between Likely and Alturas has been covered in water at different times in the last fifty years from severe storms and dam breaching. Previous mitigation projects have widened the capacity of the rivers to prevent this flooding. Major events occurred in 1962 (the Columbus Day Storm) and again in 1964 and 1978.

The HMPC was also most concerned with the Dorris Reservoir. It is US Fish and Wildlife owned, and although it has no known past breaches, there are concerns about maintenance issues with the Dam and downstream levees. Should a failure occur, there would be large impacts to agricultural land and domestic wells. Other dams of concern include:

- West Valley dam –a failure could take out the community of Likely; and
- Big Sage Dam – a failure could take out the west side of the City of Alturas and possibly the community of Canby.

Future Development

Although new growth and development corridors would likely fall in the area flooded by a dam failure, given the small chance of total dam failure and the potentially large area that a dam failure would affect, development in the dam inundation area will continue to occur.

4.3.5. Drought and Water Shortage Vulnerability Assessment

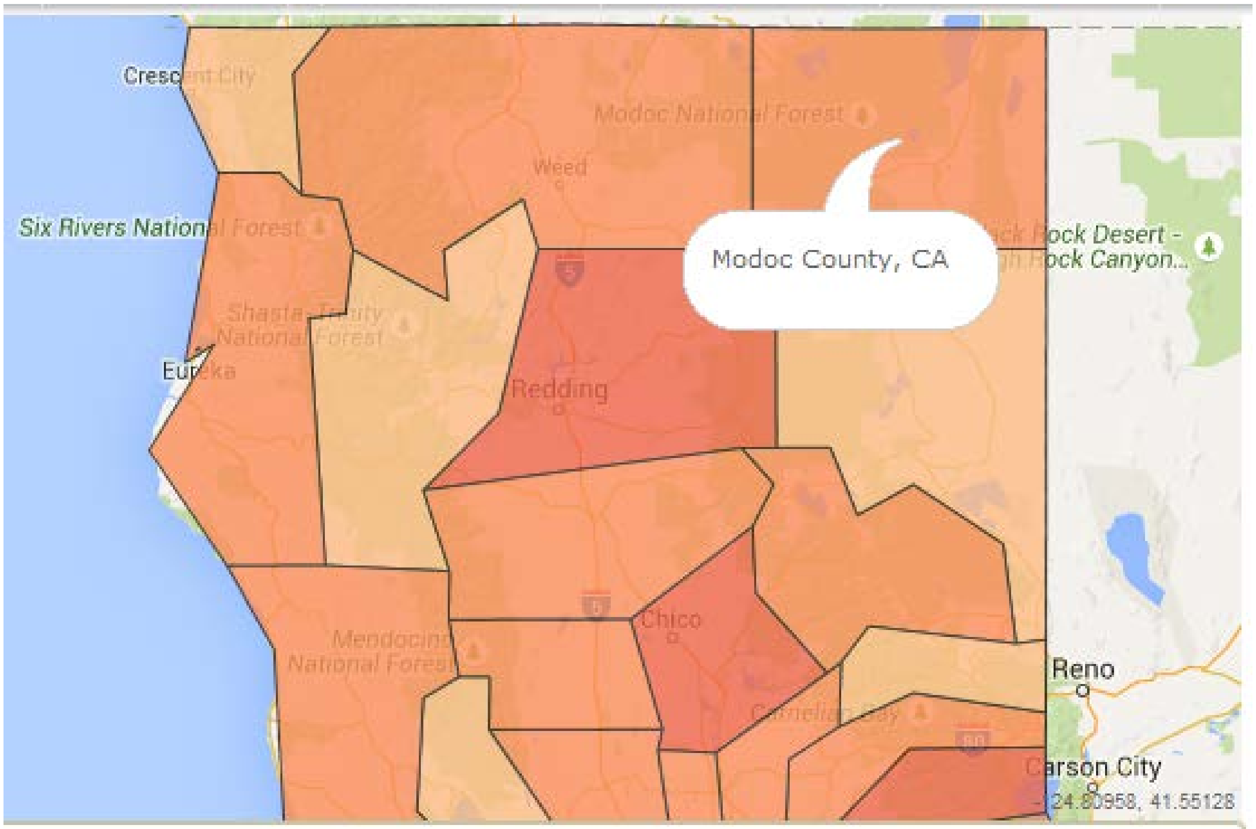
Likelihood of Future Occurrence—Highly likely
Vulnerability—High

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so too will the demand for water.

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

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult. The Drought Impact Reporter from the NDMC is a useful reference tool that compiles reported drought impacts nationwide. Figure 4-57 and Table 4-31 show drought impacts for the Modoc County Planning Area from 1850 to August 31, 2015. The data represented is skewed, with the majority of these impacts from records within the past ten years.

Figure 4-57 Modoc County Planning Area Drought Impact Reporter (1850 to 2015)



Source: National Drought Mitigation Center

Table 4-31 Modoc County Drought Impacts (1850 to 2015)

Category	Number
Agriculture	192
Business and Industry	45
Energy	14
Fire	72
Plans & Wildlife	70
Relief, Response, and Restrictions	254
Society and Public Health	150
Tourism and recreation	20
Water Supply and Quality	250
Total	**571**

Source: National Drought Mitigation Center

The HMPC noted that the main source of water supply and fire suppression for the County are groundwater wells. On the City side of hill there is adequate water in the areas from Alturas to Likely; however, the Cedarville area of the County has shallow wells, which are starting to dry out. Some citizens feel that now is the time to be dredging the reservoirs to increase capacity (Doris, Big Sage, and West Valley). According to the HMPC, the County has been under federal drought declaration for more than 10 years. 75% of County land mass is public lands. The cattle industry has been impacted with reduced grazing areas/duration due to lack of surface water. This has also caused the cost of hay/alfalfa and other products to increase.

The impacts from the recent drought are far reaching. The HMPC noted that locally, multiple impacts have occurred, including:

- domestic wells have been drilled deeper
- groundwater levels have declined
- more state regulation is predicted for ground water management
- wildlife has been impacted with fewer sources of water
- the cattle industry has seen less forage and grazing
- cattle allotments have been reduced for lack of water
- cattle does not mature as normal with less grass and water
- ranches are seeing a need to change normal practices which means there is enough water to run drinking/household water but not enough to grow feed
- dams were curtailed from storing water but that has been lifted
- wildfires are increased because there is less water to draw from (fire suppression concerns) but also less grass creates less underbrush and general reduction in fuels
- dust and air quality issues exist because the lack of surface water and in croplands creates dust, although with lack of rain, is less lightning.

The most impacted area is the Tulelake Irrigation Groundwater Basin which has seen their water basin drop twenty-five feet in the last 22 years.

Future Development

Population growth in the County will add additional pressure to water supply during periods of drought and water shortage. Water companies will need to continue to plan for and add infrastructure capacity for population growth.

4.3.6. Earthquake Vulnerability Assessment

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable. Earthquake losses will vary across the County depending on the source and magnitude of the event. A map showing peak ground accelerations in Modoc County was shown in Figure 4-24. Based on this map, Modoc County is located in a relatively low seismic area. The earthquake scenario run for this LHMP provides a good estimate of loss to the Planning Area based on a realistic earthquake scenario. The methodology and results of this scenario are described below.

2015 Earthquake Scenarios

HAZUS-MH 2.2 was utilized to model earthquake losses for Modoc County. Specifically, the probable magnitude used for Modoc County utilized a 7.5 magnitude earthquake, based on data from the Modoc County EOP. Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the probabilistic earthquake scenario used probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500 year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst case scenario.

The results of the probabilistic scenario are captured in Table 4-32. Key losses included the following:

- Total economic loss estimated for the earthquake was $2.18 million, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $1.81 million.
- 0.6 percent of the buildings in the County were at least moderately damaged. No buildings were completely destroyed.
- Over 52 percent of the building- and income-related losses were residential structures. 16 percent of the estimated losses were related to business interruptions.
- No households experienced a loss of potable water the first day after the earthquake.

Table 4-32 Modoc County Planning Area - HAZUS-MH 2,500-year Earthquake Scenario Results

Impacts/Earthquake	7.5 Magnitude Earthquake
Residential Buildings Damaged (Based upon 5,426 buildings)	Slight: 126 Moderate: 30 Extensive: 2 Complete: 0
Building Related Loss	$1,810,000
Total Economic Loss	$2,180,000
Injuries (Based upon 2am time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0

Impacts/Earthquake	7.5 Magnitude Earthquake	
Injuries (Based upon 2pm time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0	
Injuries (Based upon 5pm time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0	
Essential Facility Damage (Based upon 37 buildings)	None with at least moderate damage.	
Transportation and Utility Lifeline Damage	None with at least moderate damage.	
Households w/out Power & Water Service (Based upon 4,064 households)	Power loss @ Day 1: 0 Power loss @ Day 3: 0 Power loss @ Day 7: 0 Power loss @ Day 30: 0	Water loss @ Day 1: 0 Water loss @ Day 3: 0 Water loss @ Day 7: 0 Water loss @ Day 30: 0
Displaced Households	0	
Shelter Requirements	0	
Debris Generation	0 tons	

Source: HAZUS-MH 2.2

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be no ignitions.

The HMPC noted that the Surprise Valley area is on a large fault. The Surprise Valley area is an earthquake cluster area and frequently experiences them but without significant damage. There have been no past damaging earthquakes, but if a large earthquake were to occur, especially in the City of Alturas, a large portion of the population and most of the City/County infrastructure would be damaged. Since the County's has structures in the area, both the City and County would sustain damages.

In addition, the HMPC performed a search of unreinforced masonry buildings in the County. There have been few masonry buildings constructed since the 1960's and prior to that time there were no earthquake standards. Almost all buildings are unreinforced. An approximation of unreinforced commercial buildings is listed:

- Alturas: 16
- Cedarville: 3
- Canby: 1
- Davis Creek: 1
- New Pine Creek: 0
- Ft. Bidwell: 1
- Eagleville: 1

Future Development

Although new growth and development corridors would fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in the earthquake area will continue to occur, and other earthquake related damages are possible.

4.3.7. Erosion Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—Medium

Erosion is the general process whereby rocks and soils are broken down, removed by weathering, or fragmented and then deposited in other places by water or air. Both water and wind erosion pose problems for Modoc County. The rate of erosion depends on many variables, including the soil or rock texture and composition, soil permeability, slope, extent of vegetative cover, and precipitation amounts and patterns. Erosion increases with increasing slope and precipitation and with decreasing vegetative cover, which includes areas where protective vegetation has been removed by fire, construction, or cultivation. Modoc County is traversed by many waterways, including leveed areas. These locations are all subject to bank erosion. Certain developed areas that abut creeks and rivers in the County are at risk to continued bank erosion. Levees are at risk to erosion as well, due to the channelization due to narrow river channels. Significant erosion can cause degradation and loss of agricultural land, degradation of streams and other water habitats, and rapid silting of reservoirs.

The HMPC noted that there is a rather unique form of streambank erosions that affects the County. When ice breaks up on rivers in the County, it erodes streambanks and levees as it travels downstream. The HMPC noted that burn scar areas in the County are also subject to higher levels of erosion after heavy rains. In addition, erosion of dry lake beds like Goose Lake is also a concern. This erosion affects air quality around the Goose Lake area. This erosion has been exacerbated by recent drought conditions.

Future Development

Planned developments should take erosion risk areas into account during the construction of new homes and commercial properties. The County will continue to enforce the zoning and subdivision ordinances that are discussed in Section 4.4.1.

4.3.8. Flood: 100/500 year Vulnerability Assessment

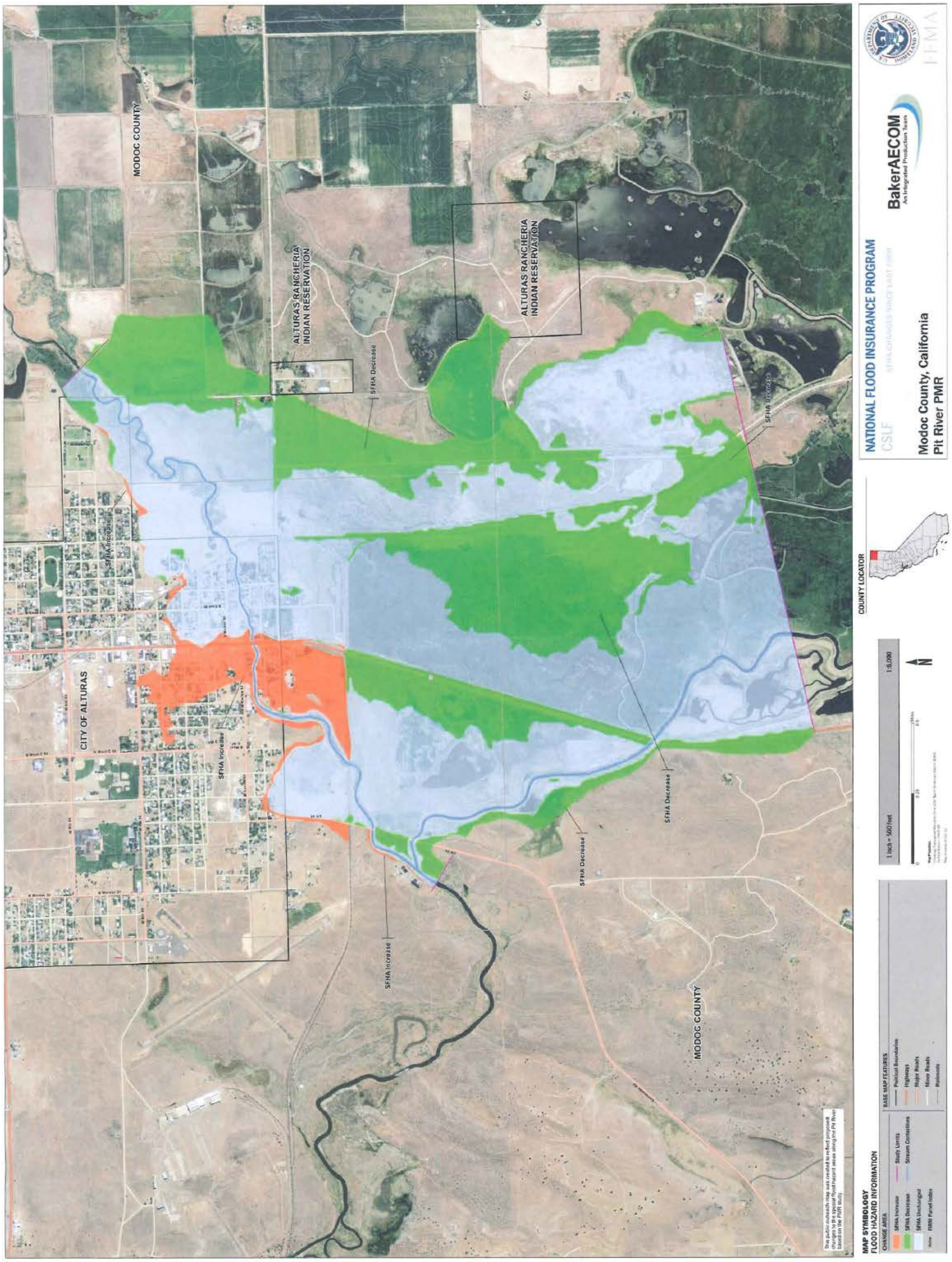
Likelihood of Future Occurrence—Occasional
Vulnerability—High

Flooding in the Modoc County Planning Area can occur any time from fall to spring as a result of the occurrence of general rainstorms. General rain floods result from prolonged, heavy rainfall over tributary areas and are characterized by high peak flows and moderate duration and a large volume of runoff. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions, when the ground is frozen and infiltration is minimal, or when rain on snow in the higher elevations adds snowmelt to rain flood runoff.

The FIS reported that Tule Lake affords some degree of manmade storage near the Siskiyou County line. Effects on the 100- and 500-year flood events from this storage lake cannot be determined, though it does reduce discharge volumes downstream.

It is important to note the changes affecting the FEMA floodplain in the planning area due to recent map changes. Specifically, the June 2010 DFIRMs changed and placed additional area into the 100-year floodplain due to the decertification of the levees as part of the DFIRM process. In addition the 2013 DFIRM updates also made changes to the affected area within both the 100- and 500-year floodplain as a result of a LIDAR study completed by FEMA. As a result of the recent LIDAR study, the latest 2013 DFIRM flood maps made minor changes to the flood hazard zone in the unincorporated county. Some of the areas south of Alturas, including the refuge, transitioned from the 100-year to the 500-year FHZ. The City of Alturas was more significantly affected by these map changes with 89 additional properties added into the 1% annual chance floodplain; of these, 30 are commercial properties and 59 residential. Figure 4-58 shows the results of the LIDAR study. Orange is increased flood hazard zone (areas placed in the flood zone, and conversions of 500-year to 100-year), light blue areas show no change, and green areas indicate a decreased FHZ (100- to 500-year)

Figure 4-58 Changes between 2010 DFIRM and 2013 Preliminary DFIRM



In 2005, there were issues with small stream flooding during hard rains (Tom's Creek, Beaver dam.). Impact to roads are one of the biggest flood concerns. Generally flood impacts would be limited in nature, mostly small stream flooding, unless a dam breach occurred along with a major flood. Impacts depend on the spatial extent and magnitude of rains.

Flooding has occurred in the Planning Area, and the vulnerability to flood damages is high. This section quantifies the vulnerability of the Planning Area to floods.

Assets at Risk

Unincorporated Modoc County and the City of Alturas have mapped FEMA flood hazard areas. GIS was used to determine the possible impacts of flooding within the County and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and assets at risk to the 1% and 0.2% annual chance flood event. Analysis on assets at risk to floods in the County is provided for two different areas in this base plan:

- Modoc County Planning Area
- Unincorporated Modoc County

The Modoc County Planning Area includes both the unincorporated County and the City of Alturas, essentially the entire geographical area of Modoc County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the City of Alturas are included in the City's annex to this plan.

Methodology

Modoc County's 2014 GIS parcel layer and April 2014 Assessor's data were used as the basis for the countywide inventory of developed parcels, acres, and values. Modoc County has a February 14, 2013 preliminary FEMA DFIRM, which updates the 6/4/2010 DFIRM and is scheduled to become effective 12/2/2015, which was utilized to perform the flood analysis.

In some cases there are parcels in multiple flood zones, such as Zone A, Zone AE, Zone AH, Zone AO, the 2% Annual Chance Zone, Zone X, or Zone D. GIS was used to create a centroid, or a point representing the center of the parcel polygon. DFIRM flood data was then overlaid on the parcel layer. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. The parcels were segregated and analyzed in this fashion for the entire Modoc County Planning Area.

The model assumes that every parcel with an improved structure value greater than zero is improved in some way. This approach was used to support the parcel layer analysis as there was no associated building layer available for this analysis. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

The Property Use summary categories (derived from the Use Code categories) previously assigned to the detailed assessor database were used to develop content value and show potential loss from hazards by property use. For the Modoc County flood analysis, there were several modifications to the Property Use categories. First, the Unclassified category was adjusted to an Exempt category since Modoc County's data contained this pre-existing category. The content replacement value for the Exempt remained at 100 percent. Secondly, the analysis did not include any Property Use under the Vacant category. Instead, the County data was filtered using a pre-existing Recreational property use, to which a 100 percent content replacement value was applied.

Content replacement values estimations are based on FEMA Hazus methodologies, which estimates value as a percent of improved structure values by property use. The only exception was the addition of the exempt property use for Modoc County, which is not identified in FEMA methodologies. For the exempt category, a replacement contents factor of 100% was used. Table 4-33 shows the breakdown of the different property use in Modoc County and their estimated content replacement value percentages.

Table 4-33 Content Replacement Factors

Property Use	Content Replacement Values
Residential	50%
Agricultural	100%
Commercial	100%
Exempt	100%
Institutional	100%
Unclassified	100%
Industrial	150%
Vacant Land	0%

Source: Hazus 2.2

The loss estimate for flood is based on the total of improved structure value from the Assessor data combined with contents value derived from the above Content Replacement Factors. Only improved parcels and the value of their improvements were included in the flood loss analysis. The value of land is not included in the loss estimates as generally the land is not at loss to floods, just the value of improvements and structure contents. The land value is represented in the detailed flood tables, but are only present to show the value of the land associated with each flood zone, the land values are not included in the loss estimates.

Once the potential value of affected parcels was calculated, a damage factor was applied to obtain loss estimates by flood zone. When a flood occurs, seldom does the event cause total destruction of an area or structure. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type, and construction. The percent of damage is primarily related to the flood depth. FEMA's flood benefit/cost module uses a simplified approach to model flood damage based on building type and flood depth. The assets at risk in the flood analysis tables were refined by applying an average damage estimation of 20% of the total building value utilizing FEMA's Flood Building Loss Table based on an average flood depth of 2 feet.

It also should be noted that the resulting flood loss estimates may actually be more or less than that presented in the below tables as the Planning Area may include structures located within the 1% or 0.2% annual chance floodplain that are elevated at or above the level of the base flood elevation, according to local floodplain development requirements. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the floodplain.

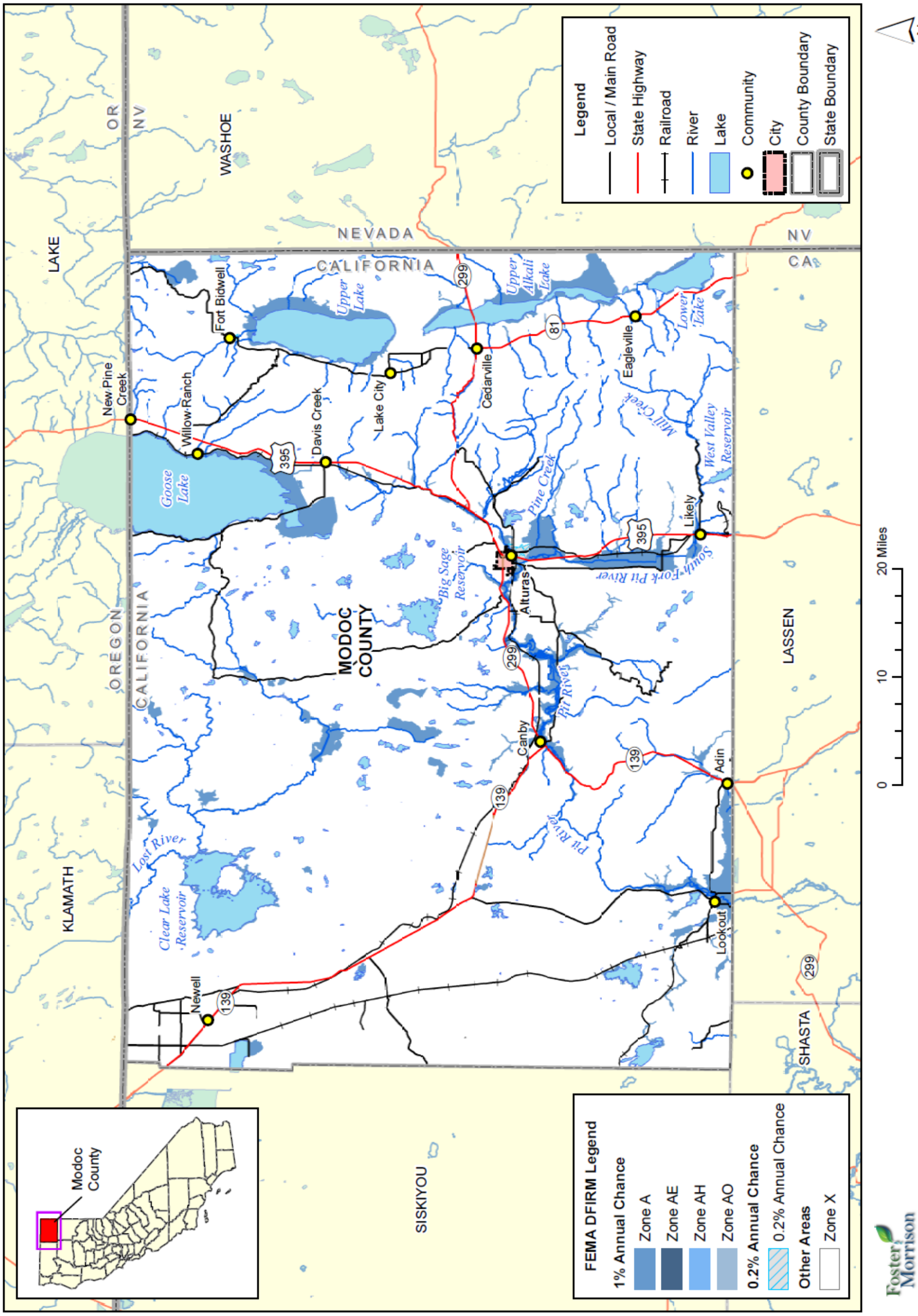
Each of the DFIRM flood zones that begins with the letter 'A' depict the Special Flood Hazard Area, or the 1% annual chance flood event (commonly referred to as the 100-year flood). Table 4-34 explains the difference between DFIRM mapped flood zones within the 1% and 0.2% annual chance flood zone as well as other flood zones located within the Planning Area. The preliminary DFIRM maps (dated 2/14/2013) for the Modoc County Planning Area are shown on Figure 4-59 for the County.

Table 4-34 Modoc County Planning Area – DFIRM Flood Hazard Zones

Flood Zone	Description
A	100-year Flood: No base flood elevations provided
AE	100-year Flood: Base flood elevations provided
AH	100-year Flood: Base flood elevations derived from detailed analyses provided
AO	100-year Flood: Average flood depths (ranging 1-3 feet) derived from detailed analyses provided
0.2% Annual Chance	500-year Flood; An area inundated by 0.2% annual chance flooding.
D	Areas where there are possible but undetermined flood hazards, as no analysis of flood hazards has been conducted
X	No flood hazard

Source: FEMA

Figure 4-59 Modoc County Planning Area – DFIRM Flood Zones



Data Source: Modoc County, CALATLAS, FEMA Preliminary DFIRM/NFHL 12/12/2015, OSDL, NVBLM; Map Date: 8/2015.

Modoc County Planning Area

Table 4-35 and Table 4-36 contain flood analysis results for the entire Modoc County Planning Area. This includes unincorporated Modoc County and the City of Alturas. These tables show the number of parcels and assets at risk to the 1% and 0.2% annual chance event. Table 4-35 shows the total parcel count and the count and value of improved parcels by jurisdiction by flood event. Table 4-36 shows the total and improved parcel count and improved values by property use category in each flood zone for the entire Planning Area.

Table 4-35 Modoc County Planning Area – Count and Improved Value of Parcels in Flood Zone by Jurisdiction

Jurisdiction	Total Planning Area			1% Chance Flood Zone			0.2% Chance Flood Zone		
	Total Parcel Count	Improved Parcel Count	Improved Structure Value	Total Parcel Count	Improved Parcels	Improved Structure Value	Total Parcel Count	Improved Parcels	Improved Structure Value
City of Alturas	1,930	1,340	$111,646,889	338	240	$17,358,072	138	103	$6,183,846
Unincorporated	30,493	3,967	$274,076,176	1,437	209	$17,949,508	60	18	$878,317
Total	**32,423**	**5,307**	**$385,723,065**	**1,775**	**625**	**$35,307,580**	**198**	**121**	**$7,062,163**

Source: FEMA Preliminary DFIRM 2/14/2013, Modoc County Assessor's 2014 Data, County Parcel Layer 2014

Table 4-36 Modoc County Planning Area – Count and Improved Value by Property Use in 1% and 0.2% Annual Chance Flood Zone

Property Use	Total Planning Area			1% Annual Chance Flood Zone			0.2% Annual Chance Flood Zone		
	Total Parcel Count	Improved Parcel Count	Improved Structure Value	Total Parcel Count	Improved Parcel Count	Improved Structure Value	Total Parcel Count	Improved Parcel Count	Improved Structure Value
Agricultural	3,771	752	$58,239,716	364	84	$10,287,922	0	0	$0
Commercial	602	351	$46,196,887	97	64	$6,031,589	11	7	$714,266
Institutional	4,818	0	$0	508	0	$0	52	0	$0
Industrial	31	11	$240,628	4	0	$0	0	0	$0
Exempt	33	29	$4,302,205	2	2	$303,138	2	2	$461,705
Recreational	18,743	1,103	$59,699,719	434	35	$1,656,235	0	0	$0
Residential	4,425	3,061	$217,043,910	366	264	$17,028,696	133	112	$5,886,192
Total	**32,423**	**5,307**	**$385,723,065**	**1,775**	**449**	**$35,307,580**	**198**	**121**	**$7,062,163**

Source: FEMA Preliminary DFIRM 2/14/2013, Modoc County Assessor's 2014 Data; County Parcel Layer 2014

Table 4-37 shows potential losses summarized by the 1% and 0.2% annual chance flood event with loss estimates and loss ratios for the Planning Area. The 20% loss estimate was based on the improved structure values combined with the contents replacement values as previously described. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the Planning Area) and displayed as a percentage of loss by 1% annual chance and 0.2% annual chance floods. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The County should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance floodplain, unless development is elevated in accordance with the local floodplain management ordinance.

Table 4-37 Modoc County Planning Area – Flood Loss Estimates

Flood Zone	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Improved Value	Loss Estimate	Loss Ratio
1% Annual Chance	449	$35,307,580	$26,793,232	$62,100,812	$12,420,162.40	1.49%
0.2% Annual Chance	121	$7,062,163	$4,119,067	$11,181,230	$2,236,246.00	0.27%
Total	**570**	**$42,369,743**	**$30,912,299**	**$73,282,042**	**$14,656,408.40**	**1.76%**

Source: FEMA Preliminary DFIRM 2/14/2013, Modoc County Assessor's 2014 Data; County Parcel Layer 2014

According to the information in Table 4-35 through Table 4-37, the Modoc County Planning Area has 570 improved parcels and roughly $62 million of structure and contents value in the 1% annual chance floodplain. There are an additional 121 improved parcels in the 0.2% annual chance flood event. A loss ratio of 1.76% for both 1% and 0.2% annual chance flood zones indicates that while the County does have assets at risk to flood, those asset values do not indicate a disproportionate number of assets in the FEMA floodplains, and this even if the Planning Area experiences a significant flood, recovery efforts should be manageable.

Unincorporated Modoc County

Table 4-38 and Table 4-39 contain information for unincorporated Modoc County only. Table 4-38 shows the total number of parcels, improved parcels and improved structure values at risk to the each of the FEMA flood zones using the DFIRM data in the unincorporated areas. For the detailed tables, land value is included with the improved structure value in the total value column to provide information on the value of land within each detailed flood zone. Table 4-39 shows potential losses summarized by 1% and 0.2% annual chance flood events with loss estimates and loss ratios.

Table 4-38 Unincorporated Modoc County – Count and Improved Value by Property Use and Detailed Flood Zone

Flood Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value*
Zone A	Agricultural	357	83	$43,451,497	$10,285,082	$53,736,579
	Commercial	9	3	$52,051	$217,025	$269,076
	Exempt	442	0	$0	$0	$0
	Industrial	3	0	$54,340	$0	$54,340
	Institutional	0	0	$0	$0	$0
	Recreational	434	35	$1,758,075	$1,656,235	$3,414,310
	Residential	62	36	$1,856,061	$3,533,833	$5,389,894
Total Zone A		**1,307**	**157**	**$47,172,024**	**$15,692,175**	**$62,864,199**

Flood Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value*
Zone AE	Agricultural	1	0	$3,115	$0	$3,115
	Commercial	13	3	$53,007	$60,540	$113,547
	Exempt	3	0	$0	$0	$0
	Industrial	1	0	$13,111	$0	$13,111
	Institutional	0	0	$0	$0	$0
	Recreational	0	0	$0	$0	$0
	Residential	49	31	$540,021	$1,541,838	$2,081,859
Total Zone AE		**67**	**34**	**$609,254**	**$1,602,378**	**$2,211,632**
Zone AH	Agricultural	1	1	$79,593	$2,840	$82,433
	Commercial	0	0	$0	$0	$0
	Exempt	1	0	$0	$0	$0
	Industrial	0	0	$0	$0	$0
	Institutional	0	0	$0	$0	$0
	Recreational	0	0	$0	$0	$0
	Residential	0	0	$0	$0	$0
Total Zone AH		**2**	**1**	**$79,593**	**$2,840**	**$82,433**
Zone AO	Agricultural	4	0	$261,855	$0	$261,855
	Commercial	1	0	$18,802	$0	$18,802
	Exempt	30	0	$0	$0	$0
	Industrial	0	0	$0	$0	$0
	Institutional	0	0	$0	$0	$0
	Recreational	0	0	$0	$0	$0
	Residential	26	17	$688,592	$652,115	$1,340,707
Total Zone AO		**61**	**17**	**$969,249**	**$652,115**	**$1,621,364**
0.2% Annual Chance (Shaded X)	Agricultural	0	0	$0	$0	$0
	Commercial	2	1	$50,729	$39,159	$89,888
	Exempt	38	0	$0	$0	$0
	Industrial	0	0	$0	$0	$0
	Institutional	0	0	$0	$0	$0
	Recreational	0	0	$0	$0	$0
	Residential	20	17	$922,053	$839,158	$1,761,211
Total 0.2% Annual Chance		**60**	**18**	**$972,782**	**$878,317**	**$1,851,099**

Flood Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value*
Zone D	Agricultural	996	55	$32,459,828	$2,897,090	$35,356,918
	Commercial	40	3	$196,118	$341,688	$537,806
	Exempt	2,836	0	$0	$0	$0
	Industrial	1	0	$27,556	$0	$27,556
	Institutional	0	0	$0	$0	$0
	Recreational	11,861	189	$43,176,931	$7,890,081	$51,067,012
	Residential	178	88	$5,743,715	$7,118,071	$12,861,786
Total Zone D		**15,912**	**335**	**$81,604,148**	**$18,246,930**	**$99,851,078**
Zone X	Agricultural	2,411	613	$197,812,425	$45,054,704	$242,867,129
	Commercial	303	171	$4,750,123	$17,653,794	$22,403,917
	Exempt	1,318	0	$0	$0	$0
	Industrial	20	10	$748,771	$205,774	$954,545
	Institutional	14	14	$51,879	$348,694	$400,573
	Recreational	6,447	878	$37,153,169	$50,081,774	$87,234,943
	Residential	2,571	1,719	$51,403,719	$123,656,681	$175,060,400
Total Zone X		**13,084**	**3,405**	**$291,920,086**	**$237,001,421**	**$528,921,507**
Grand Total		**30,493**	**3,967**	**$423,327,136**	**$274,076,176**	**$697,403,312**

Source: FEMA Preliminary DFIRM 2/14/2013, Modoc County Assessor's 2014 Data, County Parcel Layer 2015

*Land and structure values

Table 4-39 Unincorporated Modoc County – Flood Loss Estimates

Flood Zone	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Improved Value	Loss Estimate	Loss Ratio
1% Annual Chance	209	$17,949,508	$15,085,615	$33,035,123	$6,607,025	0.95%
0.2% Annual Chance	18	$878,317	$458,738	$1,337,055	$267,411	0.04%
Total	**227**	**$18,827,825**	**$15,544,353**	**$34,372,178**	**$6,874,436**	**0.99%**

Source: FEMA Preliminary DFIRM 2/14/2013, Modoc County Assessor's 2014 Data, County Parcel Layer 2014

According to Table 4-38 and Table 4-39, unincorporated Modoc County has 209 improved parcels and roughly $33 million of structure and contents value in the 1% annual chance floodplain. Additionally, unincorporated Modoc County has 18 improved parcels and roughly $1.3 million of structure and contents value in the 2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described, there is a 1% chance in any given year of a flood event causing roughly $6.6 million in damage in the unincorporated areas of Modoc County. A loss ratio of 0.95% indicates that while the unincorporated County has assets at risk in the floodplain, flood losses would be limited compared to the total built environment and the community would likely be able to recover adequately.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the Modoc County Planning Area and unincorporated county area. Details on flooded acres in the City of Alturas are shown in their annex to this plan.

Methodology

GIS was used to calculate acres flooded by FEMA flood zones and property use categories. The Modoc County parcel layer and FEMA preliminary DFIRM were intersected, and each segment divided by the intersection of flood zone and parcels was calculated for acres. This process was conducted for 1% and 0.2% annual chance flood areas, with each segment being defined by zone type (A, AE, AH, AO, 0.2% Annual Chance, X and D) and acres. The resulting data tables with flooded acreages were then imported into a database and linked back to the original parcels, including total acres by parcel number. Once this was completed, each parcel contained acreage values for flooded acre by zone type within the parcel. In the tables below, the 1% and 0.2% annual chance flood zones are summarized and then split out by property use, their total flooded acres, total improved acres, and percent of improved acres that are flooded.

It is important to keep in mind that this methodology assumes that improvements are uniformly found throughout the parcel, while in reality only portions of the parcel are improved, and improvements may or may not fall within the flood zone portion of a parcel. Thus, areas of flooded improvements calculated through this method may be higher or lower than those presented.

Table 4-40 represents an analysis of total acres by the 1% and 0.2% annual chance flood events for the Modoc County Planning Area by jurisdiction. Table 4-41 provides detailed flooded acres information by property use and detailed flood zone for the unincorporated County. This information is available for the City of Alturas jurisdiction in its annex.

Table 4-40 Modoc County Planning Area – Flooded Acres

Jurisdiction	Flood Zone	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
City of Alturas	1% Annual Chance	77.72	53.67	69.06%
	0.2% Annual Chance	74.82	22.13	29.58%
Unincorporated County	1% Annual Chance	1,640,145.46	29,401.75	1.79%
	0.2% Annual Chance	666.15	43.22	6.49%

Source: FEMA Preliminary DFIRM 2/14/2013, County Parcel Layer 2014

Table 4-41 Unincorporated Modoc County – Flooded Acres

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
A	Agricultural	43,911.59	16,218.03	36.93%
	Commercial	4.44	3.04	68.31%
	Exempt	198,477.62	0.00	0.00%
	Industrial	53.32	0.00	0.00%
	Institutional	0.00	0.00	0.00%
	Recreational	394.00	60.60	15.38%
	Residential	859.40	521.69	60.70%
	Total Zone A	**243,700.36**	**16,803.35**	**6.89%**
AE	Agricultural	1.26	0.00	0.00%
	Commercial	0.90	0.27	29.59%
	Exempt	0.22	0.00	0.00%
	Industrial	0.21	0.00	0.00%
	Institutional	0.00	0.00	0.00%
	Recreational	0.00	0.00	0.00%
	Residential	13.17	8.67	65.88%
	Total Zone AE	**15.75**	**8.94**	**56.76%**
AH	Agricultural	1.32	1.32	100.00%
	Commercial	0.00	0.00	0.00%
	Exempt	1.19	0.00	0.00%
	Industrial	0.00	0.00	0.00%
	Institutional	0.00	0.00	0.00%
	Recreational	0.00	0.00	0.00%
	Residential	0.00	0.00	0.00%
	Total Zone A	**2.52**	**1.32**	**52.38%**
AO	Agricultural	5.96	0.00	0.00%
	Commercial	4.21	0.00	0.00%
	Exempt	97.71	0.00	0.00%
	Industrial	0.00	0.00	0.00%
	Institutional	0.00	0.00	0.00%
	Recreational	0.00	0.00	0.00%
	Residential	21.98	3.78	17.19%
	Total Zone AE	**129.86**	**3.78**	**2.91%**

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Total 1%	**243,848.49**	**16,817.39**	**6.90%**
D	Agricultural	215,781.39	10,022.15	4.64%
	Commercial	56.56	14.20	25.11%
	Exempt	1,158,134.03	0.00	0.00%
	Industrial	28.61	0.00	0.00%
	Institutional	0.00	0.00	0.00%
	Recreational	17,393.92	299.51	1.72%
	Residential	4,902.47	2,248.51	45.86%
	Total Zone D	**1,396,296.98**	**12,584.37**	**0.91%**
0.2% Annual Chance (Shaded X)	Agricultural	0.00	0.00	0.00%
	Commercial	2.84	2.22	77.91%
	Exempt	621.89	0.00	0.00%
	Industrial	0.00	0.00	0.00%
	Institutional	0.00	0.00	0.00%
	Recreational	0.00	0.00	0.00%
	Residential	41.41	41.01	99.03%
	Total 0.2%	**666.15**	**43.22**	**6.49%**

Source: FEMA Preliminary DFIRM 2/13/2013, County Parcel Layer 2014

Population at Risk

The preliminary DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and tabulated by jurisdiction. According to this analysis, there is a total population of 1,066 residents of Modoc County Planning Area at risk to flooding. This is shown in Table 4-42. Table 4-43 shows a population of 434 within the unincorporated County. Population information relative to the flood hazard for the City of Alturas is provided in its Annex.

Table 4-42 Modoc County Planning Area – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
A	36	83
AE	31	71
AH	4	9
AO	193	444

Flood Zone	Improved Residential Parcels	Population*
Total 1% Annual Chance	**264**	**607**
0.2% Annual Chance (Shaded X)	112	257
D	88	202
Grand Total	**464**	**1,066**

Source: Modoc County 2014 Assessor's Data; FEMA Preliminary DFIRM 2/14/2013, US Census Bureau
* Average household populations from the 2010 US Census were used: Modoc County – 2.30; Alturas – 2.27.

Table 4-43 Unincorporated Modoc County – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
A	36	83
AE	31	71
AH	0	0
AO	17	39
Total 1% Annual Chance	**84**	**193**
0.2% Annual Chance	17	39
D	88	202
Grand Total	**189**	**434**

Source: Modoc County 2014 Assessor's Data; FEMA preliminary DFIRM 6/2/2015, US Census Bureau
* Average household populations from the 2010 US Census were used: Modoc County – 2.30; Alturas – 2.27.

NFIP Insurance Coverage Details

Unincorporated Modoc County joined the NFIP on September 24, 1984. The County does not participate in the Community Rating System. NFIP insurance data provided by DWR indicates that as of September 15, 2014, there were 27 policies in force in the unincorporated County with $20,537 in premiums, resulting in $4,653,700 of insurance in force. There has been 1 closed paid losses totaling $5,654. This was for a pre-FIRM residential single family structure in the A Zone. As there has been only one paid loss, there are no repetitive loss or severe repetitive loss structures in the County.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Modoc County and all jurisdictions to determine critical facilities in the 1% and 0.2 annual chance floodplains. Using GIS, the Preliminary DFIRM flood zones were overlayed on the critical facility location data. Figure 4-60 shows critical facilities, as well as the DFIRM flood zones. Table 4-44 details critical facilities by facility type and count. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure 4-60 Modoc County Planning Area – Critical Facilities by Flood Zone

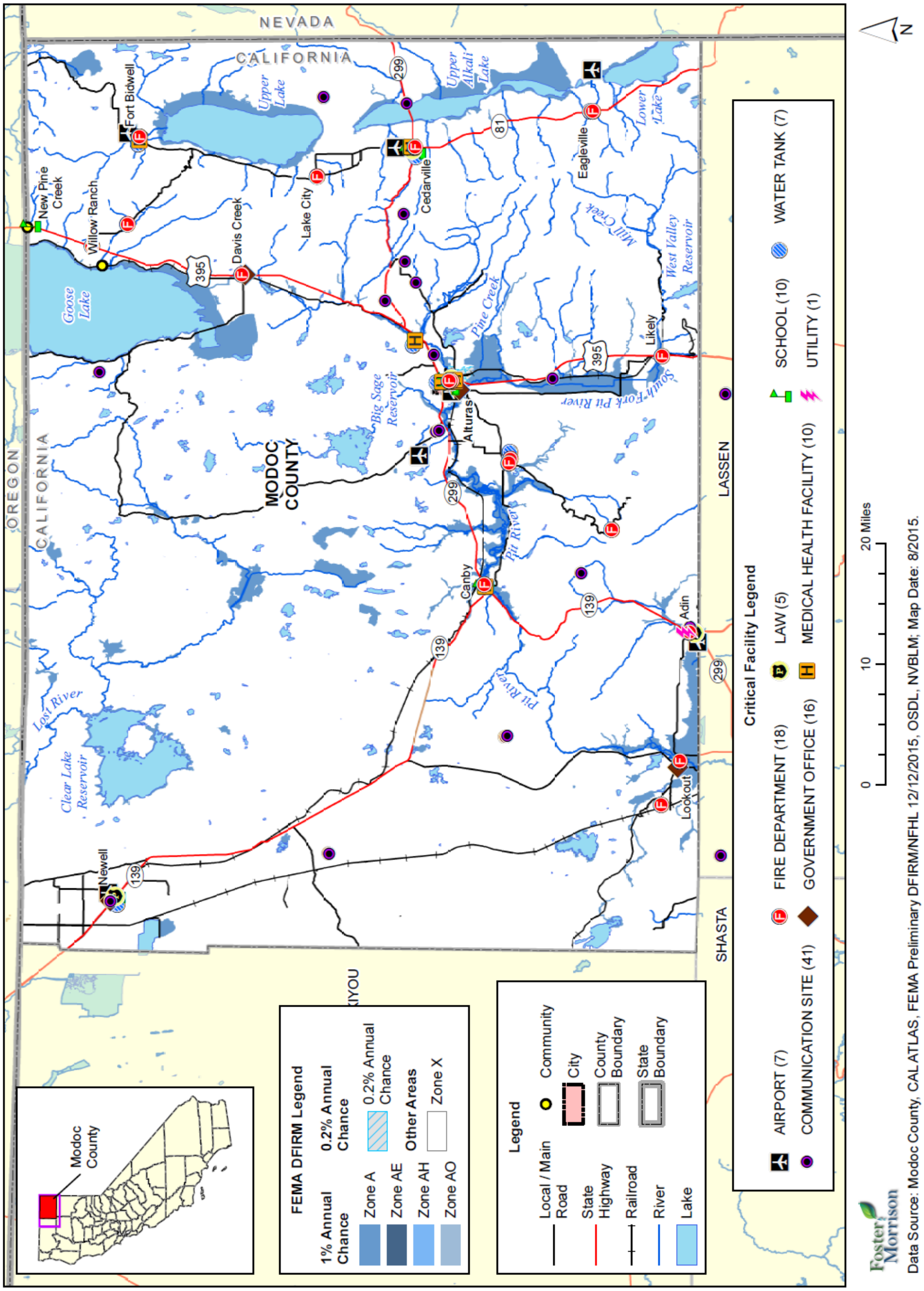


Table 4-44 Unincorporated Modoc County – Critical Facilities by Flood Zone

Flood	Category	Type	Facility Count
1% Annual Chance (Zone A)	Category IV Critical Facilities	Communication Site	1
		Fire Department	1
		Total 1% Annual Chance	**2**
0.2% Annual Chance	Category IV Critical Facilities	Law	1
		Medical Health Facility	2
		Total 0.2% Annual Chance	**3**
Total			5

Source: Modoc County GIS; FEMA preliminary DFIRM 6/2/2015

Future Development

To determine potential development constraints based on the location of future development areas relative to the FEMA flood zones, additional analysis was performed using GIS. For the Planning Area, the future development areas (non-improved parcels in approved subdivisions) provided by the Modoc County Planning Department were intersected with the FEMA flood zones to identify future areas of development by 1% and 0.2% annual chance flood zones as well as Zone X. Table 4-45 provides an analysis of the future development areas by flood zone shown in Figure 4-61. While the subdivisions on this table have been approved for development, it should be noted that large tracts of land within the County that are privately owned may be developed in the future and are not included in this analysis.

Figure 4-61 Unincorporated Modoc County – Future Development in Flood Zones

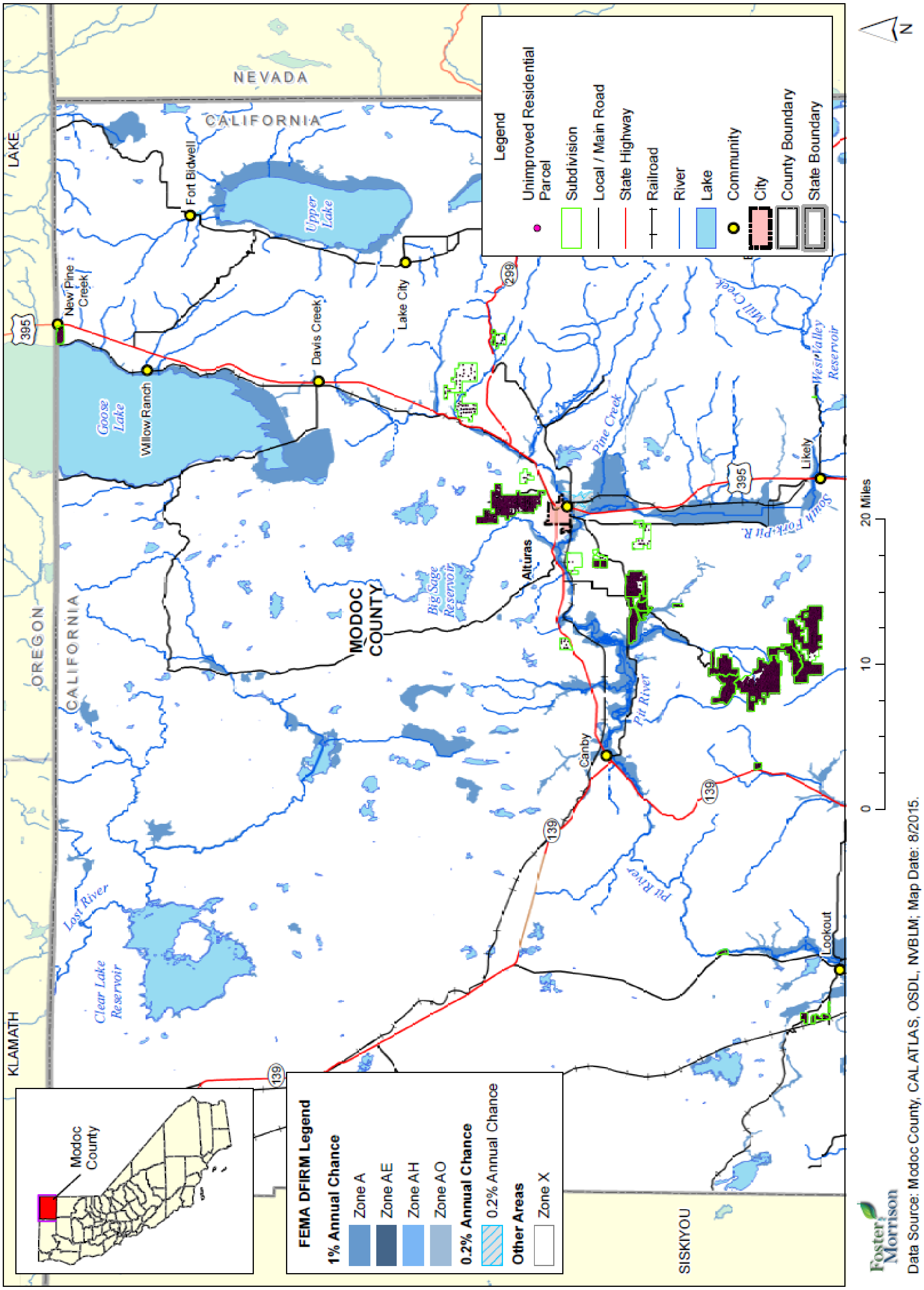


Table 4-45 Unincorporated Modoc County – Future Development Detail Table

Subdivision Projects	# of Parcels	Improved Parcels	Non-Improved Parcels	% Improved	Acres	Flood Zone
Big Valley Ranchettes - Unit 1	111	35	76	31.53%	192.0	X
Big Valley Ranchettes - Unit 2	69	23	46	33.33%	88.3	X
Big Valley Ranchettes - Unit 3	56	21	35	37.50%	98.1	X
Big Valley Ranchettes - Unit 4A	25	11	14	44.00%	34.3	X
Big Valley Ranchettes - Unit 4B	46	16	30	34.78%	114.5	X
California Pines-Hill Unit 1	1,221	21	1,200	1.72%	1,343.7	D
California Pines-Hill Unit 2	1,315	7	1,308	0.53%	1,377.4	D
California Pines-Hill Unit 3	3,445	70	3,375	2.03%	4,103.3	D
California Pines-Hill Unit 4	1,235	13	1,222	1.05%	1,244.0	D
California Pines-Hill Unit 5	4,203	6	4,197	0.14%	4,829.0	D
California Pines-Lake Unit 1A	801	13	788	1.62%	790.9	A, X
California Pines-Lake Unit 1B	778	55	723	7.07%	191.2	A, X
California Pines-Lake Unit 2	1,099	72	1,027	6.55%	1,398.1	X
California Pines-Lake Unit 3	161	6	155	3.73%	175.0	A, X
California Pines-Lake Unit 4	673	51	622	7.58%	302.0	X
California Pines-Mobile home Park	360	47	313	13.06%	43.1	A, X
Castle Rock Estates	81	24	57	29.63%	147.3	X
Cedar Pass Properties	22	10	12	45.45%	389.2	X
Cedar Pass Summerland - 1st Addition	21	7	14	33.33%	78.4	X
Cedar Pass Summerland - Unit A	35	8	27	22.86%	44.6	X
Centerville Estates	8	4	4	50.00%	179.2	X
Conestoga Ranches	20	9	11	45.00%	373.7	X
Goose Lake Estates	201	36	165	17.91%	411.5	X
Ivory Ranches	30	16	14	53.33%	115.2	A, X
Juniper Acres	17	16	1	94.12%	10.7	D
Modoc Farms	13	11	2	84.62%	798.9	X
Modoc Farms Too	10	10	-	100.00%	62.4	X
Modoc Recreational Estates	1,864	327	1,537	17.54%	3,970.9	A, D, X
Pit River Ranchos	25	4	21	16.00%	124.8	A, D, X
Pit River Rec. Estate - T-12	94	4	90	4.26%	161.9	X
Pit River Rec. Estates - T-10, U-1	123	12	111	9.76%	162.8	X
Pit River Rec. Estates - T-10, U-2	132	2	130	1.52%	158.4	X
Rimrock Ranches	31	26	5	83.87%	396.9	X
Rush Creek Subdivision	105	33	72	31.43%	145.6	D
Thoms Creek Estates - Unit 1	59	24	35	40.68%	1,177.1	A, D, X

Subdivision Projects	# of Parcels	Improved Parcels	Non-Improved Parcels	% Improved	Acres	Flood Zone
Thoms Creek Estates - Unit 2	81	47	34	58.02%	1,690.9	X
Wildlife Estates	58	40	18	68.97%	952.3	X
Total	**18,628**	**1,137**	**17,491**	**–**	**27,877**	

Source: Modoc County Planning Department; FEMA preliminary DFIRM 6/2/2015

ARkStorm Scenario

Although much attention in California's focuses on the "Big One" as a high magnitude earthquake, there is the risk of another significant event in California – a massive, statewide winter storm. The last such storms occurred in the 19th century, outside the memory of current emergency managers, officials, and communities. However, massive storms are a recurring feature of the state, the source of rare but inevitable disasters. The USGS Multi Hazards Demonstration Project's (MHDP) developed a product called ARkStorm, which addressed massive U.S. West Coast storms analogous to those that devastated California in 1861-1862. Over the last decade, scientists have determined that the largest storms in California are the product of phenomena called Atmospheric Rivers, and so the MHDP storm scenario is called the ARkStorm, for Atmospheric River 1000 (a measure of the storm's size).

Scientific studies of offshore deposits in northern and southern California indicate that storms of this magnitude and larger have occurred about as often as large earthquakes on the southern San Andreas Fault. Such storms are projected to become more frequent and intense as a result of climate change. This scientific effort resulted in a plausible flood hazard scenario to be used as a planning and preparation tool by hazard mitigation and emergency response agencies.

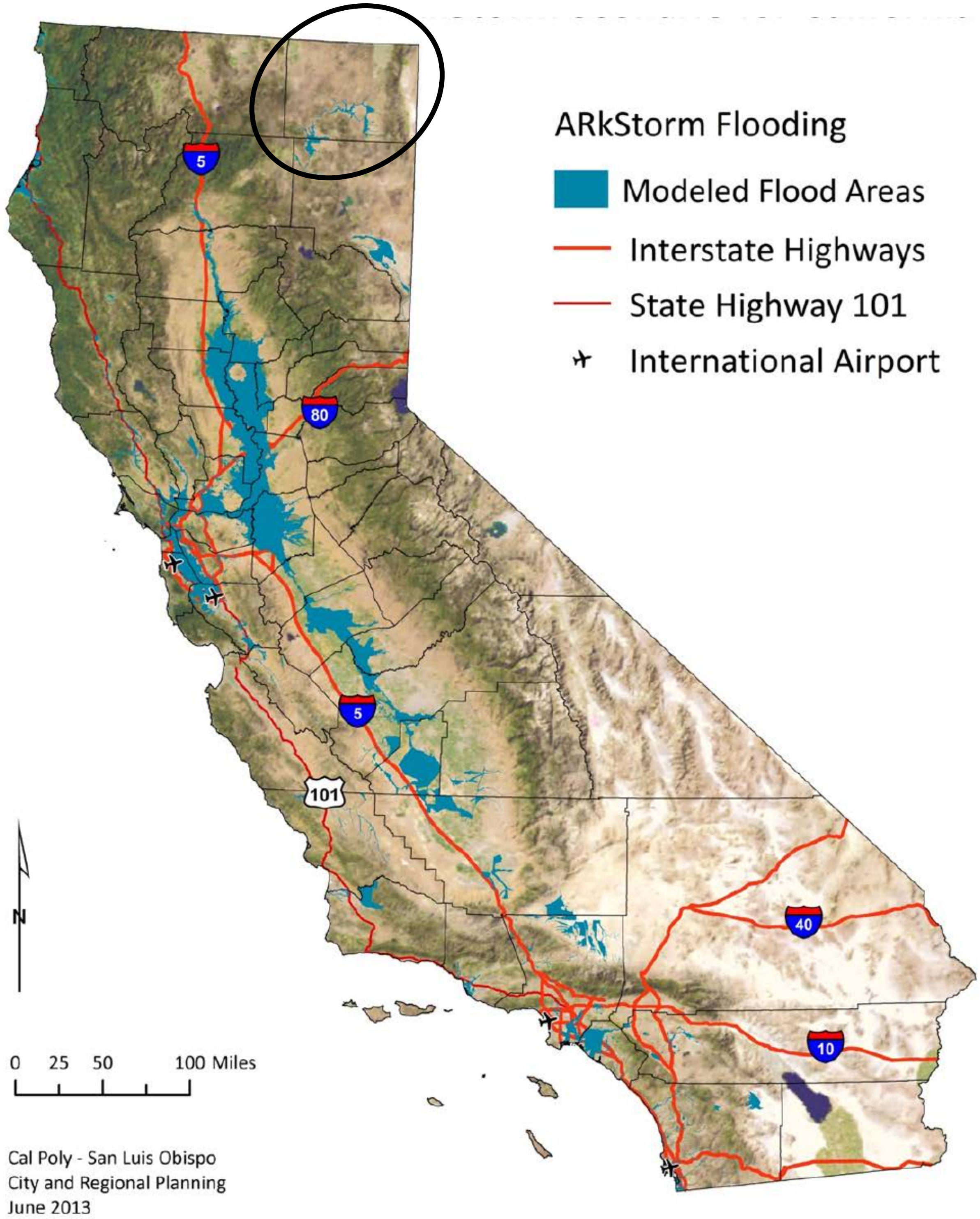
For the ARkStorm Scenario, experts designed a large, scientifically realistic meteorological event followed by an examination of the secondary hazards (e.g., landslides and flooding), physical damages to the intense winter storms of 1861-62 that left California's Central Valley impassible. Storms far larger than the ARkStorm, dubbed megastorms, have also hit California at least six times in the last two millennia.

The ARkStorm produces precipitation in many places exceeding levels experienced on average every 500 to 1,000 years. Extensive flooding in many cases overwhelms the state's flood protection system, which is at best designed to resist 100- to 200-year runoffs (many flood protection systems in the state were designed for much smaller runoff events). The Central Valley experiences widespread flooding. Serious flooding also occurs in Orange County, Los Angeles County, San Diego, the San Francisco Bay Area, and other coastal communities. In some places, winds reach hurricane speeds, as high as 125 miles per hour. Hundreds of landslides occur, damaging roads, highways, and homes. Property damage exceeds $300 billion, most of it from flooding. Agricultural losses and other costs to repair lifelines, dewater flooded islands, and repair damage from landslides brings the total direct property loss to nearly $400 billion, of which only $20 to $30 billion would be recoverable through public and commercial insurance. Power, water, sewer, and other lifelines experience damage that takes weeks or months to restore. Flooding evacuation could involve over one million residents in the inland region and Delta counties.

A storm of ARkStorm's magnitude has important implications: 1) it raises serious questions about the ability of existing national, state, and local disaster policy to handle an event of this magnitude; 2) it emphasizes the choice between paying now to mitigate, or paying a lot more later to recover; 3) innovative financing solutions are likely to be needed to avoid fiscal crisis and adequately fund response and recovery costs; 4) responders and government managers at all levels should be encouraged to conduct self-assessments and devise table-top exercises to exercise their ability to address a similar event; 5) the scenario can be a reference point for application of FEMA and Cal OES guidance connecting federal, state, and local natural hazards mapping and mitigation planning under the NFIP and Disaster Mitigation Act of 2000; and 6) common messages to educate the public about the risk of such an extreme event could be developed and consistently communicated to facilitate policy formulation and transformation.

Figure 4-62 depicts an ARkStorm modeled scenario showing the potential for flooding in the Central Valley as the result of a large storm. In Modoc County, the modeled scenario suggests the central and south central portion of the County would face inundation.

Figure 4-62 Projected ARkStorm Flooding in California



Source: USGS ArkStorm

4.3.9. Flood: Localized Stormwater Flooding Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—Medium

Historically, the County has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs throughout the Planning Area at various times throughout the year with one area of primary concern unique to the County where impervious ground causes localized flooding near one of the water treatment plants.

Storm water has the potential to damage public infrastructure and private property in all areas of the county. The most severe damage typically occurs when warm heavy rain falls on snowy slopes causing the snow to melt rapidly. These storm events bring a higher than normal flow of water that can exceed the capacity of ditches and channels. The flooding can be more intense and problematic in areas with steep slopes where the water is more likely to carry heavy silt and rocks, filling ditches and plugging culverts.

In the past the county has seen infrastructure damaged from storm water in all parts of the county. There are many vulnerable road segments in the Surprise Valley and Newell areas but all of our districts can experience localized flooding that can disrupt transportation and infrastructure elements. For the most part electrical and phone service infrastructure tend to follow County Roads making flooding an issue not only for transportation but for other critical services as well.

Table 4-46 lists roads that have experienced localized flooding and related events since 2003, when computerized recordkeeping began in the County. The flooding events on these roads triggered debris removal (at a minimum) with most requiring more extensive maintenance. Typically debris removal and associated issues routinely included downed trees, heavy mud, pavement deterioration and washouts.

Table 4-46 Modoc County Localized Flooding Areas

County Road Number and Name		
001 ROAD: CR 1 Surprise Valley Road	083 ROAD: From Canby to SR 139	221 ROAD: 19th Street
002 ROAD: CR 2 Highgrade Road	084 ROAD: CR 84 Bushy Road	224 ROAD: CR 224Bidwell Creek Road
002A ROAD: CR 2A Larry Flat Road	085 ROAD: CR 85 Stone Cole Road	228 ROAD: CR 228 Lookout Indian Reserv Rd
005 ROAD: Cowhead Lake Grvl Pit	085C ROAD: Shaw Pit Road	233 ROAD: Fitzhugh Creek Road
006 ROAD: CR 6 Fee Reservoir Road	086 ROAD: CR 86	236 ROAD: CR 236 Woodduck Lane MRE
008 ROAD: CR 8 Sagehorn Road	087 ROAD: CR 87 Adin-Lookout Road	256 ROAD: Off CR 1, North of Cedarville
009 ROAD: CR 9 Fandango Pass Road	087A ROAD: CR 87A	258 ROAD: CR 258 Blue Lake Road
011 ROAD: CR 11 Lake City Road	088 ROAD: CR 88 Adin to Madeline	267 ROAD: Thomas Creek Drive

County Road Number and Name		
015 ROAD: Lake City Pit Road	088A ROAD: CR 88A Adin Transfer Station Road	272 ROAD: CR 272 Day Road
017 ROAD: CR 17 Upper Lake City Road	089 ROAD: CR 89 Adin Cemetery Road	AD-002 ROAD: CR AD-2 Canal St
018 ROAD: CR 18 Forty-nine Lane	090 ROAD: CR 90 Gouger Neck Road	AD-003 ROAD: CR AD-3 McDowell St
023 ROAD: East of Cedarville off SR 299	091 ROAD: CR 91 Lookout-Hackamore Road	AD-004 ROAD: CR AD-4 Willow St
027 ROAD: CR 27 Granger Creek Road	091A ROAD: CR 91A Lookout Access Road	AD-005 ROAD: CR AD-5 Cedar St
027A ROAD: CR 27A	093 ROAD: CR 93	AD-006 ROAD: AD CR-6 Oak St
028 ROAD: CR 28	093A ROAD: CR 93A Main Street, Lookout	AD-007 ROAD: CR AD-7 Juniper St
029 ROAD: CR 29	093B ROAD: CR 93B Lookout Transfer Station Rd	AD-008 ROAD: CR AD-8 Walnut St
030 ROAD: CR 30	094 ROAD: CR 94 Widow Valley Road	AD-009 ROAD: CR AD-9 Spring St
030A ROAD: CR 31A	097 ROAD: CR 97 Tionesta Road	AD-010 ROAD: CR AD10 Adin St
031 ROAD: Patterson Lane	100 ROAD: CR 100	AD-011 ROAD: CR AD-11 Main St
033 ROAD: CR 33	101 ROAD: CR101	AD-012 ROAD: CR AD-12 Ash St
035 ROAD: CR 35	102 ROAD: CR 102 / East / West Road	AD-013 ROAD: CR AD-13 Center Street
037 ROAD: From SR 299,South of CR 038	104N ROAD: CR 104N	BVR-001 ROAD: CR BVR-1 Cedar Drive
037S ROAD: CR 37S	105 ROAD: CR 105	BVR-002 ROAD: CR BVR-2 Mahogany Way
038 ROAD: CR 38 Hays Canyon Road	108 ROAD: CR 108	BVR-003 ROAD: CR BVR-3 Artemisia Way
039 ROAD: CR 39	111N ROAD: CR 111N Great Northern Road	BVR-004 ROAD: CR BVR-3 Juniper Way
040 ROAD: CR 40 Emerson Road	112 ROAD: Old Malin Highway	BVR-005 ROAD: CR BVR-5 Oak Way
042 ROAD: CR 42 Patterson Mill Road	112N ROAD: CR 112N Old Malin Highway	BVR-006 ROAD: CR BVR-6 Acorn Way
044 ROAD: CR 44	112S ROAD: CR 112S Old Malin Highway	BVR-007 ROAD: CR BVR-7 Sage Way
045 ROAD: Pine Street	114 ROAD: CR 114 Old Alturas Highway	BVR-010 ROAD: CR BVR-10 West Ponderosa Drive
047 ROAD: Willow Ranch Road	115 ROAD: CR 115 Old Highway 395	BVR-011 ROAD: CR BVR-11 Ponderosa Drive
047W ROAD: CR 47W Willow Ranch Rd West	118 ROAD: CR 118 Joseph Creek Road	BVR-012 ROAD: CR BVR-12 North Ponderosa Drive

County Road Number and Name		
048 ROAD: CR 48 West Side Road	119 ROAD: CR 119 Fee Road	BVR-013 ROAD: CR BVR-13 Fir Ct.
050 ROAD: Off CR 048,1.5 miles West of	120 ROAD: CR 120 Causeway -Tulelake Sump	CV-001 ROAD: CR CV-1 Patterson St
052 ROAD: CR 52 Franklin Canyon Road	121 ROAD: SR 139 to CR 120	CV-003 ROAD: Lincoln Street
054 ROAD: CR 54 Centerville Road	122 ROAD: Between CR 120 and CR 121,Southeast	CV-004 ROAD: CR CV-4 Garfield St
055 ROAD: CR 55 Pencil Road	132 ROAD: Off CR 111-Panhandle	CV-005 ROAD: High Street
056 ROAD: Parker Creek Road	133A ROAD: CR 133A Old SR 395	CV-006 ROAD: Center Street
057 ROAD: Off CR 056,to Pine Creek Reservoir	133B ROAD: Old SR 395	CV-007 ROAD: Bonner Street
058 ROAD: CR 58 Alpine Road	133C ROAD: CR 133C Old SR 395	CV-009 ROAD: Hays Street, Cedarville
058B ROAD: Dry Creek Basin Road	133D ROAD: From SR 395 to CR 009,North of	FB-008 ROAD: CR FB-8 Post S
058C ROAD: Off CR 58B	133DS ROAD: CR 133DS	FB-009 ROAD: Bridge Street
059 ROAD: Pine Creek Boulevard	134 ROAD: CR 134 Sage Grouse Road	FB-011 ROAD: Ross St., Ft Bidwell
059A ROAD: Off CR 059	135 ROAD: CR 120 to CR 124,Panhandle-Newell	FB-014 ROAD: CR FB-14 Willow St
059B ROAD: CR 59B	139 ROAD: Willow Ranch from SR 395 to CR 046	LK-001 ROAD: CR LK-1 First Street
060 ROAD: CR 60 West Side Road	140 ROAD: From SR 139 to CR 114,South of	LK-002 ROAD: A Street, Lookout
061 ROAD: CR 61 Jones Lane	143 ROAD: Off CR 001,South of Cedarville	LK-003 ROAD: CR LK-3 B St
063 ROAD: CR 63 Brush Road	146 ROAD: CR 146 Shephard Road	LK-004 ROAD: CR LK-4 C St
064 ROAD: CR 64 Jess Valley Road	150 ROAD: CR 150	NE-001 ROAD: CR NE-1 Fresno St
065 ROAD: Indian Road off SR 395,Likely	161 ROAD: Canby	NE-002 ROAD: CR NE-2 Fourth Avenue
066 ROAD: West Valley Reservoir Road,	169 ROAD: Off SR 139,South of Newell	NE-003 ROAD: CR NE-3 Glendale St
068 ROAD: SX Road	172 ROAD: Off CR 056	NE-004 ROAD: CR NE-4 Hollywood St
069 ROAD: SR 299 to CR 054,between Alturas	175 ROAD: Off CR 054,South of Canby	NE-006 ROAD: NE-6 Peninsula Drive
071 ROAD: CR 71 Cal Pines Boulevard	176 ROAD: CR 176	NE-007 ROAD: CR NE-7 Wagonwheel Dr.
073 ROAD: CR 73 Crowder Flat Road	176A ROAD: CR 176A Tulelake Airport Road	NE-008 ROAD: CR NE-8 Captain Jack Way

County Road Number and Name		
074 ROAD: CR 74 Devils Garden Con Camp Rd	178 ROAD: CR 178 Sixth Avenue	NE-009 ROAD: CR NE-9 C Street
075 ROAD: SR 299 to CR 054,West of Alturas	181 ROAD: CR 181 South Main Road	NE-010 ROAD: CR NE-10 D Street
076 ROAD: CR 76	189 ROAD: Old SR 395,North of Likely	NE-011 ROAD: CR NE-11 B Street
077 ROAD: CR 77 Big Lakes Road	193 ROAD: Off CR 121,South of Newell	NE-012 ROAD: CR NE-12 5th Avenue
078 ROAD: Lucilane Boulevard	198 ROAD: CR 198	NE-013 ROAD: CR NE-13 Eureka St.
079 ROAD: East Street	200 ROAD: Lakeshore Ranch Road	NE-016 ROAD: CR NE-16 Meander Dr
081 ROAD: CR 81 Bowman Road	205 ROAD: Steward Road	NP-001 ROAD: CR NP 1 McKune St
082 ROAD: CR 82 Blacks Canyon Road	220 ROAD: CR 220	

Source: Modoc County

Future Development

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding.

The potential for flooding may increase as storm water is channelized due to land development. Such changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on the ultimate built-out land use in order to assure that all new development remains safe from future hydrologic conditions. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can result in floodplain impacts regardless. Additional growth in the County could contribute to increased localized flooding.

4.3.10. Landslide, Mudslides, and Debris Flows Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Medium

Landslide Analysis

Landslides in Modoc County include a wide variety of processes resulting in downward and outward movement of soil, rock, and vegetation. Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. Although landslides are primarily associated with slopes greater than 15 percent, they can also occur in relatively flat areas and as cut-and-fill failures, river bluff failures, lateral spreading landslides, collapse of wine-waste piles, failures associated with quarries, and open-pit mines. Landslides may be triggered by both natural- and human-caused activity. Although this hazard also includes related issues such as mudslides and debris flows, available mapped hazard data was limited to landslides; thus, the remainder of this section is focused on the landslide vulnerability. Additional data and information on mudslides and debris flows were included in the hazard profiles section of this plan.

Methodology

According to the landslide layer obtained by the USGS there is a landslide incidence of low to moderate in the Planning Area. No areas of high landslide risk exist in the County. The County's parcel layer was used as the basis for the inventory of all parcels within Modoc County. GIS was used to overlay the landslide hazard layer with the parcel layer centroids and where the landslide zones intersected a parcel centroid, it was assigned with that hazard zone for the entire parcel. Only improved parcels were included in this analysis. Note that the value of the improved land is also included in the total of values at risk as the land itself is at risk to landslide.

Values at Risk

The USGS landslide layer was overlaid with the county parcel layer in GIS to obtain results. This is shown in Figure 4-63. Table 4-47 illustrates the estimated damages to both Alturas and unincorporated Modoc County that would be sustained from landslides. Table 4-48 shows the unincorporated County property uses by landslide risk.

Figure 4-63 Modoc County Planning Area – Landslide Incidence Potential

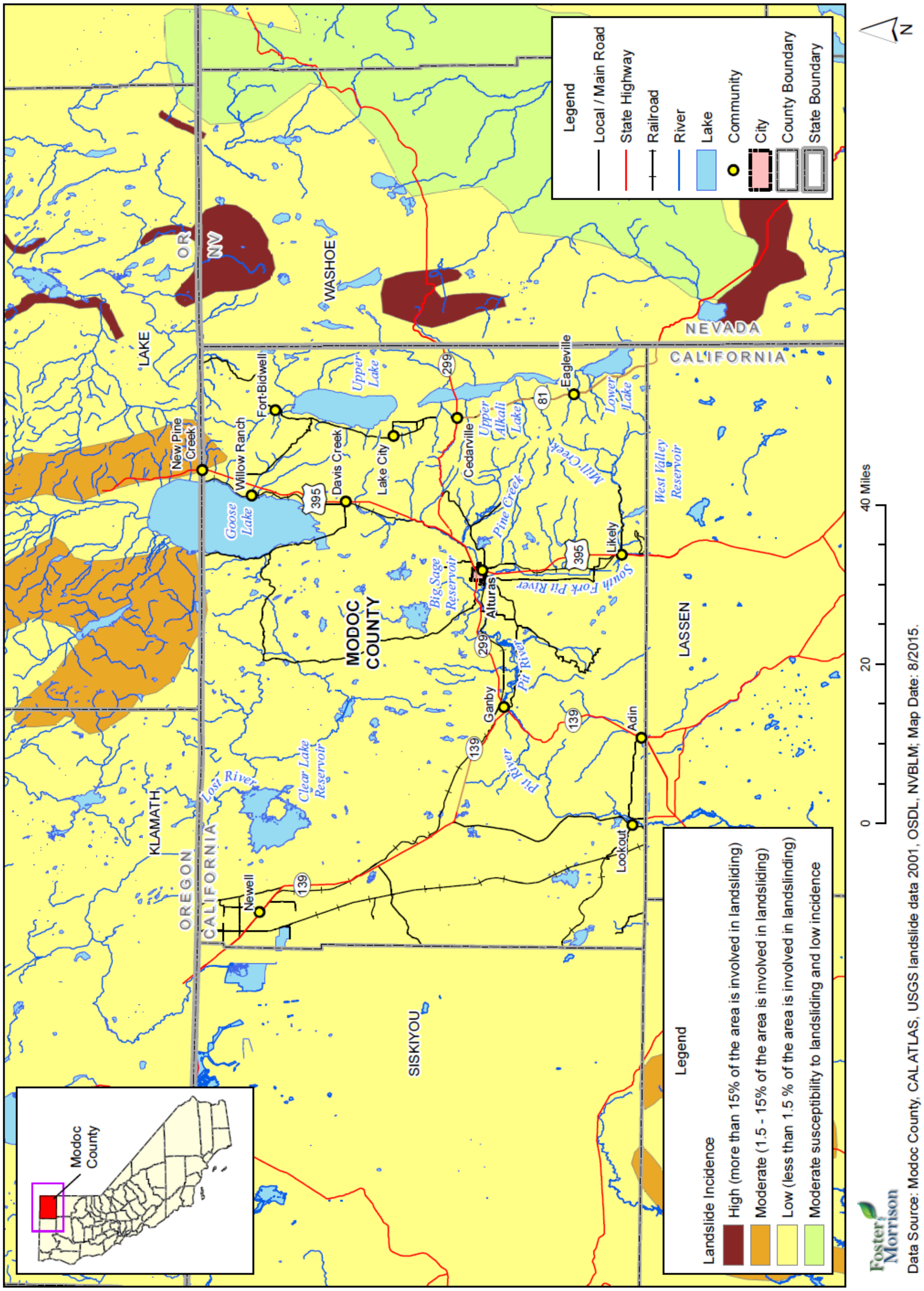


Table 4-47 Modoc County Planning Area – Assets at Risk to Landslide by Incidence Potential

Jurisdiction	Total Parcel Count	Improved Parcel Count	Improved Value	Improved Land Value	Total Value
High Incidence					
City of Alturas	0	0	$0	$0	$0
Unincorporated	0	0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**
Moderate Incidence					
City of Alturas	-	-	$0	$0	$0
Unincorporated	119	42	$1,462,540	$763,639	$2,226,179
Total	**119**	**42**	**$1,462,540**	**$763,639**	**$2,226,179**
Low Incidence					
City of Alturas	1,930	1,340	$111,646,889	$17,581,097	$129,227,986
Unincorporated	30,374	3,925	$272,613,636	$171,298,533	$443,912,169
Total	**32,304**	**5,265**	**$384,260,525**	**$188,879,630**	**$573,140,155**
Grand Total	**32,423**	**5,307**	**$385,723,065**	**$189,643,269**	**$575,366,334**

Source: USGS, Modoc County 2014 Assessor's Data

Table 4-48 Unincorporated Modoc County – Assets at Risk to Landslide by Property Type

Property Use	Total Parcel Count	Improved Parcel Count	Improved Value	Improved Land Value	Total Value
High Incidence					
Agricultural	0	0	$0	$0	$0
Commercial	0	0	$0	$0	$0
Exempt	0	0	$0	$0	$0
Industrial	0	0	$0	$0	$0
Institutional	0	0	$0	$0	$0
Recreational	0	0	$0	$0	$0
Residential	0	0	$0	$0	$0
Total High Risk	**0**	**0**	**$0**	**$0**	**$0**
Moderate Incidence					
Agricultural	11	2	$369,506	$201,265	$570,771
Commercial	9	3	$79,100	$24,891	$103,991
Exempt	17	-	-	-	$0
Industrial	-	-	-	-	$0

Property Use	Total Parcel Count	Improved Parcel Count	Improved Value	Improved Land Value	Total Value
Institutional	-	-	-	-	$0
Recreational	9	-	-	-	$0
Residential	73	37	$1,013,934	$537,483	$1,551,417
Total Moderate Risk	**119**	**42**	**$1,462,540**	**$763,639**	**$2,226,179**
Low Incidence					
Agricultural	3,760	750	$57,870,210	$105,073,543	$162,943,753
Commercial	593	348	$46,117,787	$9,870,637	$55,988,424
Exempt	4,801	0	$0	$0	$0
Industrial	31	11	$240,628	$553,751	$794,379
Institutional	33	29	$4,302,205	$289,807	$4,592,012
Recreational	18,734	1,103	$59,699,719	$16,953,880	$76,653,599
Residential	**4,352**	**3,024**	**$216,029,976**	**$56,138,012**	**$272,167,988**
Total Low Risk	**32,304**	**5,265**	**$384,260,525**	**$188,879,630**	**$573,140,155**
Grand Total	**32,423**	**5,307**	**$385,723,065**	**$189,643,269**	**$575,366,334**

Source: USGS, Modoc County 2014 Assessor's Data

Populations at Risk

Those residential parcel centroids that intersect the landslide risk zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 85 residents of Modoc County Planning Area at risk to moderate incidence or greater landslide. This is shown in Table 4-49.

Table 4-49 Unincorporated Modoc County – Count of Improved Residential Parcels and Population by Landslide Incidence

Landslide Incidence	Improved Residential Parcels	Population*
High	0	0
Medium	37	85
Low	3,024	6,955
Total	**3,061**	**7,040**

Source: USGS, Modoc County 2014 Assessor's Data, Census Bureau

* Average household populations from the 2010 US Census were used: Modoc County – 2.30; Alturas – 2.27.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Modoc County and all jurisdictions to determine critical facilities in the landslide incidence zones. Using GIS, landslide incidence zones were overlayed on the critical facility location data. Figure 4-64 shows critical facilities, as well as the landslide incidence zones. There is one critical facilities in the medium or high landslide incidence zones, as shown on Table 4-50. Details of critical facility definition, type, name and address and jurisdiction by landslide incidence zone are listed in Appendix E.

Figure 4-64 Modoc County Planning Area – Critical Facilities in Landslide Incidence Zones

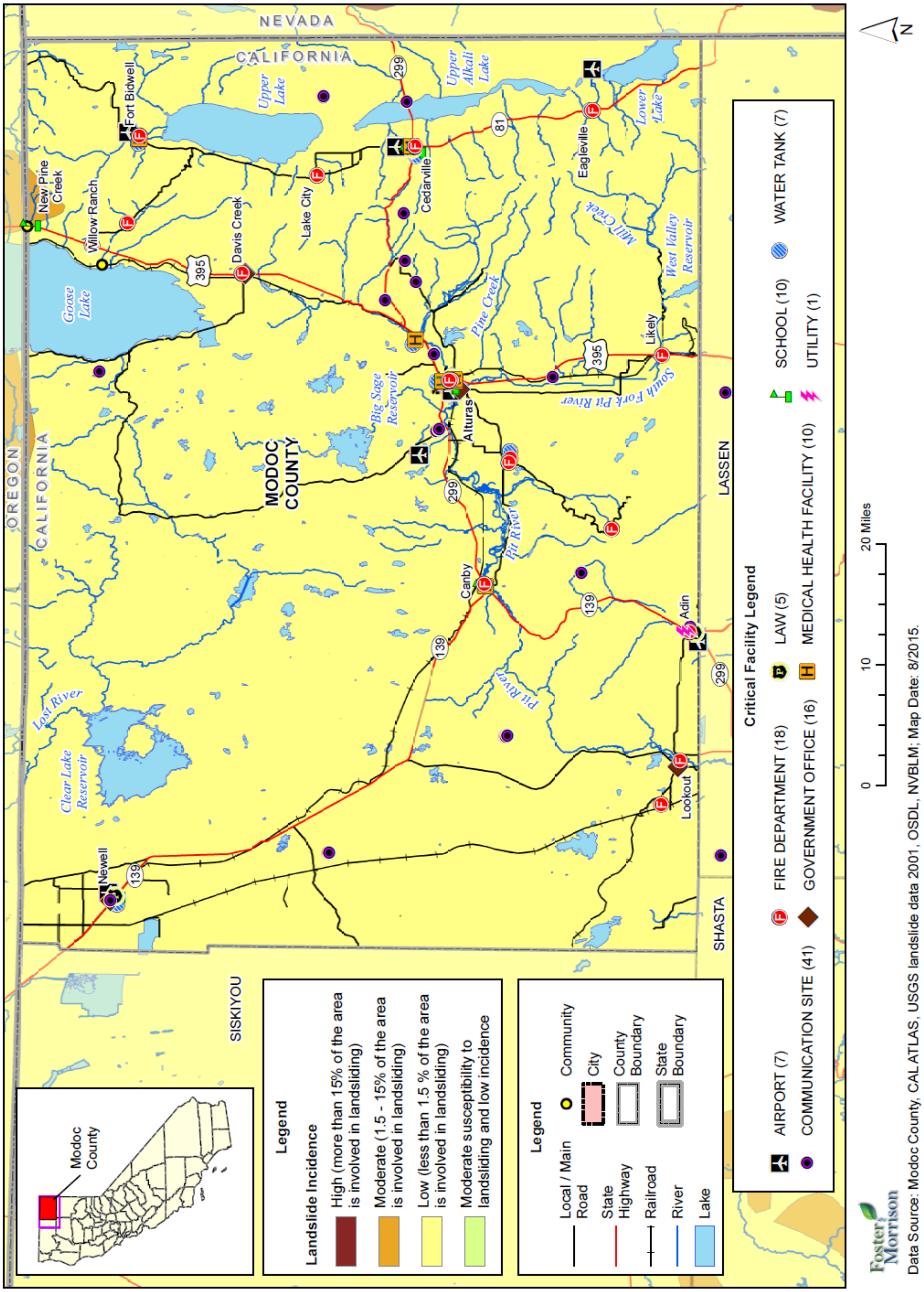


Table 4-50 Modoc County Planning Area – Critical Facilities in Landslide Incidence Zones

Jurisdiction	Critical Facility Designation	Critical Facility Type	Name	Landslide Incidence Zone
Modoc County Unincorporated Areas	Category IV Critical Facilities	SCHOOL	STATELINE SCHOOL	Moderate

Source: USGS, Modoc County GIS

Future Development

Although new growth and development corridors would fall in the area affected by moderate risk of landslide, given the small chance of a major landslide and the building codes and erosion ordinance in effect, development in the landslide area will continue to occur.

To determine potential development constraints based on the location of future development areas relative to the landslide risk zones, additional analysis was performed using GIS. For the Planning Area, the future development areas (non-improved parcels in approved subdivisions) provided by the Modoc County Planning Department were intersected with the landslide incidence zones to identify future areas of development at risk to landslide. Table 4-45 provides an analysis of the future development areas by landslide incidence zone shown in Figure 4-61. While the subdivisions on this table have been approved for development, it should be noted that large tracts of land within the County that are privately owned may be developed in the future and are not included in this analysis.

Figure 4-65 Modoc County Planning Area– Future Development in Landslide Zones

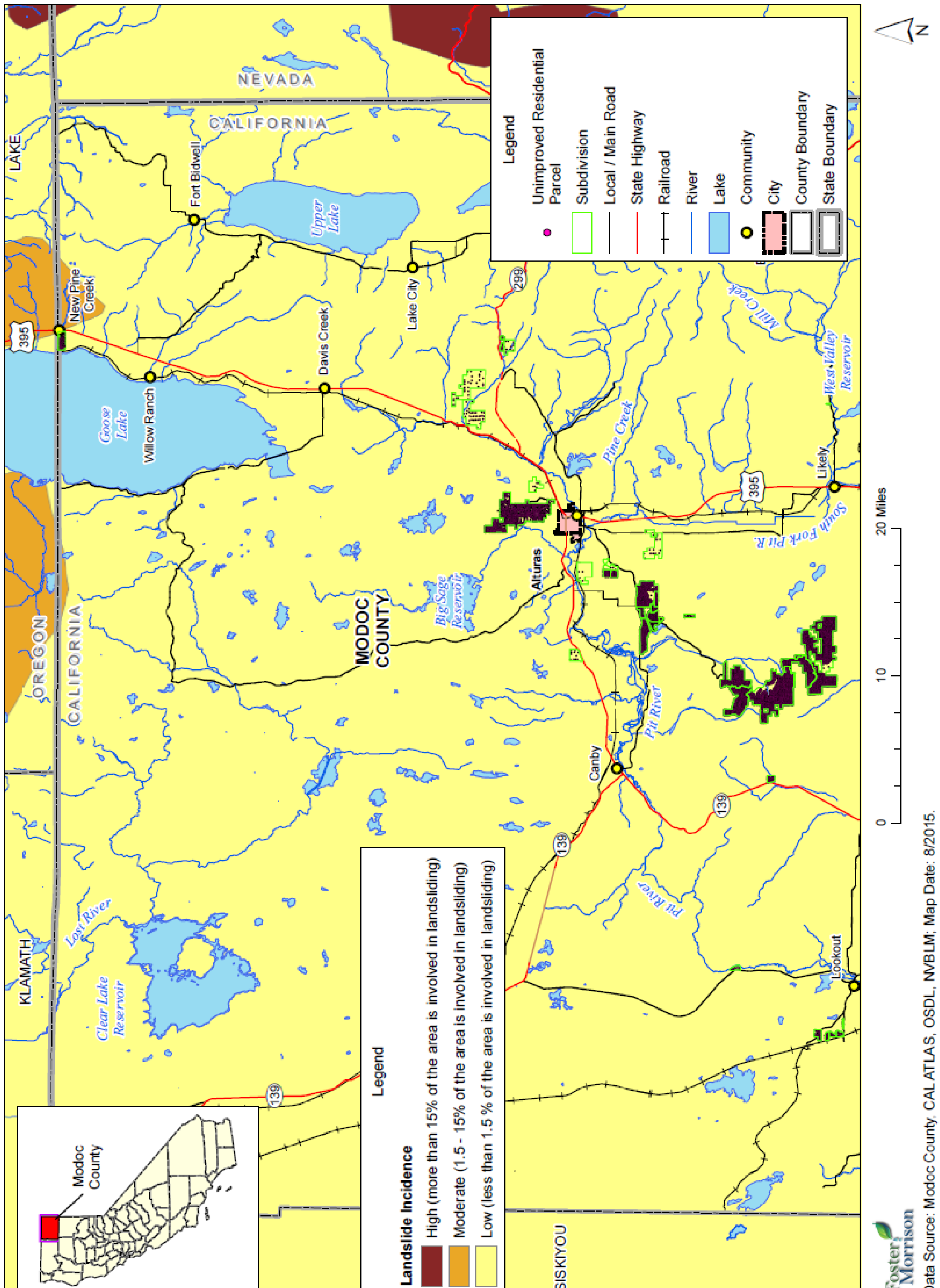


Table 4-51 Unincorporated Modoc County – Future Development Detail Table

Subdivision Projects	# of Parcels	Improved Parcels	Non-Improved Parcels	% Improved	Acres	Landslide Susceptibility
Big Valley Ranchettes - Unit 1	111	35	76	31.53%	192.0	Low
Big Valley Ranchettes - Unit 2	69	23	46	33.33%	88.3	Low
Big Valley Ranchettes - Unit 3	56	21	35	37.50%	98.1	Low
Big Valley Ranchettes - Unit 4A	25	11	14	44.00%	34.3	Low
Big Valley Ranchettes - Unit 4B	46	16	30	34.78%	114.5	Low
California Pines-Hill Unit 1	1,221	21	1,200	1.72%	1,343.7	Low
California Pines-Hill Unit 2	1,315	7	1,308	0.53%	1,377.4	Low
California Pines-Hill Unit 3	3,445	70	3,375	2.03%	4,103.3	Low
California Pines-Hill Unit 4	1,235	13	1,222	1.05%	1,244.0	Low
California Pines-Hill Unit 5	4,203	6	4,197	0.14%	4,829.0	Low
California Pines-Lake Unit 1A	801	13	788	1.62%	790.9	Low
California Pines-Lake Unit 1B	778	55	723	7.07%	191.2	Low
California Pines-Lake Unit 2	1,099	72	1,027	6.55%	1,398.1	Low
California Pines-Lake Unit 3	161	6	155	3.73%	175.0	Low
California Pines-Lake Unit 4	673	51	622	7.58%	302.0	Low
California Pines-Mobile home Park	360	47	313	13.06%	43.1	Low
Castle Rock Estates	81	24	57	29.63%	147.3	Low
Cedar Pass Properties	22	10	12	45.45%	389.2	Low
Cedar Pass Summerland - 1st Addition	21	7	14	33.33%	78.4	Low
Cedar Pass Summerland - Unit A	35	8	27	22.86%	44.6	Low
Centerville Estates	8	4	4	50.00%	179.2	Low
Conestoga Ranches	20	9	11	45.00%	373.7	Low
Goose Lake Estates	201	36	165	17.91%	411.5	Low
Ivory Ranches	30	16	14	53.33%	115.2	Low
Juniper Acres	17	16	1	94.12%	10.7	Low
Modoc Farms	13	11	2	84.62%	798.9	Low
Modoc Farms Too	10	10	-	100.00%	62.4	Low
Modoc Recreational Estates	1,864	327	1,537	17.54%	3,970.9	Low
Pit River Ranchos	25	4	21	16.00%	124.8	Low
Pit River Rec. Estate - T-12	94	4	90	4.26%	161.9	Low
Pit River Rec. Estates - T-10, U-1	123	12	111	9.76%	162.8	Low
Pit River Rec. Estates - T-10, U-2	132	2	130	1.52%	158.4	Low
Rimrock Ranches	31	26	5	83.87%	396.9	Low
Rush Creek Subdivision	105	33	72	31.43%	145.6	Low

Subdivision Projects	# of Parcels	Improved Parcels	Non-Improved Parcels	% Improved	Acres	Landslide Susceptibility
Thoms Creek Estates - Unit 1	59	24	35	40.68%	1,177.1	Low
Thoms Creek Estates - Unit 2	81	47	34	58.02%	1,690.9	Low
Wildlife Estates	58	40	18	68.97%	952.3	Low
Total	**18,628**	**1,137**	**17,491**	**–**	**27,877**	

Source: USGS, Modoc County Planning Department

4.3.11. Levee Failure Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Medium

Levee failure flooding can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. The primary danger associated with dam or levee failure is the high velocity flooding of those properties downstream of the breach.

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to levee failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Levee failure flooding would vary in the Planning Area depending on which structure fails and the nature and extent of the failure and associated flooding. This flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

There are numerous levee systems in Modoc County. In fact, the HMPC noted that there were over 900 miles of levee in the County. However, none of them are accredited by FEMA as providing protection against the 100-year flood. No significant flood problems have been experienced in the City of Alturas since the completion of the USACE channel modification and levee improvement project in 1972; however, these levees are no longer accredited with providing protection against the 100-year flood. Due to this, no GIS analysis could be performed on leveed zones in the County.

Future Development

According to the HMPC, no development is occurring in levee protected areas.

4.3.12. Severe Weather: Extreme Cold, Freeze, Winter Weather Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—High

Extreme cold, freeze, and winter weather can occasionally be accompanied by high winds, and can cause downed trees and power lines, power outages, frozen pipes, accidents, and road closures. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets to impacts of severe winter weather in the County. The ability for the County to continue to operate during periods of winter storm and freeze is paramount. Although freeze can burst pipes, freeze normally does not impact structures, but is a life safety issue. Vulnerable populations to winter weather and freeze include:

- Homeless
- Infants and children under age five
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

In addition to vulnerable populations, pets and livestock are at risk to freeze and cold. However many residents of Modoc County are self-sufficient and accustomed to rural living and the climate extremes that are part of the territory. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme cold and heavy snows.

Freeze can also affect farmers. Extended periods of cold/freeze can prevent trees from pollinating properly. However, during the winter/freeze months, many of the crops aren't even in the ground to be affected. High value crops, such as almond and citrus trees, can be severely damaged by freeze, causing large economic issues for farmers and the businesses they support.

Areas prone to excessively cold temperatures are identified normally on a nation-wide assessment scale, which doesn‘t allow detailed results on specific structures. Secondary impacts of freeze can affect the supporting mechanisms or systems of a community‘s infrastructure. For example, when extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption in the transmission of that power shutting down electric furnaces, which may lead to frozen pipes in homes and businesses.

The HMPC noted that this hazard presents a potentially widespread catastrophic problem. One of the biggest concerns of the County from hazards such as winter storms is being cut off from outside support systems. There are only three ways ingress and egress routes (139, 299, and 395). State Route 299 is the only road that connects Surprise Valley with the rest of Modoc County. It can be blocked for snow, slides, debris, etc. County Road 1 that runs the length of Surprise Valley is also the only transportation route in the valley and often is flooded. Many in the community are self-sufficient, with their own wood stoves, fuel supplies, backup generators and storage, but with the demographics shifting in recent years adding more low income citizens, more people are reliant on the community during adverse conditions. With much of the population on propane for heating, the Planning Area is extremely vulnerable should propane supplies run out. The County has 3 large, 3 phase generators and water storage tanks purchased for potable water in addition to gravity flow systems. But fuel for these generators will likely run out in the County within 36 hours. The remoteness of the County affects both refueling and the ability to respond to hazard events. The most potentially daunting storms are in January with a hard freeze and power loss, with roads closed.

Note – propane is not the only heating source, nor primary one. People use a combination of propane, kerosene, electric and wood.

Future Development

Future development built to code (for those areas with building codes) should be able to withstand snow loads from severe winter storms. Pipes at risk of freezing should be mitigated by either burying or insulating them from freeze as new facilities are improved or added. Current County codes provide such provisions for new construction. Vulnerability to extreme cold will increase as the average age and demographics of the population in the County shifts. Greater numbers of future senior citizens will result from the large number of baby boomers in the Planning Area. However, as previously mentioned, many of the residents of Modoc County are still self-sufficient and accustomed to rural living.

4.3.13. Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning) Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—High

According to historical hazard data, severe weather is an annual occurrence in Modoc County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the County. Wind, hail, and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods, mudslides, fire, and agricultural losses that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this plan.

Future Development

New critical facilities should be built to withstand hail damage, lightning, and thunderstorm winds. While no damages have occurred to critical facilities in the past due to heavy rains and storms, there still remains future risk. With development occurring in the region, future losses to new development may occur.

4.3.14. Severe Weather: High Winds/Tornadoes Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—High

The County is subject to potentially destructive straight-line winds as well as tornadoes. High winds are common throughout the area, and can happen during most times of the entire year. Straight line winds are primarily a public safety and economic concern. Windstorms and tornadoes can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered.

Future losses from straight line winds include:

- Erosion (soil loss) (discussed in greater detail in Section 4.3.7)
- Dry land farming seed loss
- Windblown weeds
- Downed trees
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs

While there has been some scattered record keeping describing the impacts of dust storms, there is little information to indicate that straight-line winds are little more than a nuisance that causes sporadic problems. For example, while winds can blow weeds that can create an additional expense for farmers, they often cause little long term damage and there is little justification for allocating resources to combat them. Though recordkeeping may be scattered, the HMPC noted that microbursts have caused problems in the County in the past. Damages to buildings, irrigation systems, and alkaline dust from Goose Lake and its associated air quality issues have all occurred in the past. With the recent drought, larger areas of dirt and dust have become more susceptible to the effects of winds.

Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures. Livestock that may be contained in these structures may be injured or killed, causing economic harm to the rancher who owns both the structure and the livestock. Overhead power lines are vulnerable and account for the majority of historical damages. State highways can be vulnerable to high winds and dust storms, where high profile vehicles may be overturned by winds and lowered visibility can lead to multi-car accidents.

Winds have caused downed trees that have fallen on homes and have blocked roadways. This is common in the City of Alturas. The HMPC noted that areas of the County have had road closures due to high winds and dust storms. An example is large dust storm the occurred by Goose Lake. The dust is a concern with the high alkali content causing a choking hazard. Also damage to roofs, roads closed, shattered parts of the dome on the Courthouse, downed trees, and other effects from windstorms have occurred in the County.

Future Development

Future development projects should consider windstorm hazards at the planning, engineering and architectural design stage with the goal of reducing vulnerability. Development trends in the County are not expected to increase vulnerability to the hazard.

4.3.15. Volcano Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely
Vulnerability—Medium

The USGS has ranked the volcanic threat at all U.S. volcanoes using volcano age, types of potential hazards, and estimates of the societal exposure to those hazards. Sixteen volcanoes are on California's watch list to monitor. Research suggests that partially molten rock (magma) lies beneath seven of these volcanoes—Medicine Lake Volcano, Mount Shasta, Lassen Volcanic Center, Clear Lake Volcanic Field, the Long Valley Volcanic Region, Coso Volcanic Field, and Salton Buttes. At these volcanoes, earthquakes (seismicity), hot springs, volcanic gas emissions, and (or) ground movement (deformation) attest to their restless nature. Three of these (Medicine Lake Volcano, Mount Shasta, Lassen Volcanic Center) pose a risk to the County. These are shown in Table 4-52.

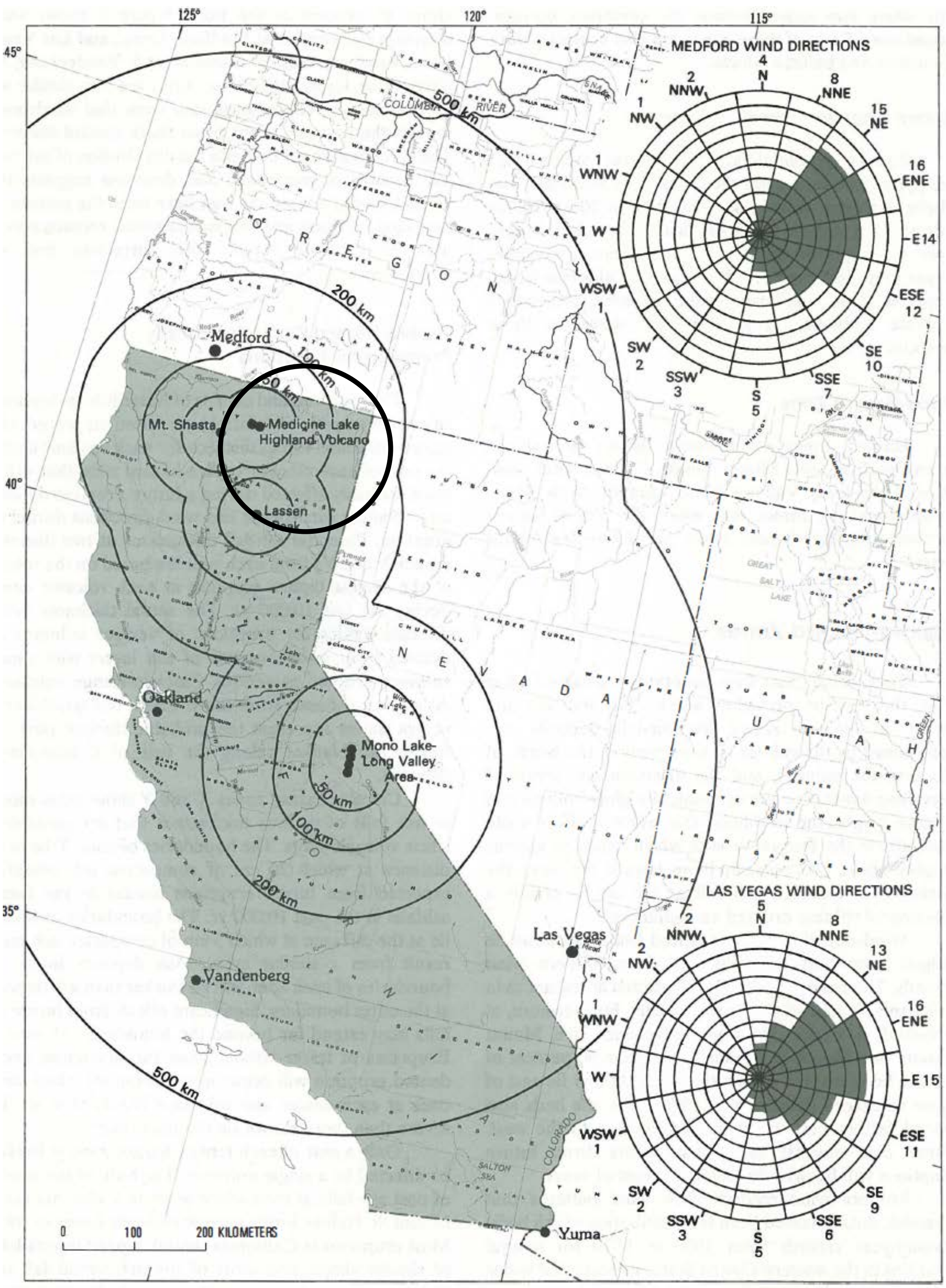
Table 4-52 Volcanoes Threat near Modoc County

Volcano	Medicine Lake Volcano	Mount Shasta	Lassen Volcanic Center
Threat	High Threat	Very High Threat	Very High Threat
	Lava Beds National Monument, about 30 miles south of Klamath Falls, Oregon, is located on the lower northern flank of the shield-shaped Medicine Lake Volcano and contains the highest concentration of lava-tube caves in North America.	This 14,162-foot-high volcano holds the headwaters of the upper Sacramento River and is adjacent to several towns and major highway, rail, and air transportation corridors.	Lassen Volcanic National Park, located about 50 miles east of Redding, showcases the dynamic history of this area and draws more than 350,000 visitors each year. Lassen Peak erupted violently in the early twentieth century.

Source: USGS Fact Sheet 2014-3120

The USGS, in Bulletin 1847, described the nature and probable distribution of potentially hazardous volcanic phenomena and their threat to people and property. It included hazard zonation maps that depicted areas relatively likely to be affected by future eruptions in California. Affected areas fall in Modoc County. This is shown on Figure 4-66.

Figure 4-66 Potential Ashfall Areas for California Volcanoes



Source: USGS Bulletin 1847

Low-level volcanic unrest can persist for decades or even hundreds of years without an eruption. Although steady, low-level unrest is normal for many young volcanoes, rapidly accelerating unrest is cause for concern. At California's most threatening volcanoes, monitoring sensors are in place to continuously track levels of unrest. Such monitoring is necessary to determine the baseline, or background level, of activity at a volcano to help volcanologists know what is normal. An uptick in unrest may be a sign of increased volcanic threat.

Future Development

Future development in the County may be at risk to volcanic activity; however, future development is at no greater risk to volcanic activity than current development. Further, given the uncertainties with regard to volcanic activity, it is unlikely that future development activities would be constrained in any manner.

4.3.16. Wildfire Vulnerability Assessment

Likelihood of Future Occurrence—Highly likely
Vulnerability—Extremely High

Risk and vulnerability to the Modoc County Planning Area from wildfire is of significant concern, with some areas of the Planning Area being at greater risk than others as described further in this section. High fuel loads in the Planning Area, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, lightning, and periodic winds, can result in frequent and sometimes catastrophic fires. During the April to October fire season, the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the Planning Area, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

The wildfire hazard is the highest priority hazard in the County, and is the hazard with the greatest potential for catastrophic loss. Wildfires can cause short-term and long-term disruption to the County. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the County by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires may result in casualties and can destroy buildings and infrastructure.

Although the physical damages and casualties arising from wildland-urban interface fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. In some cases, the economic impact of this loss of services may be comparable to the economic impact of physical damages or, in some cases, even greater. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Fires can also cause major damage to power plants and power lines needed to distribute electricity to operate facilities.

Modoc County Communities at Risk

The National Fire Plan is a cooperative, long-term effort between various government agency partners with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. For purposes of the National Fire Plan, the California Department of Forestry and Fire Protection (CAL FIRE) generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine the wildfire threat in the wildland-urban interface areas of California: fuel hazards, probability of fire, and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the Federal Register, January 4, 2001. The National Fire Plan identifies the following 17 "Communities at Risk" in Modoc County in Table 4-53.

Table 4-53 Communities at Risk in Modoc County

Community		
Adin	Copic	Likely
Alturas	Davis Creek	Lookout
Cal Pines Lower Units	Day	New Pine Creek
Cal Pines Upper Units	Eagleville	Newell
Canby	Fort Bidwell	Willow Ranch
Cedarville	Lake City	

Source: CAL FIRE

Assets at Risk

According to the CWPP, the many assets at risk in Modoc County include the various residential, commercial, governmental, and other structures and property that exist within the county. Many of these structures and properties are located close to or within the flammable natural vegetation of the area. Utilities and associated infrastructure such as electric, telephone, gas, water lines, telecommunication sites and rail lines are also at risk. Other important assets that are in jeopardy from wildfires include the many scenic and recreational areas, wildlife and watersheds, timber, livestock forage, agricultural crops, and prehistoric and historic archaeological sites and artifacts.

Unincorporated Modoc County and the City of Alturas have mapped CAL FIRE fire hazard severity zones. GIS was used to determine the possible impacts of wildfire within the County and how the wildfire risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values by fire severity. Analysis on assets at risk to wildfire in the County is provided for two different areas in this base plan:

- Modoc County Planning Area
- Unincorporated Modoc County

The Modoc County Planning Area includes both the unincorporated County and the City of Alturas, essentially the entire geographical area of Modoc County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the City of Alturas are included in the City's annex to this plan.

Methodology

There are numerous wildland fire protection agencies that have responsibility within the county, including the USDA Forest Service (FS), the Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA) and the California Department of Forestry and Fire Protection (CAL FIRE). There are also numerous fire departments and fire protection districts that serve local areas, many of whom have mutual aid agreements with each other as well as state and federal agencies for fire suppression and protection.

As part of the Fire and Resource Assessment Program (FRAP), CAL FIRE was mandated to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), then define the application of various mitigation strategies to reduce risk associated with wildland fires.

Fire hazard is a way to measure the physical fire behavior so that people can predict the damage a fire is likely to cause. Fire hazard measurement includes the speed at which a wildfire moves, the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The fire hazard model developed by CAL FIRE considers the wildland fuels. Fuel is that part of the natural vegetation that burns during the wildfire. The model also considers topography, especially the steepness of the slopes. Fires burn faster as they burn up-slope. Weather (temperature, humidity, and wind) has a significant influence on fire behavior. The model recognizes that some areas of California have more frequent and severe wildfires than other areas. Finally, the model considers the production of burning fire brands (embers) how far they move, and how receptive the landing site is to new fires.

In 2007, CAL FIRE updated its fire hazard severity zone maps for the State of California to provide updated map zones, based on new data, science, and technology that will create more accurate zone designations such that mitigation strategies are implemented in areas where hazards warrant these investments. The zones will provide specific designation for application of defensible space and building standards consistent with known mechanisms of fire risk to people, property, and natural resources. The program is still ongoing with fire hazard severity zone maps being updated based on designated responsibility areas: State Responsibility Area (SRA) and Local Responsibility Area (LRA). The State Responsibility Area (SRA) was originally mapped in 1985 and Local Responsibility Areas (LRA) was originally mapped in 1996.

Responsibility Areas

CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and land use. CAL FIRE is now also responsible for determining parcels subject to the SRA Fire Prevention Fee under AB X1 29. This dataset (SRA15_1) represents SRA status as of 7/1/14 and was used for the final determination of which parcels were potentially eligible for the fee. CAL FIRE's State Responsibility Area layer was used in this analysis to show Modoc County's values, inventory and population by Federal Responsibility Area (FRA), SRA, and LRA. The FRA in the

County is relatively small. The largest is the SRA, with 70 percent of the parcels in the county falling in the SRA. Locations of each responsibility area are shown in Figure 4-67. The FRA contains 3,722 parcels, none of which are improved. The SRA contains 23,263 parcels, with over $548 million in total value. The LRA has 5,438 parcels with $560 million in total value. It should be noted that fire does not just affect structural values, fire can also affect contents and land values. Contents values were derived from the improved structure values using the same methodology as described in the flood analysis (see Section 4.3.8). The Assessor's land values and all parcels were accounted for in this analysis to represent total County assets at risk. However, it is highly unlikely the whole County will ever be on fire at once. Analysis results by fire responsibility areas for the entire Modoc County Planning Area are provided in Table 4-54, which summarizes total parcel counts, improved parcel counts, and their land values, structure values, contents value, and total values by property use.

Figure 4-67 Modoc County FRA, SRA, LRA Wildfire Areas

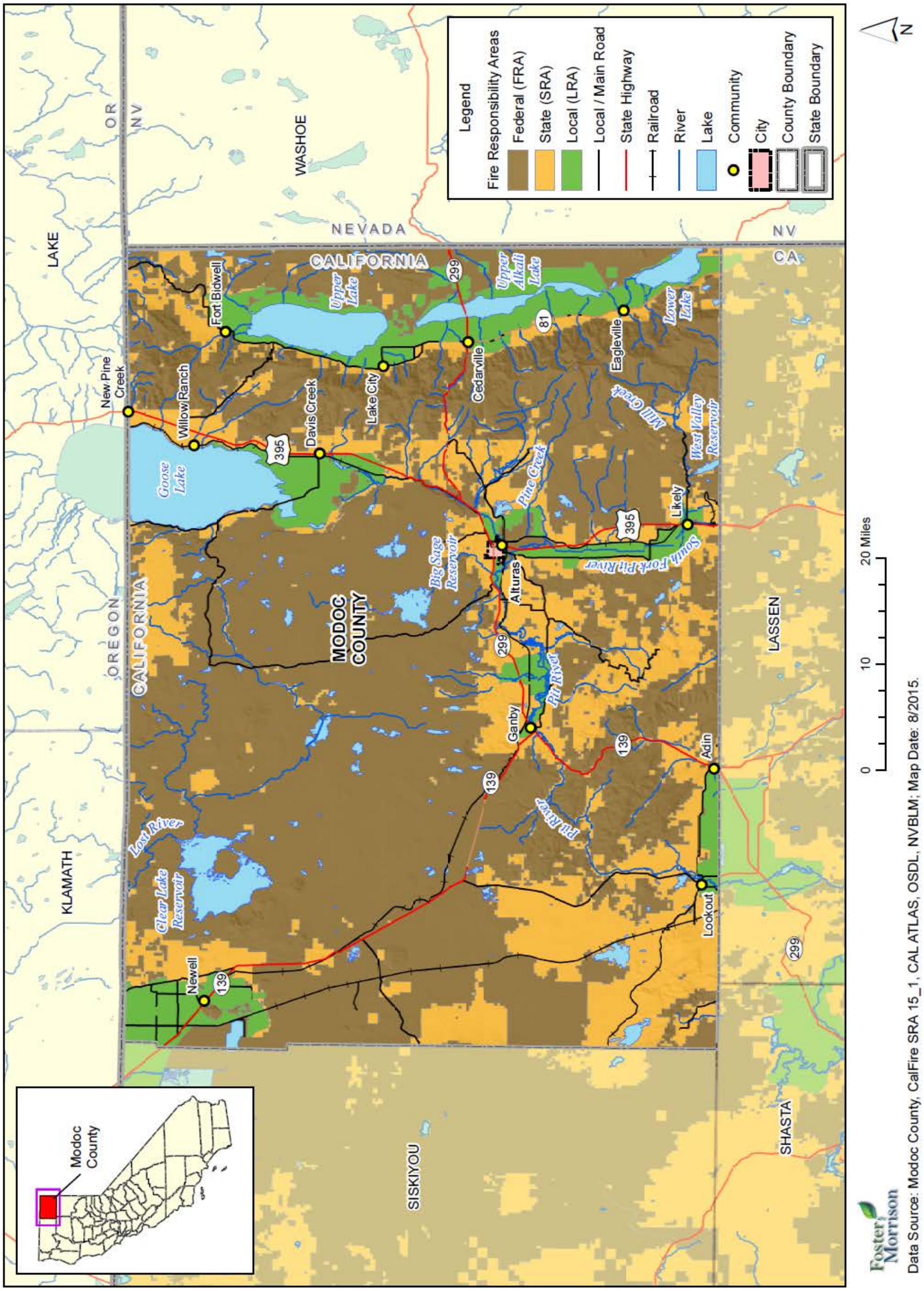


Table 4-54 Modoc County Planning Area – Assets in Local, State, and Federal Responsibility Areas by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Contents Value	Total Value
Federal Responsibility Area						
Agricultural	6	0	$365,823	$0	$0	$365,823
Commercial	0	0	$0	$0	$0	$0
Exempt	3,711	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Institutional	0	0	$0	$0	$0	$0
Recreational	2	0	$8,509	$0	$0	$8,509
Residential	3	0	$5,730	$0	$0	$5,730
Total	**3,722**	**0**	**$380,062**	**$0**	**$0**	**$380,062**
State Responsibility Area						
Agricultural	2,552	366	$122,456,759	$40,489,342	$40,489,342	$203,435,443
Commercial	172	45	$1,330,915	$9,238,016	$9,238,016	$19,806,947
Exempt	294	0	$0	$0	$0	$0
Industrial	7	4	$81,907	$105,076	$157,614	$344,597
Institutional	1	1	$8,128	$22,112	$22,112	$52,352
Recreational	18,715	1,100	$81,571,762	$63,299,207	$63,299,207	$208,170,176
Residential	1,522	940	$41,898,994	$83,982,907	$41,991,454	$167,873,355
Total	**23,263**	**2,456**	**$247,348,465**	**$197,136,660**	**$155,197,745**	**$599,682,870**
Local Responsibility Area						
Agricultural	1,213	472	$151,248,378	$51,240,361	$51,240,361	$253,729,100
Commercial	430	306	$11,757,079	$47,872,943	$47,872,943	$107,502,965
Exempt	813	0	$0	$0	$0	$0
Industrial	24	7	$852,636	$191,805	$287,708	$1,332,149
Institutional	32	28	$308,251	$4,280,093	$4,280,093	$8,868,437
Recreational	26	9	$515,091	$853,939	$853,939	$2,222,969
Residential	2,900	2,145	$33,075,460	$142,278,857	$71,139,429	$246,493,746
Total	**5,438**	**2,967**	**$197,756,895**	**$246,717,998**	**$175,674,472**	**$620,149,365**
Grand Total	**32,423**	**5,423**	**$445,485,422**	**$443,854,658**	**$330,872,217**	**$1,220,212,297**

Source: Cal FIRE, Modoc County Assessor's 2014 Data, Modoc County Parcel Data 2014

Fire Hazard Severity Analysis

CAL FIRE mapped the SRA Fire Hazard Severity Zones (FHSZs), or areas of significant fire hazard, based on fuels, terrain, weather, and other relevant factors. Zones are designated with Very High, High, Moderate, Non-Wildland/Urban and Urban Unzoned hazard classes. The goal of this mapping effort is to create more accurate fire hazard zone designations such that mitigation strategies are implemented in areas where hazards warrant these investments. The fire hazard zones will provide specific designation for application of defensible space and building standards consistent with known mechanisms of fire risk to people, property, and natural resources.

Typically, CAL FIRE maps the LRA Very High Fire Hazard Severity Zones (VHFHSZ). However, in June 2008, CAL FIRE determined that Modoc County has no Very High Fire Hazard Severity Zones in the LRA. Therefore, Modoc County does not have a map of the recommended VHFHSZ in LRA. For this reason, the SRA dataset (c25fhszl06_1) was utilized as the countywide coverage dataset to determine the FHSZ.

Analysis was performed using the dataset referenced above and using GIS, the parcel layer was overlaid on the FHSZ layer. For the purposes of this analysis, if the parcel centroid intersects the zone's area, it will be assumed that the entire parcel is in that area. This analysis illustrates the Fire Hazard Severity Zones specific to the Planning Area.

Assets at Risk

Results are presented by total Planning Area, unincorporated county, and by the City of Alturas (in its annex to the plan), and detailed tables show improved parcel counts and their structure values by property use (residential, industrial, etc.) within each severity zone. According to the information in Table 4-55, almost all of the assets of the County fall in the moderate or high fire severity category. Within Alturas, the majority of the City falls in the urban unzoned fire severity category, although several portions of Alturas fall within the high, moderate, and non-wildland non-urban fire severity zones.

Analysis results for the entire Modoc County Planning Area are summarized in Table 4-55, which summarizes total parcel counts, improved parcel counts, and their land values, structure values, contents value, and total values by property use. Contents values were derived from the improved structure values using the same methodology as described in the flood section (see Section 4.3.8). Table 4-56 breaks out the details of fire severity class and property use type for the unincorporated County. Fire severity is shown in Figure 4-68.

Figure 4-68 Modoc County Planning Area – Fire Severity Zones

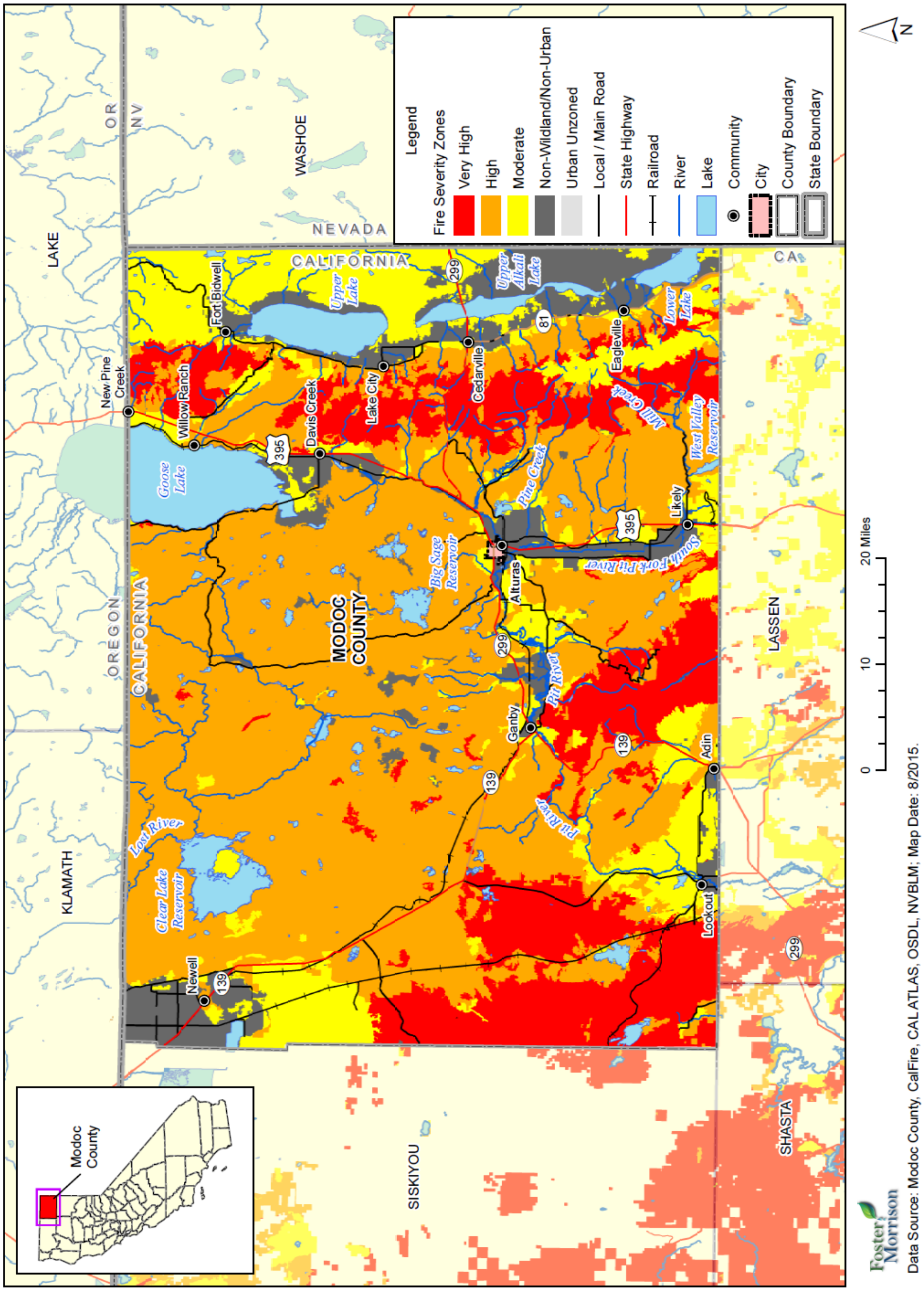


Table 4-55 Modoc County Planning Area – Count and Value of Parcels by Jurisdiction and Fire Severity Zone

Fire Severity/ Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Contents Value	Total Value
Very High Fire Severity						
City of Alturas	0	0	$0	$0	$0	$0
Unincorporated	11,068	217	$56,459,166	$13,089,823	$11,024,272	$80,573,261
Total	**11,068**	**217**	**$56,459,166**	**$13,089,823**	**$11,024,272**	**$80,573,261**
High Fire Severity						
City of Alturas	75	52	$914,421	$2,921,405	$1,478,474	$5,314,300
Unincorporated	11,290	1,543	$107,611,043	$115,021,983	$91,265,088	$313,898,114
Total	**11,365**	**1,595**	**$108,525,464**	**$117,943,388**	**$92,743,562**	**$319,212,414**
Moderate Fire Severity						
City of Alturas	213	126	$1,671,624	$8,240,540	$5,337,095	$15,249,259
Unincorporated	5,587	1,264	$102,982,904	$103,485,558	$77,362,224	$283,830,686
Total	**5,800**	**1,390**	**$104,654,528**	**$111,726,098**	**$82,699,319**	**$299,079,945**
Non-Wildland/Non-Urban Fire Severity						
City of Alturas	76	34	$2,135,646	$5,275,977	$4,267,367	$11,678,990
Unincorporated	2,048	734	$150,833,564	$79,479,051	$66,444,370	$296,756,985
Total	**2,124**	**768**	**$152,969,210**	**$84,755,028**	**$70,711,737**	**$308,435,975**
Urban Unzoned Fire Severity						
City of Alturas	1,566	1,141	$17,436,595	$98,186,799	$63,205,201	$178,828,595
Unincorporated	500	312	$5,440,459	$18,153,522	$10,488,128	$34,082,109
Total	**2,066**	**1,453**	**$22,877,054**	**$116,340,321**	**$73,693,328**	**$212,910,703**
Grand Total	**32,423**	**5,423**	**$445,485,422**	**$443,854,658**	**$330,872,217**	**$1,220,212,297**

Source: CAL FIRE, Modoc County Assessor's 2014 Data; Modoc County Parcel Data 2014

Table 4-56 Unincorporated Modoc County - Count and Value of Parcels by Property Use and Fire Severity Zone

Fire Severity Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Contents Value	Total Value
Very High	Agricultural	652	25	$16,328,089	$1,611,682	$1,611,682	$19,551,453
	Commercial	4	0	$19,589	$0	$0	$19,589
	Exempt	656	0	$0	$0	$0	$0
	Industrial	0	0	$0	$0	$0	$0

Fire Severity Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Contents Value	Total Value
	Institutional	0	0	$0	$0	$0	$0
	Recreational	9,654	148	$36,074,936	$7,347,038	$7,347,038	$50,769,012
	Residential	102	44	$4,036,552	$4,131,103	$2,065,552	$10,233,207
	Total	**11,068**	**217**	**$56,459,166**	**$13,089,823**	**$11,024,272**	**$80,573,261**
High	Agricultural	1,043	143	$49,600,581	$13,453,727	$13,453,727	$76,508,035
	Commercial	131	60	$1,196,785	$12,751,160	$12,751,160	$26,699,105
	Exempt	2,489	0	$0	$0	$0	$0
	Industrial	10	5	$219,212	$172,085	$258,128	$649,425
	Institutional	5	5	$11,596	$74,011	$74,011	$159,618
	Recreational	6,591	735	$33,694,859	$40,885,124	$40,885,124	$115,465,107
	Residential	1,021	595	$22,888,010	$47,685,876	$23,842,938	$94,416,824
	Total	**11,290**	**1,543**	**$107,611,043**	**$115,021,983**	**$91,265,088**	**$313,898,114**
Moderate	Agricultural	1,026	243	$67,269,478	$30,471,051	$30,471,051	$128,211,580
	Commercial	154	59	$1,722,369	$5,538,391	$5,538,391	$12,799,151
	Exempt	793	0	$0	$0	$0	$0
	Industrial	5	0	$56,602	$0	$0	$56,602
	Institutional	3	3	$14,649	$60,360	$60,360	$135,369
	Recreational	2,482	218	$11,961,342	$15,169,088	$15,169,088	$42,299,518
	Residential	1,124	741	$21,958,464	$52,246,668	$26,123,334	$100,328,466
	Total	**5,587**	**1,264**	**$102,982,904**	**$103,485,558**	**$77,362,224**	**$283,830,686**
Non-Wildland/ Non-Urban	Agricultural	1,044	426	$140,714,291	$46,190,403	$46,190,403	$233,095,097
	Commercial	26	20	$1,333,572	$6,359,135	$6,359,135	$14,051,842
	Exempt	600	0	$0	$0	$0	$0
	Industrial	10	5	$567,964	$89,942	$134,913	$792,819
	Institutional	0	0	$0	$0	$0	$0
	Recreational	15	7	$357,038	$680,267	$680,267	$1,717,572
	Residential	353	276	$7,860,699	$26,159,304	$13,079,652	$47,099,655
	Total	**2,048**	**734**	**$150,833,564**	**$79,479,051**	**$66,444,370**	**$296,756,985**
	Agricultural	5	1	$155,874	$2,840	$2,840	$161,554

Fire Severity Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Contents Value	Total Value
Urban Unzoned	Commercial	53	42	$848,515	$2,605,570	$2,605,570	$6,059,655
	Exempt	130	0	$0	$0	$0	$0
	Industrial	0	0	$0	$0	$0	$0
	Institutional	6	6	$25,634	$214,323	$214,323	$454,280
	Recreational	0	0	$0	$0	$0	$0
	Residential	306	263	$4,410,436	$15,330,789	$7,665,395	$27,406,620
	Total	**500**	**312**	**$5,440,459**	**$18,153,522**	**$10,488,128**	**$34,082,109**
Grand Total		**30,493**	**4,070**	**$423,327,136**	**$329,229,937**	**$256,584,081**	**$1,009,141,154**

Source: CAL FIRE, Modoc County Assessor's 2014 Data; Modoc County Parcel Data 2014

Population at Risk

The Fire Hazard Severity Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 7,095 residents of Modoc County Planning Area at risk to wildfire. This is shown in Table 4-57. Table 4-58 shows a 4,419 population within the unincorporated County. Population information relative to the wildfire hazard for the City of Alturas is provided in its Annex.

Table 4-57 Modoc County Planning Area – Count of Improved Residential Parcels and Population by Fire Severity Zone

Fire Severity Zone	Improved Residential Parcels	Population*
Very High	44	101
High	646	1,486
Moderate	854	1,964
Non-Wildland/Urban	304	699
Urban Unzoned	1,237	2,845
Total	**3,085**	**7,095**

Source: CAL FIRE, Modoc County 2014 Assessor's Data; US Census Bureau

* Average household populations from the 2010 US Census were used: Modoc County – 2.30; Alturas – 2.27.

Table 4-58 Unincorporated Modoc County – Count of Improved Residential Parcels and Population by Fire Severity Zone

Fire Severity Zone	Improved Residential Parcels	Population*
Very High	44	101
High	595	1,369
Moderate	741	1,704
Non-Wildland/Urban	276	635
Urban Unzoned	263	610
Total	**1,919**	**4,419**

Source: CAL FIRE, Modoc County 2014 Assessor's Data; US Census Bureau

* Average household populations from the 2010 US Census were used: Modoc County – 2.30.

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Modoc County and all jurisdictions. GIS was used to determine whether the facility locations intersect a wildfire hazard areas provided by CAL FIRE, and if so, which zone it intersects. This is shown on Figure 4-60. There are 3 facilities in the very high fire, 34 in the high fire severity zone, and 25 facilities in the moderate fire severity zone, as shown in Table 4-44. All of the facilities in the moderate fire severity zone are located in the unincorporated County. Details of critical facility definition, type, name, address, and jurisdiction by fire severity zone are listed in Appendix E.

Figure 4-69 Modoc County Planning Area – Critical Facilities by Fire Severity Zone

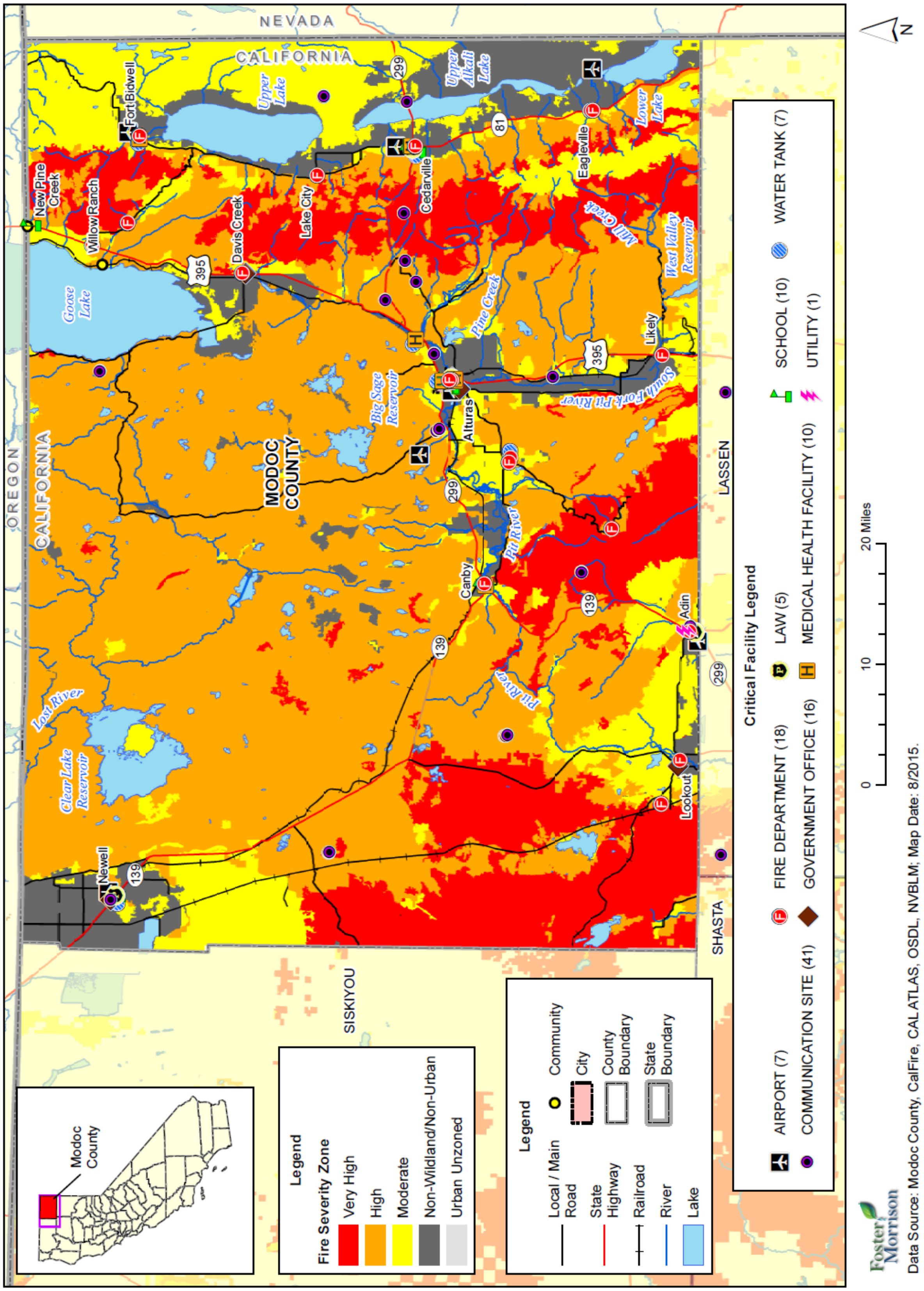


Table 4-59 Modoc County Planning Area – Critical Facilities by Fire Severity Zone

Fire	Category	Type	Facility Count
City of Alturas			
Moderate	Category IV Critical Facilities	Fire Department	1
		Government Office	3
		School	1
		Total Moderate	**5**
Non-Wildland/Non-Urban	Category IV Critical Facilities	Airport	1
		Water Tank	1
		Total Non-Wildland/Non-Urban	**2**
Urban Unzoned	Category IV Critical Facilities	Communication Site	7
		Fire Department	1
		Government Office	8
		Law	2
		Medical Health Facility	3
		School	3
		Water Tank	1
		Total Urban Unzoned	**25**
Total Fire - City of Alturas			**32**
Unincorporated Modoc County			
Very High	Category IV Critical Facilities	Communication Site	3
		Total Very High	**3**
High	Category IV Critical Facilities	Airport	2
		Communication Site	17
		Fire Department	6
		Government Office	1
		Law	1
		Medical Health Facility	1
		School	1
		Utility	1
		Water Tank	4
		Total High	**34**
Moderate	Category IV Critical Facilities	Airport	1
		Communication Site	4
		Fire Department	7
		Government Office	2

Fire	Category	Type	Facility Count
		Law	1
		Medical Health Facility	2
		School	2
		Water Tank	1
		Total Moderate	**20**
Non-Wildland/Non-Urban	Category IV Critical Facilities	Airport	3
		Communication Site	4
		Fire Department	1
		Government Office	1
		School	1
		Total Non-Wildland/Non-Urban	**10**
Urban Unzoned	Category IV Critical Facilities	Fire Department	2
		Government Office	1
		Law	1
		Medical Health Facility	4
		School	2
		Total Urban Unzoned	**10**
Total Fire - Unincorporated Modoc County			**77**
Total Fire - Planning Area			**109**
Unincorporated Lassen County			
N/A (outside of area of interest)	Category IV Critical Facilities	Communication Site	6
		Total	**6**
Total Fire - Unincorporated Lassen County Area			**6**
Total Critical Facilities Supporting the Modoc County Area			**115**

Source: Modoc County GIS; CAL FIRE

Future Development

The primary type of growth occurring in Modoc County is rural residential development, which is often in the wildland-urban interface. This puts more people and property at risk, adds a new fuel source to vegetative fuels, and increases the fire protection challenges for local governments. The wildfire mitigation practices of surrounding land owners affects the fire risk of the each citizen and emphasizes the importance of education and partnerships regarding this shared responsibility. The County Building Department enforces the 2013 California Building Code. That Code includes restrictions on how new construction may be built in the County.

GIS Analysis

To determine potential development constraints based on the location of future development areas relative to the CAL FIRE fire severity zones, additional analysis was performed using GIS. For the Planning Area, the future development areas (non-improved parcels in approved subdivisions) provided by the Modoc County Planning Department were intersected with the fire severity zones to identify future areas of development at risk to wildfire. Table 4-60 provides an analysis of the future development areas by fire severity zone shown in Figure 4-70. While the subdivisions on this table have been approved for development, it should be noted that large tracts of land within the County that are privately owned may be developed in the future and are not included in this analysis.

Figure 4-70 Unincorporated Modoc County Future Development in Fire Severity Zones

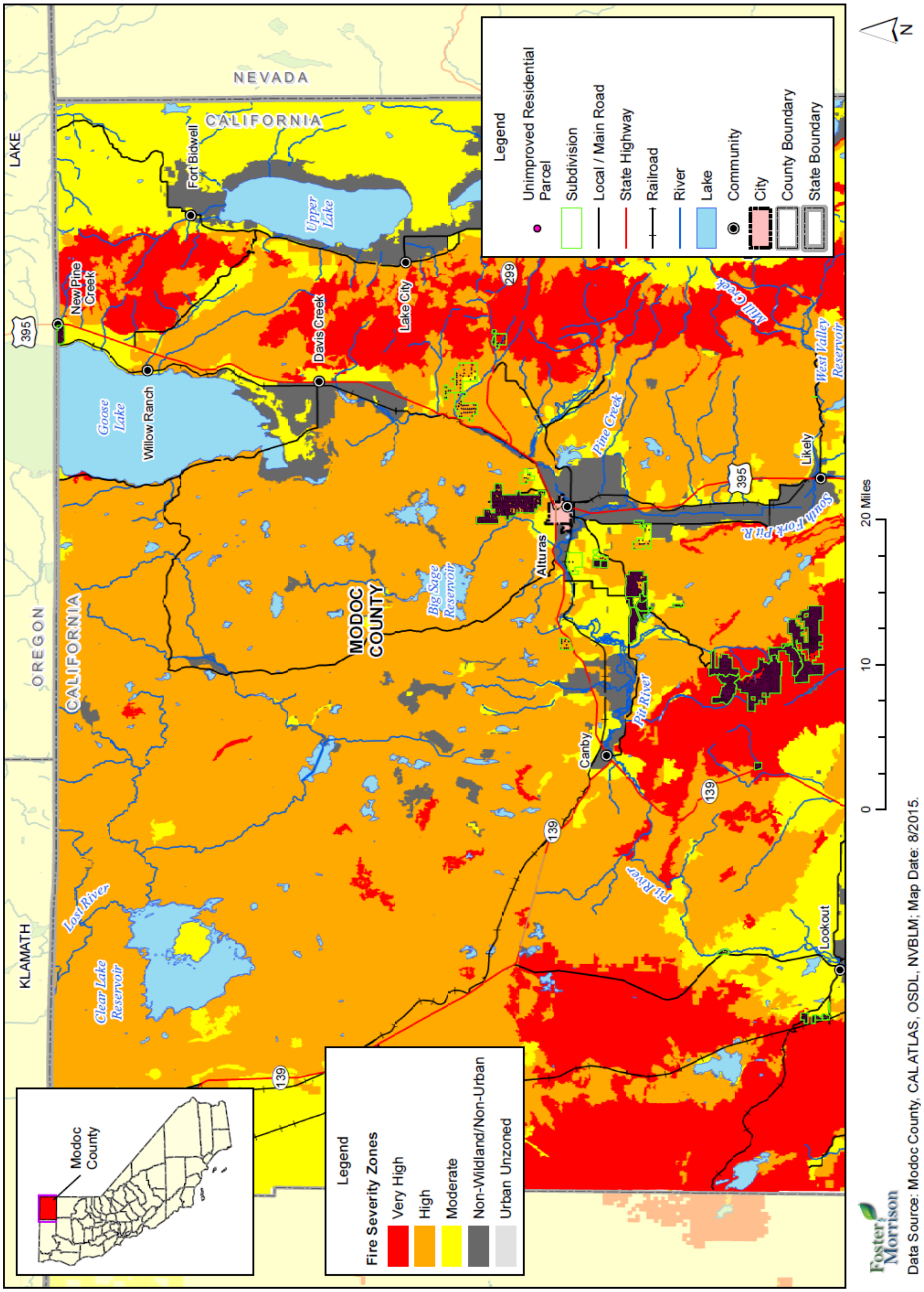


Table 4-60 Unincorporated Modoc County – Future Development by Fire Severity Detail

Subdivision Projects	# of Parcels	Improved Parcels	Non-Improved Parcels	% Improved	Acres	Fire Severity Zone
Big Valley Ranchettes - Unit 1	111	35	76	31.53%	192.0	Very High, High, Moderate
Big Valley Ranchettes - Unit 2	69	23	46	33.33%	88.3	Very High, High, Moderate
Big Valley Ranchettes - Unit 3	56	21	35	37.50%	98.1	High, Moderate
Big Valley Ranchettes - Unit 4A	25	11	14	44.00%	34.3	High, Moderate
Big Valley Ranchettes - Unit 4B	46	16	30	34.78%	114.5	High, Moderate
California Pines-Hill Unit 1	1,221	21	1,200	1.72%	1,343.7	Very High, High
California Pines-Hill Unit 2	1,315	7	1,308	0.53%	1,377.4	Very High
California Pines-Hill Unit 3	3,445	70	3,375	2.03%	4,103.3	Very High, High
California Pines-Hill Unit 4	1,235	13	1,222	1.05%	1,244.0	Very High, High
California Pines-Hill Unit 5	4,203	6	4,197	0.14%	4,829.0	Very High, High, Moderate
California Pines-Lake Unit 1A	801	13	788	1.62%	790.9	Moderate
California Pines-Lake Unit 1B	778	55	723	7.07%	191.2	High, Moderate
California Pines-Lake Unit 2	1,099	72	1,027	6.55%	1,398.1	High, Moderate
California Pines-Lake Unit 3	161	6	155	3.73%	175.0	High, Moderate
California Pines-Lake Unit 4	673	51	622	7.58%	302.0	High, Moderate
California Pines-Mobilehome Park	360	47	313	13.06%	43.1	High, Moderate
Castle Rock Estates	81	24	57	29.63%	147.3	High, Moderate
Cedar Pass Properties	22	10	12	45.45%	389.2	Very High, High
Cedar Pass Summerland - 1st Addition	21	7	14	33.33%	78.4	Very High, High
Cedar Pass Summerland - Unit A	35	8	27	22.86%	44.6	Very High
Centerville Estates	8	4	4	50.00%	179.2	High, Moderate
Conestoga Ranches	20	9	11	45.00%	373.7	High
Goose Lake Estates	201	36	165	17.91%	411.5	Moderate
Ivory Ranches	30	16	14	53.33%	115.2	High, Moderate
Juniper Acres	17	16	1	94.12%	10.7	High
Modoc Farms	13	11	2	84.62%	798.9	Moderate
Modoc Farms Too	10	10	-	100.00%	62.4	Moderate
Modoc Recreational Estates	1,864	327	1,537	17.54%	3,970.9	High, Moderate
Pit River Ranchos	25	4	21	16.00%	124.8	Moderate
Pit River Rec. Estate - T-12	94	4	90	4.26%	161.9	High, Moderate
Pit River Rec. Estates - T-10, U-1	123	12	111	9.76%	162.8	High
Pit River Rec. Estates - T-10, U-2	132	2	130	1.52%	158.4	High

Subdivision Projects	# of Parcels	Improved Parcels	Non-Improved Parcels	% Improved	Acres	Fire Severity Zone
Rimrock Ranches	31	26	5	83.87%	396.9	High, Moderate
Rush Creek Subdivision	105	33	72	31.43%	145.6	Very High
Thoms Creek Estates - Unit 1	59	24	35	40.68%	1,177.1	High
Thoms Creek Estates - Unit 2	81	47	34	58.02%	1,690.9	High Moderate
Wildlife Estates	58	40	18	68.97%	952.3	High, Moderate, Non-Wildland / Non-Urban
Total	**18,628**	**1,137**	**17,491**	**–**	**27,877**	

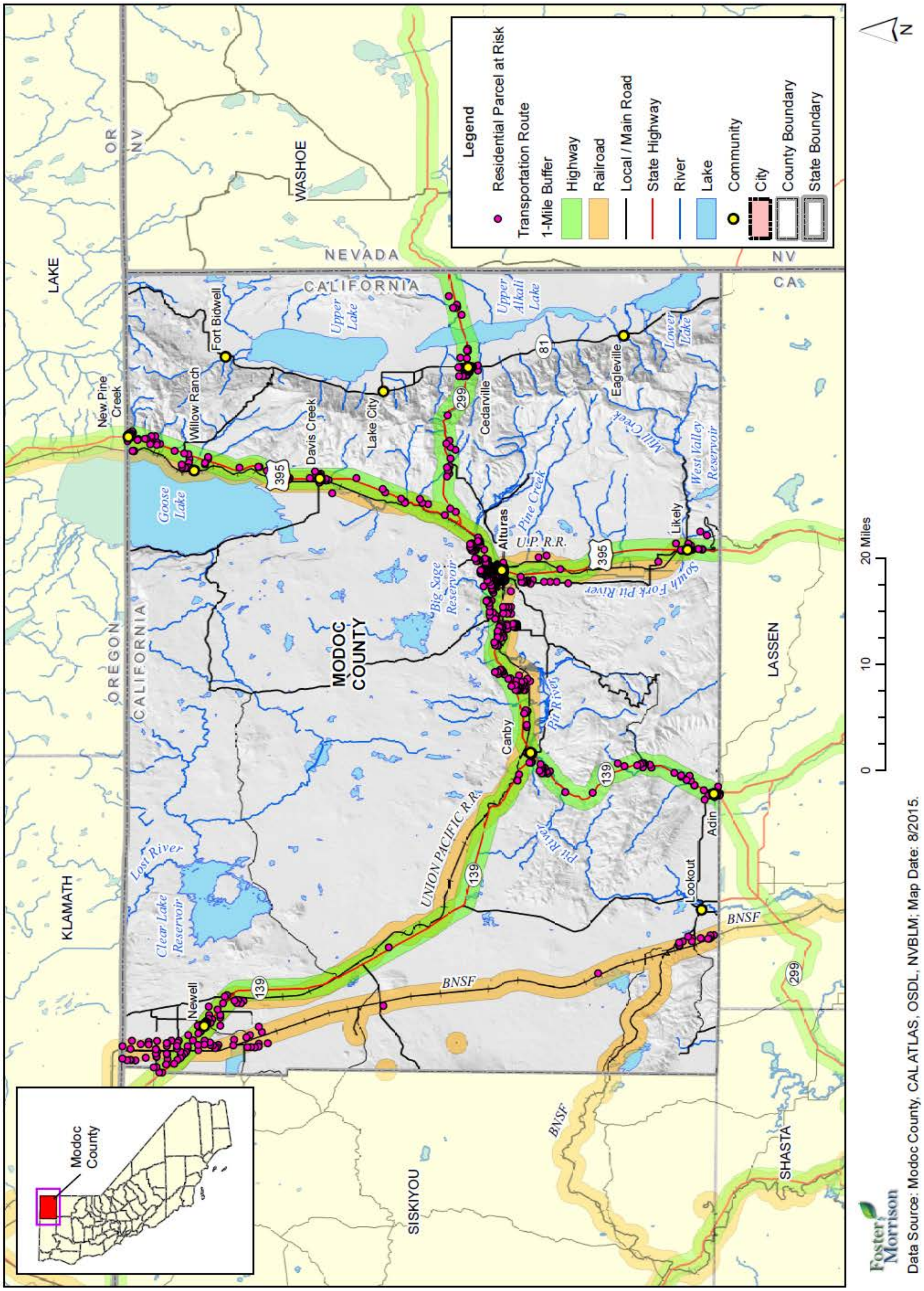
Source: Modoc County Planning Department

4.3.17. Hazardous Materials Transport Vulnerability Assessment

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

It is often quite difficult to quantify the potential losses from human-caused hazards. While the facilities themselves have a tangible dollar value, loss from a human-caused hazard often inflicts an even greater toll on a community, both economically and emotionally. The impact to identified assets will vary from event to event and depend on the type, location, and nature of a specific hazardous material incident. Given the difficulty in quantifying the losses associated with technological hazards, this section focuses on analyzing key assets and populations relative to the hazardous materials sites and transportation corridors identified above. Figure 4-71 shows the hazardous materials transportation corridors in Modoc County as well as the two mile buffer zone used this analysis.

Figure 4-71 Modoc County Planning Area – Hazardous Materials Routes and Buffer Zones



Foster Morrison

Assets at Risk

During a hazardous materials transportation spill, it is generally the people that are at risk to the effects of the spill. During a spill, buildings and property are at limited risk. Should a propane truck catch fire in a residential area, it may cause a building to burn, but will not burn all buildings inside the buffer zone. As such, no analysis on assets in the buffer zone was performed.

Populations at Risk to Hazardous Materials from Transportation Corridors

To determine the populations at risk from a transportation-related hazardous materials release within identified transportation corridors, an analysis was performed using GIS. A one mile buffer was applied to both sides of Highways 139, 299, and 395 and the BNSF, Union Pacific Railroads, and the Lakeview – Lake County Railroad, creating a two mile buffer zones around each corridor. The buffer distance was based on guidelines in the U.S. Department of Transportation's Emergency Response Guidebook that suggest distances useful to protect people from vapors resulting from spills involving dangerous goods considered toxic if inhaled. The recommended buffer distance referred to in the guide as the "protective action distance" is the area surrounding the incident in which people are at risk of harmful exposure. For purposes of this plan, an average buffer distance of one mile was used on either side of the transportation corridor. Actual buffer distances will vary depending on the nature and quantity of the release, whether the release occurred during the night or daytime, and prevailing weather conditions.

Analysis was done for jurisdictions found in Table 4-61. This table shows total population that are within the proximity of this two-mile buffer of all the highway and railroad corridors (shown on Figure 4-71). Using GIS, the buffered corridor was overlaid on the improved residential parcel data. Those parcel centroids that intersect the buffered corridor were counted and multiplied by the 2010 Census Bureau average household factors for Modoc County. According to this analysis, there is a total population of 5,336 in the buffered corridor. There are 2,714 people in the Unincorporated County in the buffered corridor.

Table 4-61 Modoc County Planning Area – Populations at Risk in Haz-Mat Corridors by Jurisdiction

Jurisdiction	Improved Residential Parcels	Population
Alturas	1,153	2,617
Unincorporated	1,180	2,714
Total	**2,333**	**5,331**

Source: Cal Trans, Modoc County GIS, US Census Bureau

* Average household populations from the 2010 US Census were used: Modoc County – 2.30; Alturas – 2.27.

Critical Facilities at Risk

During a hazardous materials transportation spill, it is generally the people that are at risk to the effects of the spill. During a spill, buildings and property are at limited risk. However, critical facilities may be at risk to evacuation and reduction of emergency services or other capabilities. Figure 4-72 and Table 4-62 show the critical facilities at risk in the buffer zone.

Figure 4-72 Unincorporated Modoc County – Critical Facilities in Haz Mat Corridors

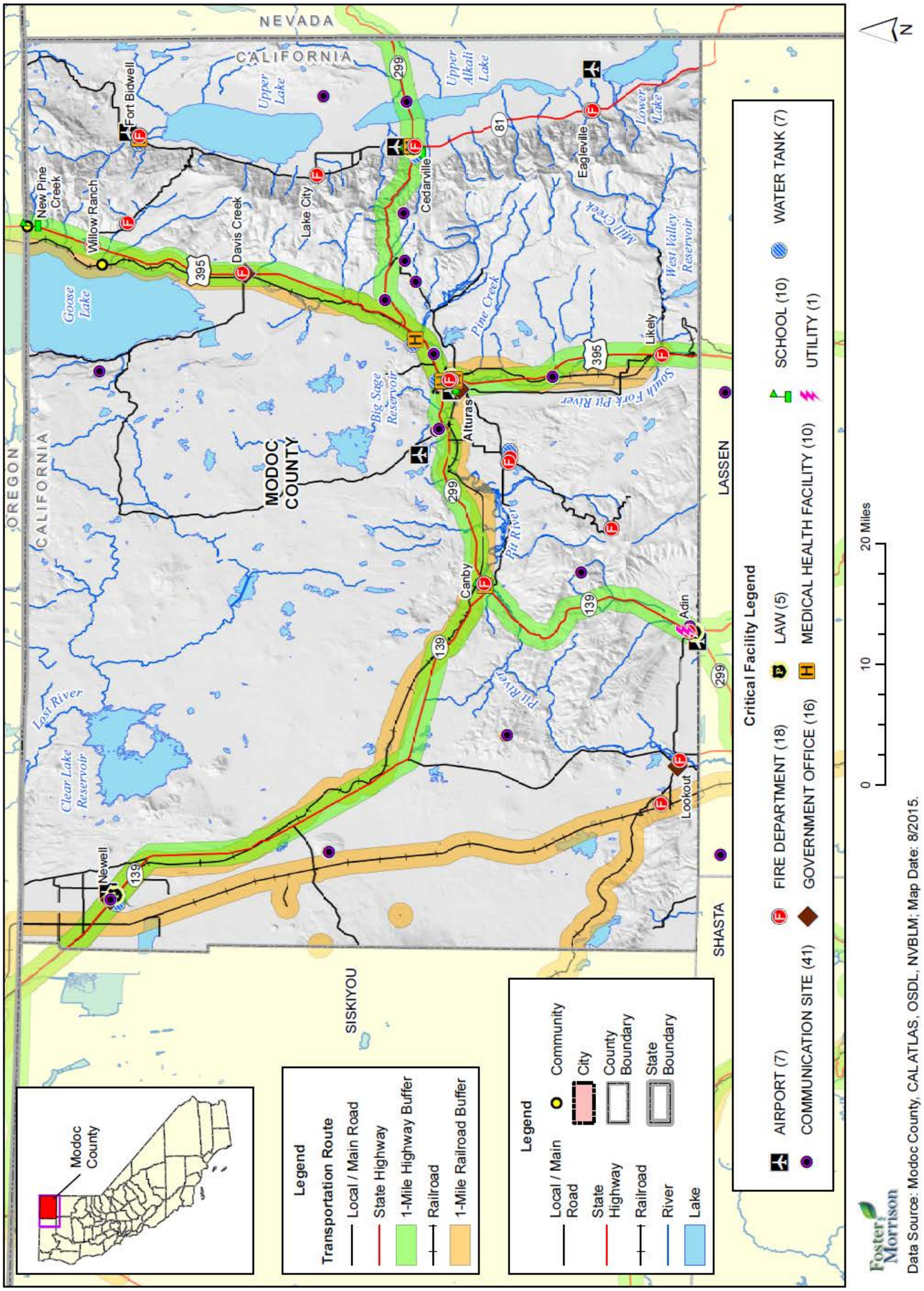


Table 4-62 Unincorporated Modoc County – Critical Facilities in Haz Mat Corridors

Hazardous Materials Route	Category	Type	Facility Count
Hazardous Materials Highway Route	Category IV Critical Facilities	Airport	1
		Communication Site	5
		Fire Department	3
		Government Office	1
		Law	2
		Medical Health Facility	2
		School	4
		Utility	1
		Water Tank	1
	Total Hazardous Materials Highway Route		**20**
Hazardous Materials Railroad Route	Category IV Critical Facilities	Fire Department	1
	Total Hazardous Materials Railroad Route		**1**
Combined Hazardous Materials Highway and Railroad Route	Category IV Critical Facilities	Airport	1
		Communication Site	6
		Fire Department	3
		Government Office	3
		Law	1
		Medical Health Facility	4
		School	2
		Water Tank	2
	Total Hazardous Materials Highway and Railroad Route		**22**
Outside of Hazardous Materials Route	Category IV Critical Facilities	Airport	4
		Communication Site	17
		Fire Department	9
		Government Office	1
		Medical Health Facility	1
		Water Tank	2
	Total Outside of Hazardous Materials Route		34
Total Hazardous Materials Route - Unincorporated Modoc County			**77**

Source: Cal Trans, Modoc County Assessor's 2014 Data

Future Development

Development will continue to happen within hazardous materials transportation zones. Table 4-63 shows that there are 990 residential parcels in the County in a haz-mat corridor that have not been developed.

Those who choose to develop in these areas should be made aware of the risks associated with living within a hazardous materials transportation route.

Table 4-63 Modoc County Planning Area – Total and Improved Parcels in Haz-Mat Corridors

Jurisdiction	Non-improved Parcel Count	Non-improved Population Estimates
Alturas	366	853
Unincorporated	624	1,435
Total	**990**	**2,288**

Source: Cal Trans, Modoc County GIS

4.4 Capability Assessment

Thus far, the planning process has identified the natural hazards posing a threat to the Planning Area and described, in general, the vulnerability of the County to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the County's net vulnerability to disasters, and more accurately focuses the goals, objectives, and proposed actions of this plan.

The HMPC used a two-step approach to conduct this assessment for the County. First, an inventory of common mitigation activities was made through the use of a matrix. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken if deemed appropriate. Second, the HMPC conducted an inventory and review of existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This section presents the County's mitigation capabilities and discusses select state and federal mitigation capabilities that are applicable to the County. .

Similar to the HMPC's effort to describe hazards, risks, and vulnerability of the County, this mitigation capability assessment describes the District's existing capabilities, programs, and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This assessment is divided into four sections: regulatory mitigation capabilities are discussed in Section 4.4.1; administrative and technical mitigation capabilities are discussed in Section 4.4.2; fiscal mitigation capabilities are discussed in Section 4.4.3; and mitigation education, outreach, and partnerships are discussed in Section 4.4.4. A discussion of other mitigation efforts follows in Section 4.4.5.

4.4.1. Modoc County's Regulatory Mitigation Capabilities

Table 4-64 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities, and indicates those that are in place in the County. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 4-64 Modoc County Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y General Plan,1988	General Plan inadequately addresses hazards; Update of Safety Element is in progress to meet state requirements.
Capital Improvements Plan	N county wide plan	All airports have capital improvement plans for maintenance and mandatory requirements. There is a need for a countywide capital improvement plans to address an ADA Transition Plan
Economic Development Plan	Y	2006 Economic Vitality Plan; does not address hazards
Local Emergency Operations Plan	Y	Updated 2015; General synopsis on hazards; does not name mitigation projects
Continuity of Operations Plan	Y	Addressed in EOP
Transportation Plan	Y	Modoc participates in a Regional Transportation Commission and they have a Regional Transportation Plan. The Evacuation Annex, does not specify routes because it will be incident specific. Wildland Urban Interface Areas (WUI) for developments in MRE and CalPines both have evacuation routes but they also will be incident specific, dependent on type of incident and weather conditions.
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	Y	This is done within various regulatory agencies for permits. Some may be DWR, Fish and Wildlife, Army Corps of Engineers, etc. It is possible that plan projects may be in conflict: i.e. Fish and Wildlife vs Army Corps of Engineers or the Road Department. Efforts to mitigate flooding by clearing streams and creeks have been denied access by Fish and Wildlife. There is also the Pit River Watershed Alliance that has a plan and mitigation projects.
Community Wildfire Protection Plan	Y	Updated in 2012. Grants have been written for mitigations projects for fuel reduction, evacuation, etc. Currently grants are being written to update the plan, get Board approval, and prioritize new projects.
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: CBC 2013
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:

Fire department ISO rating:		Adin 4/8B & 8B/10 Alturas 4/10 Cal Pines Lake Units 5/8B Cal Pines Upper Hill Units 9/10 Cedarville 5/10 Davis Creek 9/10 Eagleville 9/10 Fort Bidwell 9/10 Lake City 9/10 Likely 6/6Y (6Y=8B) Lookout 7/8B New Pine Creek 8B/10 Willow Ranch 10 Tulelake 5/8B 8B means within 5 miles but over 1000' from a hydrant
Site plan review requirements	Y	Adequately enforced, but should be updated to meet current standards
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	N Plan does not address hazards; needs updating. Y, It is in enforced for what is currently in place.
Subdivision ordinance	Y	Y, meets Fire Safe standards according to Govt. PRC code; Y
Floodplain ordinance	Y	Y, generally; Y, adequately administered but it may be staff dependent or difficult to staff
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	This is needed. Western foothill area of Surprise Valley has unique hazard needs that need to be addressed.
Flood insurance rate maps	Y	Alturas Panel was updated in 2015; Modoc's Panels are from 2010; Y, adequately administered
Elevation Certificates	Y	This is part of the permitting process
Acquisition of land for open space and public recreation uses	Not applicable	Modoc County is 75% public land
Erosion or sediment control program	N	Potentially needed in some specific areas of the County
Other	Y	General Plan Safety Element includes some mitigation measures
How can these capabilities be expanded and improved to reduce risk?		
There is a need for hazard ordinances in the County's Zoning code; Current General Plan Safety Element does not adequately address floods, fire and earthquake but should be updated by 2017 to meet state requirements.		

As indicated in the table above, Modoc County has several plans and programs that guide the County's mitigation of development of hazard-prone areas. Starting with the Modoc County General Plan, some of these are described in more detail below.

Modoc County Plans

Modoc County General Plan, 1988

A general plan is a legal document, required by state law which serves as a community's "constitution" for the development and use of its land. It must be a comprehensive, long-term document, detailing proposals for the physical development of the county, and of any land outside its boundaries which in the planning agency's judgment bears relation to its planning. There are seven required elements and an economic development element, plus a comprehensive action program. Each element while addressing a separate subject, is interrelated with all the other elements. The elements in the 1988 General Plan are:

- Land Use Element
- Housing Element
- Circulation Element
- Conservation and Open Space Element
- Noise Element
- Safety Element
- Economic Development Element

The Safety Element addresses four separate hazards: geologic hazards, seismic hazards, wildfire hazards, and flood hazards. Specific goals and policies related to mitigation from the Safety Element include:

GOAL: TO PROTECT THE PUBLIC HEALTH AND SAFETY THROUGH LIMITATION OF DEVELOPMENT IN HAZARDOUS AREAS.

Policies:

- 1. The County should not permit new development on land which has been identified as environmentally unsound to support such development.
- 2. Any development on hillsides should be sited in the least obtrusive fashion, minimizing the extent of topographic alteration. In any case, development should be restricted to slopes of 30% or less.
- 3. New development should demonstrate the availability of adequate fire protection and suppression facilities.
- 4. Recommendations within the state Fire Safe Guide should be implemented wherever practical in Modoc County.

Actions

- 1. Zone or otherwise designate all areas within potential hazard areas so as to insure safe development or appropriate mitigation measures.
- 2. Prepare a hillside development ordinance and implement same in the review and approval of development in slope areas.
- 3. Review the existing flood zoning to insure that all potential flood hazard areas are adequately zoned.
- 4. Implement all appropriate recommendations of the Fire Safe Guide.

Modoc County Emergency Operations Plan, 2015

The EOP's purpose is to effectively and efficiently organize and coordinate the county's response to major emergencies by:

- Identifying major natural and manmade hazards, threats to life, property, and/or the environment
- Managing and coordinating emergency operations in unincorporated areas of the operational area
- Assigning emergency management responsibilities and tasks
- Describing predetermined actions to be taken by departments, agencies and districts to respond to emergencies and eliminate or mitigate the effects of disasters
- Documenting and maintaining the resource capabilities within the operating area
- Coordinating resources within the operational area
- Coordinating mutual aid
- Requesting and allocating resources from outside the county
- Enhancing cooperative agreements and coordination with community agencies, mutual aid jurisdictions, State, and Federal agencies

This plan provides for:

- Mitigation, preparedness, response, and recovery policy and procedures
- Disaster and emergency responsibilities
- Training and public education activities

This plan is strategic and addresses the following functions:

- Operational area emergency response
- Communications and warning systems
- Rapid utilization of resources
- Coordinated post-disaster response and recovery
- Annual training and exercises to assess emergency response capabilities
- Clearly defined responsibilities for departments, agencies, and districts through a function annex approach

Lassen-Modoc-Plumas Unit Strategic Fire Plan, 2012

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, Fire Safe Councils and other stakeholders focused on identifying specific problem areas and solving the mutually agreed upon fire issues. The Lassen Modoc Plumas Unit Fire Management Plan documents the assessment of the fire situation in the Unit. It includes stakeholder contributions and priorities which identify strategic targets for proactive approaches and project based solutions.

Community Wildfire Protection Plan, 2008

The CWPP is a a planning tool to help concerned citizens, planning professionals, Fire Safe Councils, responsible Federal, State and local fire agencies, and other interested parties to assess the threat level and to identify measures that may be taken to reduce the danger that wildland fire poses to the communities in Modoc County. The purpose of this project is to help reduce the potential loss of human life and damage to property and natural resources within Modoc County. More specifically, the objective is to protect assets at risk through focused pre-fire management prescriptions (such as fuel reduction) which will increase success of initial fire attack. A critical component is to encourage individual citizens to be involved in the coordinated effort of pre-fire planning and fire prevention and protection within his or her respective community. This document is organized to include all of Modoc County.

Modoc County Ordinances

The Modoc County General Plan provides policy direction for land use, development, open space protection, and environmental quality; however, this policy direction must be carried out through numerous ordinances, programs, and agreements. The following ordinances are among the most important tools for implementing the General Plan and/or are critical to the mitigation of hazards identified in this plan.

Title 2 Administration and Personnel; Chapter 2.40 Disaster Council

The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within this county in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of this county with all other public agencies, corporations, organizations, and affected private persons. As used in this chapter, "emergency" means the actual or threatened existence of conditions of disaster or of extreme peril to the safety of persons and property within this county caused by such conditions as air pollution, fire, flood, storm, epidemic, riot, or earthquake, or other conditions including conditions resulting from war or imminent threat of war, but other than conditions resulting from a labor controversy, which conditions are or are likely to be beyond the control of the services, personnel, equipment and facilities of the county, requiring the combined forces of other political subdivisions to combat.

Title 8 Health and Safety; Chapter 8.31 Modoc County Hazard Severity Zone Designations

Modoc County adopts the fire hazard severity maps and future maps pursuant to the Public Resources Code Sections 4201, 4202, 4203 and 4204 as amended from time to time by the director of the Department of Forestry and Fire Protection. The fire hazard severity maps designate fire hazard severity zones and implement the requirements pursuant to PRC Sections 4290 and 4291 as follows:

- California Code of Regulations (CCR) Title 14, Division 1.5, Chapter 7, Subchapter 2, Articles 1 through 5 in State Responsibility Area (SRA) lands.
- Defensible space vegetation clearance requirements of PRC Section 4291 in Local Responsibility Area (LRA) lands designated Very High (VH) severity.

Title 15 Building Regulations

This title shall be known as the "Modoc County Building Code" and may be cited as such, but will be referred to in all proceedings as "the code." The purpose of the code is to enact regulations relating to buildings and structures imposing restrictions at least equal to those imposed by the State Building Standards and State Housing Laws and to provide for their enforcement by the building official. In the event of any conflict between the code and any law, rule or regulation of the state of California, that requirement which establishes the higher standard of safety shall govern; except when pertaining to owner-built rural dwellings where designated and zoned for the application of said article as provided for in Title 25, Division 1, Chapter 1, Subchapter 1, otherwise known as the State Housing Law Regulations. The provisions of the code are to provide minimum requirements and standards for the protection for the public safety, health, property and welfare in the county of Modoc. The provisions of the code shall apply to all the unincorporated territory of the county. The code shall be enforced by Modoc County Building and Safety, a division of public works. The director of public works is the building official for Modoc County. Where reference is made to the building official it shall mean, the "Building Official or his/her designated deputy." Where any reference in the codes are made to the building department it shall mean Modoc County Building and Safety. Policies may be adopted by the building official as deemed reasonably necessary for the administration and implementation of the code. No policy adopted by this part shall be construed to violate the provisions of the code.

The following publications and all subsequent editions thereof are hereby adopted by reference and incorporated in the code, as adopted and amended by the California Building Standards Commission in the California Building Standards Code, Title 24 of the California Code of Regulations (CCR), except as expressly amended or superseded herein.

- Title 24, CCR, Part 2, California Building Code (CBC), 2010 Edition, based on the 2009 International Building Code, as published by the International Code Council (ICC), including, among the appendices, Appendix Chapter 1 (Administrative) unless otherwise amended herein or by policy, Appendix Chapter C (Group U-Agricultural Buildings) for those agricultural buildings not regulated, in Chapter 3, Appendix Chapter H (Signs), Appendix Chapter I (Patio Covers), and Appendix Chapter J (Grading) sections apply only when there is to be a structure or building associated with the grading work for which a building permit is required.
- Title 24, CCR, Part 2.5, California Residential Code (CRC), 2010 Edition, based on the 2009 International Residential Code, as published by the International Code Council (ICC), including, among the appendices, Appendix Chapter 1 (Administrative)
- Title 24, CCR, Part 3, California Electrical Code (CEC), 2010 Edition, based on the 2008 National Electrical Code, as published by the National Fire Protection Association (NFPA).
- Title 24, CCR, Part 4, California Mechanical Code (CMC), 2010 Edition, including the appendices, based on the 2009 Uniform Mechanical Code as published by the International Association of Plumbing and Mechanical Officials (IAPMO).
- Title 24, CCR, Part 5, California Plumbing Code (CPC), 2010 Edition, based on the 2009 Uniform Plumbing Code as published by the International Association of Plumbing and Mechanical Officials (IAMPO), including among the appendices, Appendix Chapter A (Sizing water supply systems), Appendix Chapter D (Sizing storm water drainage systems), Appendix Chapter I (Installation standards table of contents). Whenever the Plumbing Code makes reference to the administrative authority relating to sewers, sewage disposal systems, adequate water supply and approved sources of potable water, the County Health Officer shall be the person referenced.
- Title 24, CCR, Part 6, California Energy Code.
- Title 24, CCR, Part 8, California Historical Building Code, including Appendix Chapter A.
- Title 24, CCR, Part 9, California Fire Code (CFC), 2010 Edition, based on the 2009 International Fire Code as published by the International Code Council (ICC). Where the County is required by the Code to delegate the enforcement of the building standards relating to fire and panic safety and other

regulations of the State Fire Marshal as they relate to Group R, Division 3 Dwellings to the building official or fire chief, enforcement responsibility shall be the building official.

- Title 24, CCR, Part 10, California Existing Building Code (CBC), 2010 based on the 2009 International Existing Building Code as published by the International Code Council (ICC).
- Title 24, CCR, Part 11, California Green Building Standards Code (CGBC), 2010 Edition.
- Title 24, CCR, Part 12, California Referenced Standards Code.

Chapter 18.70 Flood Hazard Zone

The FH zone is an overlay zone and is applied in combination with principal zones to minimize or avoid hazards to life and property from flooding in the special flood hazard areas established by the Federal Emergency Management Agency (FEMA), and in other areas of significant flood hazard designated by the county. The FH zone is consistent with all general plan land use designations. The regulations set out in this chapter shall apply in all FH zones, and shall supersede conflicting or less restrictive regulations of the zones which they overlay. The FH zone includes all areas designated "Zone A, AE, AH, AO, Al-30, or A99" on the adopted flood insurance rate maps and any amendments thereto, and may be additionally applied to other areas of significant flood hazard designated on the zoning maps by the county.

Applications for building permits and all land use entitlements in the FH zone shall include plans and specifications for all proposed construction and the following:

- Proposed elevation in relation to mean sea level of the lowest floor (including basement) of all structures.
- Proposed elevation in relation to mean sea level to which any structure will be floodproofed.
- Location and type of drainage facilities, amount of fill or storage, and the extent to which any watercourse will be altered or relocated.
- All appropriate certifications required by this chapter.
- Subdivision and use permit applications shall identify the flood hazard area and elevation of the base flood.
- Any other information deemed necessary by the building or planning department in order to carry out the purposes of this chapter, and as necessary to make the determinations required by this chapter.

No building permit or other land use entitlement shall be granted unless the approving body makes the following findings:

- That the requirements in Section 18.70.070 have been met.
- That the development is reasonably safe from flooding.
- Drainage has been designed to reduce exposure of proposed and anticipated development to flood hazards.
- That all subdivision and use permit proposals are consistent with the need to minimize flood damage.

When base flood elevation data has not been provided by FEMA, the flood plain administrator shall obtain, review, and reasonably utilize the best data available from any source, including high water marks, floods of record and private engineering reports. The flood plain administrator shall obtain and maintain the elevation certifications necessary to confirm that the elevation requirements in Section 18.70.070 have been met. The flood plain administrator shall notify adjacent communities and the Department of Water Resources prior to any permitted alteration or relocation of a watercourse.

All uses in the FH zone shall comply with the following standards and restrictions:

- Other permits. All permits from governmental agencies whose approval of development in the FH zone is required by federal or state law shall be obtained prior to commencement of any construction or installation of any structure, water supply or sewage disposal system.
- Anchoring. All new construction and substantial improvements shall be designed or anchored to prevent flotation, collapse, or lateral movement of the structure due to flooding.
- Construction materials and methods. All construction materials shall be resistant to flood damage, construction methods and practices which will minimize flood damage shall be used, and all public utilities shall be located and constructed to minimize flood damage.
- Sewage disposal and water supply. All new and replacement water supply and sewage disposal systems shall be designed and installed to prevent infiltration from and discharge into floodwaters.
- Heating, electrical, plumbing facilities. All new construction and substantial improvements shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located to prevent water from entering or accumulating within the components during flooding.
- Elevation of residential structures. For all residential structures or substantial improvements to existing residential structures:
  - In FIRM Zone AH or AO: The lowest floor, including the basement, shall be elevated above the highest adjacent grade or at least as high as the depth number specified in feet on the FIRM, or at least two feet if no depth number is specified, and certified as such by a registered professional engineer or surveyor, or verified by the flood plain administrator as being properly elevated.
  - In FIRM Zone A, AE, A1-30, or A99: The lowest floor, including the basement, shall be at or above the base flood elevation, and certified as such by a registered professional engineer or surveyor, or verified by the flood plain administrator as being properly elevated.
- Elevation of nonresidential structures. Nonresidential construction shall either be elevated in conformance with subsection F, or shall be floodproofed below the base flood level and certified as such by a registered professional engineer or architect.
- Enclosed areas below lowest floor. For all new construction and substantial improvements, fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect, or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.
- Manufactured dwellings in manufactured dwelling parks or subdivisions.
  - When a manufactured dwelling located in an existing manufactured dwelling park or manufactured dwelling subdivision is damaged as the result of a flood, requiring substantial improvement or replacement, all future placements or substantial improvements on that site shall be elevated to or above the base flood elevation. The elevation shall be certified by a registered professional engineer or surveyor.
  - All other manufactured dwellings placed or substantially improved in existing manufactured dwelling parks or subdivisions must be elevated on reinforced piers or other foundation elements that are at least three feet in height above grade or have their lowest floor at or above the base flood

elevation if this allows for a lower foundation. The flood elevation shall be certified by a registered professional engineer or surveyor.

- Subdivisions and use permits. When the base flood elevation is not provided by FEMA, subdivision and use permit applications shall provide the location of the flood hazard area and the elevation of the base flood. Final subdivision and use permit plans shall provide the elevation of the proposed structure(s) and pads, and if the site is filled above the base flood elevation, the final pad elevation shall be certified by a registered professional engineer or surveyor.
- Watercourse alteration or relocation. No work that alters or relocates any portion of a watercourse shall diminish the flood carrying capacity of the altered or relocated portion of the watercourse.

Chapter 18.71 Floodplain Management

The flood hazard areas of Modoc County are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards, which increase flood heights and velocities also contributes to flood losses. The purpose of this chapter is to set forth legally enforceable regulations for the community that applies to all development within the identified special flood hazard areas (SFHA). These regulations are designed to:

- Protect human life and health;
- Promote the public health, safety, and general welfare of the community;
- Minimize expenditure of public money for costly flood control projects by reducing public and private losses due to flood conditions;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, this chapter includes regulations to:

- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Control filling, grading, dredging, and other development which may increase flood damage;

- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

The areas of special flood hazard identified by the Federal Emergency Management Agency (FEMA) in the "Flood Insurance Study (FIS) for Modoc County, dated September 24, 1984, with accompanying flood insurance rate maps (FIRMs) and flood boundary and floodway map (FBFMs), dated September 24, 1984, and as all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this chapter. This information is on file and may be viewed at the Modoc County Planning Department, 203 West 4th Street, Alturas.

A development permit shall be obtained before any construction or other development, including manufactured homes, within any area of special flood hazard established in section 18.71.070. Application for a development permit shall be made on forms furnished by the Modoc County Planning Department. The applicant shall provide the following minimum information:

- Plans in duplicate, drawn to scale, showing:
  - ✓ Location, dimensions, and elevation of the area in question, existing or proposed structures, storage of materials and equipment and their location;
  - ✓ Proposed locations of water supply, sanitary sewer, and other utilities;
  - ✓ Grading information showing existing and proposed contours, any proposed fill, and drainage facilities;
  - ✓ Location of the regulatory floodway when applicable;
  - ✓ Base flood elevation information as specified in section 18.71.070 or subsection 18.71.140C.;
  - ✓ Proposed elevation in relation to mean sea level, of the lowest floor (including basement) of all structures; and
  - ✓ Proposed elevation in relation to mean sea level to which any nonresidential structure will be floodproofed, as required in subsection 18.71.170C.2. of this chapter and detailed in FEMA Technical Bulletin, TB 3-93.
- Certification from a registered civil engineer or architect that the nonresidential floodproofed building meets the floodproofing criteria in subsection 18.71.170C.2.
- For a crawl-space foundation, location and total net area of foundation openings as required in subsection 18.71.170C.3. of this chapter and detailed in FEMA Technical Bulletins 1-93 and 7-93.
- Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.
- All appropriate certifications listed in subsection 18.71.140E. of this chapter.

In all areas of special flood hazards the following standards are required:

- Anchoring. All new construction and substantial improvements of structures, including manufactured homes, shall be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- Construction materials and methods. All new construction and substantial improvements of structures, including manufactured homes, shall be constructed:
  - ✓ With flood-resistant materials and utility equipment resistant to flood damage for areas below the base flood elevation;
  - ✓ Using methods and practices that minimize flood damage;

- ✓ With electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and
- ✓ Within zones AH or AO, so that there are adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.

- ➢ Elevation and floodproofing.
  - ✓ Residential construction. All new construction or substantial improvements of residential structures shall have the lowest floor, including basement:
    - ♦ In AE, AH, A1-30 zones, elevated to or above the base flood elevation.
    - ♦ In an AO zone, elevated above the highest adjacent grade to a height equal to or exceeding the depth number specified in feet on the FIRM, or elevated at least two feet above the highest adjacent grade if no depth number is specified.
    - ♦ In an A zone, without BFEs specified on the FIRM (unnumbered A zone), elevated to or above the base flood elevation; as determined under subsection 18.71.140C.

Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered civil engineer or licensed land surveyor, and verified by the Modoc County Building Inspector to be properly elevated. Such certification and verification shall be provided to the floodplain administrator.

- ➢ Nonresidential construction. All new construction or substantial improvements of nonresidential structures shall either be elevated to conform with subsection C.1. or:
  - ✓ Be floodproofed, together with attendant utility and sanitary facilities, below the elevation recommended under subsection C.1., so that the structure is watertight with walls substantially impermeable to the passage of water;
  - ✓ Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
  - ✓ Be certified by a registered civil engineer or architect that the standards of subsections C.2.a. and b. are satisfied. Such certification shall be provided to the floodplain administrator.
- ➢ Flood openings. All new construction and substantial improvements of structures with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement must meet the following minimum criteria:
  - ✓ For nonengineered openings:
    - ♦ Have a minimum of two openings on different sides having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;
    - ♦ The bottom of all openings shall be no higher than one foot above grade;
    - ♦ Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of floodwater; and
    - ♦ Buildings with more than one enclosed area must have openings on exterior walls for each area to allow floodwater to directly enter.
  - ✓ Be certified by a registered civil engineer or architect.
- ➢ Manufactured homes.
  - ✓ See section 18.71.200.

- Garages and low cost accessory structures.
  - ✓ Attached garages.
    - ♦ A garage attached to a residential structure, constructed with the garage floor slab below the BFE, must be designed to allow for the automatic entry of floodwaters. See subsection C.3. Areas of the garage below the BFE must be constructed with flood-resistant materials. See subsection B.
    - ♦ A garage attached to a nonresidential structure must meet the above requirements or be dry floodproofed. For guidance on below grade parking areas, see FEMA Technical Bulletin TB-6.
  - ✓ Detached garages and accessory structures.
    - ♦ "Accessory structures" used solely for parking (two-car detached garages or smaller) or limited storage (small, low-cost sheds), as defined in section 18.71.050, may be constructed such that its floor is below the base flood elevation (BFE), provided the structure is designed and constructed in accordance with the following requirements:
    - ♦ Use of the accessory structure must be limited to parking or limited storage:
    - ♦ The portions of the accessory structure located below the BFE must be built using flood-resistant materials;
    - ♦ The accessory structure must be adequately anchored to prevent flotation, collapse and lateral movement;
    - ♦ Any mechanical and utility equipment in the accessory structure must be elevated or floodproofed to or above the BFE;
    - ♦ The accessory structure must comply with floodplain encroachment provisions in section 18.71.220; and
    - ♦ The accessory structure must be designed to allow for the automatic entry of floodwaters in accordance with subsection C.3.
  - ✓ Detached garages and accessory structures not meeting the above standards must be constructed in accordance with all applicable standards in [this] section.

Chapter 18.71.180 – Standards for utilities.

All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate:

- Infiltration of floodwaters into the systems; and
- Discharge from the systems into floodwaters.

Onsite waste disposal systems shall be located to avoid impairment to them, or contamination from them during flooding.

Chapter 18.71.190 – Standards for subdivisions and other proposed development.

All new subdivisions proposals and other proposed development, including proposals for manufactured home parks and subdivisions, greater than 50 lots or five acres, whichever is the lesser, shall:

- Identify the special flood hazard areas (SFHA) and base flood elevations (BFE).

- Identify the elevations of lowest floors of all proposed structures and pads on the final plans.
- If the site is filled above the base flood elevation, the following as-built information for each structure shall be certified by a registered civil engineer or licensed land surveyor and provided as part of an application for a letter of map revision based on fill (LOMR-F) to the floodplain administrator:
  - ✓ Lowest floor elevation.
  - ✓ Pad elevation.
  - ✓ Lowest adjacent grade.
- All subdivision proposals and other proposed development shall be consistent with the need to minimize flood damage.
- All subdivision proposals and other proposed development shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.
- All subdivisions and other proposed development shall provide adequate drainage to reduce exposure to flood hazards.

Chapter 18.71.200 – Standards for manufactured homes.

All manufactured homes that are placed or substantially improved, on sites located: (1) outside of a manufactured home park or subdivision; (2) in a new manufactured home park or subdivision; (3) in an expansion to an existing manufactured home park or subdivision; or (4) in an existing manufactured home park or subdivision upon which a manufactured home has incurred "substantial damage" as the result of a flood, shall:

- Within zones A1-30, AH, and AE on the community's flood insurance rate map, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely fastened to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within zones A1-30, AH, and AE on the community's flood insurance rate map that are not subject to the provisions of subsection A. will be securely fastened to an adequately anchored foundation system to resist flotation, collapse, and lateral movement, and be elevated so that either the:

- Lowest floor of the manufactured home is at or above the base flood elevation; or
- Reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade support manufactured home chassis.

Upon the completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered civil engineer or licensed land surveyor, and verified by the Modoc County Building Inspector to be properly elevated. Such certification and verification shall be provided to the floodplain administrator.

Chapter 18.71.210 – Standards for recreational vehicles.

All recreational vehicles placed in zones A1-30, AH, and AE will either:

- Be on the site for fewer than 180 consecutive days;

- Be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
- Meet the permit requirements of section 18.71.150 of this chapter and the elevation and anchoring requirements for manufactured homes in subsection 18.71.200A.

Chapter 18.71.220 – Floodways.

Since floodways are an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- Until a regulatory floodway is adopted, no new construction, substantial development, or other development (including fill) shall be permitted within zones A1-30 and AE, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other development, will not increase the water surface elevation of the base flood more than one foot at any point within the County of Modoc.
- Within an adopted regulatory floodway, the Modoc County Planning Department shall prohibit encroachments, including fill, new construction, substantial improvements, and other development, unless certification by a registered civil engineer is provided demonstrating that the proposed encroachment shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- If subsections A. and B. are satisfied, all new construction, substantial improvement, and other proposed new development shall comply with all other applicable flood hazard reduction provisions of article IV.

Title 16 Subdivision Ordinance

The ordinance codified in this title is adopted to supplement and implement the Subdivision Map Act, and may be cited as the "subdivision ordinance of Modoc County." The purpose of the regulations is to reflect the design and improvements approved of major subdivisions, the total area of which is more than five acres, and any resulting parcel of which has an area of less than twenty acres.

Title 18 Zoning

There is hereby adopted in this title a zoning plan for Modoc County, California, said plan being a districting plan consisting of regulations and maps, pursuant to Section 65800 et seq. of the California Government Code. The plan shall be referred to as the county zoning ordinance. The ordinances codified in this title are enacted for the following purposes:

- To promote and protect the public health, safety, peace, morals, comfort, convenience, and general welfare.
- To implement the general plan and any applicable specific plan, and to facilitate and guide growth in the county consistent with the general plan and any applicable specific plan.
- To protect the social and economic stability of residential, commercial, industrial, resource production, and recreational activities within the county through the orderly, planned use of the land.

A series of maps known as zoning maps shall be utilized to show the designations, locations, and boundaries of each zone district established by this title within the unincorporated areas of Modoc County. A series of maps known as special zoning maps shall be utilized to show certain zone districts or areas in more detail or in a different arrangement than shown on the zoning maps. The maps referenced in this section are made part of this title and are incorporated in this title as if set forth in full. Copies shall be maintained and shall be available for examination in the planning department during normal working hours. The planning director shall revise any of the maps referenced in this section to show amendments to the zoning ordinance, including changes in designations, rezonings of lots or parcels and clarifications of zone boundaries made pursuant to Chapter 18.150.

4.4.2. Modoc County's Administrative/Technical Mitigation Capabilities

Table 4-65 identifies the County personnel responsible for activities related to mitigation and loss prevention in the County.

Table 4-65 Modoc County Administrative/Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Regular meetings; coordination is effective with county departments
Mitigation Planning Committee	Y	There is no committee with that particular name but the Disaster Council functions in that capacity. It meets quarterly and is a composite of federal, state, county and non-governmental agencies to review all plans, exercises and incidents.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Y Both Roads and Public Works have ongoing projects
Mutual aid agreements	Y	Yes
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	Y Y Y There is coordination within the county but also close coordination with the City of Alturas.
Floodplain Administrator	Y	Part-time with Planning: this could be improved Y Y
Emergency Manager	Y	Y Y Y
Community Planner	Y	Part-time; could be improved Y Y
Civil Engineer	Y	Roads has a CE; but other County work is contracted out
GIS Coordinator	Y	There is no centralized GIS coordinator; each department has a "GIS" person: Roads, Planning Dept. for 911 addressing, OES for emergency planning and response
Other		

Technical	Y/N	Describe capability Has capability been used to assess/mitigate risk in the past?
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Currently under Reverse 911 TENS System; slated to upgrade to IPAWS compliant alert and warning system in 2016.
Hazard data and information	Y	CUPA Program Certified Unified Program Agency
Grant writing	Y	No formalized writing department
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

4.4.3. Modoc County's Fiscal Mitigation Capabilities

Table 4-66 identifies financial tools or resources that the County could potentially use to help fund mitigation activities.

Table 4-66 Modoc County Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Not sure how it would be funded
Authority to levy taxes for specific purposes	Y	Requires 2/3 majority vote
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Requires 2/3 majority vote
Incur debt through private activities	N	
Community Development Block Grant	N	Not eligible for grants at this time; Previously it funded the Newell Water Project for clean drinking water and the Pit River Watershed Project to address erosion of stream beds
Other federal funding programs	Y	
State funding programs	Y	Title 3, NRCS, CUPA, Rural Reimbursement, Community Facilities Grant (USDA), Proposition 1, HCD, HUD, multiple programs through Public Health, OES, and Environmental Health
Other		
How can these capabilities be expanded and improved to reduce risk?		

4.4.4. Mitigation Education, Outreach, and Partnerships

Table 4-67 identifies education and outreach programs and methods already in place in Modoc County that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 4-67 Modoc County Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	County SS and PH have programs in place. Strong Family Health has outreach. Pitt River Watershed Alliance, River Center, Faith Based Groups, Senior Center, etc.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	OES, Fire Safe Council, Faith Based Groups
Natural disaster or safety related school programs	Y	Safe Schools Plan for various emergencies
StormReady certification	N	Unsure what this is
Firewise Communities certification	Y	Current plan was approved by BOS in 2008. Currently being reviewed and updated as that conditions and resources have changed considerably. There are two approved Firewise certified communities: Lookout Ranchettes and Rush Creek.
Public-private partnership initiatives addressing disaster-related issues	Y/N	Red Cross, Humane Society, Cal Pines, MRE, ISOT
Other		Attached is a list of all Community Wildfire Protection Projects. There are 16 identified and 3 have been completed. To summarize the fuel break projects: CalPines Shaded, Tionesta, Modoc Recreational Estates (3), Rush Creek (2), Granger Canyon and Franklin Canyon (2).
How can these capabilities be expanded and improved to reduce risk?		
There is always room for additional outreach. Modoc Fire Safe Council has plans for educational outreach to update and prioritize the project list that is attached.		

4.4.5. Other Mitigation Efforts

In addition to those items above, the County has also participated in other mitigation efforts. These include:

- 2015 Emergency Operations Plan and Annexes: Updated from 2013 EOP which was written to federal standards; 4 additional annexes from 2013; ongoing work in progress.
- 1996, 2008, 2015 Pitt River Dredging Project to reduce flooding

- Improvements on County Road 1 flooding impact
- 2008 Newell Water Project to provide quality drinking water and to add pressure for new fire hydrants
- On-going Modoc Fire Safe Council projects to reduce fuels, provide breaks, maintain access roads.
- Emergency Operations Center yearly exercises (3) to prepare, exercise plans, and revise as needed.
- Public Health: Medical Counter Measure Program that prepares health care providers and the community with various programs and educational outreach
- The community of Likely has the West Valley Diversion Ditch Project that works on bank stabilization projects to reduce the effects of erosion.
- Current and past levee improvement projects
- Wildfire projects implemented through the CWPP
- Public Works and Roads ongoing maintenance projects for debris removal

Chapter 5 Mitigation Strategy

Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the Modoc County Local Hazard Mitigation Plan. It describes how the County met the requirements for the following from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the HMPC led to the action plan in Section 5.4 Mitigation Action Plan. Taking all of the above into consideration, the HMPC developed the following umbrella mitigation strategy for this LHMP Update:

- **Communicate** the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they can do to be better prepared.
- **Use** existing rules, regulations, policies, and procedures already in existence.
- **Implement** the action plan recommendations of this plan.
- **Monitor** multi-objective management opportunities so that funding opportunities may be shared and packaged and broader constituent support may be garnered.

5.1.1. Continued Compliance with NFIP

Given the flood hazard in the planning area, an emphasis will be placed on continued compliance with the National Flood Insurance Program (NFIP) by all communities. Detailed below is a description of Modoc County's flood management program to ensure continued compliance with the NFIP. Also to be considered are the numerous flood mitigation actions contained in this LHMP that support the ongoing efforts by the county to minimize the risk and vulnerability of the community to the flood hazard and to enhance their overall floodplain management program. A summary of the flood management programs and continued compliance with the NFIP for Alturas is detailed its annex.

Modoc County's Flood Management Program

Modoc County has participated in the Regular Phase of the NFIP since September 24, 1984. Since then, the County has administered floodplain management regulations that meet the minimum requirements of the NFIP. As a result, residents and businesses pay the same flood insurance premium rates as most other communities in the country.

The Community Rating System (CRS) was created in 1990. It is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. If a community implements public information, mapping, regulatory, loss reduction and/or flood preparedness activities and submits the appropriate documentation to the FEMA, then its residents can qualify for a flood insurance premium rate reduction. The County and the City of Alturas will evaluate the overall value of joining CRS in the future during the implementation phase of this LHMP.

Presently, the County manages its floodplains in compliance with NFIP requirements and implements a floodplain management program designed to protect the people and property of the County. Floodplain regulations are a critical element in local floodplain management and are a primary component in the County's participation in the NFIP. The County will be updating their current 2008 flood zone development ordinance with the finalization of their latest DFIRMs in December 2015. These NFIP regulations require the County to meet and continue to meet the minimum design, operations, and maintenance standards for the County's levees and flood control system that are consistent with the level of protection from a 1% annual chance event. As well, the County's floodplain management activities apply to existing and new development areas, implementing flood protection measures for structures and maintaining drainage systems to help reduce the potential of flooding within the County.

The County will continue to manage their floodplains in continued compliance with the NFIP. An overview of the County's NFIP status and floodplain management program are discussed on Table 5-1.

Table 5-1 Modoc County NFIP Status

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	As of September 15, 2014, 27 policies are in force. $4,564,700 is insured. 11 of these are in the A zones; 16 policies are in the B, C, or X Zones.
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	As of September 15, 2014, 1 paid loss of $5,653.60 was reported. It was for a single family home in an A zone. This was a pre-FIRM loss.
How many structures are exposed to flood risk within the community?	There are 209 improved parcels in the unincorporated County in the 1% annual chance flood zone. There are 18 improved parcels in the unincorporated County in the 0.2% annual chance flood zone.

NFIP Topic	Comments
Describe any areas of flood risk with limited NFIP policy coverage	With only 11 of the 209 improved parcels within the SFHA having flood insurance, the remaining 198 parcels (or 95%) remain vulnerable and uninsured. With the new DRIRMs in 2010 which decertified the levees and the finalization of the most recent DFIRMs in 2015 that incorporated new study data, new areas were mapped into the SFHA. This likely accounts for the large percentage of homeowners in the SFHA without flood insurance. As the maps are being finalized, homeowners in these areas are in varying stages of obtaining flood insurance. However, it should be recognized that the flood risk has not necessarily changed; the levees still provide the same level of protection. Additionally, the County is pursuing projects to enhance the levee and reduce the flood risk in these areas.
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	N Partially Certified
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, inspection, engineering assessment, contract for specialized services as necessary; review elevation certs, inspection of water, etc.
What are the barriers to running an effective NFIP program in the community, if any?	FEMA regulations are not always sensible for a small, rural county
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	Not with NFIP
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	2009
Is a CAV or CAC scheduled or needed?	N
Regulation	
When did the community enter the NFIP?	September 24, 1984
Are the FIRMs digital or paper?	DFIRM
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Y; Modoc meets minimum standards but does not exceed (2015 FEMA Review)
Provide an explanation of the permitting process.	Clearly outlined in flood plain ordinances and they are enforced.
Community Rating System	
Does the community participate in CRS?	N
What is the community's CRS Class Ranking?	N/A

NFIP Topic	Comments
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

Source: FEMA/Modoc County

5.2 Goals and Objectives

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Up to this point in the planning process, the HMPC has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section. Appendix C documents the information covered in these mitigation strategy meetings, including information on the goals development and the identification and prioritization of mitigation alternatives by the HMPC.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and to develop the mitigation strategy for the Modoc County planning area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives (policies) define strategies to attain the goals and are more specific and measurable.

HMPC members were given a list of sample goals to consider. They were told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was each given three index cards and asked to write a goal statement on each card. Goal statements were collected and grouped into similar themes and pasted onto the wall of the meeting room. The goal statements were then grouped into similar topics. New goals from the HMPC were discussed until the team came to consensus. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal.

Based on the risk assessment review and goal setting process, the HMPC identified the following goals and policies, which provide the direction for reducing future hazard-related losses within the Modoc County planning area.

Goal 1: Minimize risk and vulnerability of Modoc County to the impacts of natural hazards. The primary goal is to protect lives; reduce damages and losses to property and critical infrastructure; maintain services; maintain the economic base; and protect the environment.

- Provide for safety of residents, public, contractors, and responders
- Provide for continuity of critical infrastructure and services
- Minimize impacts to both existing and future development from all hazards
- Minimize impacts to natural and cultural resources
- Prevent and reduce the potential for catastrophic loss due to wildfire
- Prevent and reduce flood risk and related damages

Goal 2: Increase communities' capabilities to mitigate losses and to be prepared for, respond to, and recover from a disaster event.

- Continued enhancements to Emergency Services' capabilities to integrate new technologies and use of shared resources to reduce losses and save lives
- Improve interagency (local, state, & federal) emergency coordination, planning, training, exercising, and communication to ensure effective community preparedness, response and recovery
- Identify, fund, and implement community mitigation projects
- Improve interagency coordination with respect to implementation of multi-jurisdictional mitigation activities
- Continue to support first responders

Goal 3: Improve public awareness, education, and preparedness programs for all hazards

- Increase public knowledge of various hazards and recommend actions that will protect lives and reduce losses
    - ✓ In particular, to make aware of the probable consequences of Severe Winter Weather Events (e.g., the need for 72 hours of food and fuel reserves, the possibility of CO2 poisoning, frozen pipes or power outages, etc.)
    - ✓ To build awareness of ongoing actions that reduce hazards. For example signage for burn restrictions or emergency warnings, recognition of hazardous vegetation, utilization of water conservation measures, necessity of ditch maintenance, importance of flood insurance, plans for evacuation and sheltering, etc.

5.3 Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In order to identify and select mitigation actions to support the mitigation goals, each hazard in Section 4.1 Identifying Hazards: Natural Hazards was evaluated. Only those hazards that were determined to be a priority hazard at the completion of the Vulnerability Assessment were considered further in the development of hazard-specific mitigation actions. These priority hazards (in alphabetical order) are:

- Agriculture Hazards
- Dam Failure
- Drought and Water Shortage
- Earthquake
- Erosion
- Flood: 100/500 year
- Flood: Localized Stormwater Flooding
- Landslide, Mudslides and Debris Flows
- Levee Failure
- Severe Weather: Extreme Cold, Freeze, Winter Weather
- Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)
- Severe Weather: High Winds/Tornadoes
- Volcano
- Wildfire
- Hazardous Materials Transport

The HMPC eliminated the hazards identified below from further consideration in the development of mitigation actions because the risk of a hazard event in the County is unlikely or nonexistent, the vulnerability of the County is low, or capabilities are already in place to mitigate negative impacts. The eliminated hazards are:

- Avalanche
- Severe Weather: Extreme Heat

It is important to note, however, that all the hazards addressed in this plan are included in the City's multi-hazard public awareness mitigation action as well as in other multi-hazard and emergency management actions.

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of categories of mitigation actions, which originate from the Community Rating System:

- Prevention
- Property protection
- Structural projects
- Natural resource protection
- Emergency services
- Public information

The HMPC was also provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both future and existing buildings in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.3.1. Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations)
- Technical: Is the action technically feasible? Does it solve the problem?
- Administrative: Are there adequate staffing, funding, and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes:

- Contribution of the action to save life or property
- Availability of funding and perceived cost-
- Available resources for implementation
- Ability of the action to address the problem

The mitigation categories, multi-hazard actions, and criteria are included in Appendix C.

With these criteria in mind, HMPC members were each given a set of nine colored dots, three each of red, blue, and yellow. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and yellow for low priority (worth one point). The team was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

Recognizing the limitations in prioritizing actions from multiple jurisdictions and departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue actions that contributed to saving lives and property as first and foremost, with additional consideration given to the benefit-cost aspect of a project. This process drove the development of a determination of a high, medium, or low priority for each mitigation action, and a comprehensive prioritized action plan for the Modoc County Planning Area.

5.4 Mitigation Action Plan

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This action plan was developed to present the recommendations developed by the HMPC for how the Modoc County Planning Area can reduce the risk and vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act. Table 5-2 identifies the mitigation actions and lead jurisdiction for each action. Only those actions where the County is the lead jurisdiction are detailed further in this section. Actions specific to the City of Alturas are detailed in their annex.

It is important to note that Modoc County and the participating jurisdictions have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as community wildfire protection plans/fire plans, stormwater plans and capital improvement budgets and reports. These actions are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. The HMPC also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

Further, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. The participating jurisdictions are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the community to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the CRS mitigation categories and criteria contained in Appendix C.

It should be noted that the projects submitted by each jurisdiction in Table 5-2 benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. It is also important to note that the public outreach action, in addition to many of the emergency services actions, apply to all hazards regardless of hazard priority

Table 5-2 Modoc County Mitigation Actions

Mitigation Action Title	Lead Jurisdiction	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Modoc County/ City of Alturas* Planning Departments			
Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Modoc County/ City of Alturas* Planning Departments			X
East Warner Mountains Fuel Break (WF-7 Create Defensible Space Around Structures and Infrastructure)	Modoc County Fire Safe Council	X	X	
Dredge Sons of Pioneer Lake and Install Dry Hydrant (W-8 Conduct Maintenance to Reduce Risk/Water Quality/Quantity)	Modoc County Fire Safe Council	X	X	X
Construct a new Hospital and Clinic outside the floodplain (including access roads) (F-12 Remove Existing Structures from Flood Hazard Areas)	Modoc County in coordination with Last Frontier Healthcare District	X	X	X
Relocate Jail (MU-12 Protect Structures)	Modoc County Sherriff's Office	X	X	X
Complete Levee Flood Assessment Response Plan and Exercise it (F-2 Form Partnerships to Support Floodplain Management)	Modoc County Planning Department	X	X	X
Pit River Levee Bypass Channel and Restricted Orifice (F-13 Improve Stormwater Drainage System Capacity)	Modoc County Public Works / City of Alturas*	X	X	X
Pit River Levee Dredging and Silt Removal (F-14 Conduct Regular Maintenance for Drainage systems and Flood Control Structures)	Modoc County Public Works / City of Alturas*	X	X	X
City of Alturas Storm Drainage (F-13 Improve Stormwater Drainage System Capacity)	Modoc County Public Works / City of Alturas*	X	X	X
Alternate Dispatch (MU-12 Protect Structures)	Modoc County Sherriff's Office	X	X	
Fireproof Radio Tower Sites (11)(MU-13 Protect Infrastructure and Critical Facilities)	Modoc County Office of Emergency Services	X	X	
Communications Redundancy: Intranet Link of 11 Radio Towers (MU-13 Protect Infrastructure and Critical Facilities)	Modoc County Office of Emergency Services and Public Health	X	X	

Mitigation Action Title	Lead Jurisdiction	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
GIS Coordinator (MU-2 Map Community Risk)	Modoc County	X	X	
Improve the outreach and enrollment in the Support and Aid For Everyone program. (MU – 14 Increase Hazard Education and Risk Awareness; MU – 15 Improve Household Disaster Preparedness)	Modoc County Public Health	X	X	
Construct a new skilled nursing facility outside the floodplain (including access roads) (F-12 Remove Existing Structures from Flood Hazard Areas)	Modoc County in coordination with Last Frontier Healthcare District	X	X	X
Rock scaling on Co Rd 64 (Pitt River Canyon/Jess Valley Road) and 91 (Lookout) to prevent road damage and traffic disruptions from landslides (LS-3 Prevent Impacts to Roadways)	Modoc County Roads Department	X	X	
Bridge Abutment Repair on Co Rd 75 (Pitt River); Co Rd 58 (Parker Creek); culvert replacement for Co Rd 2 and Rd 118 in Davis Creek (F-1 Incorporate Flood Mitigation in Local Planning)	Modoc County Roads Department	X	X	X
Tree Removal on Co Rd 1 (Surprise Valley) (SW-4 Protect Power Lines and Infrastructure; WW-4 Reduce Impacts to Roadways)	Modoc County Office of Emergency Services	X	X	
Outlet Allotment Riparian Juniper Cutting (F-14 Conduct Regular Maintenance for Drainage Systems and Flood Control Structures)	Modoc County Office of Emergency Services	X	X	

*Specifics for these actions for the City of Alturas may be found in its annex to this plan.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: Modoc County Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: All (priority and non-priority) hazards

Issue/Background: Modoc County and the City of Alturas are the two primary participating jurisdictions to the Modoc County Local Hazard Mitigation Plan. Each jurisdiction plays a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The County and the City will work with other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms and will consider:

- Using a variety of information outlets, including websites, local radio stations, news media, schools, and local, public sponsored events;
- Creating and Distributing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;
- Displaying public outreach information in County and City office buildings, libraries, and other public places and events;
- Developing public-private partnerships and incentives to support public education activities.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County, City, and other agency outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: Modoc County

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Schedule: Ongoing/Annual public awareness campaign

Action 3. East Warner Mountains Fuel Break (WF-7 Create Defensible Space Around Structures and Infrastructure)

Hazards Addressed: Wildfire/Water Quality/Quantity

Issue/Background: The Warner Mountain Range is riddled with dead and dying conifers due to bug kill. There are many privately owned homes as well as hundreds of acres of agriculture at the base of the Warner Mountains that have no protection in the event of a wildfire traveling off of the public land.

Other Alternatives: Reduce hazardous fuels on public land

Existing Planning Mechanism(s) through which Action Will Be Implemented: Modoc Community Wildfire Protection Plan

Responsible Office/Partners:

- Modoc Fire Safe Council
- Modoc National Forest
- Private Landowners

Project Priority: The Modoc Fire Safe Council believes that this project is a high priority.

Cost Estimate: Unknown; varies with amount identified

Benefits (Losses Avoided): The completion of this project would result in the decreased probability of property and life loss. This will also allow for a staging area in the event of a wildfire.

Potential Funding: Private landowners are eligible for Community Fire Safe Grants; various federal and state grants.

Timeline: This project would be completed in phases and could take several years to complete.

Action 4. Dredge Sons of Pioneer Lake and Install Dry Hydrant (W-8 Conduct Maintenance to Reduce Risk/Water Quality/Quantity)

Hazards Addressed: Wildfire

Issue/Background: At this time, the lake is so overgrown with weeds that it is not deep enough to allow air tanks or truck to draw from the lake. This is essential in the event of a structure fire in the MRE area as well as it can be used in the event of a wildfire.

Other Alternatives: The only other alternative is to restore water to the fire hydrants that border the MRE area.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Modoc Fire Safe Council Updated Community Action Plan, 2016

Responsible Office/Partners:

- Modoc Fire Safe Council
- California Department of Fish and Game
- Modoc Recreational Estates Home Owners Association

Project Priority: The Modoc Fire Safe Council believes that his project is a high priority.

Cost Estimate: $456,900.00

Benefits (Losses Avoided): The completion of this project would result in the decreased probability of property and life loss. This will also allow for rapid response in the event of a wildfire in the area.

Potential Funding: Unknown

Timeline: This project would take at approximately two years to complete.

Action 5. Construct a new Hospital and Clinic outside the floodplain (including access roads) (F-12 Remove Existing Structures from Flood Hazard Areas)

Hazards Addressed: Flood, Earthquake

Issue/Background: Communities may remove structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving lands subject to repetitive flooding. The current structures that are listed above are part of Modoc Medical Center and exist within the 100-year flood plain and do not meet current building standards for earthquakes.

Other Alternatives: Remaining in existing facilities and building earthen dikes around flood-threatened critical areas.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Since 2013, the Last Frontier Healthcare District has been planning to replace the hospital facility. Plans for the Clinic and

Skilled Nursing Center will follow after the completion of the hospital. The District has a New Facility Planning Committee that coordinates facility planning.

Responsible Office/Partners: Last Frontier Healthcare District

Project Priority: Top Priority (State will close existing facility in 2020)

Cost Estimate: $40.6 million

Benefits (Losses Avoided): Having the hospital is a benefit to the Community and to the population. The community benefits in attractiveness to businesses and individuals by having medical facilities nearby. There is no other hospital facility with the same capabilities within 150 miles.

Potential Funding: USDA loan

Timeline: 5 years; completion date in 2020

Action 6. Relocate Jail (MU-12 Protect Structures)

Hazards Addressed: Flood

Issue/Background: The current jail is located within the 100 year flood plain. There is a need for an alternate facility if flooding occurs.

Other Alternatives: None: If the jail is renovated, it is still in the floodplain.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Modoc Sheriff's Office has applied for state and federal grants to rebuild or renovate the jail.

Responsible Office/Partners: Modoc County Sheriff's Office

Project Priority: Top priority

Cost Estimate: $10 million

Benefits (Losses Avoided): Critical infrastructure loss is avoided

Potential Funding: California SB 1022

Timeline: 2018

Action 7. Complete Levee Flood Assessment Response Plan and Exercise it (F-2 Form Partnerships to Support Floodplain Management)

Hazards Addressed: Flood

Issue/Background: In the fall of 2014, the Army Corp conducted a life loss survey. The final report is still pending but the draft shows significant deviation from areas on DFIRM map and includes the hospital, City and County offices and school facilities. Furthermore, the Army Corp "periodic inspection" requires ongoing outreach and exercises for compliance.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Office of Emergency Services will coordinate annex acquisition to the Emergency Operations Plan

Responsible Office/Partners:

- Lead: Modoc County Planning Department
- Secondary: Modoc County OES
- Partners: Disaster Council which includes the City of Alturas, state and federal agencies, as well as non-governmental agencies

Project Priority: Very High

Cost Estimate: This would fall within existing departmental budgets and staff

Benefits (Losses Avoided): Loss of life and economic impacts may be mitigated;

Life and economic loss will be quantified for final US Army Corp reporting requirements

Potential Funding: Existing budgets

Timeline: Implement in 2016; ongoing (as are all EOP elements)

Action 8. Pit River Levee Bypass Channel and Restricted Orifice (F-13 Improve Stormwater Drainage System Capacity)

Hazards Addressed: Flood

Issue/Background: The revised FEMA FIRM maps effective December 2, 2015 have more critical facilities in the 100 year flood plain. The detention hydrograph also shows changes in precipitation patterns over the last 20 years. The variance in fall and spring precipitation causes surge effects. Therefore there are times when more water moves through watershed in a shorter time frame. Installation of a restricted orifice bar screen upstream of the levee and a bypass channel could address will provide surge capacity needed to avoid events correlated with precipitation pattern changes.

Other Alternatives:

- Dredging Dorris Reservoir: Increases watershed retention capacity
- Onging levee maintenance and silt removal
- Buyouts

Existing Planning Mechanism(s) through which Action Will Be Implemented: FEMA Planning Grant (This would require community support from FEMA)

Responsible Office/Partners:

- City of Alturas – USFWS
- Modoc County Public Works in conjunction with
- California Fish and Wildlife Service

Project Priority: Medium

Cost Estimate: Unknown until planning study is completed (It may be less than alternatives.)

Benefits (Losses Avoided):

- Avoids potential flooding as identified by FEMA (DFIRM maps) and Army Corp (Screening/economic loss)
- Reduction in long term flood insurance rates for ½ of Alturas
- Downstream habitat improved due to water retention in Refuge

Potential Funding: FEMA for planning grant; potential USFWS grants or CA bond funds; FEMA funding after a flood has occurred.

Timeline: Planning phase completed by 2020

Action 9. Pit River Levee Dredging and Silt Removal (F-14 Conduct Regular Maintenance for Drainage systems and Flood Control Structures)

Hazards Addressed: Flood, Levee Failure

Issue/Background: Levee is non-compliant with Army Corp of Engineers PL Program. Silt is only a component of a larger issue. Full Compliance requires:

- Documented flood exercises
- Televising culverts and culvert repair
- Vegetation removal
- Bank restoration
- Rodent control plan and implementation
- Encroachment of utilities: relocated

Other Alternatives: None - The silt removal complements other projects but the other issues have no alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Stream bed alteration permit (CFG)
- LEQA (Modoc Co Planning)
- Engineering (Modoc County and consultants)

Responsible Office/Partners:

- Lead Agency: Modoc County Public Works
- Secondary – City of Alturas

Project Priority: High

Cost Estimate: $420,000

Benefits (Losses Avoided):

- Avoids potential flooding as identified by FEMA (DFIRM maps) and Army Corp (Screening/economic loss)
- Reduction in long term flood insurance rates for ½ of Alturas
- Downstream habitat improved due to water retention in Refuge

Potential Funding: FEMA for planning grant; California Proposition 1 for implementation; future bond acts; City & County Maintenance funds (limited)

Timeline: Planning phase completed by 2020

Action 10. City of Alturas Storm Drainage (F-13 Improve Stormwater Drainage System Capacity)

Hazards Addressed: Flood

Issue/Background: During times of heavy precipitation city culverts backup and thus cause flooding. The current project would install backflow devices to prevent this.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Alturas and Modoc County Public Works Departments

Responsible Office/Partners: City of Alturas and Modoc County Public Works

Project Priority: High

Cost Estimate: $20,000

Benefits (Losses Avoided): Avoids potential street flooding

Potential Funding: Various grants for water quality

Timeline: 2017

Action 11. Alternate Dispatch (MU-12 Protect Structures)

Hazards Addressed: Multi-Hazard

Issue/Background: Current Dispatch/911 is located within the 100 year flood plain. Need for an alternate facility if flooding occurs.

Other Alternatives: Move current Dispatch/911 out of the flood plain

Existing Planning Mechanism(s) through which Action Will Be Implemented: OES All Hazards Plan, 2016

Responsible Office/Partners: Modoc County Sherriff's Office

Project Priority: High

Cost Estimate: $210,000

Benefits (Losses Avoided): Critical infrastructure loss is avoided

Potential Funding: None

Timeline: Immediate: 2016

Action 12. Fireproof Radio Tower Sites (11)(MU-13 Protect Infrastructure and Critical Facilities)

Hazards Addressed: Multi-Hazard

Issue/Background: There are 11 tower radio tower sites in remote locations. There is a need to fireproof all sites. This includes establishing a fire boundary by clearing and graveling interior perimeter, security fencing, and converting to metal poles and buildings.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: OES

Project Priority: Top priority

Cost Estimate: $30,000

Benefits (Losses Avoided): Critical infrastructure loss is avoided

Potential Funding: None

Timeline: Immediate: 2016

Action 13. Communications Redundancy: Intranet Link of 11 Radio Towers (MU-13 Protect Infrastructure and Critical Facilities)

Hazards Addressed: Multi-Hazard

Issue/Background: In the event that telephonic communication lines are inoperable, linking the radio towers with an intranet system will allow medical, fire and law enforcement agencies to communicate.

Other Alternatives: Satellite phones

Existing Planning Mechanism(s) through which Action Will Be Implemented: OES All Hazards Plan, 2016

Responsible Office/Partners: OES and Public Health

Project Priority: Medium

Cost Estimate: $60,000

Benefits (Losses Avoided): Provides communications' redundancy should phone lines be inoperable

Potential Funding: Various Public Health and OES grants

Timeline: 2017

Action 14. GIS Coordinator (MU-2 Map Community Risk)

Hazards Addressed: Multi-hazard

Issue/Background: Currently, GIS functions are limited, spread among various departments. Department use is function specific, generally to addressing and roads. For other GIS functions, outside contractors are used. There is no person to coordinate all data and uses across departments and provide leadership.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: All Hazards Plan

Responsible Office/Partners: Modoc County

Project Priority: Medium

Cost Estimate: $90,000

Benefits (Losses Avoided): The benefits would be utilization of a system that has multiple uses that are not being accessed.

Potential Funding: None

Timeline: 2017

Action 15. Improve the outreach and enrollment in the Support and Aid For Everyone program. (MU – 14 Increase Hazard Education and Risk Awareness; MU – 15 Improve Household Disaster Preparedness)

Hazards Addressed: Multi-Hazard

Issue/Background: This project is a database to reach persons with special needs and/or equipment during an emergency. It utilizes email, phones, social media etc. to make sure clients' needs are met during an emergency. This is a very rural county. It involves a program coordinator who can do outreach to 12 fire districts, five tribes, and four clinics.

Other Alternatives: This is an effective program that needs utilization.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Health Emergency Preparedness Program

Responsible Office/Partners: PH: Emergency Preparedness Coordinator

Project Priority: Medium

Cost Estimate: $8,500 (Part-time help $17 per hour for 500 hours)

Benefits (Losses Avoided): Utilization of multiple means to contact members for wellness checks avoids loss of services and possible medical problems during an emergency.

Potential Funding: Public Health Emergency Preparedness Grant

Timeline: End of FY 2017

Action 16. Construct a new skilled nursing facility outside the floodplain (including access roads) (F-12 Remove Existing Structures from Flood Hazard Areas)

Hazards Addressed: Flood

Issue/Background: Communities may remove structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving lands subject to repetitive flooding. The current structures that are listed above are part of Modoc Medical Center and exist within the 100 year flood plain and do not meet current building standards for earthquakes.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Since 2013, the Last Frontier Healthcare District has been planning to replace the hospital facility. Plans for the Clinic and Skilled Nursing Center will follow after the completion of the hospital. The District has a New Facility Planning Committee that coordinates facility planning.

Responsible Office/Partners: Last Frontier Healthcare District

Project Priority: Medium priority

Cost Estimate: $12 million

Benefits (Losses Avoided): Warnerview Skilled Nursing Facility is one of two facilities in the county; the only one on this side of the Warner Mountains. If it should be closed there are very limited options without significant travel for residents

Potential Funding: USDA loan; Commercial lending

Timeline: 8 years; completion date in 2023

Action 17. Rock scaling on Co Rd 64 (Pitt River Canyon/Jess Valley Road) and 91 (Lookout) to prevent road damage and traffic disruptions from landslides (LS-3 Prevent Impacts to Roadways)

*Scaling: removal of rock by hand, selectively; mechanical scaling is not an option because of the slope of the land

Hazards Addressed: Landslides, flood; severe winter weather; earthquakes

Issue/Background: Data from roads over the last 10 years, Roads routinely has to clean ditches (beyond normal maintenance) and remove large boulders. Jess Valley Road is a steep canyon with one side large boulders and a river that runs through the canyon beside the road. The slopes are becoming unstable so that any use of equipment vibration, may result in further slide activity. Jess Valley Road is critical due to the fact that closure of that road isolates approximately 50 people with no other means of egress except forest service roads.

Other Alternatives: There really is no other alternative.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Road Department Grant Process

Responsible Office/Partners: Modoc County Roads Department

Project Priority: It is a high priority because it is a major road to recreation area and permanent residences.

Cost Estimate:

- Jess Valley Road: $550,000
- Lookout: $100,000

Benefits (Losses Avoided):

- Damage to roads
- Potential for large scale flooding if slide dams the river
- Potential for vehicle/rock collisions, loss of life

Potential Funding: California Department of Transportation Grants: Hazard Mitigation Grants

Timeline: At this point, difficult to fund through existing grants because the population in the area is so small.

Action 18. Bridge Abutment Repair on Co Rd 75 (Pitt River); Co Rd 58 (Parker Creek); culvert replacement for Co Rd 2 and Rd 118 in Davis Creek (F-1 Incorporate Flood Mitigation in Local Planning)

Hazards Addressed: Flood; severe winter weather

Issue/Background: When it is a high water situation due to weather conditions, the water is washing out from behind the abutments and thus destabilizes the bridges. The culverts are undersized for the amount of water that needs to be handled.

Other Alternatives: There really is no other alternative.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Road Department Grant Process

Responsible Office/Partners: Modoc County Roads Department

Project Priority: It is high priority because they are interconnecting roadways for higher population density communities.

Cost Estimate:

- $250,000 per bridge abutments
- $50,000 for culvert upgrades

Benefits (Losses Avoided):

- Damage to roads
- Washing out of bridges

Potential Funding: California Department of Transportation Grants: Hazard Mitigation Grants

Timeline: At this point, difficult to fund through existing grants because it is deteriorating but not to the degree of damage that will qualify for DOT funding

Action 19. Tree Removal on Co Rd 1 (Surprise Valley) (SW-4 Protect Power Lines and Infrastructure; WW-4 Reduce Impacts to Roadways)

Hazards Addressed: Severe Wind; Severe Winter Storm

Issue/Background: There are incidents annually of trees falling and severing power lines as well as blocking roadways.

Other Alternatives: There really is no other alternative.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Tree removal does not qualify for California Department of Transportation (DOT) grants

Responsible Office/Partners: Office of Emergency Services Mitigation Projects

Project Priority: It is high priority because they are interconnecting roadways for higher population density communities and the possibility of interrupting electrical services to isolated communities.

Cost Estimate: $200,000 because of the size, quantity and disposal of trees

Benefits (Losses Avoided):

- Damage to roads
- Disruption of electrical services

Potential Funding: County Tax Dollars

Timeline: Without the grant funds, it is not likely to be funded through normal County funding.

Action 20. Outlet Allotment Riparian Juniper Cutting (F-14 Conduct Regular Maintenance for Drainage Systems and Flood Control Structures)

Hazards Addressed: Flood

Issue/Background: Current USFS project for juniper eradication left debris which in severe winter weather or significant precipitation could be moved downstream causing blockage of normal flow, resulting in flooding.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Where possible to still achieve the objective of creating a barrier to cattle movement along the South Fork Pit River the downed juniper adjacent to the river bank will be bucked and moved by hand out of the high water area. Material that cannot be moved will be bucked into small sections to reduce the chance of it moving downstream and causing a blockage.

Responsible Office/Partners: United States Forest Service: Modoc National Forest

Project Priority: High

Cost Estimate: Work will be done by Forest Service crews.

Benefits (Losses Avoided): Mitigates potential flooding; avoids road closures; prevents isolation of communities.

Potential Funding: Forest Service funding

Timeline: Work will be completed this winter prior to spring high flows.

Chapter 6 Plan Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from Modoc County, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. This adoption also establishes compliance with AB 2140 requiring adoption by reference or incorporation into the safety element of the general plan. The Modoc County Board of Supervisors and the City of Alturas City Council have adopted this Local Hazard Mitigation Plan by passing a resolution. A copy of the sample resolution and the executed copies for the County and the City (pending) are included in Appendix D: Adoption Resolution.

Chapter 7 Plan Implementation

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

7.1 Implementation

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the County and participating jurisdictions will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as the general plans and Community Wildfire Protection Plans for Modoc County and participating jurisdictions. The County and the City of Alturas already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the Modoc County community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the participating jurisdictions will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

The elected officials and officials appointed to head each department within the County and City are charged with implementation of various activities in the plan. During the annual review as described later in this section, an assessment of progress on each of the goals and activities in the plan will be determined and noted. At that time, recommendations will be made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from the plan entirely and activities addressing problems unforeseen during plan development may be added,

7.1.1. Role of Hazard Mitigation Planning Committee in Implementation and Maintenance

With adoption of this plan, the participating jurisdictions will be responsible for the plan implementation and maintenance. The HMPC identified in Appendix A (or a similar committee) will reconvene each year to ensure mitigation strategies are being implemented and the County and City continues to maintain compliance with the NFIP. As such, Modoc County and participating jurisdictions agree to continue its relationship with the HMPC and:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the various governing boards or councils of all participating jurisdictions; and
- Inform and solicit input from the public.

The primary duty of the participating jurisdictions is to see the plan successfully carried out and to report to their community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County website (and others as appropriate).

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

7.2.1. Maintenance Schedule

The Modoc County OES is responsible for initiating plan reviews and consulting with the other participating jurisdictions. In order to monitor progress and update the mitigation strategies identified in the action plan, Modoc County OES and the standing HMPC will revisit this plan annually and following a hazard event. The HMPC will meet annually to review progress on plan implementation and will provide annual evaluation reports for each participating agency. The HMPC will also submit a five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be fully approved and adopted in mid- 2016, the next formal plan update for the Modoc County Planning Area will occur in 2021.

7.2.2. Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. All mitigation actions will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the HMPC deems appropriate and necessary, and as approved by the appropriate governing boards or councils of the other participating jurisdictions. In keeping with the five-year update process, the HMPC will convene public meetings to solicit public input on the plan and its routine maintenance and the final product will be adopted by the governing boards or councils.

Annual Plan Review Process

For the 2016 hazard mitigation plan update review process, the Modoc County OES will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the plan. The review of the Hazard Mitigation Plan will normally occur on an annual basis each year and will be conducted by the HMPC as follows:

- The Modoc County OES will place an advertisement in the local newspaper advising the public of the date, time, and place for each annual review of the plan and will be responsible for leading the meeting to review the plan.
- Notices will be mailed to the members of the HMPC, federal, state, and local agencies, non-profit groups, local planning agencies, representatives of business interests, neighboring communities, and others advising them of the date, time, and place for the review.
- County/City/District officials will be noticed by email and telephone or personal visit and urged to participate.
- Members of the Communities' Planning Commission and other appointed commissions and groups will also be noticed by email and either by telephone or personal visit.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- The local news media will be contacted and a copy of the current plan will be available for public comment at Modoc County and the City of Alturas.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the HMPC and forwarded to the news media (public) and other interested stakeholders. The report will also be presented to the County and City governing boards for review, and a request will be made that the Board take action to recognize and adopt any changes resulting from the review.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan. More specifically, the annual reviews will include the following information:

- Community growth or change in the past year.
- The number of substantially damaged or substantially improved structures by flood zone
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether or not the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services
- The dates of hazard events descriptions
- Documented damages due to the event
- Closures of places of employment or schools and the number of days closed
- Road or bridge closures due to the hazard and the length of time closed
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Hazard Mitigation Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other county and city plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in Section 7.1 of this plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The point is re-emphasized here. As described in this plan's capability assessment, the County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- County and City general and master plans
- County and City Emergency Operations Plans
- County and City ordinances
- Community Wildfire Protection Plans
- Flood/stormwater management/master plans
- Capital improvement plans and budgets
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc, as appropriate. As described in Section 7.1, incorporation into existing planning mechanisms will be done through the routine actions of:

- monitoring other planning/program agendas;
- attending other planning/program meetings;
- participating in other planning processes; and
- monitoring community budget meetings for other community program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community. Examples of incorporation of the Local Hazard Mitigation Plan into existing planning mechanisms include:

1. As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan(s). Evidence of such adoption (by formal, certified resolution) shall be provided to CAL OES and FEMA.
2. Integration of flood actions identified in this mitigation strategy with the actions and implementation priorities established in existing Watershed and Stormwater Drainage Plans.
3. Integration of wildfire actions identified in this mitigation strategy with the actions and implementation priorities established in existing Community Wildfire Protection Plans.
4. Using the risk assessment information to update the hazard analysis and other data, such as Critical Facility locations, in the Modoc County and City of Alturas Emergency Operations Plans.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

7.2.4. Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stores from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Annual Reviews

The public will be noticed by placing an advertisement in local media and social media specifying the date and time for the review and inviting public participation. The HMPC, local, state, and regional agencies will be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the HMPC will be responsible for coordinating the activities necessary to involve the greater public. The HMPC will develop a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public meetings will be held and public comments will be solicited on the plan update draft.

Annex A City of Alturas

A.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Alturas, a participating jurisdiction to the Modoc County Local Hazard Mitigation Plan (LHMP). This annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the City. This annex provides additional information specific to the City of Alturas, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

A.2 Planning Process

As described above, the City of Alturas followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the Modoc County Hazard Mitigation Planning Committee (HMPC), the City formulated their own internal planning team (City Planning Team) to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table A-1. Additional details on plan participation and City representatives are included in Appendix A.

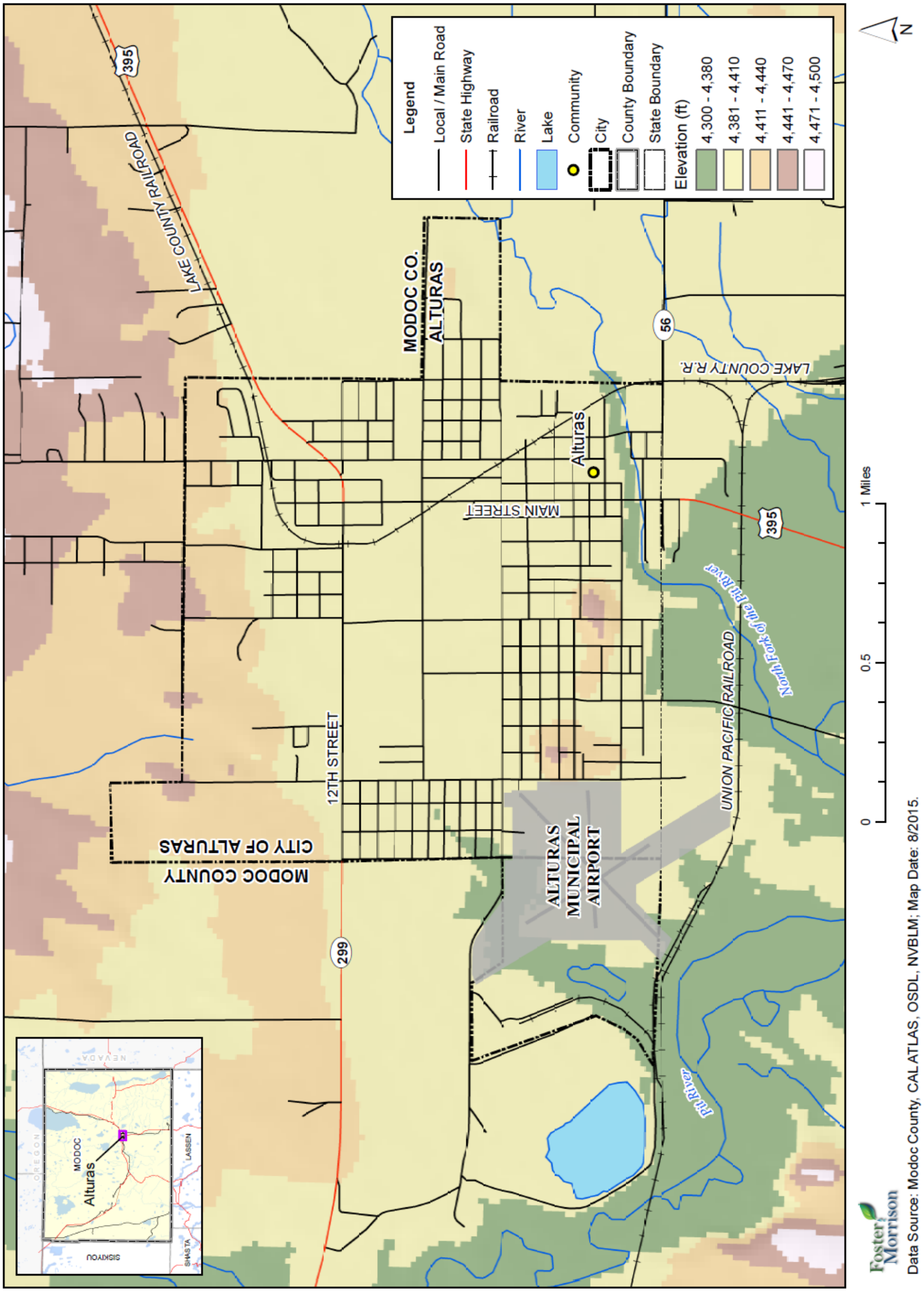
Table A-1 City of Auburn Planning Team

Name	Position/Title	How Participated
Joe Picotte	Director of Public Works	Attended meetings. Provided hazard data. Reviewed drafts. Provided mapping info.
John Wellenmeyer	Fire Department	Attended meetings. Provided hazard data. Reviewed drafts.
Paula Jessup	Airport Manager	Compiled and provided hazard data. Attended meetings
Bobbie Jean Kemper	Administrative Assistant	Compiled and provided hazard data.

A.3 Community Profile

The community profile for the City of Alturas is detailed in the following sections. Figure A-1 displays a map and the location of the City of Alturas within Modoc County.

Figure A-1 City of Alturas Base Map



A.3.1. Geography and Location

The City of Alturas is located near the northeast corner of California, approximately 39 miles south of the Oregon border, 43 miles west of the Nevada border, and 305 miles northeast of Sacramento, California. The City covers an area of approximately 24 square miles, and is located on the Modoc Plateau at an elevation of approximately 4,300 feet. Alturas straddles the North Fork of the Pit River, near its confluence with the South Fork in the north end of South Fork Valley, in the extreme northeastern corner of California. The tall Warner Mountains lie to the east, the wetlands and wild rice fields of South Fork Valley to the south, and the extensive Modoc Plateau to the north.

The City of Alturas is serviced by U.S. Highway 395 from the north and south and State Highway 299 from the west and east. The Southern Pacific Railroad runs north-south and west through the City. The City has a municipal airport serving general aviation traffic.

A.3.2. History

The City of Alturas has been the County seat of Modoc County since its incorporation in 1874. Alturas now occupies what was initially an Achumawi (Pit River) village known as Kosealekte. The City was initially known as Dorris Bridge (or Dorris' Bridge), named after Pressley and James Dorris, who built a bridge across the Pit River at this location.

The Dorris Bridge post office opened in 1871, renamed Dorrisville in 1874, and in 1876, was renamed Alturas, which is Spanish for "heights". The census of 1880 showed a population of 148. However, settlement continued over the next two decades, until the City was officially incorporated on September 16, 1901; the County's only incorporated city. Because of its central location, Dorrisville became the county seat when Modoc County formed in 1874, even though both Adin and Cedarville were then larger towns. Modoc County has always been an agriculture area but during 1940-70 Alturas also had a number of lumber mills and associated logging businesses which no longer exist.

A.3.3. Economy

The City of Alturas serves as the government and commercial center for the surrounding area. The primary economic activities in the area are agriculture, including livestock, hay and grain, and vegetable crops; outdoor recreation such as hunting and fishing.

Alturas is the headquarters to the Modoc National Forest, the Alturas Field Office of the Bureau of Land Management, the Modoc National Wildlife Refuge and other recreation areas, and is the trade center for the agricultural region, which produces beef, sheep, potatoes, alfalfa and lumber. Despite its abundance of wilderness, recreational opportunities, hunting and fishing resources, and natural beauty, tourism is not a major sector of the local economy - largely due to the City's remote location. Local, state, federal, and tribal governments are the largest employers in Alturas.

US Census estimates show economic characteristics for the City of Alturas. These are shown in Table A-2.

Table A-2 City of Alturas Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	357	12.1%
Construction	223	7.5%
Manufacturing	287	9.7%
Wholesale trade	83	2.8%
Retail trade	446	15.1%
Transportation and warehousing, and utilities	169	5.7%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	127	4.3%
Professional, scientific, and management, and administrative and waste management services	245	8.3%
Educational services, and health care and social assistance	517	17.5%
Arts, entertainment, and recreation, and accommodation and food services	172	5.8%
Other services, except public administration	270	9.1%
Public administration	58	2.0%

Source: US Census Bureau American Community Survey 2009-2013 Estimates

A.3.4. Population

The California Department of Finance estimated the population of the City of Alturas to be 2,668 in January of 2014.

A.4 Hazard Identification and Summary

This section details how the risk varies across the Modoc County planning area. The City's planning team identified the hazards that affect the City and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to Alturas (see Table A-3). In the context of the plan's planning area, there are no hazards that are unique to Alturas.

Information on past occurrences and the likelihood of future occurrences is detailed in Section 4, Risk Assessment, of the base plan. Additional information for high and medium significant hazards for the City is included in the Vulnerability Assessment section of this Annex.

Table A-3 City of Alturas Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agriculture Hazards	Limited	Highly Likely	Negligible	Low
Avalanche	Limited	Unlikely	Negligible	Low
Dam Failure	Significant	Unlikely	Critical	High
Drought and Water Shortage	Extensive	Highly Likely	Catastrophic	High
Earthquake	Extensive	Unlikely	Limited	Low
Erosion	Limited	Highly Likely	Limited	Medium
Flood: 100/500 year	Significant	Occasional	Critical	High
Flood: Localized Stormwater Flooding	Extensive	Highly Likely	Limited	Medium
Landslide, Mudslides and Debris Flows	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Occasional	Limited	Medium
Severe Weather: Extreme Cold, Freeze, Winter Weather	Extensive	Highly Likely	Catastrophic	High
Severe Weather: Extreme Heat	Extensive	Highly Likely	Negligible	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: High Winds/Tornadoes	Extensive	Highly Likely	Limited	Medium
Volcano	Extensive	Unlikely	Limited	Low
Wildfire	Extensive	Highly Likely	Catastrophic	High
Hazardous Materials Transport	Extensive	Occasional	Catastrophic	High

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

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

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

A.5 Vulnerability Assessment

The intent of this section is to assess Alturas's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 4.3 Vulnerability Assessment of the base plan. This vulnerability assessment includes hazard profile information specific to Alturas and provides an inventory of the population, property, and other assets located within the City and further analyzes those assets at risk to identified hazards ranked of medium or high significance (as listed in Table A-3) to the community. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

A.5.1. Total Assets at Risk

This section identifies Alturas's total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Modoc County Assessor's Office is based on the 2014 Assessor's data. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table A-4 shows the Assessor's values (e.g., the values at risk) broken down by property type for the City of Alturas.

Table A-4 City of Alturas Total Exposure

Property Type	Total Parcel Count	Improved Parcel Count	Improved Value	Total Land Value	Total Value
Agricultural	1	$2,647	0	$0	$2,647
Commercial	234	$7,967,164	170	$27,884,681	$35,851,845
Exempt	150	$0	0	$0	$0
Industrial	6	$90,765	1	$34,854	$125,619
Institutional	19	$264,500	15	$3,953,511	$4,218,011
Recreational	1	$7,187	1	$71,629	$78,816
Residential	1,519	$13,826,023	1,153	$79,702,214	$93,528,237
Total	**1,930**	**$22,158,286**	**1,340**	**$111,646,889**	**$133,805,175**

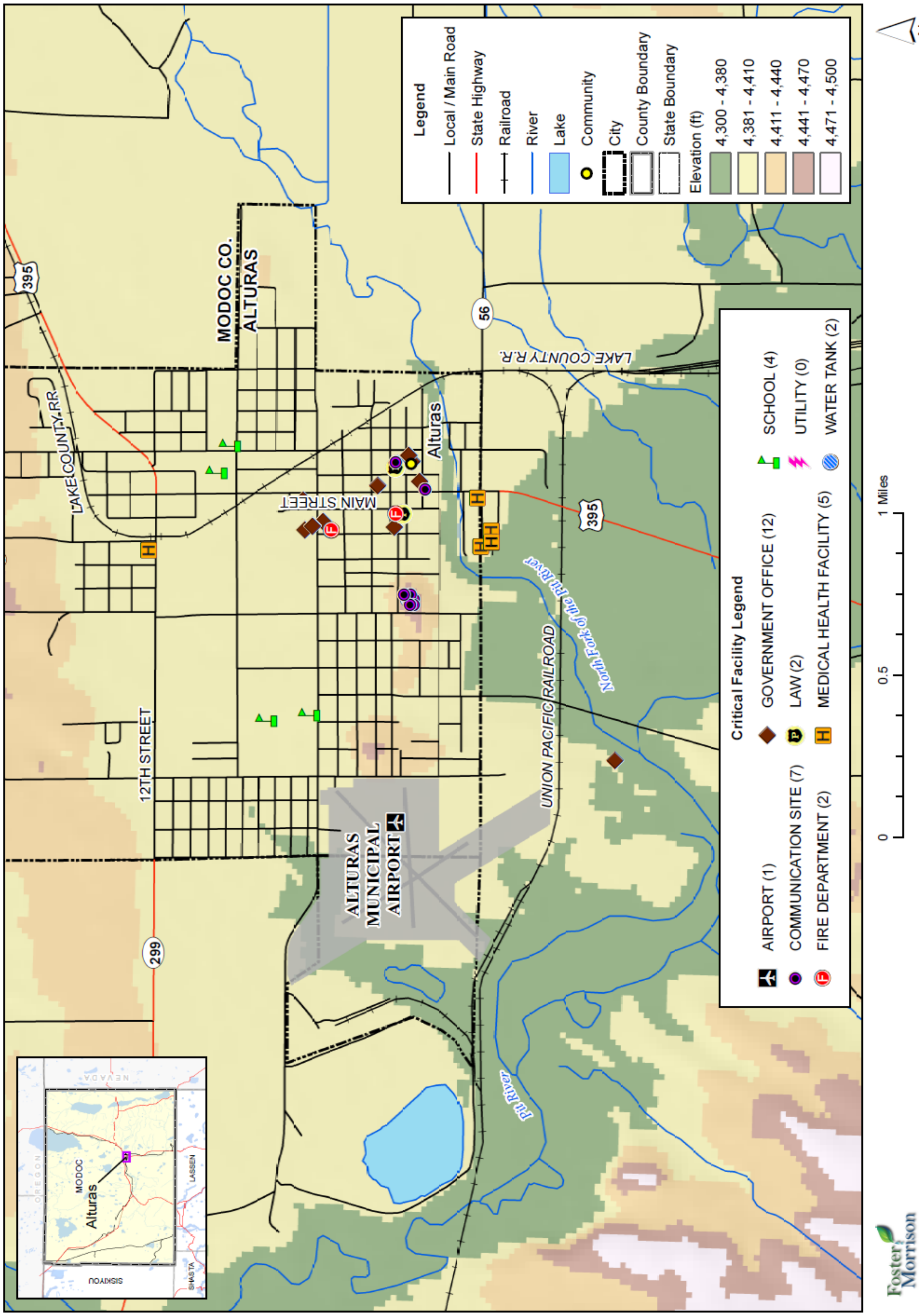
Source: Modoc County 2014 Assessor's Data

Critical Facilities and Infrastructure

For purposes of this LHMP, Modoc County is using a FEMA Category IV Critical Facility definition for mapping and analysis purposes. Category IV Critical Facilities include: essential facilities such as hospitals, fire and police stations, rescue and other emergency service facilities, power stations, water supply facilities, aviation facilities, and other buildings critical for the delivery of vital services and for the protection of the community.

An inventory of critical facilities in the City of Alturas from Modoc County GIS is provided in Table A-5 and shown on Figure A-2. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure A-2 City of Alturas – Critical Facility Inventory



Data Source: Modoc County, CAL ATLAS, OSDL, NVBLM; Map Date: 8/2015.

Table A-5 City of Alturas – Critical Facility Inventory

Category	Type	Facility Count
Category IV Critical Facilities	Airport	1
	Communication Site	7
	Fire Department	2
	Government Office	11
	Law	2
	Medical Health Facility	3
	School	4
	Water Tank	2
	Total City of Alturas	**32**

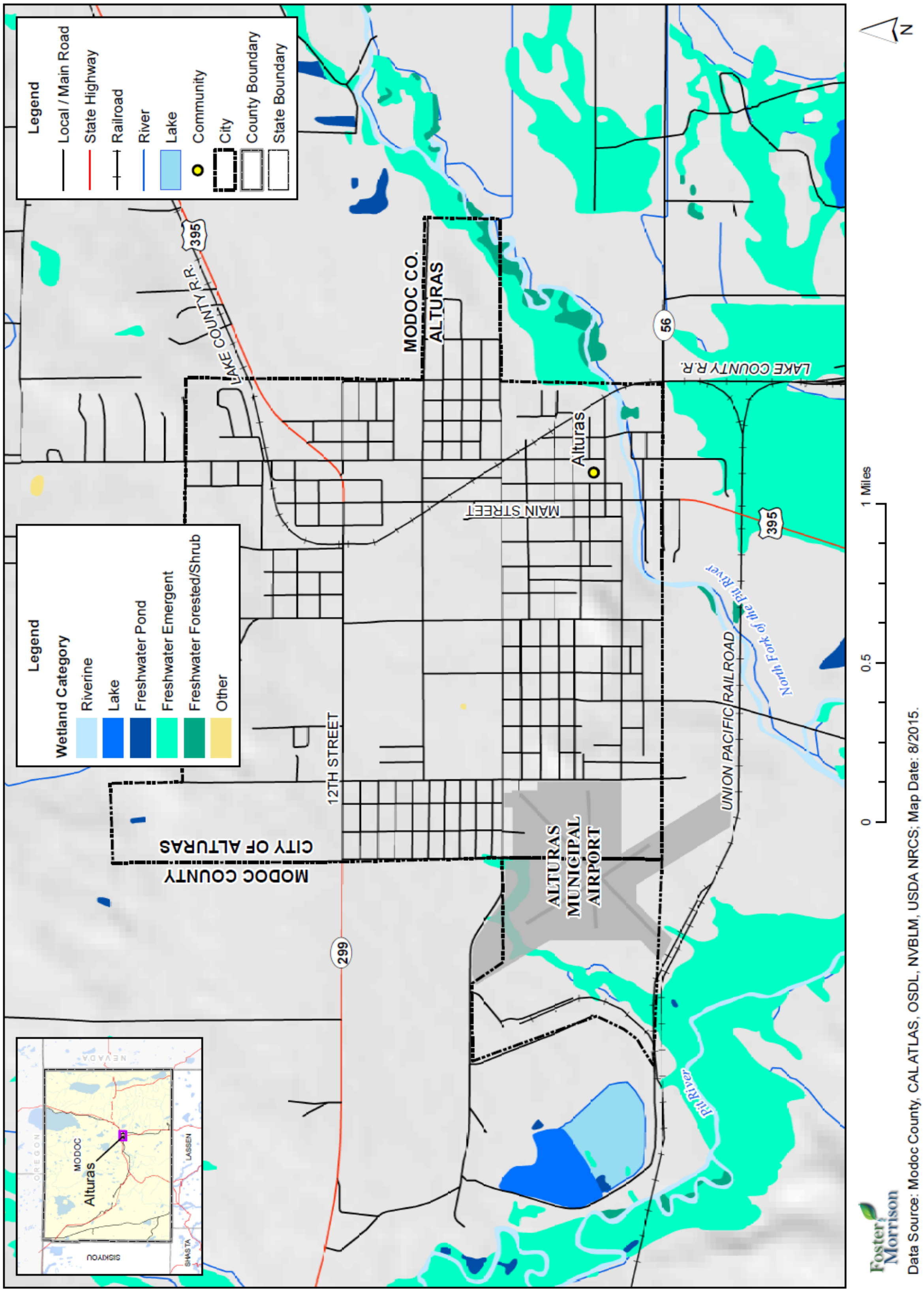
Source: Modoc County GIS

Natural Resources

Alturas is surrounded by the Modoc National Forest, abundant wildlife, open space, clean air, and a natural river and lake. All of its water comes from area wells and there is geothermal energy available underground. The extensive natural environment provides abundant opportunities for outdoor activities such as fishing and hunting as well as motor sports.

There are wetlands located in and through the City. These locations have been mapped and are shown on Figure A-3.

Figure A-3 City of Alturas – Wetlands Map



Historic and Cultural Resources

The City of Alturas has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the City Planning Team collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements. The criteria can be found in Section 4.3.1 of the base plan

Historical resources in the City included in the programs above are identified in Table A-6.

Table A-6 Modoc County – OHP Historical Resources

Name/Landmark Plaque Number	National Register	State Landmark	California Register	Point of Interest	Date Listed	Town
Adin Supply Company (N1972)	X				2/7/1997	Adin (Modoc)
Alturas Passenger Station (P320)				X	1/10/1974	Alturas (MOD)
Chimney Rock (109)		X			3/29/1933	Alturas (Modoc)
First Jail & Office Of First Auditor & Recorder Of Modoc (P182)				X	9/24/1970	Alturas (MOD)
Madigan Memorial (P368)				X	1/17/1975	Alturas (MOD)
Modoc County Courthouse (P708)				X	11/22/1988	Alturas (MOD)
NCO Railway Depot (N1349)	X				2/28/1985	Alturas (Modoc)
Nevada-California-Oregon Railway Co. General Office Building (N299)	X				9/6/1974	Alturas (Modoc)
Sacred Heart Catholic Church (N1194)	X				6/30/1983	Alturas (Modoc)

Source: California Office of Historic Preservation

It should be noted that as defined by the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Growth and Development Trends

Past Growth

About two-thirds of the land area in Alturas is zoned for residential uses. Of this, about 27 percent is zoned for single family residential, 67 percent is zoned medium density residential, and the remaining 6 percent is zoned high density residential. Existing (non-vacant) land use is about half residential, with over 95 percent devoted to single family units, about four percent to multi-family units, and less than one percent to duplexes.

In 1980, 3,025 persons lived in Alturas in 1,302 housing units. By 1985, according to the State Department of Finance, there were 3,262 people living in the city's 1,470 units. Although population was projected to grow by about 1.5 percent per year, the DOF's current population figures indicate a negative growth rate. As of January 1, 2012, the City's population was estimated at 2,774 persons. Given these population statistics, there continues to be more than enough vacant residentially-zoned land to accommodate residential growth in the City.

Special Populations

There are a large number of disabled individuals and senior citizens in the City without support of family or friends. Also, the level of poverty is such in Alturas that many cannot afford to prepare ahead of time for an emergency.

Future Development

The City of Alturas has been experiencing a slight decrease in population. Lack of jobs and the need to be closer to better medical care are two of the largest reasons triggering a move.

The City has delineated areas of the City where development is approved or expected to occur. The City provided locations, which were georeferenced by Foster Morrison staff for purposes of analysis. A hospital, wastewater treatment plant, and millsite airport expansion are expected to be placed in the locations shown on Figure A-4. Total parcel counts for these areas is shown on Table A-7.

Figure A-4 City of Alturas – Future Development Zones

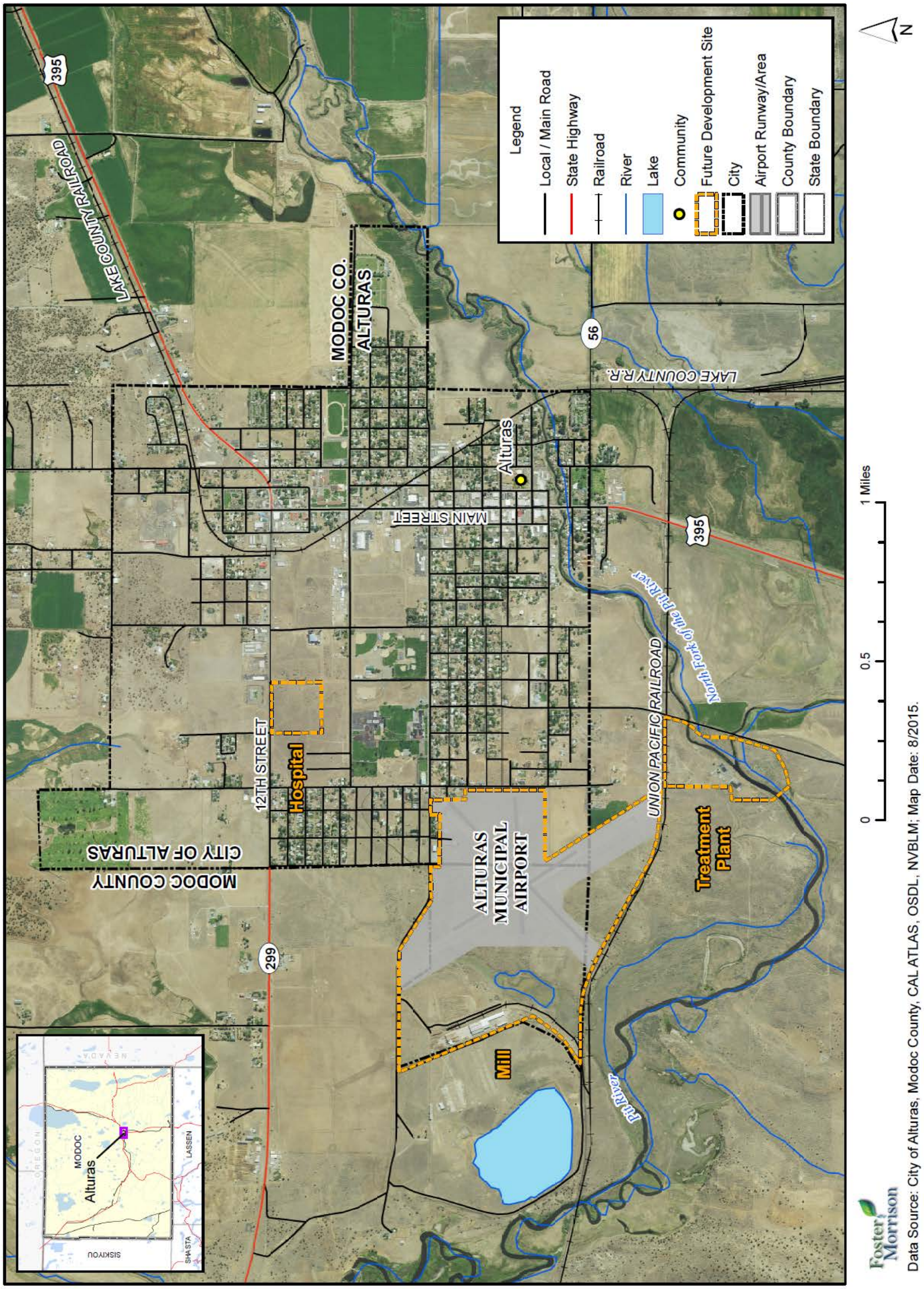


Table A-7 City of Alturas – Future Development Locations

Location	City of Alturas Parcels	Unincorporated Modoc County Parcels	Total Parcel Count	Total Acres
Hospital Site	3	0	3	16
Mill Site and Airport Combined	9	12	21	294
Wastewater Treatment Plant Site	0	6	6	42
City of Alturas Total	**12**	**18**	**30**	**351**

Source: City of Alturas

A.5.2. Priority Hazards: Vulnerability Assessment

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table A-3 as high or medium significance hazards. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the base plan for more detailed information about these hazards and their impacts on the Modoc County planning area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the base plan. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

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

Dam Failure

Vulnerability to Dam Failure

Likelihood of Future Occurrence—Unlikely
Vulnerability—High

According to data provided by Modoc County and Cal OES, there are 83 dams in Modoc County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 84 dams, 6 are rated as High Hazard, 11 as Significant Hazard, and 30 as Low Hazard. 37 dams in the County are not rated by the Division of Safety of Dams.

There are several dams, which, if they fail, may impact the people and resources of the City of Alturas. Failure of any one of these dams could flood downstream areas and could cause loss of life and property

Dams of concern include:

- Big Sage Dam – a failure could take out the west side of the City of Alturas and possibly the community of Canby.

A complete breach of Dorris Reservoir presents a definite risk to ranches and businesses downstream of the dam, as well as areas within the City of Alturas. The City of Alturas lies within the 100 year flood zone and such an occurrence would necessitate evacuations.

The City Planning Team noted that the valley between Likely and Alturas has been covered in water at different times in the last fifty years from severe storms and dam breaching. Previous mitigation projects have widened the capacity of the rivers to prevent this flooding. Major events occurred in 1962 (the Columbus Day Storm) and again in 1964 and 1978.

Future Development

Development is expected to continue to occur in the City. While future development may place more structures in the dam inundation areas, due to the unlikely probability of dam failure, development will be allowed in these areas.

Drought and Water Shortage

Vulnerability to Drought and Water Shortage

Likelihood of Future Occurrence—Highly Likely
Vulnerability—High

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

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

The most significant qualitative impacts associated with drought in the planning area are those related to water intensive activities such as wildfire suppression and protection, municipal usage, commerce, tourism, and recreation. Voluntary conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

Future Development

As the population in the area continues to grow, so will the demand for water. Water shortages in the future may be worsened by drought, as the City relies on wells for its water source. Increased planning will be needed to account for population growth and increased water demands.

Erosion

Vulnerability to Erosion

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

According to the CGS, erosion is a two-step process by which soils and rocks are broken down or fragmented and then transported. Aside from natural causes of erosion, including flooding and fire, human activities such as mining, logging, farming, and cattle ranching can also facilitate erosion.

During January 1995, a significant storm event was experienced in the area. No flooding occurred; however, there was some channel erosion, sediment deposition, and slope protection damage in the project area. As a result, the USACE performed a rehabilitation project under Public Law 84-99, which included sediment removal and the repair of eroded areas and slope protection. This work was completed in 1996 (USACE, August 1995 and USACE, July 1996).

Future Development

Erosion is expected to continue in the future, but is not expected to limit future development in the City. During the permitting process, the City requires developers to take erosion into account during project development. The City and County continue to work to maintain stream channels and the levees to reduce future erosion.

Flood: 100/500 year

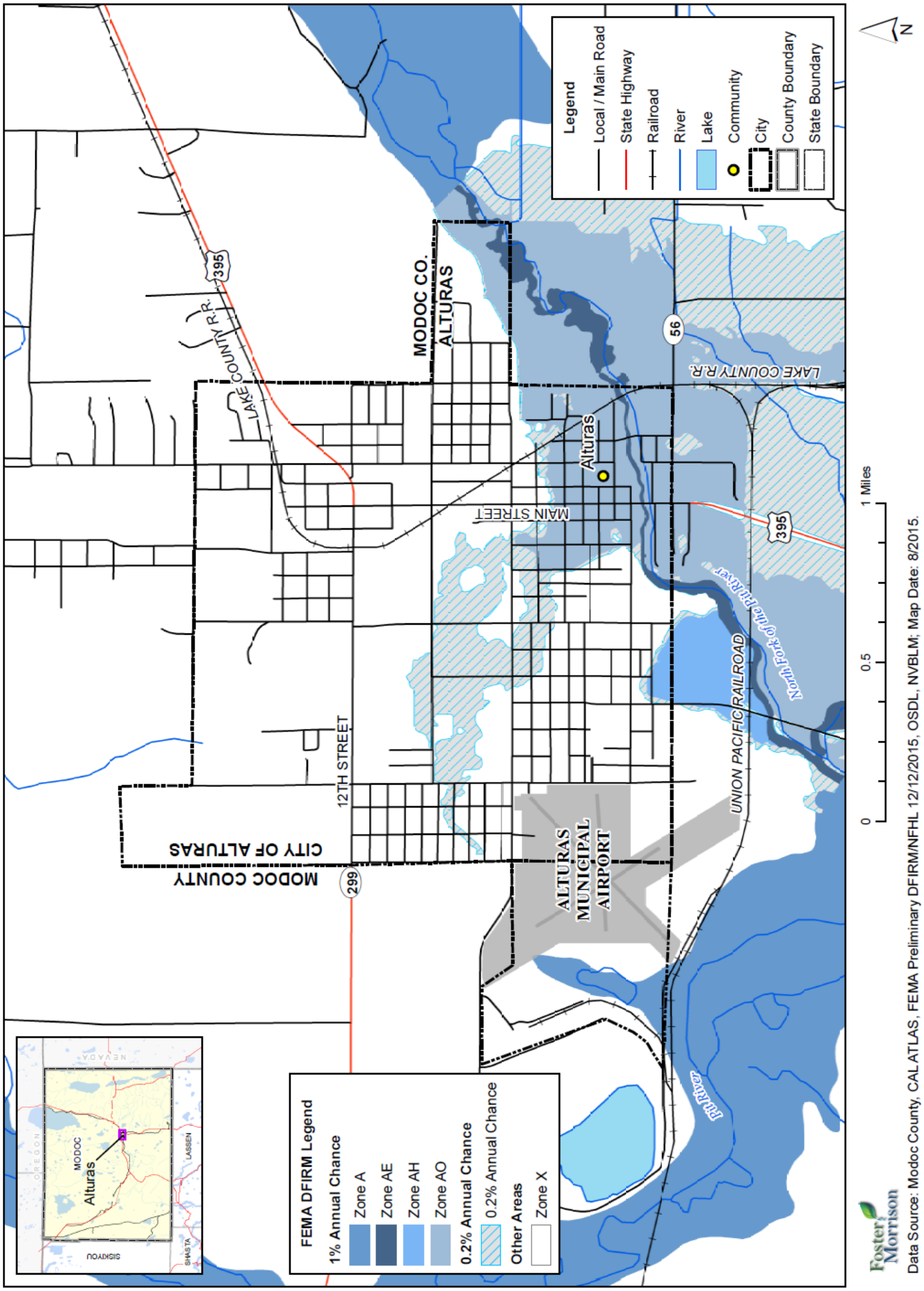
Vulnerability to Flood: 100/500 year

Likelihood of Future Occurrence—Occasional
Vulnerability—High

The City of Alturas has properties in both the 1% and 0.2% annual chance FEMA flood zones. There have been no major floods in the City since the levees were constructed in 1973. These levees on the Pitt River have since been decertified, placing additional properties into FEMA flood zones. The decertification occurred during as part of the DFIRM mapping process in 2010. During the 2013 (preliminary maps finalized in 2015) DFIRM update process, more properties were added to the floodplain (see Section 4.3.8 of the base plan for a map showing changes to the FEMA flood zones). 89 properties were mapped into the FEMA 1% annual chance floodplain in 2013. Of those 89 properties, approximately 30 of them are commercial properties. The remaining 59 properties are residential. The City planning team noted that this remapping has had a large impact on a small community, with varying levels of impacts. Houses have been abandoned, causing reductions to the property tax base of the City. Other homes are going unsold due to people not being able to afford the additional costs of flood insurance.

A map of the current FEMA flood zones for the City is shown in Figure A-5.

Figure A-5 City of Alturas DFIRM Flood Zones



Assets at Risk

GIS was used to determine the possible impacts of flooding within the City of Alturas. The methodology described in Section 4.3.6 of the base plan was followed in determining structures and values at risk to the 1% annual chance flood event. Table A-8 and Table A-9 contain information for incorporated City of Alturas only. Table A-8 shows the number of improved parcels and associated structure and contents values at risk to the each of the FEMA flood zones (defined in Section 4.3.8 of the base plan) by property use type using the DFIRM data in the unincorporated areas and Table A-9 shows potential losses summarized by FEMA flood zone with loss estimates and loss ratios. Methodology for the loss ratios was shown in Section 4.3.8 of the base plan.

Table A-8 City of Alturas – Count and Improved Value by Property Use and Detailed Flood Zone

FEMA Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Value	Total Value
Zone AH	Agricultural	0	0	$0	$0	$0
	Commercial	0	0	$0	$0	$0
	Exempt	1	0	$0	$0	$0
	Industrial	0	0	$0	$0	$0
	Institutional	0	0	$0	$0	$0
	Recreational	0	0	$0	$0	$0
	Residential	10	4	$75,081	$174,501	$249,582
	Total	**11**	**4**	**$75,081**	**$174,501**	**$249,582**
Zone AO	Agricultural	1	0	$2,647	$0	$2,647
	Commercial	74	58	$1,720,433	$5,754,024	$7,474,457
	Exempt	31	0	$0	$0	$0
	Industrial	0	0	$0	$0	$0
	Institutional	2	2	$14,076	$303,138	$317,214
	Recreational	0	0	$0	$0	$0
	Residential	219	176	$1,711,659	$11,126,409	$12,838,068
	Total	**327**	**236**	**$3,448,815**	**$17,183,571**	**$20,632,386**
0.2% Annual Chance (Shaded X)	Agricultural	0	0	$0	$0	$0
	Commercial	9	6	$244,356	$675,107	$919,463
	Exempt	14	0	$0	$0	$0
	Industrial	0	0	$0	$0	$0
	Institutional	2	2	$24,197	$461,705	$485,902
	Recreational	0	0	$0	$0	$0
	Residential	113	95	$773,688	$5,047,034	$5,820,722

FEMA Zone	Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Value	Total Value
	Total	**138**	**103**	**$1,042,241**	**$6,183,846**	**$7,226,087**
Zone X	Agricultural	0	0	$0	$0	$0
	Commercial	151	106	$6,002,375	$21,455,550	$27,457,925
	Exempt	104	0	$0	$0	$0
	Industrial	6	1	$90,765	$34,854	$125,619
	Institutional	15	11	$226,227	$3,188,668	$3,414,895
	Recreational	1	1	$7,187	$71,629	$78,816
	Residential	1,177	878	$11,265,595	$63,354,270	$74,619,865
	Total	**1,454**	**997**	**$17,592,149**	**$88,104,971**	**$105,697,120**
Grand Total		**1,930**	**1,340**	**$22,158,286**	**$111,646,889**	**$133,805,175**

Source: FEMA Preliminary DFIRM 2013, Modoc County Assessor's 2014 Data

Table A-9 City of Alturas – Flood Loss Estimates

FEMA Zone	Improved Parcel Count	Improved Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
0.2% Annual Chance	103	$6,183,846	$3,660,329	$9,844,175	$1,968,835	1.5%
1% Annual Chance	331	$17,358,072	$11,707,617	$29,065,689	$5,813,138	4.3%
Total	**434**	**$23,541,918**	**$15,367,946**	**$38,909,864**	**$7,781,973**	**5.8%**

Source: FEMA Preliminary DFIRM 2013, Modoc County Assessor's 2014 Data

According to Table A-8 and Table A-9, the City of Alturas has 331 improved parcels and $9,274,534 of structure and contents value in the 1% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described, there is a 1% chance in any given year of a flood event causing roughly $1,968,835 in damage in the City of Alturas. A loss ratio of 5.8% indicates that losses in Alturas to flood would be somewhat major. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The City should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance floodplain, unless development is elevated in accordance with the local floodplain management ordinance.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.6 of the base plan, was used for the City of Alturas as well as for the County as a whole. Table A-10 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the

City. Much of the acreage of the City that is potentially flooded by the 1% annual chance flood is improved land.

Table A-10 City of Alturas – Flooded Acres

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
AH	Agricultural	0.00	0.00	0.00%
AH	Commercial	0.00	0.00	0.00%
AH	Exempt	0.16	0.00	0.00%
AH	Industrial	0.00	0.00	0.00%
AH	Institutional	0.00	0.00	0.00%
AH	Recreational	0.00	0.00	0.00%
AH	Residential	3.04	1.16	38.32%
Total AH		**3.2**	**1.16**	**36.25%**
AO	Agricultural	0.50	0.00	0.00%
AO	Commercial	12.52	10.59	84.61%
AO	Exempt	11.11	0.00	0.00%
AO	Industrial	0.00	0.00	0.00%
AO	Institutional	1.78	1.78	100.00%
AO	Recreational	0.00	0.00	0.00%!
AO	Residential	48.61	40.13	82.56%
Total AO		**74.52**	**52.5**	**67.55%**
Total 1%	**---**	**77.72**	**53.66**	**69.04%**
0.2% Chance	Agricultural	0.00	0.00	0.00%
0.2% Chance	Commercial	3.01	2.14	70.96%
0.2% Chance	Exempt	47.87	0.00	0.00%
0.2% Chance	Industrial	0.00	0.00	0.00%
0.2% Chance	Institutional	2.73	2.73	100.00%
0.2% Chance	Recreational	0.00	0.00	0.00%!
0.2% Chance	Residential	21.20	17.26	81.40%
Total 0.2%	**---**	**74.82**	**22.13**	**29.58%**

Source: FEMA Preliminary DFIRM 2013, Modoc County Assessor's 2014 Data

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for

Alturas. According to this analysis, there is a total population of 625 residents of the City at risk to flooding. This is shown in Table A-11.

Table A-11 City of Alturas – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
AH	4	9
AO	176	400
Total 1% Annual Chance	**180**	**409**
0.2% Annual Chance	95	216
Grand Total	**275**	**625**

Source: FEMA Preliminary DFIRM 2013, Modoc County Assessor's 2014 Data, US Census Bureau
* Average household populations from the 2010 US Census were used: Alturas – 2.27.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Modoc County and Alturas. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects Details of critical facilities in the floodplain in the City of Alturas are shown in Figure A-6 and Table A-12. As shown on the table and figure, Alturas has 15 critical facilities located in 1% annual chance and 3 critical facilities in the 0.2% annual chance DFIRM flood zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure A-6 City of Alturas – Critical Facilities and Flood Zones

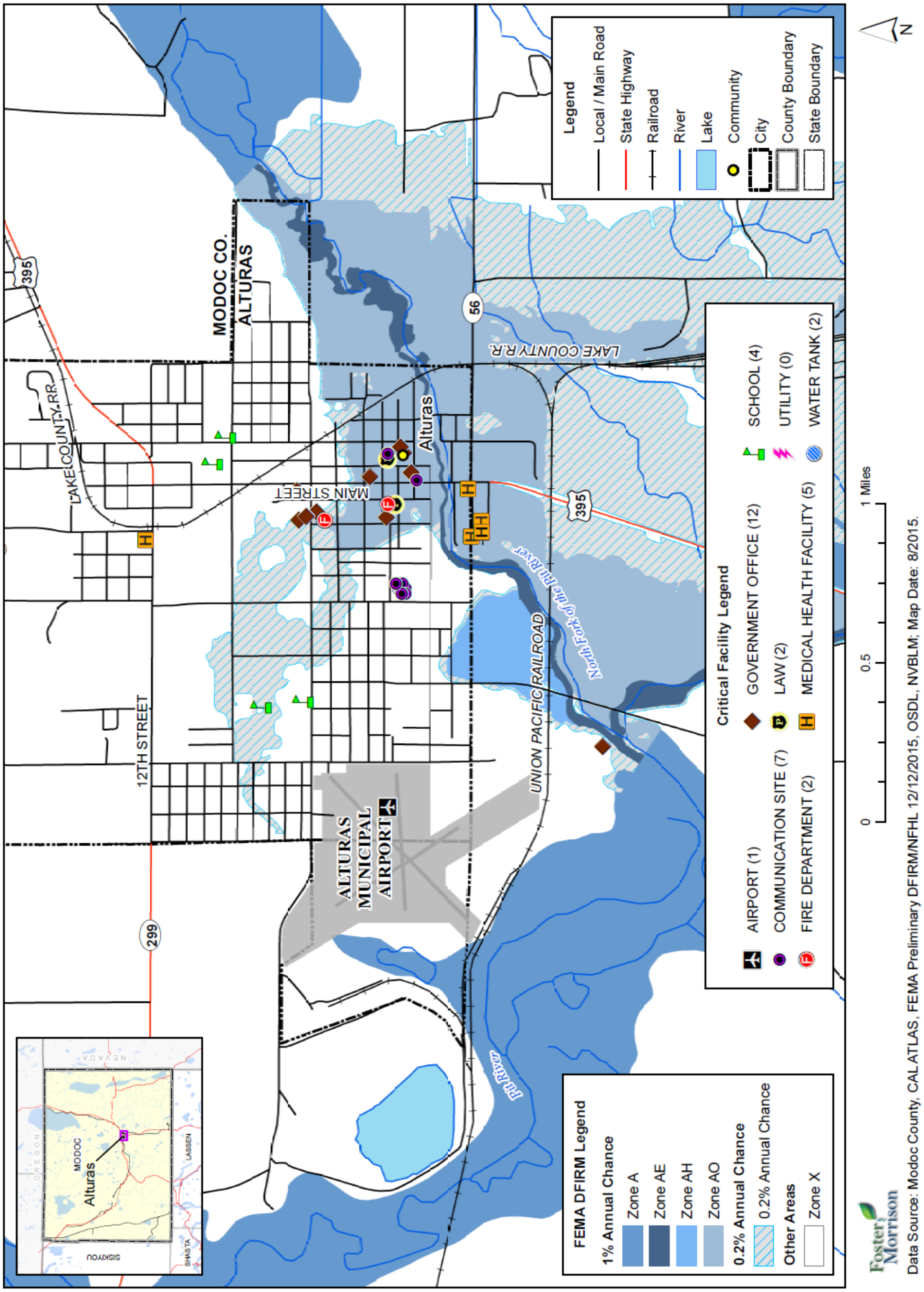


Table A-12 City of Alturas – Critical Facilities and Flood Zones

Flood	Category	Type	Facility Count
1% Annual Chance (Zone AO)	Category IV Critical Facilities	Communication Site	2
		Fire Department	2
		Government Office	7
		Law	2
		Medical Health Facility	2
		Total 1% Annual Chance	**15**
0.2% Annual Chance	Category IV Critical Facilities	Government Office	2
		School	1
		Total 0.2% Annual Chance	**3**
Total Flood - City of Alturas			**18**

Source: FEMA Preliminary DFIRM 2013, Modoc County GIS

Insurance Coverage, Claims Paid, and Repetitive Loss

The City of Alturas joined the National Flood Insurance Program (NFIP) on September 24, 1984. The City does not participate in the CRS program. NFIP data indicates that as of September 15, 2014, there were 64 flood insurance policies in force in the City with $13,422,000 of coverage. There have been no historical claims for flood losses. NFIP data further indicates that there are 0 repetitive loss (RL) and 0 severe repetitive loss buildings in the City. More information can be found on Table A-27 in Section A.7.2.

Future Development

A separate analysis was performed on the future development areas identified by the City of Alturas. GIS was used to determine whether the proposed locations intersect a DFIRM flood hazard areas, and if so, which zone it intersects. Details of future development in the floodplain in the City of Alturas are shown in Figure A-7and Table A-13. As shown on the table and figure, portions of the mill site falls in the 1% annual chance flood zone. The wastewater treatment plant will be located in 1% and 0.2% annual chance flood zones.

Figure A-7 City of Alturas – Future Development by Flood Zone

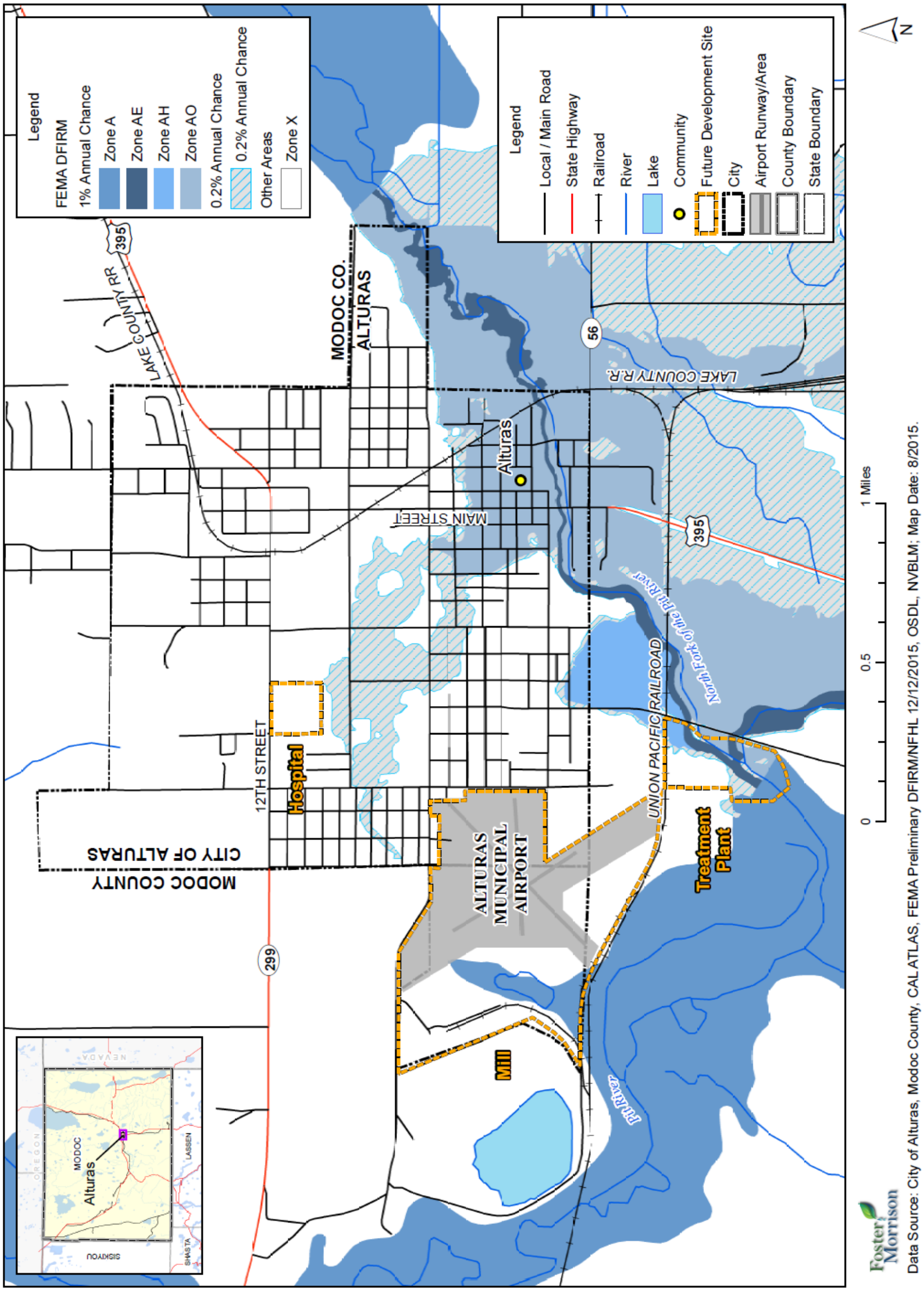


Table A-13 City of Alturas – Future Development by Flood Zone

Future Development Site	Approximate # of Parcels	Acres	Flood Zone
Hospital Site	3	16	X
Mill Site and Airport Combined	25	294	A, X
Wastewater Treatment Plant Site	8	42	A, AE, AH, AO, X, 0.2% Annual Chance Flood Hazard
Total	**36**	**351**	

Source: FEMA Preliminary DFIRM 2013, Modoc County GIS

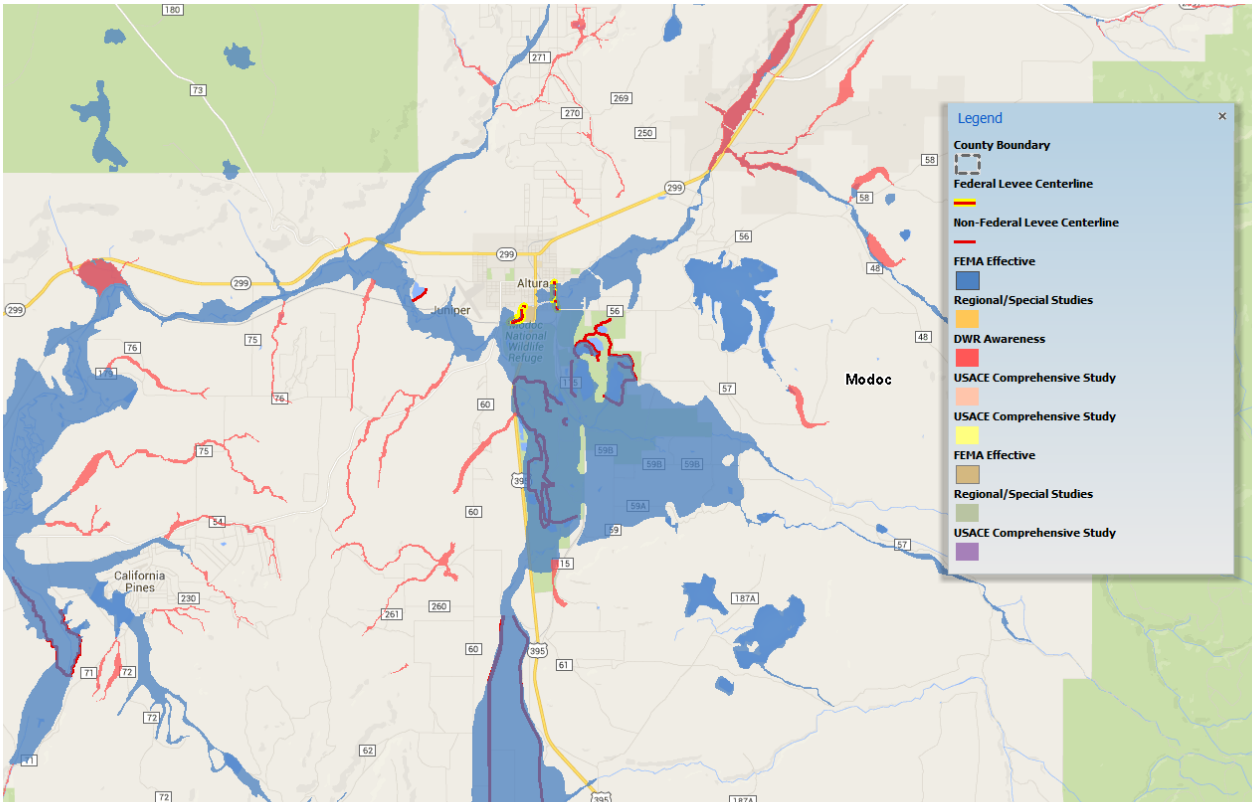
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Modoc County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas, as well as for flood awareness areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. With respect to the BAM maps for Modoc County and the City of Alturas, on the FEMA effective and DWR Awareness maps have been identified. The BAM maps for the City are shown in Figure A-8.

Figure A-8 City of Alturas Best Available Maps



Source: California Department of Water Resources

Flood: Localized Stormwater Flooding

Vulnerability to Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Localized flooding occurs at various times throughout the year and there are several areas of concern unique to the City. Historically, the City has been at risk of flooding primarily during the spring months when the waterway/creek systems swell with heavy rainfall. This may produce local street flooding due to high water in the waterway/creek systems causing outfalls to back-up into the drainage inlets. Areas at risk are shown on Table A-14.

Stormwater has the extreme ability to cause flooding throughout the City. After heavy rains, storm drains must be cleared of accumulated debris so that they can function adequately. Public Works crews will complete this task throughout the day Monday thru Friday. If for some reason there is one area that needs clearing outside of normal hours, the Public Works on call person can be requested by the Sherriff's Office to remove debris build up from drains causing localized flooding. However, if flooding is City-wide, the Sherriff's Office would contact the Public Works director who would then activate all of the Public Works crew for flood control. The Pit River runs through the edge of the City. During times of extreme rains or winter runoff exceeding the capacity of the levee banks, structures in the City can be flooded. Also, due to the natural slope of the land within the City, some areas will experience a higher likelihood of flooding.

Table A-14 City of Alturas – Localized Flooding Areas

Road Name	Flooding	Pavement Deterioration	Washouts	Erosion
Court Street (McDowell to 2nd/3rd Street)	X	X	X	
East 16th Street (Brooks Park)				X
East 1st Street (Rhine Street to West A Street(west side))	X	X	X	
East 5th Street (East D St to Josephine St)	X	X	X	
East B Street (7th Street)	X	X	X	
East B Street (east side) to 2nd Street to West A Street (west side)	X	X	X	
East B Street (portions) (9th St to 12th St)	X	X	X	
East Street (McDowell to 2nd/3rd Street)	X	X	X	
East Street and 18th Street				X
Estes Street (McDowell to Third St)	X	X	X	
Henderson Street (E & W)	X	X	X	
Howard Street (Carlos Street to 3rd Street)	X	X	X	
McDowell Street (E & W)	X	X	X	
Modoc Street (E & W) to W. Rhine Street	X	X	X	
Nagel Street (3rd Street)	X	X	X	
Nagel Street (4th Street)	X	X	X	
North Court Street (17th and 18th Street)				X
North East D Street (8th Street)	X	X	X	
North Street to W. Rhine Street	X	X	X	
Rhine Street (Carlos Street to 4th Street)	X	X	X	
West 12th Street (East B Street)	X	X	X	
West 2nd St to Park St to N Cedar St to W 3rd St				X
West 8th Street (Warner Street to Mill Street)	X	X	X	
West A Street (2nd to 3rd Street)	X	X	X	
West C Street (8th Street to 4th Street)	X	X	X	
Western St to N Danhauser St to West C St				X

Source: City of Alturas

Future Development

Future development in the City will add more impervious surfaces which will drain to existing waterways in the City. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwater. The risk of localized flooding to future development will be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Levee Failure

Vulnerability to Levee Failure

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

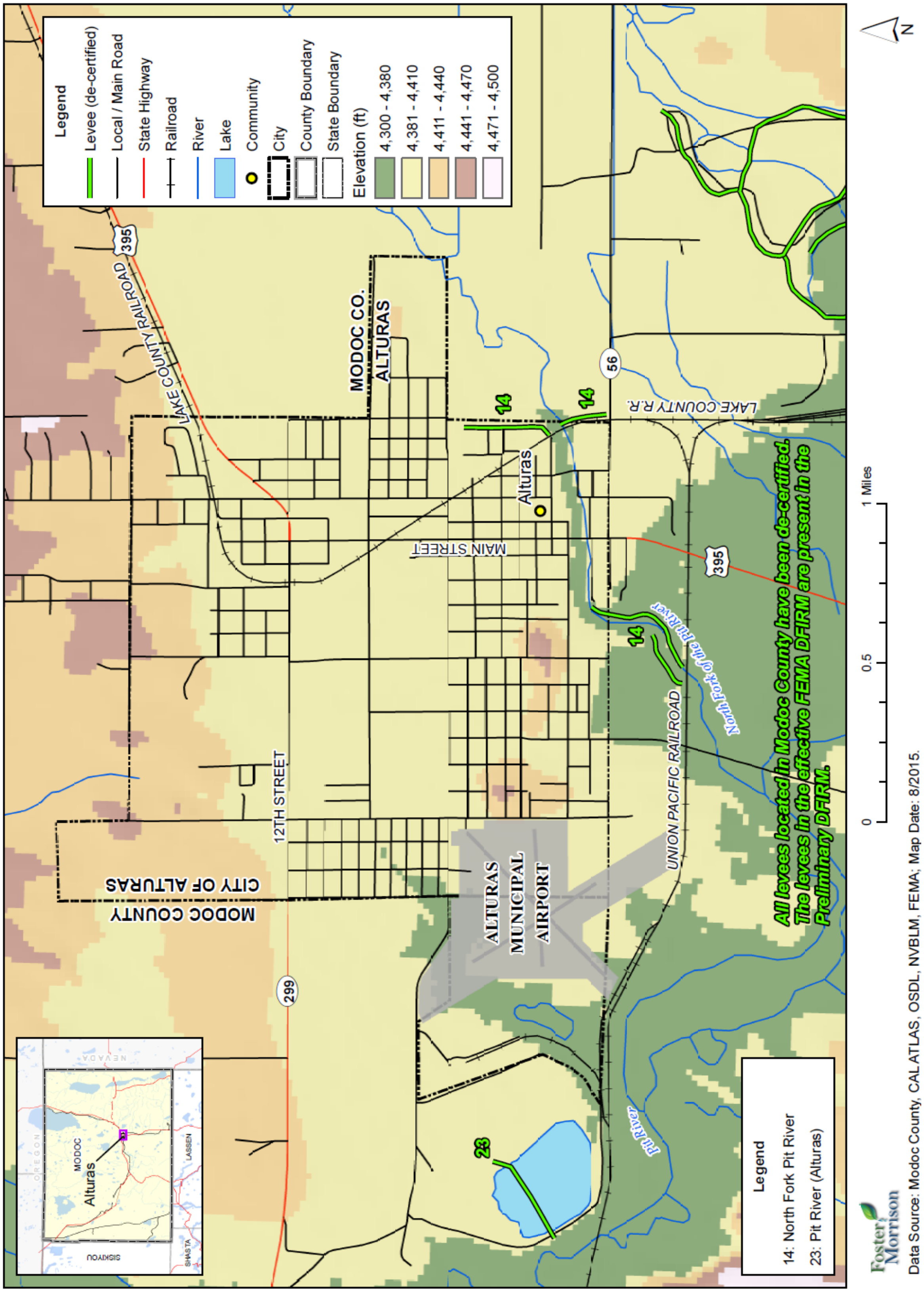
Flood protection measures for the area have been constructed by the USACE. These flood protection measures include levees that have since been decertified. The last major project, which was completed in 1972, included the following (USACE, April 1972):

- Channel excavation from approximately 4,400 feet downstream of the east-west SPRR spur track to approximately 500 feet upstream of the SPRR north-south main track. The total project was approximately 1.9 stream miles.
- New levee constructed and levee improvements at several locations throughout the project area, including the construction of a wing levee upstream of the SPRR north-south main track. The total project was approximately 1.9 stream miles.
- Channel erosion prevention facilities included riprap and sacked concrete slope protection at numerous locations throughout the project.

This flood control project is maintained by Modoc County under an agreement with the USACE. The maintenance is performed in accordance with an Operation and Maintenance Manual prepared by the USACE (USACE, February 1973). These activities include channel debris and vegetation removal and maintenance and repair of slope protection and levees. The USACE periodically inspects the project facilities and provides the County with direction regarding maintenance and repair. These inspections are to ensure that the project continues to comply with the USACE standard.

No significant flood problems have been experienced in the City of Alturas since the completion of the USACE channel modification and levee improvement project in 1972. In the analysis on levee failure, the DFIRM showed no levee protected areas in the City of Alturas. Because of this, no analysis was performed for levee failure in the City. Levee locations in the City are shown in Figure A-9.

Figure A-9 City of Alturas – Levee Inventory



Data Source: Modoc County, CAL ATLAS, OSDL, NVBLM, FEMA; Map Date: 8/2015.

Future Development

The City Planning Team noted that no development is expected to occur in the leveed areas.

Severe Weather: Extreme Cold, Freeze, Winter Weather

Vulnerability to Severe Weather: Extreme Cold, Freeze, Winter Weather

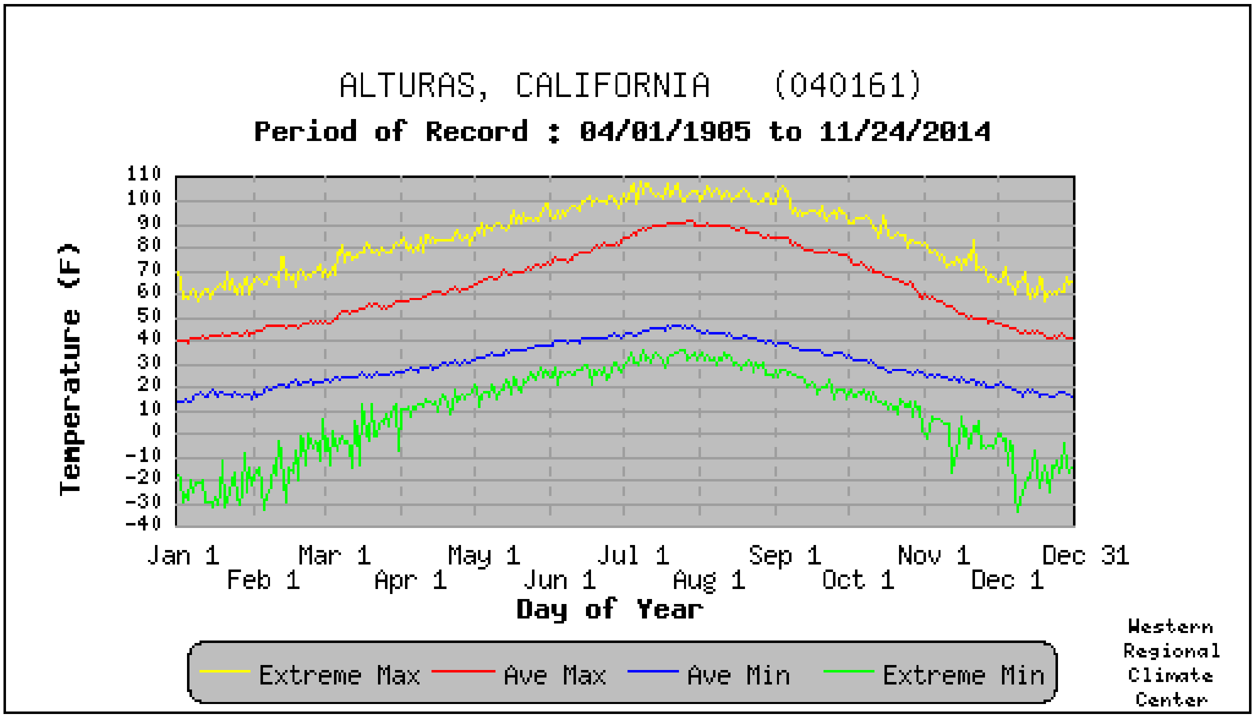
Likelihood of Future Occurrence—Highly Likely
Vulnerability——High

The threat to public safety is typically the greatest concern when it comes to impacts of winter storms. But these storms can also impact the local economy by disrupting transportation and commercial activities. Winter storms are occasionally severe enough to overwhelm snow removal efforts, transportation, livestock management, and business and commercial activities. Travelers on highways in the County, particularly along remote stretches of road, can become stranded, requiring search and rescue assistance and shelter provisions.

Structural losses to buildings are possible from severe snow loads on rooftops. Older buildings are more at risk, as are buildings with large flat rooftops (often found in public buildings such as schools). Another common impact of blizzards and severe winter storms on the planning area is the loss of power. The weight of heavy continued snowfall and/or ice accumulating on power lines often brings them to the ground causing service disruptions for thousands of customers. This can cause a loss of community water and sewer services, as well as the supply of gasoline, as these services almost always require electrical pumps. In addition, prolonged power outages can mean loss of food to grocery stores, large facilities that provide feeding services (such as hospitals and nursing homes), and restaurants.

The City experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations (see Figure A-10). Many months see a high number of days where daily low temperatures fall below 32°F (see Table A-15). On average, 203.8 days a year see low temperatures below 32°F. Generally, people who live and work in this weather are prepared to cope with these extremes.

Figure A-10 City of Alturas – Extreme Temperatures



Source: Western Regional Climate Center, Alturas Station

Table A-15 Extreme Low Temperatures in Alturas

Month	Temperature	Date	Month	Temperature	Date
January	-32°	1/15/1917	July	28°	7/1/1976
February	-33°	2/5/1989	August	24°	8/31/1908
March	-29°	3/2/1917	September	15°	9/25/1908
April	7°	4/5/1997	October	1°	10/31/2002
May	15°	5/10/1916	November	-17°	11/12/1985
June	21°	6/18/1973	December	-34°	12/9/1972

Source: Western Regional Climate Center, Alturas Station

Limited data on freeze impacts in the City was available during the development of this hazard's vulnerability. Areas prone to freezing temperatures are identified normally on a nation-wide assessment scale, which doesn't allow detailed results on specific structures. Secondary impacts of extreme cold can affect the supporting mechanisms or systems of a community's infrastructure. For example, when extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption in the transmission of that power shutting down electric furnaces, which may lead to frozen pipes in homes and businesses.

The elderly and low income population in the planning area is most vulnerable to temperature extremes. The residents of elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme cold.

Extreme cold and winter weather may also cut the City off from the County and surrounding areas. The only heating sources within City limits are wood, kerosene, propane, and electric. There is no natural gas or infrastructure of pipelines. Sustained power outages due to winter storms could cause problems for the City, especially if the storm was prolonged.

Future Development

Vulnerability to winter storms and freeze will increase as the average age of the population in the City shifts. Greater numbers of future senior citizens and the existing will result from the large number of baby boomers in the City. The elderly are more at risk to the effects of freeze. Many of the residents of the City are accustomed to living with freeze and take precautions to guard against the threat of freeze. However, the addition of greater numbers of low income individuals may increase the risk of the City to winter storms and freeze. Future development in the City should reduce the risk to frozen pipes, as building codes in the City are well enforced.

Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)

Vulnerability to Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

According to historical hazard data, severe weather is a regular occurrence in Alturas. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, historic rock wall failures, and downed trees. During times of drought, lightning can ignite wildfires as well.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from heavy storms and rain. Future development in the City is subject to these building codes. New critical facilities such as communications towers are required by code to withstand hail damage, lightning, and heavy rains.

Severe Weather: High Winds/Tornadoes

Vulnerability to Severe Weather: High Winds/Tornadoes

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

High winds are common occurrences in the City throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. Tornadoes in the City are rare, but would be devastating if one hit the City.

Losses from straight line winds and tornadoes include:

- Erosion (soil loss)
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs

Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures. Livestock that may be contained in these structures may be injured or killed, causing economic harm to the rancher who owns both the structure and the livestock. Overhead power lines are vulnerable and account for the majority of historical damages. State highways can be vulnerable to high winds and dust storms, where high profile vehicles may be overturned by winds and lowered visibility can lead to multi-car accidents.

Future Development

Future development projects should consider windstorm hazards at the planning, engineering and architectural design stage with the goal of reducing vulnerability. The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from windstorms. Future development in the City is subject to these building codes.

Wildfire

Vulnerability to Wildfire

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Extremely High

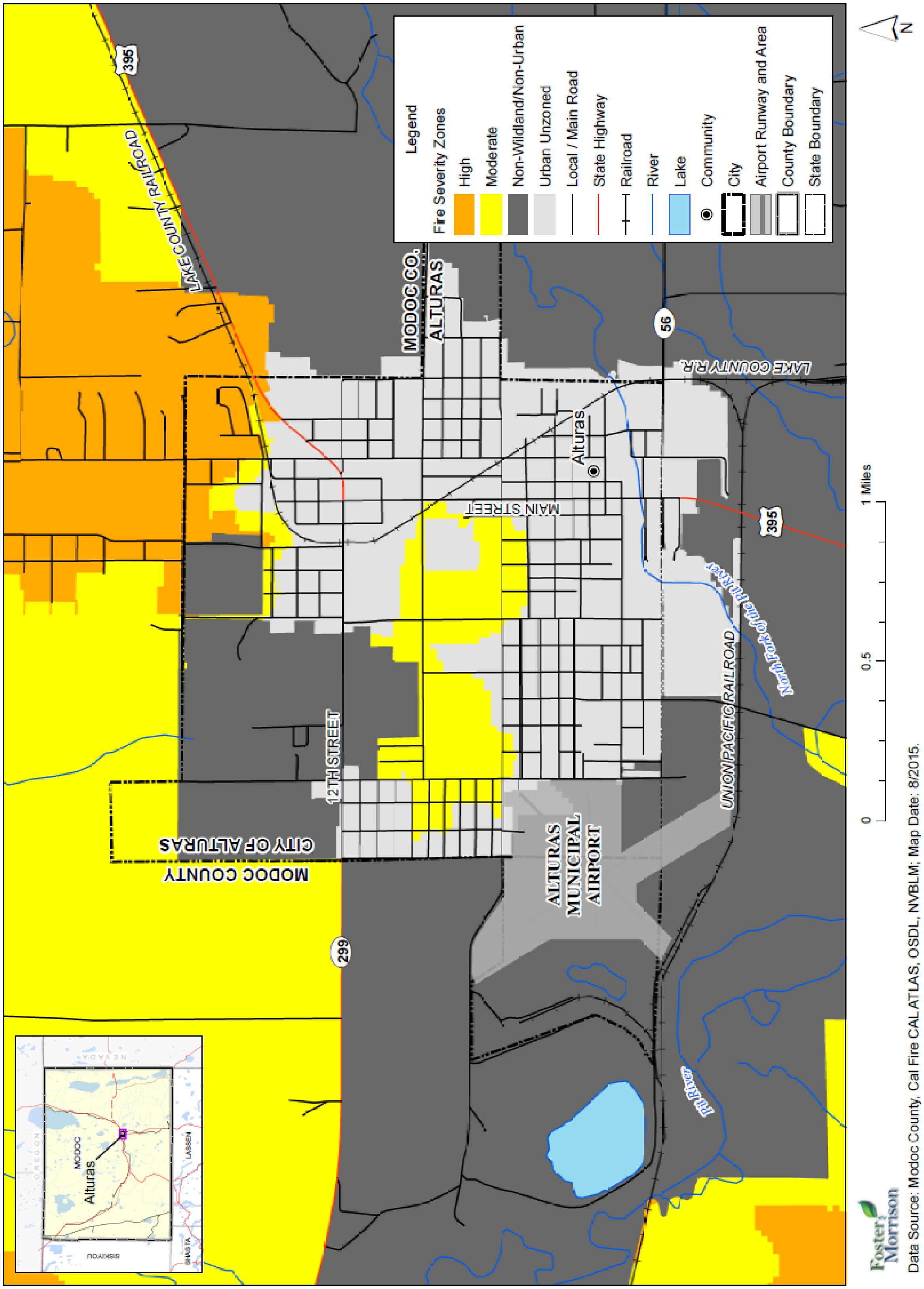
Major fires are generally categorized as either a conflagration or wildland/forestland. A conflagration may involve residential or commercial areas and spreads across both natural and constructed barriers. Wildland is associated with open range grasslands and into the foothills of a particular area. Because of development in areas adjacent to and within Alturas, a third classification has emerged, the Wildland Urban Interface wildfire. The urban interface wildfire is one that burns along the urban/rural interface and can result in major losses of property and structures.

A number of factors affect the behavior of wildland and interface fires, including terrain, weather, wind, fuels and seasons. It is well known that fire travels faster uphill than down and is more difficult to fight on steep slopes than on level ground. When weather is hot and the humidity is low, wildland fires can explode with intensity of rapid combustion. Even in the absence of strong winds, a fast-moving fire can generate its own updrafts, particularly in canyons, causing burning brands to be carried high in the air and drop a long distance ahead. This results in spot fires over a wide radius as the wind changes its direction.

Alturas is not immune to numerous types of grass and brush fires and any one of them may accelerate into an urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures, and rangeland. The natural fuels available in or near the City vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels. The local fire season generally extends from June through early October.

Figure A-11 shows wildfire risk in Alturas. Wildfire threat within the City is moderate to very high.

Figure A-11 City of Alturas Fire Severity Zones



Assets at Risk

Analysis results for Alturas are shown in Table A-16, which summarizes total parcel counts, improved parcel counts and their structure values by occupancy type as well as the percentage of parcels affected by fire.

Table A-16 City of Alturas – Count and Value of Parcels by Property Use and Fire Severity Zone

Fire Severity Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Value	Estimated Contents Value	Total Value*	% of Affected Parcels to Total
Very High	Agricultural	0	$0	0	$0	$0	$0	0.00%
	Commercial	0	$0	0	$0	$0	$0	0.00%
	Exempt	0	$0	0	$0	$0	$0	0.00%
	Industrial	0	$0	0	$0	$0	$0	0.00%
	Institutional	0	$0	0	$0	$0	$0	0.00%
	Recreational	0	$0	0	$0	$0	$0	0.00%
	Residential	0	$0	0	$0	$0	$0	0.00%
	Total	**0**	**$0**	**0**	**$0**	**$0**	**$0**	**0.00%**
High	Agricultural	0	$0	0	$0	$0	$0	0.00%
	Commercial	2	$45,855	1	$35,543	$35,543	$116,941	0.07%
	Exempt	6	$0	0	$0	$0	$0	0.00%
	Industrial	1	$5,241	0	$0	$0	$5,241	0.00%
	Institutional	0	$0	0	$0	$0	$0	0.00%
	Recreational	0	$0	0	$0	$0	$0	0.00%
	Residential	66	$863,325	51	$2,885,862	$1,442,931	$5,192,118	3.77%
	Total	**75**	**$914,421**	52	**$2,921,405**	**$1,478,474**	**$5,314,300**	**3.84%**
Moderate	Agricultural	0	$0	0	$0	$0	$0	0.00%
	Commercial	16	$474,215	10	$2,014,330	$2,014,330	$4,502,875	0.74%
	Exempt	42	$0	0	$0	$0	$0	0.00%
	Industrial	0	$0	0	$0	$0	$0	0.00%
	Institutional	3	$61,822	3	$419,320	$419,320	$900,462	0.22%
	Recreational	0	$0	0	$0	$0	$0	0.00%
	Residential	152	$1,135,587	113	$5,806,890	$2,903,445	$9,845,922	8.35%
	Total	**213**	**$1,671,624**	**126**	**$8,240,540**	**$5,337,095**	**$15,249,259**	**9.31%**

Fire Severity Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Value	Estimated Contents Value	Total Value*	% of Affected Parcels to Total
Non-Wildland/Non-Urban	Agricultural	1	$2,647	0	$0	$0	$2,647	0.00%
	Commercial	11	$928,587	5	$3,153,160	$3,153,160	$7,234,907	0.37%
	Exempt	20	$0	0	$0	$0	$0	0.00%
	Industrial	0	$0	0	$0	$0	$0	0.00%
	Institutional	1	$5,293	1	$105,596	$105,596	$216,485	0.07%
	Recreational	0	$0	0	$0	$0	$0	0.00%
	Residential	43	$1,199,119	28	$2,017,221	$1,008,611	$4,224,951	2.07%
	Total	**76**	**$2,135,646**	**34**	**$5,275,977**	**$4,267,367**	**$11,678,990**	**2.51%**
Urban Unzoned	Agricultural	0	$0	0	$0	$0	$0	0.00%
	Commercial	205	$6,518,507	154	$24,653,670	$24,653,670	$55,825,847	11.38%
	Exempt	82	$0	0	$0	$0	$0	0.00%
	Industrial	5	$85,524	1	$34,854	$52,281	$172,659	0.07%
	Institutional	15	$197,385	11	$3,428,595	$3,428,595	$7,054,575	0.81%
	Recreational	1	$7,187	1	$71,629	$71,629	$150,445	0.07%
	Residential	1,258	$10,627,992	974	$69,998,051	$34,999,026	$115,625,069	71.99%
	Total	**1,566**	**$17,436,595**	**1,141**	**$98,186,799**	**$63,205,201**	**$178,828,595**	**84.33%**
Grand Total		**1,930**	**$22,158,286**	**1,353**	**$114,624,721**	**$74,288,136**	**$211,071,143**	**100.00%**

Source: Modoc County Assessor's 2014 Data; CAL FIRE

Population at Risk

The Fire Severity Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 373 residents of Alturas at risk to moderate or higher wildfire. This is shown in Table A-17.

Table A-17 City of Alturas – Count of Improved Residential Parcels and Population by Fire Severity Zone

Fire Severity Zone	Improved Residential Parcels	Population*
Very High	0	0
High	51	116
Moderate	113	257
Non-Wildland/Urban	28	64
Urban Unzoned	974	2,211
Total	**1,166**	**2,648**

Source: Modoc County 2014 Assessor's Data; CAL FIRE

* Average household populations for Alturas (2.27) from the 2010 US Census were used

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Modoc County and Alturas. GIS was used to determine whether the facility locations intersects a CAL FIRE fire severity zone, and if so, which zone it intersects Details of critical facilities at risk to wildfire in the City of Alturas are shown in Figure A-12 and Table A-18. As shown on the table and figure, Alturas has 5 critical facilities located in moderate or higher fire severity zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure A-12 City of Alturas – Critical Facilities and Fire Severity Zones

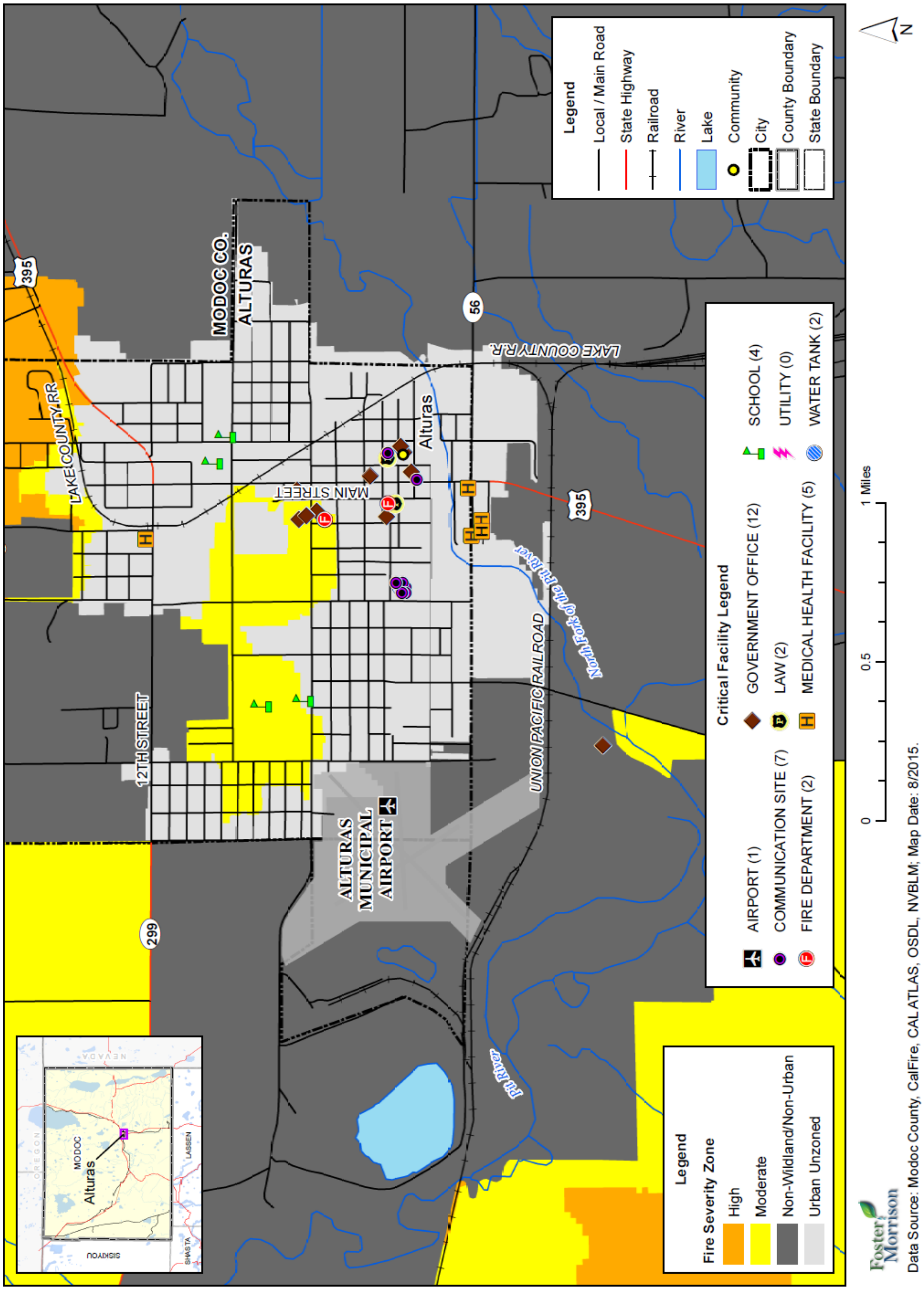


Table A-18 City of Alturas – Critical Facilities and Fire Severity Zones

Fire	Category	Type	Facility Count
Moderate	Category IV Critical Facilities	Fire Department	1
		Government Office	3
		School	1
	Total Moderate		**5**
Non-Wildland/Non-Urban	Category IV Critical Facilities	Airport	1
		Water Tank	1
	Total Non-Wildland/Non-Urban		**2**
Urban Unzoned	Category IV Critical Facilities	Communication Site	7
		Fire Department	1
		Government Office	8
		Law	2
		Medical Health Facility	3
		School	3
		Water Tank	1
	Total Urban Unzoned		**25**
Total Fire - City of Alturas			**32**

Source: CAL FIRE, Modoc County GIS

Future Development

A separate analysis was performed on the future development areas identified by the City of Alturas. GIS was used to determine whether the proposed locations intersect a CAL FIRE fire severity zone, and if so, which zone it intersects. Details of future development in the fire severity areas in the City of Alturas are shown in Figure A-13 and Table A-19. As shown on the table and figure, only the wastewater treatment plant will be located in a moderate or higher fire severity zone.

Figure A-13 City of Alturas – Future Development by Fire Severity Zone

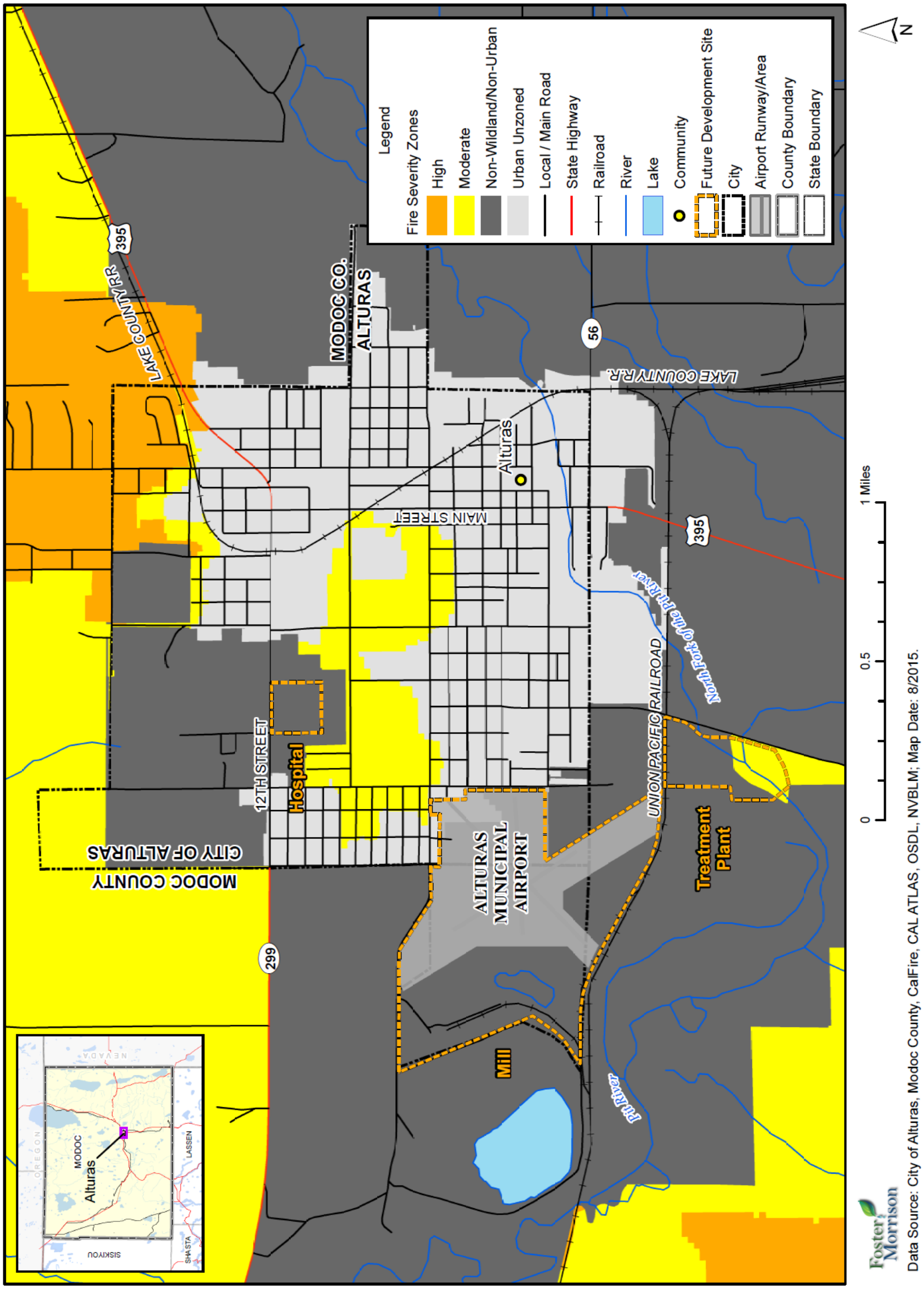


Table A-19 City of Alturas – Future Development by Fire Severity Zone

Future Development Site	Approximate # of Parcels	Acres	Fire Severity Zone
Hospital Site	3	16	Non-Wildland/Non-Urban
Mill Site and Airport Combined	25	294	Non-Wildland/Non-Urban, Urban Unzoned
Wastewater Treatment Plant Site	8	42	Moderate, Non-Wildland/Non-Urban
Total	**36**	**351**	

Source: CAL FIRE, Modoc County GIS

Hazardous Materials Transport

Vulnerability to Hazardous Materials Transport

Likelihood of Future Occurrence—Occasional
Vulnerability—High

The Union Pacific Railroad line passes through the City of Alturas, in addition to State Highways 299 and 395. Hazardous materials are regularly shipped via the rail line and highways and, while unlikely, an incident involving a transportation accident within the City could have devastating effects.

The City has little control over the types of materials that are shipped via the rail line. With regard to government activities, the content of shipments may be confidential for reasons of security and/or is generally unknown to the City. While the City has little influence over the types of material transported via the rail line, the potential for rail incidents can be reduced by ensuring that at-grade crossings within the City are operating in a safe and effective manner.

In addition to the transportation risk, the City Planning Team noted that the City has many hazardous materials storage areas. There are two 30,000 gallon propane storage tanks at Staub's Fuel (which aren't always kept to capacity) located next to fertilizer storage, which is adjacent to two schools. The City of Alturas has the largest storage capacity for the County. The City Planning Team noted that the explosions, while a significant concern, it is the actual spills that are the most likely and potentially most problematic.

Population at Risk

To determine the populations at risk from a transportation-related hazardous materials release within identified transportation corridors, an analysis was performed using GIS. A one mile buffer was applied to both sides of Highways 299 and 395 and the Union Pacific Railroads, creating a two mile buffer zone around each corridor. The buffer distance was based on guidelines in the U.S. Department of Transportation's Emergency Response Guidebook that suggest distances useful to protect people from vapors resulting from spills involving dangerous goods considered toxic if inhaled.

In Table A-20, each buffered transportation corridor was intersected with the residential parcels. It is important to note that populations associated with commercial, industrial and other property types may also be affected by a hazardous materials release, but no census/population data is associated with these property types and are therefore excluded from this analysis.

Figure A-14 City of Alturas – Improved Residential Property in Haz-Mat Buffer Zones

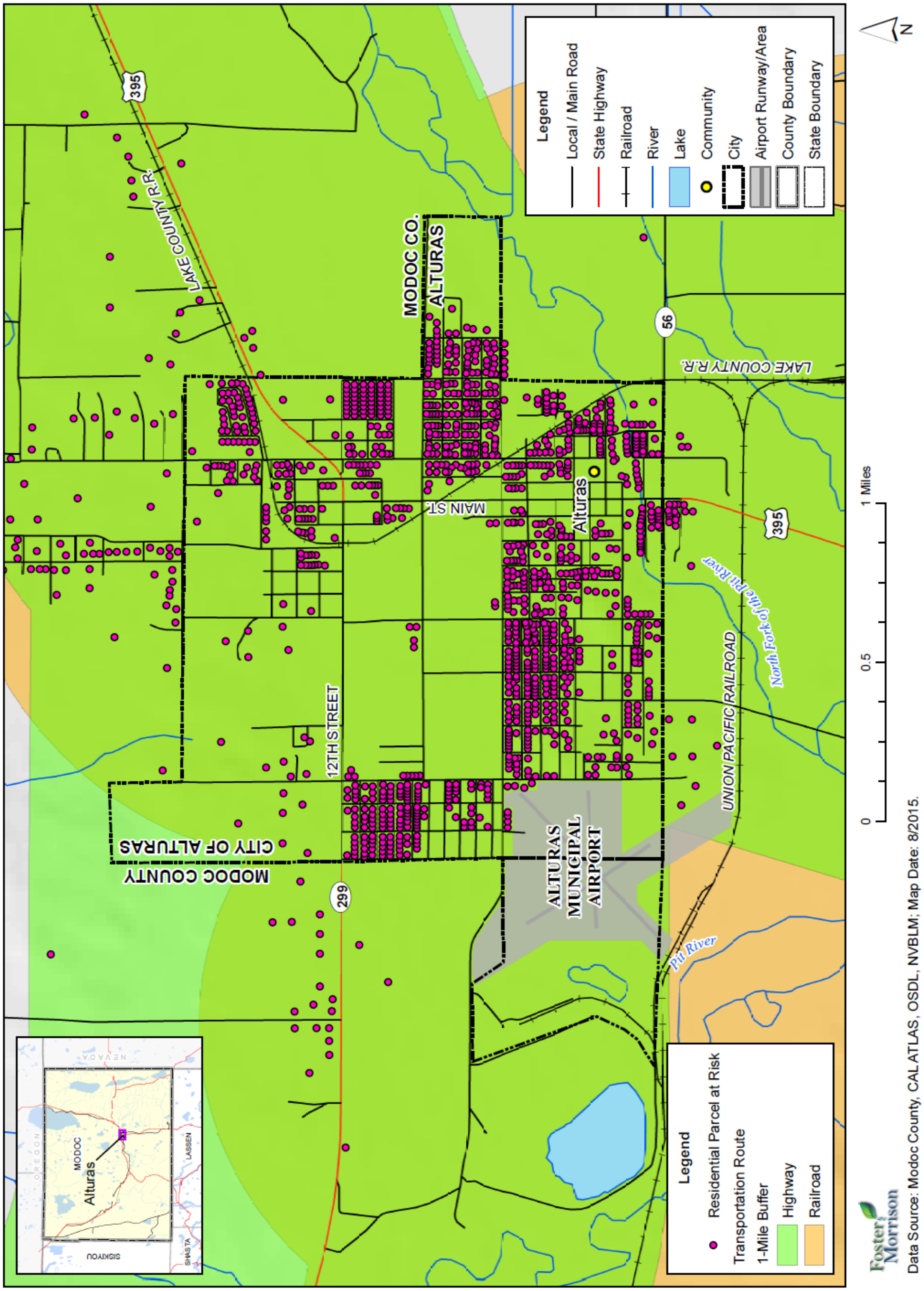


Table A-20 City of Alturas – Population at Risk in Haz Mat Corridors

Jurisdiction	Residential Parcels	Population
Alturas	1,153	2,617

Source: FEMA Preliminary DFIRM 2013, Modoc County Assessor's 2014 Data, US Census Bureau

* Average household populations from the 2010 US Census were used: Alturas – 2.27.

Critical Facilities at Risk

During a hazardous materials transportation spill, it is generally the people that are at risk to the effects of the spill. During a spill, buildings and property are at limited risk. However, critical facilities may be at risk to evacuation and reduction of emergency services or other capabilities. Table A-21 shows the critical facilities in the City at risk in the buffer zone.

Table A-21 City of Alturas – Critical Facilities in Haz Mat Corridors

Hazardous Materials Route	Category	Type	Facility Count
Hazardous Materials Highway Route	Category IV Critical Facilities	–	-
	Total Hazardous Materials Highway Route		**0**
Hazardous Materials Railroad Route	Category IV Critical Facilities	–	-
	Total Hazardous Materials Railroad Route		**0**
Combined Hazardous Materials Highway and Railroad Route	Category IV Critical Facilities	Airport	1
		Communication Site	7
		Fire Department	2
		Government Office	11
		Law	2
		Medical Health Facility	3
		School	4
		Water Tank	2
	Total Hazardous Materials Highway and Railroad Route		**32**
Outside of Hazardous Materials Route	Category IV Critical Facilities		-
	Total Outside of Hazardous Materials Route		**0**
Total Hazardous Materials Route - City of Alturas			**32**

Source: Cal Trans, Modoc County Assessor's 2014 Data

Future Development

Development will continue to happen within hazardous materials transportation zones. Table A-22 shows that there are 366 residential parcels in the City in a haz-mat corridor that have not been developed. Those who choose to develop in these areas should be made aware of the risks associated with living within a hazardous materials transportation route.

Table A-22 City of Alturas – Total and Improved Parcels in Haz-Mat Corridors

Jurisdiction	Non-improved Parcel Count	Non-improved Population Estimates
Alturas	366	853

Source: Cal Trans, Modoc County GIS

Given the land use and financial impacts of grade-separated crossings, it is highly unlikely that the at-grade crossings within City will be eliminated during the life of this Plan. Therefore, ensuring proper gate operation at the crossings is the most effective strategy the City can employ to avoid accidents and minimize safety risks. Proper gate functioning includes ensuring that gates are not in the lowered position unnecessarily. Lowering of gates for excessive time durations or when trains are not present can encourage drivers to maneuver around gates. Over time, such practices can increase the potential for a train/vehicle collision.

A.6 Capability Assessment

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

A.6.1. Regulatory Mitigation Capabilities

Table A-23 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Alturas.

Table A-23 City of Alturas Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y General Plan, 2014	
Capital Improvements Plan	Y	The CIP for the airport is updated yearly for maintenance needs and requirements.
Economic Development Plan	Y	2006 Economic Vitality Plan
Local Emergency Operations Plan	Y	Updated 2015
Continuity of Operations Plan	Y	In EOP
Transportation Plan	Y	Alturas participates in a Regional Transportation Commission. They have a Regional Transportation plan.
Stormwater Management Plan/Program	Y	
Engineering Studies for Streams	Y	This is completed within other agencies during permit process
Community Wildfire Protection Plan	N	

Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code Y		Version/Year: 2013 CA building code; needs more funding for demolition or follow up of condemned structures
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score: N/A
Fire department ISO rating:		Rating:
Site plan review requirements Y		Y
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Y/Y There is a section for future Flood Control overlay
Subdivision ordinance	Y	Y/Y
Floodplain ordinance	Y	Y/Y
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	This was just updated
Elevation Certificates	Y	This is part of the permitting process
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

As indicated in the table above, the City of Alturas has several plans and programs that guide the City's mitigation of development of hazard-prone areas. Starting with the City of Alturas General Plan, some of these are described in more detail below.

City of Alturas General Plan, Updated in 2014

A general plan is a legal document, required by state law, which serves as a community's "constitution" for the development and use of its land. It must be a comprehensive, long-term document, detailing proposals for the physical development of the city, and of any land outside its boundaries which in the Planning Agency's judgment bears relation to its planning. Time horizons vary, but the typical general plan looks 10-20 years into the future. Like a single frame in a motion picture, the general plan represents, at a given point in time, the city's aspirations for the future. While the plan sets policies and suggests actions, it must be implemented by local officials through many separate decisions.

The law specifically requires that the general plan address seven topics or "elements," including land use, circulation (transportation), housing, conservation, open space, noise, and safety. The plan must analyze issues of importance to the community, set forth policies in text and diagrams for conservation and development, and outline specific actions for implementing these policies.

A.6.2. Administrative/Technical Mitigation Capabilities

Table A-24 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Alturas.

Table A-24 City of Alturas Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Regular meetings held and coordination is effective
Mitigation Planning Committee	N/A	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Yes, This is ongoing through the City Public Works department
Mutual aid agreements	Y	Yes
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y PT	No, No, Yes
Floodplain Administrator	Y PT	No, No, No
Emergency Manager	Y PT	No
Community Planner	Y PT	No, No, Yes
Civil Engineer	N	On site
GIS Coordinator	N	
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Coordination between SO
Hazard data and information	Y	CUPA program
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

A.6.3. Fiscal Mitigation Capabilities

Table A-25 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table A-25 City of Alturas Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	CIP funding is used each year but must be part of the ALP
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Requires 2/3 majority vote
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	Y	
State funding programs	Y	
Other		
How can these capabilities be expanded and improved to reduce risk?		

A.6.4. Mitigation Education, Outreach, and Partnerships

Table A-26 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table A-26 City of Alturas Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Natural disaster or safety related school programs	Y	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

A.6.5. Other Mitigation Efforts

In addition to the items captured above, the City has engaged in many mitigation activities. These include:

- The City of Alturas has ongoing river stabilization projects on the Pit River.
- 1996, 2008, 2015 Pit River Dredging project held cooperatively with Modoc County to reduce flooding
- Improvements on SR 299 to lessen flood impacts an increase water drainage
- On-going Modoc Fire Safe Council projects to reduce fuels, provide fire breaks, and maintain road access
- Emergency Operations Center performs 3 exercises yearly to prepare and exercise necessary plans
- Public Health at the County level prepares health care providers and the community with various programs and outreach.
- City Public Works crews work diligently on ongoing debris removal that may cause lack of sufficient drainage and floods

A.7 Mitigation Strategy

This section describes the mitigation strategy process and mitigation action plan for the City of Alturas's inclusion with the Modoc County Local Hazard Mitigation Plan update.

A.7.1. Mitigation Goals and Objectives

The City of Alturas adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy of the base plan.

A.7.2. Continued Compliance with the NFIP

The City of Alturas joined the National Flood Insurance Program (NFIP) on September 24, 1984. As a participant of the NFIP, the City of Alturas has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Alturas will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City; implementing flood protection measures for existing structures and maintaining drainage systems. The goal of the program is to enhance public safety, and reduce impacts and losses while protecting the environment.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Alturas is not a current participant in the CRS program.

More information on the City's flood management efforts can be found on Table A-27.

Table A-27 City of Alturas – Flood Management Program and Efforts

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	As of September 14, 2014, there were 64 policies in force in the City. Total insurance in force was $13,422,000. Total premiums were $29,345.
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage? None	As of September 14, 2014 there were no closed losses for the City.
How many structures are exposed to flood risk within the community?	There are 331 and 103 improved parcels in the 1% and 0.2% annual chance floodplains, respectively.
Describe any areas of flood risk with limited NFIP policy coverage	There are 64 policies in force in the City. None of these policies is in the 1% annual chance zones. There are 180 improved residential parcels in the 1% annual chance floodplain.
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	N partially certified
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, inspection, engineering assessment, contract for special services as needed; review elevation certs, inspection of water, etc
What are the barriers to running an effective NFIP program in the community, if any?	Staffing and regulations geared more towards largely populated areas, not rural ones
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	6/24/14

NFIP Topic	Comments
Is a CAV or CAC scheduled or needed?	N
Regulation	
When did the community enter the NFIP?	9/24/84
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways? Meet as outlined by FEMA	Y
Provide an explanation of the permitting process.	Outlined in flood plain ordinance
Community Rating System	
Does the community participate in CRS?	N
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

A.7.3. Mitigation Actions

The planning team for the City of Alturas identified and prioritized the following mitigation actions based on the risk assessment and in accordance with the process outline in Section 5, Mitigation Strategy, of the base plan. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. General processes and information on plan implementation and maintenance of this LHMP by all participating jurisdictions is included in Section 7, Plan Implementation and Maintenance, of the base plan.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Alturas Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: All (priority and non-priority) hazards

Issue/Background: Modoc County and the City of Alturas are the two primary participating jurisdictions to the Modoc County Local Hazard Mitigation Plan. Each jurisdiction plays a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The County and the City will work with other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms and will consider:

- Using a variety of information outlets, including websites, local radio stations, news media, schools, and local, public sponsored events;
- Creating and Distributing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;
- Displaying public outreach information in County and City office buildings, libraries, and other public places and events;
- Developing public-private partnerships and incentives to support public education activities.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County, City, and other agency outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Alturas

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Schedule: Ongoing/Annual public awareness campaign

In conjunction with Modoc County, the City of Alturas has submitted three projects to mitigate effects from levees and flooding.

Action 3. City of Alturas Storm Drainage (F-13 Improve Stormwater Drainage System Capacity)

Hazards Addressed: Flood

Issue/Background: During times of heavy precipitation city culverts backup and thus cause flooding. The current project would install backflow devices to prevent this.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Alturas and Modoc County Public Works Departments

Responsible Office/Partners: City of Alturas and Modoc County Public Works

Project Priority: High

Cost Estimate: $20,000

Benefits (Losses Avoided): Avoids potential street flooding

Potential Funding: Various grants for water quality

Timeline: 2017

Action 4. Pit River Levee Bypass Channel and Restricted Orifice (F-13 Improve Stormwater Drainage System Capacity)

Hazards Addressed: Flood

Issue/Background: The revised FEMA FIRM maps effective December 2, 2015 have more critical facilities in the 100 year flood plain. The detention hydrograph also shows changes in precipitation patterns over the last 20 years. The variance in fall and spring precipitation causes surge effects. Therefore there are times when more water moves through watershed in a shorter time frame. Installation of a restricted orifice bar screen upstream of the levee and a bypass channel could address will provide surge capacity needed to avoid events correlated with precipitation pattern changes.

Other Alternatives:

- Dredging Dorris Reservoir: Increases watershed retention capacity
- Ongoing levee maintenance and silt removal
- Buyouts

Existing Planning Mechanism(s) through which Action Will Be Implemented: FEMA Planning Grant (This would require community support from FEMA)

Responsible Office/Partners:

- City of Alturas – USFWS
- Modoc County Public Works in conjunction with
- California Fish and Wildlife Service

Project Priority: Medium

Cost Estimate: Unknown until planning study is completed (It may be less than alternatives.)

Benefits (Losses Avoided):

- Avoids potential flooding as identified by FEMA (DFIRM maps) and Army Corp (Screening/economic loss)
- Reduction in long term flood insurance rates for ½ of Alturas
- Downstream habitat improved due to water retention in Refuge

Potential Funding: FEMA for planning grant; potential USFWS grants or CA bond funds; FEMA funding after a flood has occurred.

Timeline: Planning phase completed by 2020

Action 5. Pit River Levee Dredging and Silt Removal (F-14 Conduct Regular Maintenance for Drainage systems and Flood Control Structures)

Hazards Addressed: Flood, Levee Failure

Issue/Background: Levee is non-compliant with Army Corp of Engineers PL Program. Silt is only a component of a larger issue. Full Compliance requires:

- Documented flood exercises
- Televising culverts and culvert repair
- Vegetation removal
- Bank restoration
- Rodent control plan and implementation
- Encroachment of utilities: relocated

Other Alternatives: None - The silt removal complements other projects but the other issues have no alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Stream bed alteration permit (CFG)
- LEQA (Modoc Co Planning)
- Engineering (Modoc County and consultants)

Responsible Office/Partners:

- Lead Agency: Modoc County Public Works
- Secondary – City of Alturas

Project Priority: High

Cost Estimate: $420,000

Benefits (Losses Avoided):

- Avoids potential flooding as identified by FEMA (DFIRM maps) and Army Corp (Screening/economic loss)
- Reduction in long term flood insurance rates for ½ of Alturas
- Downstream habitat improved due to water retention in Refuge

Potential Funding: FEMA for planning grant; California Proposition 1 for implementation; future bond acts; City & County Maintenance funds (limited)

Timeline: Planning phase completed by 2020

Appendix A Planning Process

A.1 Lists of HMPC Invites/Stakeholders

Table A-1 2015 Mitigation Grant Invite List

Entity/Name	Office/Position	Phone	Email
Modoc County Sheriff's Office			
Sheriff Mike Poindexter	Sheriff's	233-4416	mpoindexter@modocsheriff.us
AJ McQuarrie	OES	233-4416 x248	ajm@modocsheriff.us
Modoc County Board of Supervisors			
Amber Mason	Clerk of the Board	233-6201	ambermason@co.modoc.ca.us
Jim Wills	BOS Representative	640-1963	jimwills@co.modoc.ca.us
County Departments			
Chester Robertson	Administration/Public Works	233-7660	chesterrobertson@co.modoc.ca.us
Joe Moreo	Agriculture	233-6401	susiephilpott@co.modoc.ca.us
Cheri Budmark	Assessor	233-6218	cheribudmark@co.modoc.ca.us
Stephanie Wellemeyer	Auditor	233-6207	stephaniewellemeyer@co.modoc.ca.us
Dominic Budmark	Building	233-6406	dominicbudmark@co.modoc.ca.us
Warren Farnam	Environmental Health	233-6350	warrenfarnam@co.modoc.ca.us
Steve Orloff	Farm Advisor	842-2711	sborloff@ucanr.edu
Karen Stockton	Health Services	233-6312	karenstockton@co.modoc.ca.us
Jerry Cook	Information Technology	233-4423	jerrycook@co.modoc.ca.us
Cheryl Baker	Library	233-6340	cherylbaker@co.modoc.ca.us
Kim Hunter	Planning	233-6406	kimhunter@co.modoc.ca.us
Sean Curtis	Resource Analyst	233-3276	seanrcurtis@aol.com modoccfb@frontiernet.net
Mitch Crosby	Roads	233-6414	mitchcrosby@co.modoc.ca.us
Kelly Crosby	Social Services	233-6501	kellycrosby@co.modoc.ca.us
Cheryl Knoch	Treasurer	233-6223	cherylknoch@co.modoc.ca.us
Wai Lee	Watermaster	233 -5155 640-3062	wailee@co.modoc.ca.us
Robert Dolan	Asst. Watermaster	640-1949	
State and Federal Agencies			
Paige Caldwell	Army Corps of Engineer	916-557-6903	paige.caldwell@usace.army.mil
Dana Cook	BLM	279-6101	dwcook@blm.gov
Steve Walker	Cal Fire	310-2214	Steve.Walker@fire.ca.gov

Entity/Name	Office/Position	Phone	Email
Scott Packwood	Cal Fire	310-2236	scott.packwood@fire.ca.gov
Grizz Adams	CalOES	526-0922	Grizz.Adams@caloes.ca.gov
Mary Randall	DWR	528-7407	Mary.Randall@water.ca.gov
Y-Ni Enzler	DWR Region Engineer	916-227-4604	y-nhi.enzler@water.ca.gov
Bill Pennington	DWR Area Engineer	916-227-4630	bill.pennington@water.ca.gov
Brian Gallaher	Fish and Wildlife	233-3581	brian.gallaher@wildlife.ca.gov
Paul Divine	Fish and Wildlife	251-6712	paul.divine@wildlife.ca.gov
Richard Shinn	Fish and Wildlife	233-3581	richard.shinn@wildlife.ca.gov
Steve Clay	Modoc Nat. Wildlife Refuge	233-3572 (fed)	steve_clay@fws.gov
Sean Cross	Modoc Nat. Wildlife Refuge	233-3572	sean_cross@fws.gov
Jim Chakarun	Ash Creek Wildlife Area	527-8917 (state)	james.chakarun@wildlife.ca.gov
Chris Lauppe	USDA-FSA	233-4391	christopher.lauppe@ca.usda.gov
Bryon Hadwick	USDA-Natural Res. Cons	233-4137 x104	bryon.hadwick@ca.usda.gov
Mike Colbert	USDA-Rural Develop.	233-4615 x112	Mike.Colbert@ca.usda.gov
Jenny Jayo	USFS(range)	233-5811	jjayo@fs.fed.us
Ken Sandusky	USFS PIO	233-8713	klsandusky@fs.fed.us
Tim Davis	USFS-Tulelake	233-8812	tedavis@fs.fed.us
Tyler Otterson	USFS Fire	640-0442	totterson@fs.fed.us
Albert Savage	USFS	233-8852	albertsavage@fs.fed.us
Tribal Entities			
Irwin Brown	Pitt River	335-1118	irvinbrown91@yahoo.com
Marissa Fierro	Pitt River	335-1118	arissa.fierro@pitrivertribe.org
Sonja Axelord	Pitt River	708-1401	sojaaxelord@gmail.com
Shawn Normington	Alturas Indian Rancheria	640-1389	chiefnormington@yahoo.com
Vi Riley	Alturas Indian Rancheria	640-1044	viriley@hdo.net
Wendy Del Rosa	Alturas Indian Rancheria	640-1044	wdelrosa@aol.com
Phillip Del Rosa	Alturas Indian Rancheria	640-1044	philmodoc@aol.com
Darren Rose	Alturas Indian Rancheria	640-1044	shastamtninc2@aol.com
Nikki Munholand	Cedarville Rancheria	233-3969	cr.munholand@gmail.com
Adrian Townsend	Fort Bidwell Rancheria	279-6310	adriantownsend87@gmail.com
Amber Drew	Fort Bidwell Rancheria-Env.	279-6310	alb.drew@gmail.com
Loyette Meza	Fort Bidwell Rancheria	279-6310	onehorse2013@gmail.com
Paula Sam (Vice Chr)	Fort Bidwell Rancheria	279-6310	paulasbishop@aol.com
Mereidth Richno	Lookout Rancheria	640-3334	meredithrichno@modocsfhc.org
Fire Protection Districts			
Paul Lemke	Adin and Lookout FPD	708-0847	paullmvph@hotmail.com
Jon Wellemeyer	Alturas City Fire	640-3537	alturasfire@cityofalturas.org

Entity/Name	Office/Position	Phone	Email
Otis Sommers	Alturas Rural FPD	640-3018	osommers@modocsheriff.us
Ron Sherer	Cal Pines CSD-Canby FPD	640-1040	calpinesgm@frontiernet.net
Ray Gorzell	Cedarville FPD	640-1097	modocpump@yahoo.com
Pat Green	Cedarville FPD	640-2333	cvfpd@frontiernet.net
Floyd Cornett	Davis Creek FPD	233-3696	diamondh@frontiernet.net
Alan Berryessa	Eagleville FPD	640-0387	alanberryessa@gmail.com
Greg Small	Fort Bidwell FPD	640-2681	greg@gsmall.us
John Erquiaga	Lake City FPD	279-6364	
Bill Bostic	Lake City FPD	569-0511	bbostic@citlink.net
Dewayne Matthews	Likely FPD	524-0783	likelyfiredept@frontiernet.net
James M Safford	Willow Ranch FPD	946-4159	jmsafford@hotmail.com
Water and Resource Districts			
Cathy Laxague	Cedarville Water District	279-6141 x22	claxague@svjusd.org
Rayne Baremore	Central Resource Conservation Dist		rgbaremore_cmrcd@yahoo.com
John Picotte	Hot Spring Valley Irrigation	640-8080	npicotte@outlook.com
Herb Jasper	Goose Lake Resource Cons	541-233-8917	jaspercattle@gmail.com
Dee Sampson	Lava Beds-Butte Valley RCD	667-3125	rcd_dee@cot.net
Mike Whitney	Newell County Water	260-1601	
Jay Younger	South Fork Irrigation District	640-8404	jayounger@hotmail.com
Ken McGarva		640-4093	ranchlady@gotsky.com
Brad Kirby	Tulelake Irrigation District	667-2249	tid@cot.net
City of Alturas			
Cary Baker	Admin	233-2512	cary@cityofalturas.org
Jim Irwin	City Council	233-2928	irvin2@frontiernet.net
Jon Wellemeyer	Fire	233-4500	alturasfire@cityofalturas.org
Joe Picotte	Public Works	640-2080	jpicotte@cityofalturas.org
Utilities			
Brad Kresge	Surprise Valley Electric	233-3511	bradsvec@frontier.com
Dennis Reed	Surprise Valley Electric	233-3511	dennissvec@frontier.com
Community Agencies/Organization			
Stacy Hafen	Modoc Fire Safe Coun.	233-4314 x114	modocfiresafecouncil.com
Carl Quigley	Surprise Valley	279-2631	rafterhk@gmail.com
Dan Lowry	Cattleman's/Hot Springs	640-0108	slowry@frontier.com
Fernand Larranaga	Land Use Committee	233-8014	fernand@citllink.net
Jerry Kresge	MC Cattleman's/Pres.	640-1302	modocauction@gmail.com
Lucky Ackley	Farm Bureau	541-891-6121	drylakeackley@hotmail.com

Entity/Name	Office/Position	Phone	Email
Scott Gooch	Surprise Valley/Cattleman's	640-2555	sk.gooch@yahoo.com
Nancy Monchamp	Big Valley	294-5596	nmonchamp8@gmail.com
Hospitals			
Kevin Kramer	Modoc Medical Center	233-5883	k.kramer@modocmedicalcenter.org
Celeste Wilder	Modoc Medical Center	233-5131 x1411	c.wilder@modocmedicalcenter.org
Linda Wellemeyer	Modoc Medical Center	233-5131 x1418	l.wellemeyer@modocmedicalcenter.org
Chris Gibson	Surprise Valley Hospital	279-6111 x1239	chrisg@svhospital.org
Rich Cornwell	Surprise Valley Hospital	279-6111	richc@svhospital.org
School Districts			
Tom O'Malley	Modoc Joint USD	233-7201 x101	tomo@modoc.k12.ca.us
Mike Martin	Modoc County Office of Ed	233-7101	mmartin@modoccoe.k12.ca.us
Janelle Anderson	Surprise Valley USD	279-6141 x124	janderson@svjusd.org
Vanessa Jones	Tulelake USD	667-2295	vjones@tbusd.org

Table A-2 Email Master List

Name	Organization	Email/Mailing Address
Paul Lemke	Adin and Lookout FPD	paullmvph@hotmail.com
Jon Wellemeyer	Alturas	alturasfire@cityofalturas.org
Shawn Normington	Alturas Indian Rancheria	chiefnormington@yahoo.com
Vi Riley	Alturas Indian Rancheria	viriley@hdo.net
Joe Picotte	Alturas Public Works	jpicotte@cityofalturas.org
Meredith Richno	Alturas Rancheria	meredithrichno@modocsfhc.org
Philip Del Rosa	Alturas Rancheria	philmodoc@aol.com
Darren Rose	Alturas Rancheria	shastamtninc2@aol.com
Wendy Del Rosa	Alturas Rancheria	wdelrosa@aol.com
Otis Sommers	Alturas Rural FPD	osommers@modocsheriff.us
Paige Caldwell	Army Corps of Engineers	paige.caldwell@usace.army.mil
James Chakarum	Ash Creek Wildlife Area	james.chakarun@wildlife.ca.gov
Nancy Monchamp	Big Valley	nmonchamp8@gmail.co
Dana Cook	BLM	dwcook@blm.gov
Brian Gallaher	CA Fish and Wildlife	brian.gallaher@wildlife.ca.gov
Paul Divine	CA Fish and Wildlife	paul.divine@wildlife.ca.gov
Richard Shinn	CA Fish and Wildlife	richard.shinn@wildlife.ca.gov
Steve Walker	Cal Fire	steve.walker@fire.ca.gov
Grizz Adams	Cal OES	Grizz.Adams@caloes.ca.gov
Ron Sherer	Cal Pines CSD Canby FPD	calpinesgm@frontiernet.net

Name	Organization	Email/Mailing Address
Pat Green	Cedarville FPD	cvfpd@frontiernet.net
Ray Gorzell	Cedarville FPD	modocpump@yahoo.com
Nikki Munholand	Cedarville Rancheria	cr.munholand@gmail.com
Cathy Laxague	Cedarville Water District	claxague@svjusd.org
Rayna Baremore	Central Modoc RCD	rgbaremore_cmrcd@yahoo.com
Floyd Cornett	Davis Creek FPD	diamondh@frontiernet.net
Bill Pennington	Department of Water Resources	bill.pennington@water.ca.gov
Mary Randall	Department of Water Resources	mary.randall@water.ca.gov
Y-Ni Enzler	Department of Water Resources	y-nhi.enzler@water.ca.gov
Alan Berryessa	Eagleville FPD	alanberryessa@gmail.com
Greg Small	Fort Bidwell FPD	greg@gsmall.us
Adrian Townsend	Fort Bidwell Rancheria	adriantownsend87@gmail.com
Amber Drew	Fort Bidwell Rancheria	alb.drew@gmail.com
Loyette Meza	Fort Bidwell Rancheria	onehorse2013@gmail.com
Paula Sam	Fort Bidwell Rancheria	paulasbishop@aol.com
Chris Morrison	Foster Morrison Consultants	chris.morrison@fostermorrison.com
Jeanine Foster	Foster Morrison Consultants	jeanine.foster@fostermorrison.com
Herb Jasper	Goose Lake RCD	jaspercattle@gmail.com
John Picotte	Hot Spring Valley Irrigation	npicotte@outlook.com
Bill Bostic	Lake City FPD	bbostic@citlink.net
John Erquiaga	Lake City FPD	42165 Co Rd 1, Lake City, CA 96115
Dee Sampson	Lava Beds-Butte Valley RCD	rcd_dee@cot.net
Dwayne Matthews	Likely Fire Department	likelyfiredept@frontiernet.net
Chester Robertson	Modoc Administration	chesterrobertson@co.modoc.ca.us
Joe Moreo	Modoc Agriculture	susiephilpott@co.modoc.ca.us
Cheri Budmark	Modoc Assessor	cheribudmark@co.modoc.ca.us
Stephanie Wellemeyer	Modoc Auditor	stephaniewellemeyer@co.modoc.ca.us
Amber Mason	Modoc Board of Supervisors	ambermason@co.modoc.ca.us
Dominic Budmark	Modoc Building	dominicbudmark@co.modoc.ca.us
Jerry Kresge	Modoc Cattleman's	modocauction@gmail.com
Warren Farnam	Modoc Environmental Health	warrenfarnam@co.modoc.ca.us
Steve Orloff	Modoc Farm Advisor	sborloff@ucanr.edu
Lucky Ackley	Modoc Farm Bureau	drylakeackley@hotmail.com
Stacy Hafen	Modoc Fire Safe Council	modocfiresafecouncil@gmail.com
Karen Stockton	Modoc Health Services	karenstockton@co.modoc.ca.us
Jerry Cook	Modoc IT	jerrycook@co.modoc.ca.us
Tom O'Malley	Modoc Joint USD	tomo@modoc.k12.ca.us

Name	Organization	Email/Mailing Address
Cheryl Baker	Modoc Library	cherylbaker@co.modoc.ca.us
Celeste Wilder	Modoc Medical Center	c.wilder@modocmedicalcenter.org
Kevin Kramer	Modoc Medical Center	k.kramer@modocmedicalcenter.org
Linda Wellemeyer	Modoc Medical Center	l.wellemeyer@modocmedicalcenter.org
AJ McQuarrie	Modoc OES	ajm@modocsheriff.us
Mike Martin	Modoc Office of Education	mmartin@modoccoe.k12.ca.us
Kim Hunter	Modoc Planning	kimhunter@co.modoc.ca.us
Sean Curtis	Modoc Resource	seanrcurtis@aol.com
Mitch Crosby	Modoc Roads	mitchcrosby@co.modoc.ca.us
Mike Poindexter	Modoc Sheriff	mpoindexter@modocsheriff.us
Kelly Crosby	Modoc Social Services	kellycrosby@co.modoc.ca.us
Cheryl Knoch	Modoc Treasurer	cherylknoch@co.modoc.ca.us
Wai Lee	Modoc Watermaster	wailee@co.modoc.ca.us
Mike Whitney	Newell Water District	504 5th Ave., Tulelake, CA 96134
Irwin Brown	Pit River Tribe	irvinbrown91@yahoo.com
Marissa Fierro	Pit River Tribe	marissa.fierro@pitrivertribe.org
Sonya Axelrod	Pit River Tribe	sonyaaxelrod@gmail.com
Jay Younger	South Fork Irrigation District	jayounger@hotmail.com
Ken McGarva	South Fork Irrigation District	ranchlady@gotsky.com
Carl Quigley	Surprise Valley	rafterhk@gmail.com
Brad Kresge	Surprise Valley Electrification Corps	bradsvec@frontier.com
Dennis Reed	Surprise Valley Electrification Corps	dennissvec@frontier.com
Chris Gibson	Surprise Valley Hospital	chrisg@svhospital.org
Rich Cornwell	Surprise Valley Hospital	richc@svhospital.org
Janelle Anderson	Surprise Valley USD	janderson@svjusd.org
Vanessa Jones	Tulelake Basin USD	vjones@tbusd.org
Brad Kirby	Tulelake Irrigation District	tid@cot.net
Sean Cross	US Fish and Wildlife Modoc Refuge	sean_cross@fws.gov
Steve Clay	US Fish and Wildlife Modoc Refuge	steve_clay@fws.gov
Chris Lauppe	USDA Farm Service Agency	christopher.lauppe@ca.usda.gov
Bryon Hadwick	USDA Natural Resource Conservation	bryon.hadwick@ca.usda.gov
Mike Colbert	USDA Rural Develop. Agency	Mike. Colbert.ca.usda.gov
Albert Savage	USFS	albertsavage@fs.fed.us
Tyler Otterson	USFS	totterson@fs.fed.us
Jenny Jayo	USFS Range	jjayo@fs.fed.us
Tim Davis	USFS Tulelake	tedavis@fs.fed.us

Name	Organization	Email/Mailing Address
James Safford	Willow Ranch FPD	jmsafford@hotmail.com
Attendees, not on original list		
Bobby Ray	City of Alturas	
Cary Baker	City of Alturas	cary@cityofalturas.org
Keith Jacques	City of Alturas: Fire	keithj@citlink.net
Scott Packwood	Cal Fire	scott.packwood@fire.ca.gov
Isobel Lechner	Modoc Medical Center	I.Lechner@modocmedicalcenter.org
Dan Travertini	Likely Fire Department	ingodspower@hotmail.com
Jim Wills	Modoc Board of Supervisors	jimwills@co.modoc.ca.us
Judy Vroman	Modoc Auditor	judithvroman@co.modoc.ca.us
Ken Sandusky	USF S Modoc Dept. Forestry	klsandusky@fs.fed.us
Tara Shepherd	Modoc Health Services	tarashepherd@co.modoc.ca.us
Stacy Sphar	Modoc Health Services	stacysphar@co.modoc.ca.us
Lilly Toaetolu	Modoc Health Services	lilliantoaetolu@co.modoc.ca.us

A.2 Kickoff Meeting

A.2.1. Invite Letter

Mike Poindexter
SHERIFF-CORONER

Ken Richardson
Undersheriff

SHERIFF'S OFFICE
MODOC COUNTY

P.O. Drawer 460
211 East 1st Street
Alturas, CA 96101
(530) 233- 4416

April 23, 2015

Dear City of Alturas, Local Jurisdictions and Modoc County Departments or Designee:

In June, Modoc County Office of Emergency Services contacted Modoc County local jurisdictions: City of Alturas, fire, hospital, water, resource and other community districts to elicit their support in pursuing an all hazards assessment grant which was granted in November, 2015. Modoc County is now kicking off efforts to develop a Modoc County Local Hazard Mitigation Plan (LHMP) pursuant to the Disaster Mitigation Act of 2000 (DMA 2000). The purpose of the LHMP is to help reduce the impacts of natural hazards to the citizens, property and critical infrastructure in Modoc County. DMA 2000 requires that local governments have a FEMA approved Hazard Mitigation Plan in place in order to maintain their eligibility for certain pre- and post-disaster funding to protect communities from future disaster related losses. We are inviting you to take part in this plan development process as a member of the Hazard Mitigation Planning Committee (HMPC).

Community participation and coordination is a requirement of an approved plan, as is the inclusion of any proposed project your organization may want to submit for future FEMA mitigation funding (e.g., a flood, wildfire or severe weather mitigation project). Thus, your participation in this process is important and encouraged. You have key knowledge and data that will be needed to develop this plan; your input will be critical to our joint success. Participation includes:

- Attending and participating in the HMPC meetings (4 anticipated over the next 10 months)
- Providing available data/information requested of the HMPC
- Reviewing and providing comments on the plan drafts

The Modoc County Office of Emergency Services is taking the lead on coordinating the plan development for the County and the City of Alturas. The project kickoff meeting will be held on:

May 14, 2015, at 10:00 a.m., in the Sheriff's Annex, 211 East 1st, Alturas, CA

A public meeting is scheduled for the same day.

May 14, 2015, at 7:00 p.m. in the Sheriff's Annex, 211 East 1st Street, Alturas, CA 96101

This meeting will bring together key City and County departments as well as the twenty-five local jurisdictions. The kickoff meeting will provide an overview of the planning process and solicit input from the planning team. The purpose will be to select a working committee: Hazard Mitigation Planning Committee (HMPC).

Please RSVP and plan on attending or delegating attendance to this important LHMP kickoff meeting to Janie Bell, 233-4416, x247 or janiebell@modocsheriff.us by Monday, May 11.

A public stakeholder meeting will also be held the evening of the same day at 7:00 p.m. at the Sheriff's Annex.

For additional information, please contact A.J. McQuarrie at 530 233-4416, x 248 or email at **ajm@modocsheriff.us**.

A.2.2. Emailed Invites to Kickoff Meeting

From: Janie Bell [mailto:janiebell@modocsheriff.us]
Sent: Thursday, April 23, 2015 11:29 AM
To: Local Hazard Mitigation Plan/Hazards
Subject: Save the Date

Please see the attached flyer for the first meeting to begin the Local Hazard Mitigation Plan. I have contacted many of you by phone but this is additional information. There is also a meeting for the general public that we will be advertising on radio and media. It will also occur on May 14th, 7:00 p.m. at the Sheriff's Annex.

OES thanks you for your support in the hazard assessment process for Modoc County.

Please call if you have questions.

Janie Bell
Modoc County OES
PO Drawer 460
Alturas, CA 96101
530 233-4416 ext. 247

A.2.3. Invite to Kickoff Meeting – Stakeholders

Save the Date

May 14, 2015

Local Hazard Mitigation Planning (LHMP) for Modoc County

10:00 a.m.
Sheriff's Annex

Who Is Requested: City of Alturas and Modoc County department heads; Hospitals; Fire, Irrigation, Resource, School and Water Districts; Modoc Fire Safe Council; BLM; Cal Fire; Fish and Wildlife; and USFS.

What to Expect: Explanation of the Modoc County Hazards Mitigation Plan Project which will assess all natural and other hazards, resulting in prioritizing projects to mitigate effects from disasters.

What is Needed: Your participation for formation of the Hazard Mitigation Planning Committee.

Goal: To reduce the impacts of natural and man-made hazards to the citizens, property, and other critical infrastructure of Modoc County and City of Alturas which will result in a city and county FEMA approved Local Hazard Mitigation Plan.

For additional information: contact A. J. McQuarrie at 530-233-4416 or email ajm@modocsheriff.us

A.2.4. Invite to Kickoff Meeting – Public

Save the Date

May 14, 2015

Local Hazard Mitigation Planning (LHMP) for Modoc County

7:00 p.m.
Sheriff's Annex

Who Is Requested: Any member of the general public who would be interested in the hazard assessment and mitigation process.

What to Expect: Explanation of the Modoc County Hazards Mitigation Plan Project which will assess all natural and other hazards, resulting in prioritizing projects to mitigate effects from disasters.

What is Needed: Public input is requested as part of the planning process for the Local Hazard Mitigation Plan.

Goal: to reduce the impacts of natural and man-made hazards to the citizens, property, and other critical infrastructure of Modoc County and City of Alturas.

For additional information: contact A. J. McQuarrie at 530-233-4416 or email ajm@modocsheriff.us

A.2.5. Second Invite to Kickoff Meeting – Public

Mike Poindexter
SHERIFF-CORONER

Ken Richardson
Undersheriff

SHERIFF'S OFFICE
MODOC COUNTY

P.O. Drawer 460
211 East 1st Street
Alturas, CA 96101
(530) 233- 4416

April 14, 2014

MODOC COUNTY INVITES PARTICIPATION IN HAZARD MITIGATION PLAN

Modoc County is kicking off efforts to develop a Local Hazard Mitigation Plan (LHMP) for the County, the City of Alturas and participating communities. The purpose of this LHMP is to assess the risk from natural hazards such as floods, wildfires, drought and other severe weather events; to implement actions to reduce future losses; and to establish eligibility for federal mitigation funds in accordance with the Disaster Mitigation Act of 2000.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disasters. Some disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated through hazard mitigation planning.

The Modoc County Office of Emergency Services (OES) will be hosting meetings to kick off the LHMP development process. Officials from Modoc County, City of Alturas, special districts, state and local agencies, members of the public, and other interested stakeholders are invited to participate in this planning effort. A hazard mitigation planning committee will be established as part of the plan development process. The purpose of the kickoff meetings is to inform the planning committee, participating jurisdictions, and other interested stakeholders about the purpose and process of the plan and to describe how to participate and the benefits of doing so.

The plan development for Modoc County and the City of Alturas will be coordinating by Modoc County Office of Emergency Services. The project kickoff meeting will be held on:

May 14, 2015, at 7:00 p.m., in the Sheriff's Annex
211 East 1st Street, Alturas, CA 96101

Modoc County OES is developing this plan utilizing the expertise of consultants with Foster Morrison Consulting, LLC, a firm that specializes in hazard mitigation and emergency management. Please come to the kickoff meeting to learn more about hazard mitigation and the process Modoc County needs to utilize to prepare for, and avoid, future disasters.

For additional information, please contact A.J. McQuarrie at 530 233-4416, x248 or email at *ajm@modocsheriff.us*.

A.2.6. Press Release for Kickoff Meeting

Mike Poindexter
SHERIFF-CORONER

Ken Richardson
Undersheriff

SHERIFF'S OFFICE
MODOC COUNTY

P.O. Drawer 460
211 East 1st Street
Alturas, CA 96101
(530) 233- 4416

May, 2015

FOR IMMEDIATE RELEASE

MODOC COUNTY INVITES PARTICIPATION IN HAZARD MITIGATION PLAN

Modoc County is kicking off efforts to develop a Local Hazard Mitigation Plan (LHMP) for the County and participating communities. The purpose of this LHMP is to assess risk to natural hazards such as floods, wildfires, drought and other severe weather events; implement actions to reduce future losses; and establish eligibility for federal mitigation funds in accordance with the Disaster Mitigation Act of 2000.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disasters. Some disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated through hazard mitigation planning.

The Modoc County Office of Emergency Services (OES) will be hosting a meeting to kick off the LHMP development process. Officials from Modoc County; City of Alturas; special districts, state and local agencies; members of the public and other interested stakeholders are invited to participate in this planning effort. A hazard mitigation planning committee will be established as part of the plan development process.

The project kickoff meeting will be held on:

May 14, 2015, at 7:00 p.m., in the Sheriff's Annex
211 East 1st Street, Alturas, CA 96101

The purpose of the kickoff meetings is to inform the planning committee, participating jurisdictions, and other interested stakeholders about the purpose and process of the plan and to describe how to participate and the benefits of doing so.

Modoc County OES is taking the initiative to develop this plan utilizing the expertise of consultants with Foster Morrison Consulting, LLC, a firm that specializes in hazard mitigation and emergency management. Please come to the kickoff meeting to learn more about hazard mitigation and the LHMP process.

For more information on this project and how you can be involved, contact A.J. McQuarrie at 530-233-4416 or ajm@modocsheriff.us.

A.2.7. Kickoff Meeting Invite to Stakeholders

Mike Poindexter
SHERIFF-CORONER

Ken Richardson
Undersheriff

SHERIFF'S OFFICE
MODOC COUNTY

P.O. Drawer 460
211 East 1st Street
Alturas, CA 96101
(530) 233- 4416

MEMORANDUM

TO: COUNTY AND CITY OF ALTURAS DEPARTMENT HEADS, LOCAL JURISDICTIONS, FEDERAL AND STATE ENTITIES and OPERATIONAL AREA STAKEHOLDERS

FROM: MODOC COUNTY OES/CITY OF ALTURAS EMERGENCY PREPAREDNESS

DATE: MAY 4, 2015

RE: LOCAL HAZARD MITIGATION PLAN

The Modoc County Office of Emergency Services (OES) and the City of Alturas, in conjunction with Foster Morrison Consulting, LLC, a firm that specialized in hazard mitigation and emergency management, will be hosting a meeting to kick off the Local Hazard Mitigation Plan (LHMP) development process.

Community participation and coordination is a requirement of an approved plan, as is the inclusion of any proposed project your organization may want to submit for future FEMA project mitigation funding. Thus, your participation in this process is important and encouraged. You have key knowledge and data that will be needed to develop this plan; your input will be critical to our joint success. Participation includes:

The project kickoff meeting will be held on:

May 14, 2015, at 10:00 a.m. – 12:00 p.m., in the Sheriff's Annex, 211 E. 1st Street

This meeting will bring together key city and county departments as well as the twenty-five local jurisdictions. The kickoff meeting will provide an overview of the planning process and solicit input from the planning team. The purpose will be to select a working committee: Hazard Mitigation Planning Committee (HMPC).

Please RSVP and plan on attending or delegating attendance to this important LHMP kickoff meeting to Janie Bell, 233-4416, x247 or janiebell@modocsheriff.us.

For additional information, please contact A.J. McQuarrie at 530 233-4416 or email at ***ajm@modocsheriff.us*.**

A.2.8. Kickoff Meeting Article – May 7, 2014 in Modoc Record

PUBLIC INFORMATION MEETING LOCAL HAZARD MITIGATION PLAN

The Modoc County Office of Emergency Services (OES) and the City of Alturas, in conjunction with Foster Morrison Consulting, LLC, a firm that specialized in hazard mitigation and emergency management, will be hosting a meeting to kick off the Local Hazard Mitigation Plan (LHMP) development process. The purpose of this LHMP is to identify hazards; perform vulnerability and capability assessments; and develop mitigation strategies to implement actions to reduce future losses.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disasters. Some disasters are predictable and in many cases, much of the damage can be reduced or even eliminated through hazard mitigation planning.

TO GET INVOLVED PLEASE PLAN ON ATTENDING

DATE: Thursday, May 14, 2015
LOCATION: Sheriff's Annex Building at 211 E. 1st Street, Alturas, CA
TIME: 7:00 p.m.

For additional information, please contact A.J. McQuarrie at 530-233-4416 or email ajm@modocsheriff.us

5/7

AGENDA

MODOC COUNTY
LOCAL HAZARD MITIGATION PLAN (LHMP) PROJECT
KICKOFF MEETING - MAY 14, 2015

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. The Role of the Hazard Mitigation Planning Committee (HMPC)
4. Planning for Public Input
5. Coordinating with other Agencies
6. Hazard Identification
7. Data Needs
8. Questions and Answers

AGENDA

MODOC COUNTY
LOCAL HAZARD MITIGATION PLAN (LHMP)
PUBLIC MEETING - MAY 14, 2015

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. Modoc County LHMP Process
4. Questions and Answers

MODOC COUNTY AND CITY OF ALTURAS
Local Hazard Mitigation Plan
Thursday, May 14, 2015, 10:00 a.m. Sheriff's Annex

NAME	AFFILIATION	EMAIL ADDRESS	PHONE NUMBER
Dana Cook	BLM	dwcook@blm.gov	530-233-7929
Nai Lee	Watermaster	wailee@co.modoc.ca.us	530-640-3062
Brian Gallagher	CADFW	brian.gallagher@wildlife.ca.gov	530-310-4232
Dan Travertini	Likely Fire Dept	inggodspower@hotmail.com	530-233-4982
Stacey Hafen	Modoc Fire Safe Council / Humane Society / NorthCal-Neva RC&D	ncnrc-d@frontier.com	530-233-4314 ext. 114
Jim Wills	Modoc County Board of Supervisors	jimwills@co.modoc.ca.us	530-640-1363 cell
Judy Vroman	Auditors Office	judithvrooman@co.modoc.ca.us	530-233-6216
Steve Clay	Modoc NWR	steve_clay@fws.gov	530-233-3572
Ken Sandusky	MDF	klsandusky@fs.fed.us	233-8713
Albert Savage	MDF	[illegible]	233-8851
Mitch Crosby	MCRD	mitchcrosby@co.modoc.ca.us	233-6412

MODOC COUNTY AND CITY OF ALTURAS
Local Hazard Mitigation Plan
Thursday, May 14, 2015, 10:00 a.m. Sheriff's Annex

NAME	AFFILIATION	EMAIL ADDRESS	PHONE NUMBER
Cary Baker	City of Alturas	cary@cityofalturas.org	233-2512
Dewayne Matthews	Likely Fire PD	likelyfiredept@frontier	233-4817
JON WEHLENBERG	OES CITY OF ALTURAS		233-4500
Tara Shepherd	Health Services	tarashepherd@co.modoc.ca.us	6312
Stacy Sphar	"	stacysphar@co.modoc.ca.us	6312
JOE MORRIS	AG DEPT		6401
LILLY ~~TOMOROW~~	MCPHD	lilliantomorrow@co.modoc.ca.us	6311

MODOC COUNTY AND CITY OF ALTURAS
Local Hazard Mitigation Plan
Thursday, May 14, 2015, 10:00 a.m. Sheriff's Annex

NAME	AFFILIATION	EMAIL ADDRESS	PHONE NUMBER
KEITH JACQUES	ALTURAS CITY FIRE	keithj@citlink.net	
Paula Nichols	Dept Child Support	nichols.paula@ mpdc.csp.ca.gov	530-233-6232
Joe Picotte	City of Alturas	jpicotte@cityofalturas.org	233-2377
Nikki Munholand	Cedarville Rancheria	cr.munholand@gmail.com	2333969
Celeste R. Wilder	MMC	c.wilder@modocmedicalcenter.org	233-5131 ext 1411
John Dederick	City of Alturas	jdederick01@frontiernet.net	640-3251
Cheryl Baker	County Library	library@co.modoc.ca.us	530-233-6340
Jerry Cook	Information Technology	jerrycook@co.modoc.ca.us	530.233.4422

MODOC COUNTY AND CITY OF ALTURAS
Local Hazard Mitigation Plan
Thursday, May 14, 2015, 10:00 a.m. Sheriff's Annex

NAME	AFFILIATION	EMAIL ADDRESS	PHONE NUMBER
Greg Small	Fort Bidwell FPD / VFD	FBVFD@gsmall.us	530-279-2091
Kim Hunter	Modoc Co Planning	kimhunter@co.modoc.ca.us	(530) 233-7651
Cheryl Knoch	Modoc TTC	CherylKnoch@co.modoc.ca.us	233-6224
Bobby Ray	City of Alturas		233-4408
Scott Packwood	CAL FIRE	scott.packwood@fire.ca.gov	310-2236
Chester Robertson	Modoc Admin	cao@co.modoc.ca.us	233-7660
Isobel Lechner	MMC	I.LECHNER@MODOCMEDICALCENTER.ORG	233 7054

AGENDA

MODOC COUNTY
LOCAL HAZARD MITIGATION PLAN (LHMP)
PUBLIC MEETING - MAY 14, 2015

1. Introductions

2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements

3. Modoc County LHMP Process

4. Questions and Answers

The public meeting was advertised, but no one members of the public attended. Therefore there is no sign-in sheet for the public meeting. Members of the HMPC attended:

- AJ McQuarrie, Modoc County OES
- Janie Bell, Modoc County OES
- John Wellenmeyer, City of Alturas
- Scott Walker, CAL FIRE
- Jeanine Foster, Foster Morrison Consulting

A.3 Risk Assessment/Mitigation Strategy Meetings

A.3.1. Emailed Invites to Risk Assessment/Mitigation Strategy Meetings with Save the Date Flyer

From: Janie Bell [mailto:janiebell@modocsheriff.us]
Sent: Monday, September 21, 2015 11:13 AM
To: Local Hazard Mitigation Plan/Hazards <lhmp@modocsheriff.us>
Subject: Save the Date

Please see the attached flyer. We really need your input!

More information will be sent next week.

Janie Bell
Modoc County OES
PO Drawer 460
Alturas, CA 96101
530 233-4416 ext. 247

A.3.2. Invite to Risk Assessment/Mitigation Strategy Meetings

Mike Poindexter
Sheriff – Coroner

AJ McQuarrie
Deputy Director OES

Save the Date

Who: Local Hazard Mitigation Partners

What: Review hazard analysis and prioritize projects

When: Two Meetings

- **October 21st, Afternoon, 1:00 – 4:00**

  Purpose: Review hazard data

- **October 22nd, Morning, 9:00 – 12:00**

  Purpose: Finalize goals and identify mitigation actions

Where: Sheriff's Annex, 211 East 1st Street, Alturas, CA

It is critical that we have key County and City departments as well as community groups who are involved with wildfire and flood projects. Please try to attend.

If you have questions, call AJ McQuarrie at 530 233-4416 or ajm@modocsheriff.us.

A.3.3. Email Reminder to Stakeholders

From: Janie Bell [mailto:janiebell@modocsheriff.us]
Sent: Tuesday, October 20, 2015 11:20 AM
To: Local Hazard Mitigation Plan/Hazards <lhmp@modocsheriff.us>
Subject: Reminder

We hope to see you tomorrow for the meetings: 1:00 on Wednesday to review hazard data and prioritize the most likely hazards; and 9:00 on Thursday to set mitigation projects.

These meetings are critical for future projects and reimbursement for incidents. We need everyone's input.

Janie Bell
Modoc County OES
PO Drawer 460
Alturas, CA 96101
530 233-4416 ext. 247

A.3.4. Stakeholder Invitation to Risk Assessment/Mitigation Strategy Meeting

Mike Poindexter
SHERIFF-CORONER

Ken Richardson
Undersheriff

SHERIFF'S OFFICE
MODOC COUNTY

P.O. Drawer 460
Alturas, CA 96101
(530) 233- 4416

October 7, 2015

Dear Emergency Stakeholders:

The Local Hazard Mitigation Plan Update meetings have been set to October 21, 2015 1:00 p.m. to 4:00 p.m., and October 22, 2015, 9:00 a.m. to 12:00 p.m. Both meetings will be held at the Sheriff's Annex Conference room, 211 E. 1st Street, Alturas, CA. Plan completion is dependent upon your attendance of these meetings.

The scheduled meetings will cover the following:

Risk Assessment/Goal Meeting:
HMPC Meeting #2, October 21, 2015

- **Risk Assessment Task:** Risk Assessment is comprised of the Hazard Identification and Profiles, Vulnerability Assessment, and Capability Assessment.
- **Map and Table Review:** Review of vulnerabilities and specific hazards across the planning area.
- **Outstanding data needs:** Final input from the County and City of Alturas.
- **Update Plan Goals and Objectives**.

Mitigation Strategy Development:
HMPC Meetings #3 October 22, 2015

- **Finalization of updated plan goals and objectives:** Identification of mitigation actions for each priority hazard, including prioritization of identified mitigation actions.
- **Overview:** Development of implementation worksheets for all mitigation action items. .

Anyone with projects to address the priority hazards for the plan should be attending both of these meetings. Priority Hazards include: **Agricultural; Dam Failure; Drought and Water Shortage; Earthquake; Erosion; Flood, 100-500 year; Flood: Localized Flooding; Landslide, mudslide, and debris flow; Levee Failure; Severe Weather: Extreme cold, freeze, winter weather; Severe Weather: Heavy Rain and Storms; Severe Weather: High Winds/Tornadoes; Volcano; Wildfire; and Hazardous Materials**

If you should have any questions please feel free to contact me at (530) 233-4416 or e-mail at ajm@modocsheriff.us.

Thanks,

AJ McQuarrie
Deputy Director
Modoc County OES

AGENDA

Modoc County
Local Hazard Mitigation Plan (LHMP)
Risk Assessment/Mitigation Strategy Meetings
October 21 & 22, 2015

HMPC Meeting #2:

1. Introductions
2. Status of the DMA Planning Process
3. Overview of Risk Assessment
4. Develop Plan Goals and Objectives

HMPC Meeting #3

1. Identify and discuss Mitigation Alternatives/Projects
2. Review Mitigation Selection Criteria
3. Prioritize Mitigation Projects
4. Review of Schedule/Data Needs

SIGN-IN SHEET
Modoc County
LOCAL HAZARD MITIGATION PLAN PROJECT
HMPC Mitigation Strategy Meeting #2
October 21, 2015

Name/Title	Email Address	Phone	City/Organization/ Affiliation
Paula Sam	paulasbishop aol		Fort Bidwell Tribe
Loraine Zangger	lzangger@fs.fed.us	530-667-8665	Modoc NF
Steve Walker	steve.walker@fire.ca.gov	310-2214	CAL Fire
Pat Green	CVFPD@FRONTIERNET.NET	530 640-2333	Cedarville FMO
Jim Irvin	irvin2@frontiernet.net	530 233 2928	City of Alturas
Ken McGarva		530 233 4809	South Fork Irrigation Dist
Greg Small	FBUFD@gsmall.us	530-279-2091	FBUFD
Megan Wright	M.wright@modocmedicalcenter.org	ext 1418 530-233-5131	Modoc Medical Center
Dominic Burmack	dominicburmack@co.modoc.ca.us	233-6413	Modoc Co BLDG
Celeste R. Wilde	c.wilde@modocmedicalcenter.org	233-5131 x1411	MMC
Dana Cook	dwcook@blm.gov	640-2224	BLM
Chester Robertson	cao@co.modoc.ca.us	233-7660	MODOC ADMIN
Kim Hunter	kimhunter@co.modoc.ca.us	233-7451	Co. Planning

SIGN-IN SHEET
Modoc County
LOCAL HAZARD MITIGATION PLAN PROJECT
HMPC Mitigation Strategy Meeting #2
October 21, 2015

Name/Title	Email Address	Phone	City/Organization/ Affiliation
Joe Johnston / Battalion Chief	Jjohnston01@FS.FED.US	530-233-8877	US Forest Service
Pearce Flournoy	wcranch@frontiernet.net	640-4914	Modoc RCD
Stacy Hafen	ncnrc_d@frontier.com ModocFiresafecouncil@gmail.com	530-233-4314 ext. 114	North Cal-Neva RC&D Council Modoc Fire Safe Council
Joseph Moreo		233 6401	AG DEPT SEALER AIR POLLUTION
Joe Picotte	jpicotte@cityofalturas.org	233-2377	City of Alturas

SIGN-IN SHEET
Modoc County
LOCAL HAZARD MITIGATION PLAN PROJECT
HMPC Mitigation Strategy Meeting #3
October 22, 2015

Name/Title	Email Address	Phone	City/Organization/ Affiliation
Stan Walker			Cal Fire
Art Green			[illegible] Fire
Albert SAVAGE			Modoc National Forest
Curtis D. Wilder	cwilder@modocmedicalcenter	233-8131 x 1411	MMC
Stacey HAFEN	NCNRC_D@Frontier.com modocfiresafecouncil@gmail.com	530-233-4314 EXT. 114	north cal-neva rc&d council ~~[illegible]~~ & Modoc Fire Safe Council
Kathie Rhoads	Kathierhoads@co.modoc.CA.us	530-233-1962	County Board of supervisors
Joe Moreo		530 233 6401	MODOC AG DEPT.
KIM Hunter			
Chester Robertson	cao@co.modoc.ca.us	530-233-7660	MODOC CO. ADMIN
Pearce Flournoy	wcranch@frontiernet.net	530-640-4914	Modoc RCD
Ken McGarva		530 233 4809	South Fork I.D.

A.4 Emailed Invite to Final Meeting

Email, agenda, sign in sheets

A.5 Meeting Handouts

Below are the handouts for each meeting. Handouts specific to the Risk Assessment Meeting can be found in Appendix C.

Modoc County Hazard Identification and Profiles – 2015

Modoc County Historic Hazard Occurrences

Table A-3 NCDC Severe Weather Events for Modoc County 1950-12/31/2014

Event Type	Number of Events	Deaths	Injuries	Property Damage	Crop Damage
Avalanche	0	0	0	$0	$0
Blizzard	2	0	0	$0	$0
Cold/Wind Chill	4	0	0	$0	$0
Extreme Cold/Wind Chill	28	0	0	$0	$0
Flash Flood	2	0	0	$0	$0
Flood	4	0	0	$332,500,000	$0
Frost/Freeze	47	0	0	$0	$0
Hail	4	0	0	$0	$60,000
Heavy Snow	42	0	0	$0	$0
High Wind	33	0	0	$30,000	$0
Lightning	1	0	0	$0	$0
Strong Wind	2	0	0	$0	$0
Thunderstorm Wind	3	0	0	$36,000	$0
Wildfire	10	0	0	$1,000,000	$0
Winter Storm	3	0	0	$0	$0
Winter Weather	7	0	0	$0	$0
Total	**191**	**0**	**0**	**$333,566,000**	**$60,000**

Source: NCDC

Table A-4 Disaster Declaration History 1950-2014

Hazard Type	Disaster Name	Disaster Number	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Costs
Flood	1962 Floods and Rains	–	10/17/62, 10/25/62, 10/30/62, & 11/4/62	10/24/1962	–	–	$4,000,000
Flood	1964 Storms	DR-183	12/22/64, 12/23/64, 12/28/64, 1/5/65, & 1/14/65	12/29/1964	–	–	$213,149,000
Flood	1969 Storms	DR-253	1/23/69, 1/25,69, 1/28/69, 1/29/69, 2/8/69, 2/10/69, 2/16/69, 3/12/69	1/26/1969	47	61	$300,000,000
Flood	1970 Northern California Flooding	DR-283	1/27/1970, 2/3/1970, 2/10/1970, 3/2/1970	2/16/1970	–	–	$27,657,478
Freeze	1972 Freeze	–	4/17/72, 5/22/72, 5/31/72	–	–	–	$111,517,260
Fire	Scarface Fire	FS-2028	–	8/1/1977	–	–	–
Flood	1986 Storms	DR-758	2/18-86 - 3/12/86	2/18/86	13	67	$407,538,904
Fire	1987 Wildland Fires	GP	9/10/87, 9/3/87	–	3	76	$18,000,000
Flood	1992 Late Winter Storms	DR-979	1/7/93 - 2/19/93	1/15/1993	20	10	$226,018,111
Earthquake	1993 Klamath Earthquake	–	10/93	–	–	–	–
Severe Storm/ Flood	Late Winter Storms	DR-1044	–	1/10/95	17	–	$1.1 billion
Flood	January 1997 Floods	–	01/03/97	–	8	–	$1.8 billion
Drought	Modoc/ Siskiyou Drought	GP 2001-03	5/4/2001	–	–	–	$14,858,480

Hazard Type	Disaster Name	Disaster Number	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Costs
Flood	Rain and Flooding (Modoc)	GP 2005-04	5/1/2004	–	–	–	$295,809
Flood	Modoc Storms	GP 2008-04	–	–	–	–	$909,499
Storms	Modoc Jan 2011 Storms	GP 2011-01	03/03/2011	–	–	–	$385,788
Drought	California Drought	GP 2014-13	1/17/2014	–	–	–	–
Wildfire	Day Fire	FM-5070		8/3/2014	–	–	–

Modoc County 2015 LHMP Hazards

Table A-5 Hazards Comparison List

Modoc County EOP*	2013 State of California Plan Applicable Hazards	Proposed 2015 Hazards (Natural)
Avalanche	Agriculture Pests and Diseases	Agriculture Pests and Diseases
Dam Break	Avalanche	Avalanche
Drought	Coastal Flooding, Erosion and Sea Level Rise	Dam Failure
Earthquake	Dam Failure	Drought and Water Shortage
Flooding	Droughts and Water Shortage	Earthquake
Landslides	Earthquake	Flood: 100/500 year
Severe Storms	Epidemic/Pandemic/Vector Borne Disease Hazards	Flood: Localized Stormwater Flooding
Volcano	Extreme Heat	Landslide
Wildfire	Flood	Levee Failure
Hazardous Materials	Freeze	Severe Weather: Extreme Cold, Freeze, Winter Storms
	Hazardous Materials Release/Oil Spills	Severe Weather: Extreme Heat
	Landslide	Severe Weather: Heavy Rains and Storms
	Levee Failure	Severe Weather: Wind
	Severe Weather and Storms	Volcano
	Volcano	Wildfire
	Wildfire	Hazardous Materials

Table A-6 Modoc County Hazard Identification Table (Blank)

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agriculture Pests and Diseases				
Avalanche				
Dam Failure				
Drought and Water Shortage				
Earthquake				
Flood: 100/500 year				
Flood: Localized Stormwater Flooding				
Landslide				
Levee Failure				
Severe Weather: Extreme Heat				
Severe Weather: Freeze				
Severe Weather: Heavy Rains and Storms				
Severe Weather: Winter Storms and Extreme Cold				
Severe Weather: Wind				
Volcano				
Wildfire				
Hazardous Materials				

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

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

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Table A-7 City of Alturas Hazard Identification Table (Blank)

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agriculture Pests and Diseases				
Avalanche				
Dam Failure				
Drought and Water Shortage				
Earthquake				
Flood: 100/500 year				
Flood: Localized Stormwater Flooding				
Landslide				
Levee Failure				
Severe Weather: Extreme Heat				
Severe Weather: Freeze				
Severe Weather: Heavy Rains and Storms				
Severe Weather: Winter Storms and Extreme Cold				
Severe Weather: Wind				
Volcano				
Wildfire				
Hazardous Materials				

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

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

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Modoc County
2015 Local Hazard Mitigation Plan
Participating Jurisdiction: Vulnerability & Capability Worksheets

Name of Jurisdiction: ____

Hazard Risk, and Vulnerability Questions

Localized/Stormwater Flooding

1. Please describe the localized/stormwater flood issue specific to your jurisdiction in paragraph form. In addition, please complete a table similar to the below example detailing types and location of localized/stormwater flooding problems. If available, also attach a map of problem areas.

Localized Flooding Description (paragraph)

Localized Flooding Areas

Road Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees

Earthquake Vulnerability

1. Number of unreinforced masonry buildings. If available, please provide an inventory of URM buildings specific to your jurisdiction. Include any tables and/or maps. Is this a layer available in GIS?

Special Populations

1. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

Development Trends

1. Describe development trends and expected growth areas and how they relate to hazard areas and vulnerability concerns/issues. Please provide any maps and tables detailing areas targeted for future development within your jurisdiction.

Hazard Mitigation Projects

5. By hazard, list any other past or ongoing mitigation projects or programs implemented by the community, designed to reduce disaster losses. Please provide a brief description and details on past mitigation projects.

6. For any responses requiring additional detail, please provide additional information below:

WORKSHEET #4: MITIGATION CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

The following planning and land management tools are typically used by local jurisdictions to implement hazard mitigation activities. Please indicate which of the following your jurisdiction has in place. If your jurisdiction does not have this capability or authority, please indicate in the comments column if a higher level of government has the authority.

Plans	**Y/N Year**	**Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan		
Capital Improvements Plan		
Economic Development Plan		
Local Emergency Operations Plan		
Continuity of Operations Plan		
Transportation Plan		
Stormwater Management Plan/Program		
Engineering Studies for Streams		
Community Wildfire Protection Plan		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code		Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score:
Fire department ISO rating:		Rating:
Site plan review requirements		
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance		
Subdivision ordinance		
Floodplain ordinance		

Natural hazard specific ordinance (stormwater, steep slope, wildfire)	
Flood insurance rate maps	
Elevation Certificates	
Acquisition of land for open space and public recreation uses	
Erosion or sediment control program	
Other	
How can these capabilities be expanded and improved to reduce risk?	

Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your jurisdiction. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, please indicate so in the comments column.

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission		
Mitigation Planning Committee		
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official		
Floodplain Administrator		
Emergency Manager		
Community Planner		
Civil Engineer		
GIS Coordinator		
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**

Warning systems/services (Reverse 911, outdoor warning signals)	
Hazard data and information	
Grant writing	
Hazus analysis	
Other	
How can these capabilities be expanded and improved to reduce risk?	

Fiscal

Identify whether your jurisdiction has access to or is eligible to use the following financial resources for hazard mitigation

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds		
Incur debt through private activities		
Community Development Block Grant		
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Education and Outreach

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

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)		
Natural disaster or safety related school programs		
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues		
Other		
How can these capabilities be expanded and improved to reduce risk?		

National Flood Insurance Program (NFIP) Worksheet

Use this worksheet to collect information on your community's participation in and continued compliance with the NFIP, as well as identify areas for improvement that could be potential mitigation actions.

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	FM to complete
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FM to complete
How many structures are exposed to flood risk within the community?	FM to complete
Describe any areas of flood risk with limited NFIP policy coverage	
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	

NFIP Topic	Comments
What are the barriers to running an effective NFIP program in the community, if any?	
Compliance History	
Is the community in good standing with the NFIP?	
Are there any outstanding compliance issues (i.e., current violations)?	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	
Is a CAV or CAC scheduled or needed?	
Regulation	
When did the community enter the NFIP?	FM to complete
Are the FIRMs digital or paper?	FM to complete
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	
Provide an explanation of the permitting process.	
Community Rating System	
Does the community participate in CRS?	
What is the community's CRS Class Ranking?	
What categories and activities provide CRS points and how can the class be improved?	
Does the plan include CRS planning requirements?	

Prepared by:	Date	Email	Phone

Appendix B References

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U.S. Forestry Service

U.S. Geological Survey.

Western Regional Climate Center.

Appendix C Mitigation Strategy

Modoc County
Local Hazard Mitigation Plan
Risk Assessment & Mitigation Strategy Meetings
October 21 & 22, 2015

Table of Contents

Day 1:

Day 2:

Jeanine Foster (jeanine.foster@fostermorrison.com)

Foster Morrison Consulting, Ltd.

AGENDA

Modoc County
Local Hazard Mitigation Plan (LHMP)
Risk Assessment/Mitigation Strategy Meetings
October 21 & 22, 2015

HMPC Meeting #2:

1. Introductions
2. Status of the DMA Planning Process
3. Overview of Risk Assessment
4. Develop Plan Goals and Objectives

HMPC Meeting #3 September 23rd

1. Identify and discuss Mitigation Alternatives/Projects
2. Review Mitigation Selection Criteria
3. Prioritize Mitigation Projects
4. Review of Schedule/Data Needs

Risk Assessment & Mitigation Strategy Meetings

Day 1

Hazard Identification & Profiles

Table 1 Modoc County Hazard Identification Table

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance
Agriculture Hazards	Extensive	Highly Likely	Catastrophic	High
Avalanche	Limited	Unlikely	Negligible	Low
Dam Failure	Significant	Occasional	Critical	Medium
Drought and Water Shortage	Extensive	Likely	Catastrophic	High
Earthquake	Extensive	Occasional	Catastrophic	Medium
Erosion	Extensive	Highly Likely	Limited	Medium
Flood: 100/500 year	Significant	Occasional	Limited	Medium
Flood: Localized Stormwater Flooding	Extensive	Highly Likely	Limited	Medium
Landslide, Mudslides, and Debris Flows	Significant	Highly Likely	Critical	Medium
Levee Failure	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Cold, Freeze, Winter Weather	Extensive	Highly Likely	Critical	High
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)	Extensive	Highly Likely	Critical	High
Severe Weather: High Winds/Tornadoes	Extensive	Highly Likely	Limited	High
Volcano	Extensive	Unlikely	Critical	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High
Hazardous Materials Transport	Limited	Occasional	Limited	Medium

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

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

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Table 2 City of Alturas Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agriculture Hazards	Limited	Highly Likely	Negligible	Low
Avalanche	Limited	Unlikely	Negligible	Low
Dam Failure	Significant	Unlikely	Critical	High
Drought and Water Shortage	Extensive	Highly Likely	Catastrophic	High
Earthquake	Extensive	Unlikely	Limited	Low
Erosion	Limited	Highly Likely	Limited	Medium
Flood: 100/500 year	Significant	Occasional	Critical	High
Flood: Localized Stormwater Flooding	Extensive	Highly Likely	Limited	Medium
Landslide, Mudslides and Debris Flows	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Occasional	Limited	Medium
Severe Weather: Extreme Cold, Freeze, Winter Weather	Extensive	Highly Likely	Catastrophic	High
Severe Weather: Extreme Heat	Extensive	Highly Likely	Negligible	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, hail, lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: High Winds/Tornadoes	Extensive	Highly Likely	Limited	Medium
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Wildfire	Extensive	Highly Likely	Catastrophic	High
Hazardous Materials Transport	Extensive	Occasional	Catastrophic	High

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

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
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Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
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Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

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

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

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

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: Modoc County Planning Area

Agricultural Hazard

- Need more local input on Ag issues
- LOFO: Highly Likely
- Vulnerability: High
- Priority Hazard

Avalanche

- The NCDC database shows no past occurrences of avalanche in the County. This is not to say that avalanche has not occurred. It may have occurred and not been recorded in the database, or it may have occurred in an area of the County that is not populated. HMPC – ANY PAST OCCURRENCES OF AVALANCHE? PHOTOS, DAMAGES, ETC?
- LOFO: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

Dam failure

- There are 83 dams in Modoc County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 83 dams, 6 are rated as High Hazard, 11 as Significant Hazard, and 31 as Low Hazard. 35 dams in the County are not rated by the Division of Safety of Dams.
  There are also dams outside the County that, should they fail, have the ability to impact Modoc County.
- LOFO: Occasional
- Vulnerability: Medium – High?
- Priority Hazard

Drought and Water Shortage

- 6 significant multi-year historical Dry Periods in California since 1850
- Since 2012, snowpack levels in California have dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels.
- 2 disaster declarations Modoc County; 1 drought emergency since 1950
- HMPC – CAN YOU PROVIDE IMPACT/DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE COUNTY RECENTLY
- LOFO: Occasional
- Vulnerability: High
- Priority Hazard

Earthquake

- 2014 USGS/CGS model indicates that Modoc County has a low to moderate risk of earthquake occurrence.
- There has been one disaster declarations in the County for the 1993 Klamath earthquake. DAMAGE DETAILS?

- LOFO: Occasional– large, damaging earthquake; Occasional – minor earthquake
- Vulnerability: Medium – High?
- Priority Hazard

Erosion

- According to the HMPC, erosion from wind and heavy rains occurs on an annual basis in the County. No database tracks this information. The February 14, 2013 Preliminary FIS noted that during January 1995, a significant storm event was experienced in the area. No flooding occurred; however, there was some channel erosion, sediment deposition, and slope protection damage in the project area. As a result, the USACE performed a rehabilitation project under Public Law 84-99, which included sediment removal and the repair of eroded areas and slope protection. .
- HMPC – CAN YOU HELP US WITH OTHER PAST OCCURRENCES OF STREAM EROSION? PICTURES AND DESCRIPTIONS ARE GREAT, AS WELL AS ANY LOSSES.
- LOFO: Highly Likely
- Vulnerability: Low-Medium?
- Non-Priority Hazard

Flood Hazards

100/500 year

- Ongoing flood history in County; although levees have historically provided additional protection
- 10 state and federal declaration for storms and flooding from 1950-present
- ANY DETAILS ON MAJOR FLOOD EVENTS, IMPACTS/ DAMAGES, PROBLEM AREAS?
- LOFO: 100-Occasional; 500-Unlikely
- Vulnerability: High
- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the County – occurs annually
- CAN THE HMPC PROVIDE ADDITIONAL DETAILS ON THESE AREAS? PICTURES/DESCRIPTIONS (City of Alturas especially)
- LOFO: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Landslides and Debris Flows

- The HMPC noted that Surprise Valley is at the base of the Warner Mountains – where historically, much of this mountain came down. The EOP noted the greatest impact from mass wasting will be the isolation of communities due to damage to the transportation and utility infrastructures, including communications, road closures, and subsequent damage.
- HMPC – PAST OCCURRENCES? NATIONAL DATABASES SHOW NO LANDSLIDES. DO LANDSLIDES HAPPEN, BUT NOT IN AREAS THAT ARE POPULATED OR DEVELOPED IN THE COUNTY?

- LOFO: ???
- Vulnerability: Low – Medium?
- Non-Priority Hazard?

Levee Failure

- Existing levees have recently been decertified as not providing protection from the 1% Annual Chance Flood
- NEED LEVEE STATUS MAP AND TABLE
- No past occurrences of levee failure. TRUE?
- The 2013 FIS noted that no significant flood problems have been experienced in the City of Alturas since the completion of the USACE channel modification and levee improvement project in 1972.
- LOFO: Unlikely based on no past occurrences, But?
- Vulnerability: Medium
- Priority Hazard

Severe weather

Extreme cold, freeze, winter storms

- Annual occurrences – severe winter storms every year
- Numerous past occurrences – potentially a significant issue – an isolating winter storm (isolates the County and various remote communities)
- LOFO: Highly Likely
- Vulnerability: High
- Priority Hazard

Extreme heat

- Annual occurrences – it gets hot every summer
- The NCDC database reported no extreme heat events for the County. A preliminary search of an alternate database (SHELDUS) showed one event in 1992 that affected all of California. No deaths, injuries, or damages due to that heat event were shown to have occurred in the County.
- Climate change might affect this hazard in the future
- LOFO: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

Heavy rains and storms

- Significant County history: annual occurrences
- Severe storms/heavy rains are the primary cause of most major flooding
- LOFO: Highly Likely
- Vulnerability: Medium – High?
- Priority Hazard

Wind (includes tornadoes)

- The NCDC data recorded 38 wind and tornado incidents for Modoc County since 1993.
- LOFO: Highly Likely
- Vulnerability: Low – Medium?
- Non-Priority Hazard?

Volcano

- Medicine Lake, Mount Shasta, and Lassen Peak are the closest volcanoes to Modoc County.
- ANY PAST ISSUES/OCCURENCES?
- LOFO: Unlikely based on no past occurrences
- Vulnerability: Low- Medium?
- Non-Priority Hazard

Wildfire

- Wildfires occur on an annual basis in the Modoc County Planning Area
- Modoc County received a state disaster declarations in 1977 and a federal disaster declaration in 2014 for the Day Fire
- Any ignition has the potential to become an out of control fire
- Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

*LOFO=Likelihood of Future Occurrence

Priority Hazards by Jurisdiction

Unincorporated Modoc County

- Agricultural Hazards
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 100/200/500–year
- Flood: Localized/Stormwater
- Landslides, mudslides, debris flows
- Levee Failure
- Severe Weather: Extreme Cold, Freeze, Winter Weather
- Severe Weather: Heavy rains and storms
- Severe Weather: High Winds
- Volcano
- Wildfire
- Hazardous Materials Transportation Incidents

City of Alturas

- Dam Failure
- Drought & Water Shortage
- Flood: 100/200/500–year
- Flood: Localized/Stormwater
- Levee Failure
- Severe Weather: Extreme Cold, Freeze, Winter Weather
- Severe Weather: Heavy rains and storms
- Severe Weather: High Winds
- Volcano
- Wildfire
- Hazardous Materials Transportation Incidents

Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

1. Mitigation Goals
2. Mitigation Actions
3. Action (Implementation) Plan

Mitigation Goals

Up to now, the HMPC has been involved in collecting and providing data for the Modoc County Local Hazard Mitigation Plan Update. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the Modoc County planning area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead us to incorporating these improvements into the Mitigation Strategy portion of the plan. Our planning goals should provide direction for what loss reduction activities can be undertaken to make the planning area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation cost, schedule, and means are not considered. Goals are public policy statements that:

- Represent basic desires of the jurisdiction;
- Encompass all aspects of planning area, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.

Goals statements will form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.

The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.

Finally, before we formulate our goals, we should discuss other planning area goals from other regional/county/city programs and priorities. This keeps us from "reinventing the wheel," as well as being consistent with Multi-Objective Management --- or "MOM" --- where communities strive for efficiency by combining projects/needs that are similar in nature or location. Utilizing "MOM" effectively can result in identifying multiple sources of funding that can be "packaged" and broadening the supporting constituency base by including "outcomes" desired by various stakeholder groups.

Types/Sources of other area mitigation plans and programs include:

- Emergency Operations Plans
- General Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans
- Community Wildfire Protection Plans
- Dam Failure Plans
- Other?

Sample Goals from other Plans

Goals from the 2013 California State Hazard Mitigation Plan

4. Significantly reduce life loss and injuries
5. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities
6. Protect the environment
7. Promote hazard mitigation as an integrated public policy and as a standard business practice

Goals from the Modoc County General Plan

The ***Safety Element*** addresses four separate hazards: geologic hazards, seismic hazards, wildfire hazards, and flood hazards. Specific goals and policies related to mitigation from the Safety Element include:

GOAL: TO PROTECT THE FUBLIC HEALTH AND SAFETY THROUGH LIMITATION OF DEVELOPMENT IN HAZARDOUS AREAS.

Policies:

- 1. The County should not permit new development on land which has been identified as environmentally unsound to support such development.
- 2. Any development on hillsides should be sited in the least obtrusive fashion, minimizing the extent of topographic alteration. In any case, development should be restricted to slopes of 30% or less.
- 3. New development should demonstrate the availability of adequate fire protection and suppression facilities.
- 4. Recommendations within the state Fire Safe Guide should be implemented wherever practical in Modoc County.

Actions:

- 1. Zone or otherwise designate all areas within potential hazard areas so as to insure safe development or appropriate mitigation measures.

- 2. Prepare a hillside development ordinance and implement same in the review and approval of development in slope areas.
- 3. Review the existing flood zoning to insure that all potential flood hazard areas are adequately zoned.
- 4. Implement all appropriate recommendations of the Fire Safe Guide.

Goals from Modoc County Emergency Operations Plan (EOP)

The EOP's purpose is to effectively and efficiently organize and coordinate the county's response to major emergencies by:

- Identifying major natural and manmade hazards, threats to life, property, and/or the environment
- Managing and coordinating emergency operations in unincorporated areas of the operational area
- Assigning emergency management responsibilities and tasks
- Describing predetermined actions to be taken by departments, agencies and districts to respond to emergencies and eliminate or mitigate the effects of disasters
- Documenting and maintaining the resource capabilities within the operating area
- ·Coordinating resources within the operational area
- ·Coordinating mutual aid
- ·Requesting and allocating resources from outside the county
- ·Enhancing cooperative agreements and coordination with community agencies, mutual aid jurisdictions, State, and Federal agencies

This plan provides for:

- Mitigation, preparedness, response, and recovery policy and procedures
- Disaster and emergency responsibilities
- Training and public education activities

This plan is strategic and addresses the following functions:

- Operational area emergency response
- Communications and warning systems
- Rapid utilization of resources
- Coordinated post-disaster response and recovery
- Annual training and exercises to assess emergency response capabilities
- Clearly defined responsibilities for departments, agencies, and districts through a function annex approach

Goal Development

You will each be given 3 sticky notes. On each note you will write what you think the goals for this mitigation planning effort should be. To get you started, provided below are possible goals for this mitigation plan. You may reword these or develop your own. These goal statements should serve as examples. It is vital that our Hazard Mitigation Planning Committee establish its own goals. Use one note for each goal. The purpose of the goal development is to reach a consensus on plan goals.

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-4 goals for the plan.

Risk Assessment and Mitigation Strategy Meetings
Day 2

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Measures

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not in¬crease damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
  - ✓ Subdivision regulations
  - ✓ Building Codes
    - Fire-Wise Construction
  - ✓ Floodplain development regulations
  - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
  - ✓ NOAA Weather Radio
  - ✓ Sirens
  - ✓ "Reverse 911" (Emergency Notification System)
- Emergency Response
  - ✓ Evacuation & Sheltering
  - ✓ Communications
  - ✓ Emergency Planning
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Passing out sand and sandbags (public works)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

    - ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
    - ✓ Lifeline Utilities Protection
- ➢ Post-Disaster Mitigation
- ➢ Building Inspections
    - ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- ➢ Retrofitting/disaster proofing
    - ✓ Floods
        - Wet/Dry floodproofing (barriers, shields, backflow valves)
        - Relocation/Elevation
        - Acquisition
        - Retrofitting
    - ✓ High Winds/Tornadoes
        - Safe Rooms
        - Securing roofs and foundations with fasteners and tie-downs
        - Strengthening garage doors and other large openings
    - ✓ Winter Storms
        - Immediate snow/ice removal from roofs, tree limbs
        - “Living” snow fences
    - ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
        - Anchoring, bracing, shear walls
        - Dewatering sites, agricultural practices
        - Catch basins
    - ✓ Drought
        - Improve water supply (transport/storage/conservation)
        - Remove moisture competitive plants (Tamarisk/Salt Cedar)
        - Water Restrictions/Water Saver Sprinklers/Appliances
        - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
        - Create incentives to consolidate/connect water services
        - Recycled wastewater on golf courses
    - ✓ Wildfire, Grassfires
        - Replacing building components with fireproof materials
        - Roofing, screening
        - Create “Defensible Space”
        - Installing spark arrestors
        - Fuels Modification

- ✓ Noxious Weeds/Insects
    - Mowing
    - Spraying
    - Replacement planting
    - Stop overgrazing
    - Introduce natural predators
- Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- Best Management Practices

Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

1. Avoidance: setting construction projects back from the stream.
2. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
3. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained

- Dumping Regulations
- Set-back regulations/buffers

- Fuels Management
- Water Use Restrictions
- Landscape Management
- Weather Modification

STRUCTURAL: Projects that have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they “stop” flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Anchoring, grading, debris basins (for landslides)
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard Maps and Data
- Outreach Projects (mailings, media, web, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Mitigation Strategy: Action Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation actions and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Tem Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect …
  - ✓ The largest # of people exposed to risk?
  - ✓ The largest # of buildings?
  - ✓ The largest # of jobs?
  - ✓ The largest tax income?
  - ✓ The largest average annual loss potential?
  - ✓ The area impacted most frequently?

    - ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization Instructions

Our Team recommendations are listed on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on the recommendations, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any recommendation --- or you may spread them out using as few of your dots as you wish. The dots will indicate the consensus of the team.

Use your list of criteria to help you make your determinations.

After the totals are counted, we will discuss them further to confirm or change any of the results as we see fit.

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

Modoc County LHMP
Mitigation Strategy: Draft Goals v.1
October 22, 2015

Goal 1: Minimize risk and vulnerability of Modoc County to the impacts of natural hazards and protect lives and reduce damages and losses to property; critical infrastructure and services; economy; and the environment.

- Provide for safety of residents, public, contractors, and responders
- Provide for continuity of critical infrastructure and services
- Minimize impacts to both existing and future development from all hazards
- Minimize impacts to natural and cultural resources
- Prevent and reduce the potential for catastrophic loss due to wildfire
- Prevent and reduce flood risk and related damages

Goal 2: Increase communities' capabilities to mitigate losses and to be prepared for, respond to, and recover from a disaster event.

- Continued enhancements to Emergency Services capabilities integrating new technologies and use of shared resources to reduce losses and save lives
- Improve interagency (local, state, federal) emergency coordination, planning, training, exercising, and communication to ensure effective community preparedness, response and recovery
- Identify, fund, and implement community mitigation projects
- Improve interagency coordination with respect to implementation of multi-jurisdictional mitigation activities
- Continued support of first responders

Goal 3: Improve public awareness, education, and preparedness program for all hazards

- Increase public knowledge of the risk and vulnerability to identified hazards and their recommended actions to hazard events to protect lives and reduce losses
  - ✓ Severe Winter Weather Events (e.g., food and fuel reserves, CO2 poisoning, frozen pipes, power outages)
  - ✓ Other (e.g. burn restrictions, signage, hazardous vegetation, water conservation measures, ditch maintenance, insurance, evacuation and sheltering)

Modoc County
Local Hazard Mitigation
Mitigation Strategy Meeting: Mitigation Actions v/1
October 22, 2015

Responsible Jurisdiction/ Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
FM for County & City	Public outreach: Education and Preparedness for all Hazards	Multi-hazard	N/A
FM for County and City	Incorporate LHMP Update by reference through board adoption into the safety element of the General Plan Update	Multi-hazard	N/A
Modoc County	Update and maintain list and GIS mapping of critical facilities: Essential Services, At-Risk Populations, Hazardous Materials Facilities	Emergency Services/Multi-hazard	N/A
	Evacuation planning enhancements using GIS, updated road/access data (USFS), etc. (Educate and Train)	Emergency Services/Multi-hazard	12
	Conduct Multi-Agency, Multi-Hazard Exercises and Training	Emergency Services/Multi-hazard	42
	Communication system enhancements/redundancy (to existing 911 system, dispatch, communications hub, other)	Emergency Services/Multi-hazard	38
	Technology enhancements	Emergency Services/Multi-hazard	15
	GIS program enhancements	Emergency Services/Multi-hazard	15
	Update Snow Removal Plan	Emergency Services/Winter Weather	5
	Address Easement issues to mitigation in upstream areas	Multi-hazard	10
	Promote Crop Insurance Program	Agricultural/ Drought/ Severe Weather	0
	Increase Water Storage	Agricultural/ Drought/ Wildfire	24
	Juniper Removal	Agricultural/ Drought/ Wildfire	42
	Lakeview Project	Agricultural/ Drought/ Wildfire	0
	Pit River and other River Dredging/Silt Removal	Agricultural/Dam Failure/ Drought/Wildfire	24
	Watershed Management	Agricultural/Dam Failure/ Drought/Wildfire	21
	Rodent Control	Dam Failure/Levee Failure/ Flood	22

Responsible Jurisdiction/ Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
	Sewage Treatment Plan Improvements	Dam Failure/Levee Failure/ Flood	23
	Increase capacity of Dorris Reservoir	Drought/Dam Failure/Levee Failure/ Flood	4
	OES Exercises and Levee Annex to EOP	Levee Failure/ Flood	N/A Complete
	Levee Certification Projects	Levee Failure/ Flood	3
	Pit River Bypass	Levee Failure/ Flood	23 Complete
	Pit River Levee Dredging/Silt Removal	Levee Failure/ Flood	0 Complete
	Groundwater studies/monitoring	Drought & Water Supply	5
	Irrigation Efficiency Programs (e.g. ditch lining, sprinkler heads modifications)	Drought & Water Supply	0
	Sage Steppe Strategy FEIS	Drought & Water Supply	16
	Inventory, Assess and Identify Retrofit Projects	Earthquake	1
	Evaluate General Plan Policies/Ordinances	Earthquake	0
	Surprise Valley Area ???? (faults, groundwater recharge, map alluvial areas – project with multiple benefits)	Earthquake/ Drought/ Landslide, Debris Flow/ Flood	4
	Cottonwood Creek Stream Restoration	Erosion, Landslide/Debris Flow/ Localized Flooding	6
	County Road 2 and 118: Install larger culverts	Erosion, Landslide/Debris Flow/ Localized Flooding	13
	Stream bank projects	Erosion, Landslide/Debris Flow/ Localized Flooding	0
	County Road 64 and 61 – Scaling project along Pit River	Erosion, Landslide/Debris Flow/ Localized Flooding	0 Complete
	County Road 75 Pit River Bridge Abatement Repair	Erosion/ Localized Flooding	0 Complete
	County Road 58 Parker Creek Bridge Abatement Repair	Erosion/ Localized Flooding	0
	County Road 1 Cottonwood tree removal – various locations	Erosion, Landslide/Debris Flow/ Localized Flooding	0 Complete
	Residential Buy-outs/Acquisitions	Flood	10
	Elevate Structures	Flood	3
	Ordinance Revisions	Flood	3
	Construct new hospital outside the floodplain (including access roads)	Flood	37
	Relocate Warner View outside the floodplain	Flood	5

Responsible Jurisdiction/ Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
	Aiden, Fort Bidwell, Lake City flood prone area projects	Flood	0
	County Road 1 flood project	Flood	0
City of Alturas	Elevate/floodproof/relocate new Fire Station in 100-year floodplain	Flood	0
	Relocate Jail out of 100-year floodplain	Flood	6
	Evaluate haz mat transport on County Road 1.	Haz Mat Transport	
	CWPP Updates	Wildfire	28
	Establish Fuel Breaks and maintenance	Wildfire	13
	Obtain firewise community status for various communities	Wildfire	8
	Fuel reduction projects	Wildfire	38
	Prescribed burns	Agricultural/Wildfire	19
	Roadside Chipper Program	Wildfire	5
	Defensible space projects	Wildfire	6
	Develop New building codes/General Plan amendments for WUI areas (not just defer to state codes)	Wildfire	10
	No Fire Suppression	Wildfire	0
	Improve/modernize Utility Infrastructure (Werner Mountains and other areas)	Winds	5
	Underground utilities in key areas (e.g., Tulelake, Alturas, Cedarville, airport, others)	Winds	9

Appendix D Adoption Resolution

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the participating jurisdictions and added to this appendix. A model resolution is provided below:

Resolution # ______

Adopting the Modoc County Local Hazard Mitigation Plan

Whereas, (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 (“Disaster Mitigation Act”) emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Modoc County Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Modoc County Local Hazard Mitigation Plan;

Whereas, adoption by the governing body for the (Name of Government/District/Organization), demonstrates the jurisdiction’s commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

Whereas, adoption of this legitimacies the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the Modoc County Local Hazard Mitigation Plan as an official plan; and

Be it resolved, that the (Name of Government/District/Organization) adopts the Modoc County Local Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of AB 2140, and

Be it further resolved, (Name of Government/District/Organization) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirements of AB 2140.

Passed:____________________
(date)

____
Certifying Official

Appendix E Critical Facilities

Table E-1 Modoc County Critical Facility Inventory

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Airport	Newell Airport	X	LRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Airport	Adin Airport	X	LRA	Non-Wildland/Non-Urban	Low	Road	
Modoc County Unincorporated Areas	Airport	Eagleville Rural Airport	X	FRA	Non-Wildland/Non-Urban	Low		
Modoc County Unincorporated Areas	Airport	Devils Garden Airport	D	FRA	High	Low		
Modoc County Unincorporated Areas	Airport	Cedarville Rural Airport	X	LRA	Non-Wildland/Non-Urban	Low		
Modoc County Unincorporated Areas	Airport	Ft Bidwell Rural Airport	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Communication Site	Likely Town Cell Site	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Communication Site	Alturas Ranch Cell Site	A	SRA	Moderate	Low	Road	Railroad
Modoc County Unincorporated Areas	Communication Site	State Radio	X	SRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Communication Site	Barnes Grade Cell	X	SRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Communication Site	FM Radio 94.5 KCNO	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad
Modoc County Unincorporated Areas	Communication Site	Newell Communication Site	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad
Modoc County Unincorporated Areas	Communication Site	Adin Communication Site	X	FRA	High	Low	Road	
Modoc County Unincorporated Areas	Communication Site	Communication Site Am/Fm Radio	X	SRA	High	Low	Road	
Modoc County Unincorporated Areas	Communication Site	Barns Grade Communication Site	X	FRA	High	Low	Road	
Modoc County Unincorporated Areas	Communication Site	Modoc Sheriff Green	X	FRA	Non-Wildland/Non-Urban	Low	Road	

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Communication Site	Tnet Wireless Bridge Site (299 And Toms Creek)	X	SRA	High	Low	Road	
Modoc County Unincorporated Areas	Communication Site	Grouse (Gov Site)	D	FRA	Very High	Low		
Modoc County Unincorporated Areas	Communication Site	Grouse Radio / Cell	D	FRA	Very High	Low		
Modoc County Unincorporated Areas	Communication Site	Happy Mountain (State Radio)	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Happy Camp Mountain Communication Site	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Happy Mountain (Cell)	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Happy Mountain (Cell)	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Happy Mountain (Cell)	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	FM Radio 106.5 (KALT)	X	SRA	High	Low		

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Communication Site	Communication Site	X	SRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Payne Communication Site	D	FRA	Very High	Low		
Modoc County Unincorporated Areas	Communication Site	Timber Mountain Communication Site	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Timber Mountain Communication Site	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	Timber Mountain Communication Site	D	FRA	High	Low		
Modoc County Unincorporated Areas	Communication Site	State Radio	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Communication Site	Communication Site	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Communication Site	FM Radio (Open Sky Radio)	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Communication Site	Communication Site	D	FRA	High	Low		

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Fire Department	Fire Department (Lookout Ranchets)	X	SRA	High	Low		Railroad
Modoc County Unincorporated Areas	Fire Department	Fire Department (Likely)	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad
Modoc County Unincorporated Areas	Fire Department	Fire Department (Canby)	X	LRA	Moderate	Low	Road	Railroad
Modoc County Unincorporated Areas	Fire Department	Fire Department (Davis Creek)	A	SRA	Moderate	Low	Road	Railroad
Modoc County Unincorporated Areas	Fire Department	Fire Hall (Adin)	X	LRA	High	Low	Road	
Modoc County Unincorporated Areas	Fire Department	Fire Department (Cedarville)	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	Fire Department	Fire Department (Willow Ranch)	X	SRA	Moderate	Low	Road	
Modoc County Unincorporated Areas	Fire Department	Fire Department (Lookout Main St)	X	LRA	Moderate	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Department (Cal-Pines Hill Unit)	D	SRA	High	Low		

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Fire Department	Fire Department (Eagleville Veh Barn)	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Department (Eagleville Main Fire Hall)	X	LRA	Urban Unzoned	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Department (Cal-Pines Fire Station)	X	SRA	High	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Hall (Cal-Pines)	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Department (Lake City)	X	SRA	High	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Department (Ft Bidwell)	X	SRA	Moderate	Low		
Modoc County Unincorporated Areas	Fire Department	Fire Department (Willow Ranch)	X	FRA	High	Low		
Modoc County Unincorporated Areas	Government Office	Sewer Treatment	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad
Modoc County Unincorporated Areas	Government Office	Davis Creek Roads Office	X	SRA	Moderate	Low	Road	Railroad

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Government Office	Newell Roads Office	X	LRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Government Office	Cedarville Roads Office	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	Government Office	Lookout Roads Office	X	LRA	Moderate	Low		
Modoc County Unincorporated Areas	Law	Modoc County Sheriff Department Resident Deputy Office	X	LRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Law	Modoc County Sheriff Department Resident Deputy Office	0.2% Annual Chance	LRA	Moderate	Low	Road	
Modoc County Unincorporated Areas	Law	Modoc County Sheriff Department Resident Deputy Office	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	Medical Health Facility	Clinic	X	LRA	Moderate	Low	Road	Railroad
Modoc County Unincorporated Areas	Medical Health Facility	Healthcare District Last Frontier	0.2% Annual Chance	LRA	Urban Unzoned	Low	Road	Railroad
Modoc County Unincorporated Areas	Medical Health Facility	Healthcare District Last Frontier (SNIF)	0.2% Annual Chance	LRA	Urban Unzoned	Low	Road	Railroad

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	Medical Health Facility	Xl Reservation Clinic	D	FRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Medical Health Facility	Surprise Valley Hospital	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	Medical Health Facility	Surprise Valley Medical Building	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	Medical Health Facility	Warner Mountain Indian Health	X	FRA	Moderate	Low		
Modoc County Unincorporated Areas	School	Isot School	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad
Modoc County Unincorporated Areas	School	Newell School	X	LRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	School	Surprise Valley School District (High)	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	School	Surprise Valley School District (District Office)	X	LRA	Urban Unzoned	Low	Road	
Modoc County Unincorporated Areas	School	Surprise Valley School District (Elementary)	X	LRA	Moderate	Low	Road	

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Modoc County Unincorporated Areas	School	Stateline School	X	SRA	Moderate	Mod	Road	
Modoc County Unincorporated Areas	Utility	Power Substation (Adin)	X	SRA	High	Low	Road	
Modoc County Unincorporated Areas	Water Tank		D	FRA	High	Low	Road	Railroad
Modoc County Unincorporated Areas	Water Tank		X		High	Low	Road	Railroad
Modoc County Unincorporated Areas	Water Tank		X	SRA	High	Low	Road	
Modoc County Unincorporated Areas	Water Tank		X	SRA	High	Low		
Modoc County Unincorporated Areas	Water Tank		X	FRA	Moderate	Low		
Lassen County Unincorporated Areas	Communication Site	State Radio		FRA		Low		
Lassen County Unincorporated Areas	Communication Site	Widow Communication Site		FRA		Low		

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
Lassen County Unincorporated Areas	Communication Site	Widow Mountain Cell		FRA		Low		
Lassen County Unincorporated Areas	Communication Site	Likely Mountain Frontiers Microwave Route		FRA		Low		
Lassen County Unincorporated Areas	Communication Site	Likely Mountain Communication Site		SRA		Low		
Lassen County Unincorporated Areas	Communication Site	Likely Mountain Radio Site		SRA		Low		
City of Alturas	Airport	City Of Alturas Airport	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad
City of Alturas	Communication Site	Fm Radio 99.1	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Communication Site	Cell Site	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Communication Site	Police Department Repeater	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Communication Site	Tnet Internet	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Communication Site	Cell Site	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Communication Site	Radio Site	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Communication Site	EOC / Dispatch	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Fire Department	Fire Department (Alturas City)	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Fire Department	Fire Department (Alturas Rural)	AO	LRA	Moderate	Low	Road	Railroad

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
City of Alturas	Government Office	Auditor	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	Modoc County Courthouse	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	Courthouse	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	City Of Alturas City Hall	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	Jail	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	City Yard	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	Social Service	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Government Office	Planning	0.2% Annual Chance	LRA	Moderate	Low	Road	Railroad
City of Alturas	Government Office	County Multi Department	X	LRA	Moderate	Low	Road	Railroad
City of Alturas	Government Office	Roads Engineering	0.2% Annual Chance	LRA	Moderate	Low	Road	Railroad
City of Alturas	Government Office	Public Health	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Law	Alturas Police Department	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Law	Modoc County Sheriff Department	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Medical Health Facility	Healthcare District Last Frontier	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Medical Health Facility	Goose Lake Medical	AO	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Medical Health Facility	Strong Family Health	X	LRA	Urban Unzoned	Low	Road	Railroad

Jurisdiction	Critical Facility Type	Name	Flood Zone	Fire Responsibility Area	Fire Severity Zone	Landslide Susceptibility Zone (High, Moderate, Low, Moderate Susceptibility)	Hazardous Materials Road Route	Hazardous Materials Railroad Route
City of Alturas	School	School District Modoc (Middle)	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	School	School District Modoc (Elementary)	0.2% Annual Chance	LRA	Moderate	Low	Road	Railroad
City of Alturas	School	School District Modoc (High Desert)	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	School	School District Modoc (High)	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Water Tank	Tank Hill Water Tank	X	LRA	Urban Unzoned	Low	Road	Railroad
City of Alturas	Water Tank	Water Tank Daphnedale	X	LRA	Non-Wildland/Non-Urban	Low	Road	Railroad

Source: Modoc County GIS

Appendix F Wildfire History

Table F-1 Modoc County Critical Facility Inventory

Cause	Fire/Treatment Name	Agency	Year	Acres
Unknown / Unidentified		USF	1900	77
Lightning		USF	1910	1,429
Lightning	GLASS MOUNTAIN	USF	1910	146,968
Miscellaneous	WILLOWRANCH	USF	1910	21
Miscellaneous		USF	1910	1,676
Miscellaneous		USF	1912	28
Lightning		USF	1914	23
Miscellaneous	MT.BIDWELL2	USF	1914	35
Lightning	HOG LAKE 3	USF	1915	22
Lightning		USF	1915	127
Lightning	CHALK HILL	USF	1915	314
Miscellaneous		USF	1916	695
Lightning	EAST CR.	USF	1917	23
Lightning		USF	1917	30
Lightning		USF	1917	40
Lightning	BADGER SP.	USF	1917	114
Miscellaneous	MILL CR.	USF	1917	53
Lightning	MUD SPRING	USF	1918	23
Lightning		USF	1918	36
Lightning		USF	1918	75
Lightning	BADGER SP.	USF	1918	227
Lightning	MILL CREEK	USF	1918	261
Miscellaneous		USF	1918	651
Miscellaneous		USF	1918	812
Lightning	HACKAMORE	USF	1919	33
Lightning		USF	1919	47
Lightning		USF	1919	150
Lightning		USF	1919	232
Miscellaneous	HOUSEHOLDER	USF	1919	21
Miscellaneous		USF	1919	29
Miscellaneous		USF	1919	55
Miscellaneous		USF	1919	1,032

Cause	Fire/Treatment Name	Agency	Year	Acres
Lightning	CUPPY GULCH	USF	1920	70
Lightning		USF	1920	299
Lightning		USF	1920	299
Lightning		USF	1920	304
Miscellaneous	CEDAR PASS	USF	1921	271
Miscellaneous	FANDANGO PK	USF	1922	257
Lightning		USF	1924	524
Lightning	SAND BUTTE	USF	1924	780
Lightning	UPPER MUD SP	USF	1924	3,447
Miscellaneous		USF	1924	22
Miscellaneous		USF	1924	28
Miscellaneous		USF	1924	42
Miscellaneous		USF	1924	84
Miscellaneous	TICKNER RD.	USF	1924	825
Miscellaneous	TIMBER MT.	USF	1924	1,405
Lightning	WILD HORSE C	USF	1925	31
Lightning		USF	1926	177
Lightning		USF	1926	179
Miscellaneous		USF	1926	27
Miscellaneous	FORT BIDWELL	USF	1926	13,101
Lightning	BUTCHER SWP.	USF	1927	44
Lightning	MCCLELLAN	USF	1928	26
Lightning	MOWITZ	USF	1928	26
Lightning	DEER HILL	USF	1928	31
Lightning	SECTION 22	USF	1928	34
Lightning	HOMESTEAD	USF	1928	36
Lightning		USF	1928	43
Lightning	CRUISER	USF	1928	77
Lightning	BLUE MT. 3	USF	1928	242
Miscellaneous	EAST CR.	USF	1928	63
Miscellaneous	TICKNER RD.	USF	1928	181
Unknown / Unidentified	BLUE MT. 3	USF	1928	248
Miscellaneous	SUGARHILL2	USF	1929	299
Miscellaneous	PAGE PLACE	USF	1929	427
Miscellaneous	SUGAR HILL	USF	1929	8,825
Miscellaneous		USF	1931	23
Miscellaneous		USF	1931	28

Cause	Fire/Treatment Name	Agency	Year	Acres
Miscellaneous		USF	1931	49
Miscellaneous	GREAT NORTHE	USF	1931	157
Miscellaneous	FANDANGO PS	USF	1931	350
Miscellaneous	SUGAR HILL	USF	1931	376
Miscellaneous	CAMP 1	USF	1931	450
Miscellaneous		USF	1931	597
Miscellaneous		USF	1931	664
Miscellaneous	LONG BELL 2	USF	1931	1,748
Miscellaneous		USF	1931	2,919
Miscellaneous	BUCK SPRING	USF	1932	28
Lightning	TIMBER MT.	USF	1933	27
Miscellaneous	SUGAR HILL	USF	1933	162
Miscellaneous		USF	1933	598
Miscellaneous		USF	1934	98
Miscellaneous	RELEFORD	USF	1934	472
Miscellaneous	ZAMBONI	USF	1934	1,560
Lightning	DISMAL SWAMP	USF	1935	21
Miscellaneous	SUGAR HILL	USF	1935	58
Miscellaneous	GOOSE LAKE R	USF	1935	125
Miscellaneous	HORSE CAMP	USF	1935	272
Lightning	SAGEHORN	USF	1936	20
Miscellaneous	GAS DRUM FLA	USF	1936	54
Miscellaneous		USF	1936	98
Miscellaneous	KILGORE	USF	1936	228
Miscellaneous	QUICKSILVER	USF	1936	386
Miscellaneous	CORNELL	USF	1936	22,050
Miscellaneous	SHAW BOX	USF	1937	41
Miscellaneous	MAMMOTH#2	USF	1937	45
Miscellaneous		USF	1937	365
Lightning	ANTELOPE CR	USF	1938	27
Lightning	MASON PLACE	USF	1938	34
Lightning	BIG SAND BUT	USF	1938	856
Lightning	LAVA BEDS	USF	1938	3,073
Miscellaneous	PEREZ	USF	1938	48
Miscellaneous	HOSPITAL ROC	USF	1938	14,245
Miscellaneous		USF	1939	20
Miscellaneous		USF	1939	27

Cause	Fire/Treatment Name	Agency	Year	Acres
Miscellaneous	LAKESHORE	USF	1939	97
Miscellaneous		USF	1939	260
Miscellaneous		USF	1939	605
Miscellaneous	SAND BUTTE	USF	1939	852
Miscellaneous	CRANE CR.	USF	1939	2,519
Lightning	TIMBER MT.	USF	1940	564
Miscellaneous		USF	1940	37
Miscellaneous		USF	1940	80
Miscellaneous	LOG CORRAL	USF	1940	849
Miscellaneous	BRYANT MT.	USF	1940	1,053
Miscellaneous	SUGAR HILL2	USF	1940	2,796
Miscellaneous	MIDDLE FORK	USF	1940	4,123
Miscellaneous	SUGAR HILL3	USF	1940	20,121
Miscellaneous	KOWOLOSKI	USF	1941	138
Miscellaneous	MAMMOTH	USF	1941	15,607
Miscellaneous	PLUM RIDGE	USF	1942	33
Miscellaneous		USF	1942	39
Miscellaneous	CANNON RES.	USF	1942	113
Miscellaneous		USF	1942	134
Lightning	GOOSE BAY	USF	1943	495
Lightning	HOLE-IN-ROCK	USF	1943	707
Miscellaneous		USF	1943	386
Miscellaneous		USF	1943	452
Lightning		BLM	1944	23
Lightning	TIMBER MT.	USF	1944	322
Lightning	TWIN SISTER	USF	1944	4,497
Miscellaneous	HOWARDS GULCH	USF	1944	111
Miscellaneous	HARTER	USF	1944	526
Miscellaneous	GLEASON CR.	USF	1944	726
Miscellaneous	SCORPION POI	USF	1944	1,073
Lightning	STATE LINE	USF	1945	69
Lightning	BLACK MT.	USF	1945	636
Miscellaneous	BOLES	USF	1945	28
Miscellaneous		USF	1945	73
Miscellaneous	JAP CAMP	USF	1945	342
Miscellaneous		USF	1945	497
Miscellaneous		USF	1946	28

Cause	Fire/Treatment Name	Agency	Year	Acres
Miscellaneous		USF	1946	68
Miscellaneous		USF	1946	95
Lightning		USF	1947	28
Miscellaneous	SHIELDS CR.	USF	1947	477
Miscellaneous		USF	1948	266
Miscellaneous	MUD SPRING	USF	1948	1,025
Unknown / Unidentified		USF	1948	18,188
Lightning		USF	1949	69
Lightning		USF	1949	186
Miscellaneous	WHITE PINE F	USF	1949	23
Miscellaneous		USF	1949	49
Miscellaneous		USF	1949	52
Miscellaneous	COVE RANCH	USF	1949	52
Miscellaneous	W. BLACK ROC	USF	1949	84
Miscellaneous	LONG BELL	USF	1949	336
Miscellaneous		USF	1949	1,474
Lightning	MT.VIDA	USF	1950	25
Lightning	DRY LAKE	USF	1950	225
Miscellaneous	PANHANDLE	USF	1950	586
Miscellaneous	BAGGETT GULCH	CDF	1950	3,941
Unknown / Unidentified	PLUM RIDGE	USF	1950	4,926
Unknown / Unidentified	PUMICE MILL	CDF	1950	6,455
Unknown / Unidentified	MAMMOTH	CDF	1950	7,061
Lightning	HOMESTEAD WE	USF	1951	27
Lightning		USF	1951	30
Lightning	BLUE MT.	USF	1951	263
Miscellaneous		USF	1951	207
Miscellaneous		USF	1951	1,499
Miscellaneous	MOWITZ	USF	1951	1,714
Miscellaneous	MEARS	USF	1951	29,523
Lightning		BLM	1954	358
Miscellaneous	MYERS	USF	1954	618
Miscellaneous	CASUSE RIDGE	USF	1954	1,063
Miscellaneous	TWIN SISTER	USF	1954	3,893
Lightning		USF	1955	22
Lightning		USF	1955	24
Miscellaneous	WELL RIG	USF	1955	40

Cause	Fire/Treatment Name	Agency	Year	Acres
Miscellaneous	HOWARDS GULCH	CDF	1955	515
Miscellaneous	MILEPOST 40	USF	1957	12,183
Unknown / Unidentified	SPRR MAINLINE #20	CDF	1957	11,668
Lightning	PARKER CR.	USF	1958	1,272
Lightning	MCGINTY	USF	1959	20
Lightning	RIM ROCK	USF	1959	173
Miscellaneous		USF	1960	4,774
Lightning	TICKNER RD.	USF	1961	47
Lightning	PORTABLE TAN	USF	1961	134
Lightning		BLM	1963	151
Lightning	BEN	USF	1963	367
Lightning	PANHANDLE	USF	1963	440
Lightning		USF	1963	867
Miscellaneous	HORSE	USF	1964	401
Unknown / Unidentified	HIGHWAY 395	CDF	1964	634
Miscellaneous		USF	1966	95
Lightning	RAIDER	USF	1968	63
Unknown / Unidentified	NELSON SPRINGS #15	CDF	1968	466
Lightning		USF	1969	23
Equipment Use	HILTON	USF	1970	253
Equipment Use	TIONESTA	USF	1971	533
Railroad	CASUSE	USF	1971	1,568
Railroad	TWIN	USF	1971	3,359
Lightning	TURNER	USF	1972	105
Lightning	WEST LAKE	USF	1972	106
Unknown / Unidentified		BLM	1972	146
Debris	CASUSE	USF	1973	168
Debris	CALABRESE	USF	1973	620
Equipment Use	ADIN	USF	1973	44
Lightning		USF	1973	23
Lightning	LAVA	USF	1973	529
Railroad	LANDS	USF	1973	167
Unknown / Unidentified	CALABRESE	CDF	1973	645
Equipment Use	BEAVER	USF	1974	1,062
Lightning	DAVIS	USF	1974	28
Debris	FENDER	USF	1976	17
Lightning	COTTONWOOD	USF	1976	25

Cause	Fire/Treatment Name	Agency	Year	Acres
Lightning	MOWITZ	USF	1977	26
Lightning	CRYSTAL	USF	1977	66
Lightning	JANES	USF	1977	93
Lightning	BANISTER	USF	1977	139
Lightning	KNOBCONE	USF	1977	224
Lightning	COUGER	USF	1977	872
Lightning	HORRS CORNER	CDF	1977	9,768
Lightning	SCARFACE	USF	1977	78,191
Equipment Use		BLM	1978	43
Lightning	HAWK	USF	1978	182
Lightning	DOBIE	USF	1978	282
Lightning	WHITNEY	USF	1978	420
Miscellaneous	SCORPION	USF	1978	111
Unknown / Unidentified	LIGHTNING #51	CDF	1978	2,042
Lightning	HAPPY	USF	1979	2,827
Smoking	SHARTELL	USF	1979	31
Lightning	HEATH	USF	1980	28
Lightning	DEADHORSE	USF	1981	52
Lightning	BLUE	USF	1981	85
Lightning	COYOTE	USF	1981	397
Lightning	EAST	USF	1981	515
Miscellaneous	ADIN PASS	USF	1981	266
Unknown / Unidentified	LIGHTNING #20 (WEBBER)	CDF	1981	1,764
Miscellaneous	BLUE	USF	1982	317
Lightning		BLM	1983	60
Equipment Use	RAIL	USF	1984	3,962
Lightning	MOUNTAIN	USF	1984	20
Lightning	HILL	USF	1984	155
Miscellaneous	EAGLE	USF	1984	1,791
Smoking	CABIN	USF	1984	58
Lightning	"F"	USF	1985	33
Lightning	BIRD	USF	1986	25
Equipment Use		BLM	1987	32
Lightning	TRIANGLE	USF	1987	68
Lightning	DITTO	USF	1987	96
Lightning	CEDAR	USF	1987	350
Lightning	HIGHROCK	USF	1987	949

Cause	Fire/Treatment Name	Agency	Year	Acres
Lightning	QUAKING	USF	1987	4,812
Unknown / Unidentified	LIGHTNING #120 (CRANK)	CDF	1987	4,076
Lightning		BLM	1988	35
Lightning	RENNER	USF	1988	253
Unknown / Unidentified	LIGHTNING #97 (BISON)	CDF	1988	3,784
Lightning	RATTLESNAKE	USF	1990	80
Lightning	TWIN	USF	1990	80
Lightning	LAKESHORE	USF	1990	186
Lightning	CROWDER MT.	USF	1990	1,482
Unknown / Unidentified	DAY	CDF	1990	4,658
Equipment Use	GRAVES	USF	1991	137
Lightning	JACKS	USF	1991	22
Lightning	DUTCH	USF	1991	269
Lightning		BLM	1991	462
Unknown / Unidentified	WHITEHORSE FIRE	CDF	1991	274
Equipment Use	DAY	USF	1992	1,540
Lightning	DUSTY	USF	1992	72
Lightning	CAMP	USF	1992	195
Lightning	TRIANGLE	USF	1992	703
Lightning	TIMBER	USF	1992	1,256
Unknown / Unidentified	DAY FIRE	CDF	1992	405
Debris	CORPORATION	USF	1994	168
Lightning	RIMROCK	USF	1994	70
Unknown / Unidentified	WIDOW INC.	CDF	1994	348
Lightning		BLM	1995	49
Lightning		BLM	1995	103
Lightning	LOST	USF	1995	127
Lightning		BLM	1995	350
Lightning	DALTON 1	USF	1996	20
Lightning	BSFMU#9	USF	1996	21
Lightning	JACKS #3 (BSFMU)	USF	1996	27
Lightning		BLM	1996	29
Lightning	CLEAR LAKE	USF	1996	71
Lightning	MOWITZ 1	USF	1996	109
Lightning	SURVEYORS	USF	1996	136
Lightning	ROCK (BSFMU #3)	USF	1996	189
Lightning	LAKE	USF	1996	237

Cause	Fire/Treatment Name	Agency	Year	Acres
Lightning	DALTON 2	USF	1996	238
Lightning	CLEAR LAKE	USF	1996	313
Lightning	RANCH	USF	1996	465
Lightning	DALTON 3	USF	1996	2,379
Lightning	HORSE	USF	1996	2,764
Lightning	DAMON/LONG	USF	1996	23,380
Lightning	RESEARCH	USF	1997	54
Lightning	WILSON	USF	1997	63
Lightning	NORTH CROWDER	USF	1998	2,693
Lightning	BSFMU XL	USF	1999	26
Lightning	GOOSE	USF	1999	30
Lightning	MUD	USF	1999	63
Lightning	CHANDLER	USF	1999	83
Lightning	ANNIE	BLM	1999	639
Miscellaneous	BELL WEST	USF	1999	1,441
Unknown / Unidentified	ERQUIAGA	BLM	1999	27
Unknown / Unidentified	F	USF	1999	51
Unknown / Unidentified	BSFMU HOG	USF	1999	73
Unknown / Unidentified	VALLEY	USF	1999	112
Unknown / Unidentified	LAKE2	BLM	1999	2,841
Unknown / Unidentified	PINE	USF	1999	30,578
Miscellaneous	POINT	USF	2000	22
Debris	HILTON	CDF	2001	392
Lightning	DOUBLEHEAD	USF	2001	24
Lightning	BSFMU48	USF	2001	26
Lightning	FOURMILE	USF	2001	82
Lightning	BSFMU34	USF	2001	121
Lightning	BSFMU25	USF	2001	126
Lightning	DEER	USF	2001	137
Lightning	BSFMU17	USF	2001	145
Lightning	SHIELDS SWWA	USF	2001	174
Lightning	KELLOGG	USF	2001	188
Lightning	CANYON	USF	2001	225
Lightning	COWHEAD	BLM	2001	710
Lightning	BSFMU31	USF	2001	713
Lightning	ROCK	USF	2001	1,313
Lightning	BELL	USF	2001	2,978

Cause	Fire/Treatment Name	Agency	Year	Acres
Lightning	CLEAR	USF	2001	4,319
Lightning	BLUE	USF	2001	34,219
Vehicle	FANDANGO	BLM	2001	31
Lightning	DEEP CREEK	USF	2002	25
Lightning	BSFMU7	USF	2002	36
Lightning	MULDOON	USF	2002	39
Lightning	LIGHTNING #1	CDF	2002	69
Lightning	ANNIE	BLM	2002	292
Unknown / Unidentified	TWENTY-NINE	BLM	2002	134
Debris	SAND	USF	2003	333
Lightning	TIMBER	USF	2003	314
Lightning	BARBER	BLM	2003	1,267
Lightning	ACKLEY	USF	2003	9,599
Lightning	MAMMOTH	USF	2004	147
Lightning	SNAKE	BLM	2004	471
Equipment Use	BUCK	USF	2005	204
Miscellaneous	COUGAR	USF	2005	115
Campfire	WILLOW	USF	2006	35
Lightning	BLUE 2	USF	2006	25
Lightning	STEELE	USF	2006	35
Lightning	MILLER DIV X	USF	2006	35
Lightning	RED	USF	2006	39
Lightning	MILLER DIV Y	USF	2006	46
Lightning	PINNACLE	USF	2006	50
Lightning	SAGEBRUSH	USF	2006	52
Lightning	MILLER DIV W	USF	2006	54
Lightning	MILLER DIV Z	USF	2006	130
Lightning	WILDLIFE	FWS	2006	158
Lightning	CRYSTAL	USF	2006	461
Lightning	BUMP	USF	2006	524
Lightning	LGT #17 (3-5)	CDF	2006	537
Lightning	CLEAR LAKE	USF	2006	554
Lightning	HIGH	USF	2006	1,053
Lightning	SAGE	USF	2006	4,854
Campfire	TIONESTA	USF	2007	20
Debris	LOOKOUT	CDF	2007	65
Lightning	CLEAR	FWS	2007	26

Cause	Fire/Treatment Name	Agency	Year	Acres
Lightning	BACKSCATTER	USF	2007	69
Lightning	LOOKOUT	USF	2007	73
Lightning	BLACK	USF	2007	74
Lightning	ROCK BSFMU A6	USF	2007	267
Lightning	FLETCHER	USF	2007	8,082
Railroad	HOWARDS GULCH	USF	2007	22
Unknown / Unidentified	DANHAUSER	BLM	2007	145
Lightning	UPPER	USF	2009	35
Lightning	RAIL	USF	2009	68
Lightning	HAGER	USF	2010	22
Lightning	POINT	USF	2010	52
Lightning	WITCHER	CDF	2010	79
Lightning	BIRTHDAY	USF	2010	147
Lightning	ANNIE	BLM	2010	249
Campfire	COUGAR	USF	2011	1,791
Railroad	MAMMOTH	USF	2011	1,193
Railroad	SCORPION	USF	2011	1,418
Unknown / Unidentified	ANNIE	BLM	2011	2,076
Equipment Use	SISTERS	USF	2012	142
Lightning	40	BLM	2012	39
Lightning	SALISBURY	USF	2012	42
Lightning	ANTELOPE	USF	2012	622
Lightning	LAKE	USF	2012	1,665
Lightning	NELSON (W-1)	BLM	2012	3,659
Lightning	BARRY POINT	USF	2012	92,945
Powerline	LIKLEY	BLM	2012	9,966
Unknown / Unidentified	SCHALER	BLM	2012	66
Equipment Use	RAIL	USF	2013	68
Lightning	WHITTEMORE	USF	2013	52
Miscellaneous	DAVIS	USF	2013	97
Lightning	LAKE	USF	2014	58
Lightning	LITTLE	USF	2014	101
Lightning	NORTHERN	USF	2014	117
Lightning	DOBIE	USF	2014	456
Lightning	DALTON	USF	2014	641
Lightning	DAY	CDF	2014	13,151
Railroad	HOWARDS	USF	2014	45

Cause	Fire/Treatment Name	Agency	Year	Acres
Railroad	GULCH3	USF	2014	58
Railroad	GULCH	USF	2014	1,397

Source: CAL FIRE