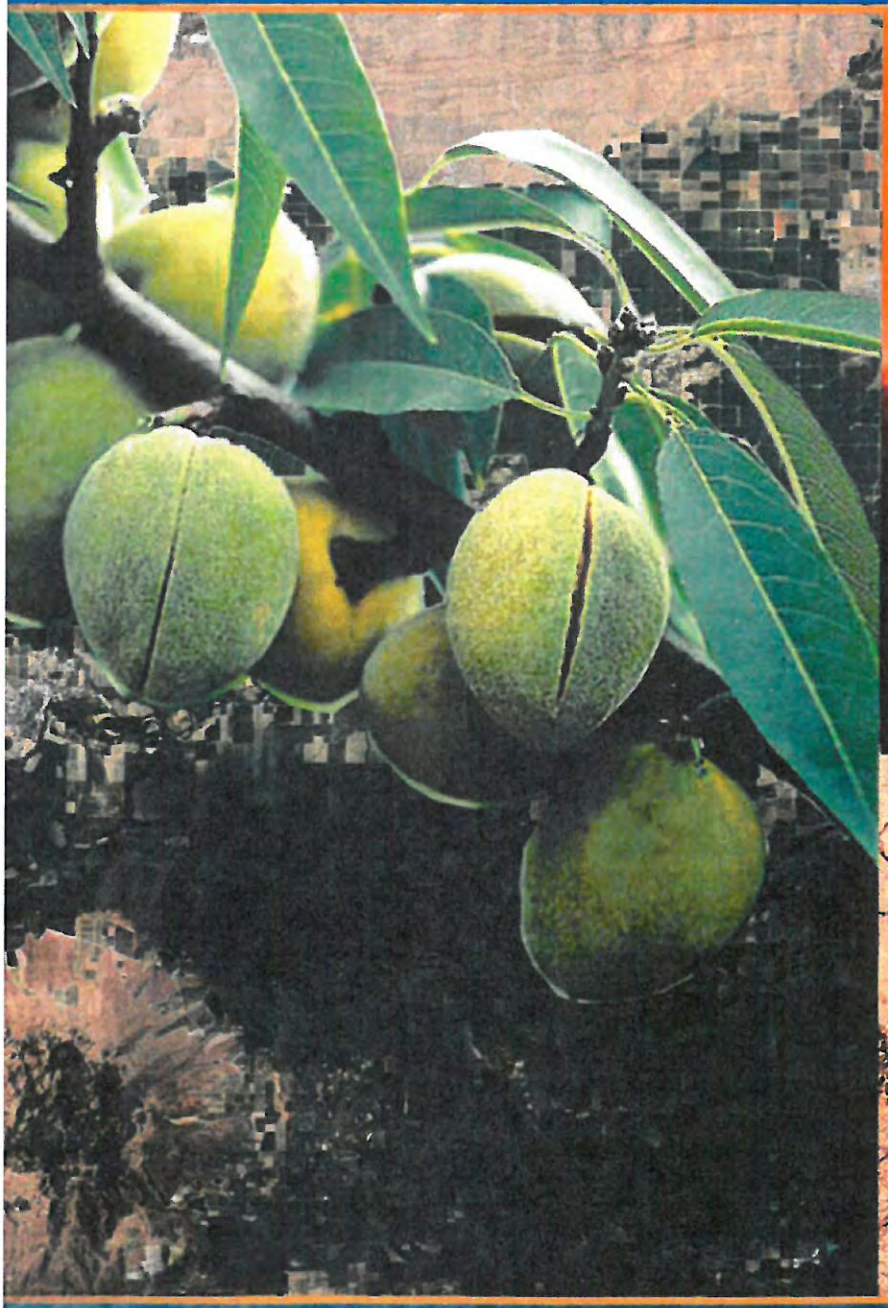
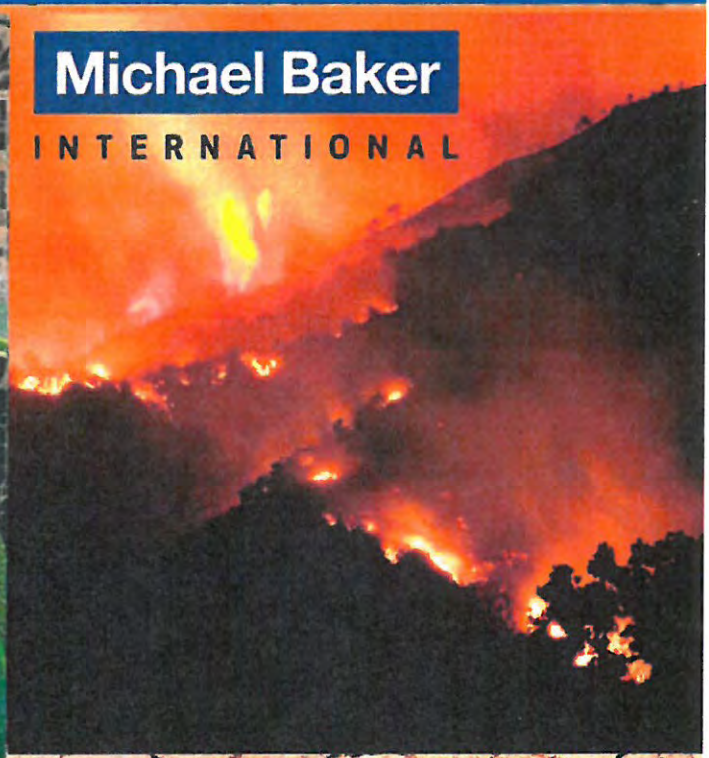
Glenn County, CA

Multi-Jurisdiction Hazard Mitigation Plan

SEPTEMBER 26, 2014





Michael Baker
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Innovation Done Right...We Make a Difference

September 26, 2014

Andy Popper, Associate Planner
Glenn County Planning & Public Works Agency
777 North Colusa Street
Willows, CA 95988

RE: Response to RFP Multi-Jurisdiction Hazard Mitigation Plan

Dear Mr. Popper:
Michael Baker International (Baker) is pleased to submit the enclosed proposal for Glenn County's Multi-Jurisdiction Hazard Mitigation Plan (MJHMP). The Baker Team has a distinct focus on public sector clients, providing Glenn County and the participating jurisdictions with a team of professionals that understand the dynamics of local government. Baker's breadth and depth of experience in Local Government policy and hazard mitigation planning will ensure the MJHMP is a comprehensive, effective, and clearly articulated document that can be effectively utilized by the Glenn County and participating jurisdictions.

Glenn County has a great opportunity, as a result of its FY2012 Pre-Disaster Mitigation grant award from FEMA, to engage in a forward thinking planning process. This multi-jurisdiction effort will ultimately reward the County and participating jurisdictions with an ability to reduce future hazards and create safer and more resilient communities in Glenn County.

Team Access: Baker will be conducting business through our Oakland, CA and other California offices, providing Glenn County with immediate access to staff and resources. This will enable Baker staff to provide Glenn County with a greater level of face-to-face meeting time and local on-the-ground participation by all team members.

Recent Hazard Mitigation Plan Experience: Baker is currently in the process of updating the Local Hazard Mitigation Plans for the Cities of Westminster, McFarland, Lawndale, and numerous state and county governments throughout the country. Baker also prepared the hazard mitigation plans for Solano County, Plumas County, Napa County, and the City of Shasta Lake in CA. As a result of this experience, the Baker Team can prepare the Glenn County MJHMP with efficiency based on the lessons learned from past hazard mitigation plan projects.

*reviewed as a participating jurisdiction for 2005 and/or 2010 ABAG MHMP

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California/National Hazard Mitigation: As part of the FEMA Contract Assistance for Mitigation Plan Reviews (CAMPR) task orders over multiple fiscal years, Baker's staff have been tasked to provide technical assistance to FEMA Region IV, VIII and IX for the hazard mitigation program. This project has been ongoing since September 2009. Baker staff in California have reviewed over 100 hazard mitigation plans submitted to FEMA Region IX. Baker's Oakland office staff used the FEMA Local Hazard Mitigation Plan Review Guide, as well as State and FEMA Local Mitigation Planning Handbook, to assess compliance with the Robert T. Stafford and provide constructive feedback to communities on how to successfully meet FEMA's requirements for the final HMP review and approval. Additionally, Baker staff provide technical assistance to communities to develop compliant HMP documents.

As a result of our review and assessment of HMPs, Baker's local staff have obtained a deep understanding of hazards across California, including the probability of future events, location and extent of these hazards, and historical occurrences. Baker staff also have the knowledge of the various mitigation measures and strategies identified by various agencies to address the risks associated with these hazards. Additionally, in working with and providing technical assistance to various communities for hazard mitigation planning, Baker staff have been able to see potential barriers to success HMP development and has devised solutions to address those roadblocks.

The Right Team Members: Baker is a full-service engineering and planning firm that brings integrated teams of professionals from a variety of disciplines together to meet client needs. As a result, Baker's clients receive higher quality work products, efficient project execution, and the expertise necessary to solve their technical challenges. Baker's team of hazard mitigation planners and policy experts will be available to address the needs of Glenn County and participating and ensure that the MJHMP is completed on time, within budget and meets Federal and State requirements and guidance.

Baker appreciates Glenn County's consideration of its proposal for the development of County's MJHMP. Baker welcomes the opportunity to meet with you and further discuss our proposal and the Project Approach in order to best meet the County's needs. Please do not hesitate to contact Ms. Kwan in our Oakland Office at 510-879-0959 or Wkwan@mbakerintl.com, should you have any questions or require additional information.

This proposal will remain valid for at least 180 days subsequent to the date of the Cost Proposal opening and thereafter in accordance with any resulting contract between Baker and Glenn County.

Respectfully submitted,

Michael Skowronek, GISP, CFM, AICP
Principal in Charge
Michael Baker International

Wynne Kwan, AICP, LEED AP (BD+C)
Project Manager
Michael Baker International

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A. Project Understanding

Michael Baker International (Baker), a full-service consulting firm providing planning, engineering, surveying, and emergency management services, developed this proposal in response to the Request for Proposals (RFP) for the Glenn County Multi-Jurisdiction Hazard Mitigation Plan (MJHMP). Based on Baker's extensive experience providing services to support the four phases of emergency management locally and nationwide, it is extremely important to have an understanding of the community(ies) and the requirements and goals of a hazard mitigation plan so that it is useful for the community(ies). Baker's understanding of Glenn County and the project requirements are described below.

A.1 Glenn County Understanding

Located within the Sacramento Valley, Glenn County (County) encompasses an area of approximately 1,327 square miles (of which 1,314 acres are land) and is bordered by Tehama County on the north, Butte County on the east, Colusa County on the south, Lake County on the southwest, and Mendocino County on the west. The Sacramento River forms a portion of Glenn County's eastern boundary. Natural protected areas within Glenn County include Mendocino National Forest, Sacramento National Wildlife Refuge are, and Sacramento River National Wildlife Refuge. The Grindstone Indian Rancheria of Wintun-Wailaki Indians is also located in Glenn County near the unincorporated community of Elk Creek.

The estimated total population is 28,353 residents, with approximately 49% residing in the County's two incorporated cities: Orland with a population of 7,683 and Willows (the County Seat) with a population of 6,154 (California Department of Finance, January 2014). The balance of the County's population resides in the unincorporated areas. According to 2013 population data, persons under 18 years made up 34.4% of the population, while persons 65 years and over made up 14.6% of the population. In 2013, the County's racial distribution was largely white (90.1%), with Hispanic/Latino making up 39.5%. The County's population is projected to reach 28,871 in 2015, 33,552 in 2030 and 40,040 in 2060.

Glenn County Incorporated Cities and Special Districts

- City of Orland
- City of Willows
- 7 Cemetery Districts
- 2 Community Service Districts
- 13 Drainage Districts
- 1 Conservation District
- 12 School Districts
- 11 Water and Irrigation Districts
- 2 Service Area Districts

The population density in Glenn County is approximately 21.4 people per square mile, with 28,022 households with an average of 2.80 persons and 331 group quarters. There are an estimated 10,994 total housing units in the County, of which 10,003 (91%) are occupied, denoting a 9% vacancy rate. The majority (73%) of the County's estimated housing units is single family units (detached and attached); multi-unit housing makes up 14%, while mobile homes make up 13%. Similar housing trends are found in the Cities of Orland and Willows. According to 2010 Housing Element, the County needs 1,1,08 new housing units, of which 95 were built at the time. A total of 28 building permits were issues for single-family housing units.

The County is primarily an agricultural region, in which the total value of agricultural and forest production was $792.4 million in 2013, of which 31% was field crops and 47% was fruit and nut crops. The County's top 3 agricultural commodities in 2013 were rice/paddy, almonds, and walnuts. Almonds and walnuts, in addition to other nuts and seed crops (i.e., beans, corn, cucumber, melon, pumpkin, squash, and watermelon) were exported from Glenn County to at least 72 countries. The biggest economic drivers in Glenn County are the large farmers, ranchers and value-add agricultural producers. The small farmer/grower and an increasing food hub, including agri-tourism, are contributing to Glenn County's agricultural heritage.

Glenn County faces many of the same challenges as other Sacramento Valley communities, with its agricultural economic base, urban development pockets, networks of creeks and agricultural levees traversing the County and the Sacramento River to the east, and intermittent expanses of forest and wildlife areas. Recent extreme heat and freeze temperatures, as well as on-going drought conditions, have resulted in agricultural losses and consequential natural disaster area declarations by the Small Business Administration and US Department of Agriculture.

Figure 1: Rice was Glenn County's top agricultural commodity in 2013, with a value of $176.5 million.

The central and eastern portions of the County have been identified as areas with high and low flood hazards. Flooding hazards have been mapped for the central and eastern portion of the County. Flooding issues have been identified in three different urban communities in Glenn County: the Cities of Orland and Willow, and the unincorporated area of Hamilton City. The Glenn Colusa Canal seems to be the primary source of flooding near Willows, since it is not containing the 100-year peak flow. For the City of Orland, Stony Creek and Bambright Creek are the largest contributing flooding sources, impacting the north and northwest periphery of the city. All of the levee segments within Glenn County are de-accredited by the Federal Emergency Management Agency (FEMA) and current FEMA maps do not show any areas that are protected by levees.

Two-thirds of the County, from approximately I-5 to the western border (and beyond) has been identified as areas with very high, high, and moderate fire hazards. This is due to the location of the Mendocino National Forest in the west and rural land adjacent to the forest.

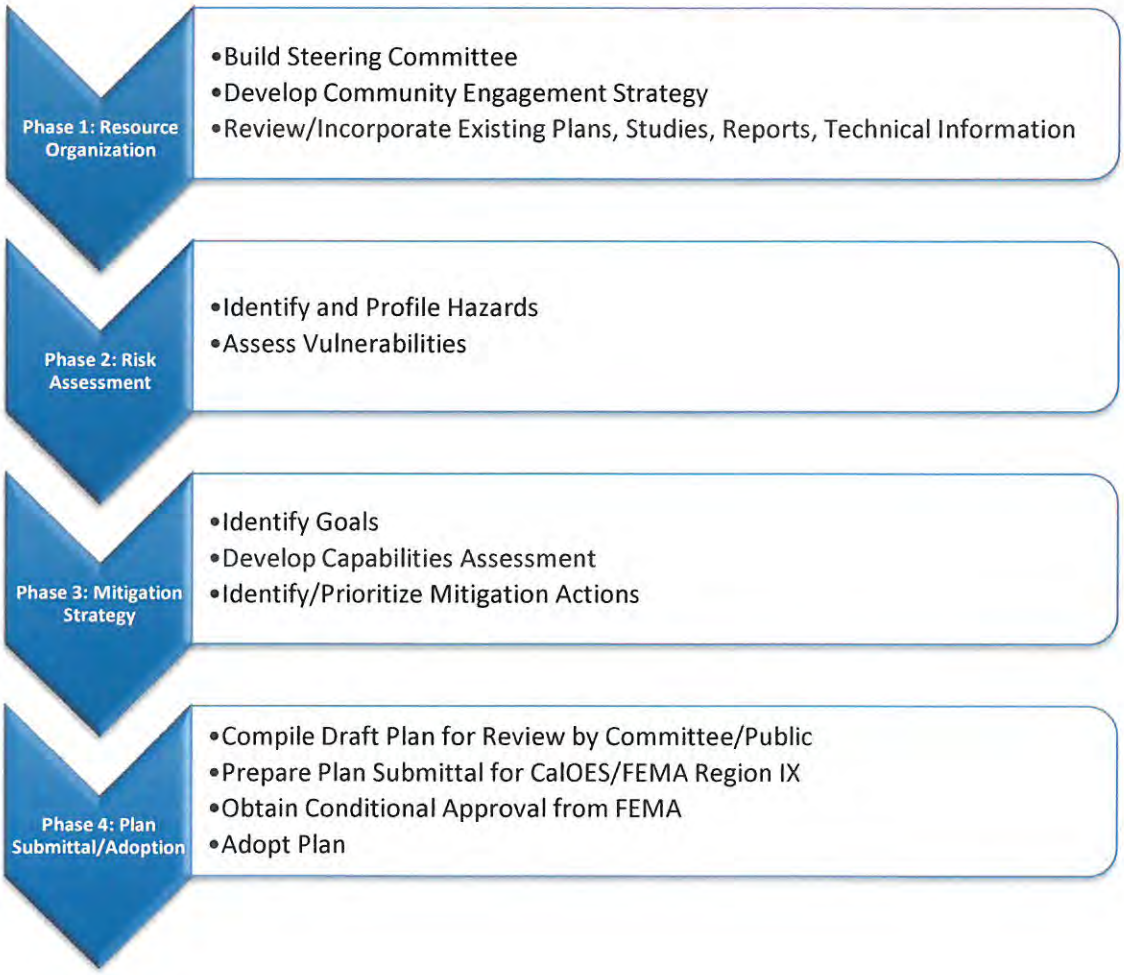
As the state of the climate continues to be more uncertain, Glenn County will likely see increases in natural hazards impacting its residents, structures, and infrastructure. As the population increases as projected, more people will be susceptible to these hazards, and will require disaster assistance and County resources to rebuild communities in the event of a hazard event. A major hazard event can paralyze Interstate-5, Glenn County's major transportation corridor connecting it to neighboring communities and beyond, resulting in lapsed disaster response, as well as lags in economic recovery and infrastructure development due to the inability to travel to Glenn County. Additionally, as already witnessed in the past couple of years, drought conditions and extreme temperatures can severely impact the County's rich agricultural infrastructure that drives the economy. These scenarios underscore the importance of identifying, assessing, and mitigating for hazards that could potentially affect the community and documenting them in the Glenn County MJHMP.

Figure 2: Drought conditions have greatly impacted Glenn County's agricultural economy in the past few years, resulting in disaster declarations.

A.2 Project Understanding

The Baker Team will facilitate the preparation of Glenn County's first Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) that complies with the Disaster Mitigation Act of 2000 (DMA 2000) requirements, and FEMA Local Hazard Mitigation Plan guidance series. The Baker Team envisions the MJHMP as a "Call to Action", rather than just a checklist response to local, state, and federal requirements, as it demonstrates a commitment to implementing hazard mitigation projects and policies. The MJHMP represents the official statement of Glenn County and participating jurisdictions' priorities for hazard mitigation planning, taking into account what makes the most sense for Glenn County's capabilities, and unique and specific situation.

The general planning process, shown, includes the identification of hazards that have the potential to impact Glenn County and the participating jurisdictions, the assessment of vulnerabilities to and impacts of identified hazards, and most importantly, the identification and prioritization of mitigation actions/projects to reduce risks from identified hazards. Additional details of associated tasks are provided in Section B, Scope of Work.



The MJHMP will document in detail the planning process, to ensure transparency and provides legitimacy for the decision making of the participating jurisdictions to pursue mitigation actions.

Upon FEMA approval and adoption by each participating jurisdiction, the MJHMP affords Glenn County and the participating jurisdictions eligibility for FEMA hazard mitigation grant funds from the following programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA), which includes Severe Repetitive Loss

Baker understands that access to these funding sources is vital in today's limited financial environment; the MJHMP will provide the County and the participating jurisdictions with a baseline for grant submittals to the State. Based on our experience and close working relationship with State and Federal agency representatives within California, we have found that the most successful mitigation plans result in meaningful mitigation actions geared toward implementation. This will ensure Glenn County and the participating jurisdictions are provided additional mechanisms to position themselves for future technical and financial assistance to implement identified mitigation actions/projects in the MJHMP.

B. Scope of Work

Our proposed planning process will bring together local County officials/staff, representatives from participating jurisdictions, stakeholders, and the general public in a community-based, transparent, and collaborative process that develops and builds the overall hazard mitigation program of Glenn County and participating jurisdictions. Based on our extensive experience in supporting, authoring, and reviewing hazard mitigation plans throughout FEMA Region IX (California, Nevada, Arizona, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands), our approach is specifically tailored to prepare a well-documented and useful MJHMP. Our tested approach provides an effective framework for an inclusive planning process and successful project completion. This process has been approved numerous times by the CalOES and FEMA, and will result in a solid foundation for Glenn County and participating jurisdictions to incorporate hazard mitigation planning into day-to-day operations. The overall planning process was presented in Section A.2, Project Understanding. This Section follows the overall planning process presented in Section A.2, Project Understanding and provides additional details of the associated tasks under each planning process phase, and incorporates required elements outlined in the County's Scope of Work identified in the RFP.

Of note, the City of Willows completed its Local Hazard Mitigation Plan (LHMP), which was adopted on January 26, 2010.

B.1 Project Coordination and Management

Baker believes effective leadership and project management is instrumental for project success, as it provides a framework to guide all participants toward common goals, enhances cost effectiveness, and reduces the risk of project budget overruns. Throughout the course of the development of the MJHMP, the Baker Team, led by **Project Manager, Wynne Kwan, AICP, LEED AP (BD+C),**, will proactively work with the Glenn County Project Coordinator, other County staff, and representatives from participating jurisdictions to ensure that tasks are completed on time and on budget - with the maximized use of resources.

B.1.1 Project Controls

Responsibility for planning and controlling a contract schedule belongs to the Project Manager, who will use all of the following project management techniques:

- Weekly workload management meetings which include long-range staffing projections
- Multi-media scheduling (word processing, graphics, editing, production scheduling)
- Timeline scheduling for tasks and milestones

Producing high quality work is an extremely important goal for Baker. The Baker Quality Control Program is a continuous process used not just at project milestones, but also on a daily basis as work flows from desk to desk, discipline to discipline, and consultant to client. Our documents undergo two types of internal reviews:

- On-going Reviews: These occur throughout the project process by the Project Manager and focus on the day-to-day accuracy and coordination.
- Formal Reviews: These occur at each of the product submittal stages and will be performed by J. Carver Struve, CFM, who will serve as a Technical Advisor, and Michael Skowronek, GISP, CFM, AICP, the Principal in Charge.

Baker regularly serves as an extension of client staff and it is the intent of the Baker Team to work with County staff and participating jurisdictions from the outset to tailor the project management approach to fit the needs and expectations of the County Project Coordinator.

B.1.2 On-Going Project Management

The project management task includes administrative management of the project from its inception to completion. Baker will regularly coordinate and communicate with County staff via telephone, memos, and/or email. Management and administration includes activities such as project accounting and oversight, ongoing coordination and scheduling of meetings, preparation of meeting notes, coordination of the Baker Team, and the preparation of written monthly project status reports.

The Baker Team will participate in face-to-face meetings and conference calls with County Project Team members during the work program period. During the kick-off meeting, a protocol for meetings will be established. In consultation with County Staff, Baker will prepare meeting agendas and distribute appropriate meetings materials at or prior to each meeting as directed.

B.1.3 Project Kick-Off Meeting

Immediately following the issuance of a notice to proceed, the Baker Team will conduct an internal kick-off meeting with the County Project Coordinator. The primary purpose of the meeting is to review of the proposed planning process, anticipated project schedule, and deliverables, as well as describe roles and responsibilities for the Baker Team, County Project Coordinator, and participating jurisdictions. Specific issues to be discussed include:

- The roles and responsibilities of the Baker Team, County Project Coordinator, and the participating jurisdictions.
- The identification of potential entities to be considered "participating jurisdictions" that intend to fully participate in the planning process and adopt the plan as their own upon completion. At the conclusion of the kick-off meeting, Baker will prepare a draft invitation to potential entities for MJHMP participation.
- The identification of other critical stakeholder to be involved in the planning process through the Steering Committee or through other means.
- The development and implementation of a Community Engagement Strategy to ensure public involvement during the MJHMP development and prior to final approval of the MJHMP. This would include identifying methods to generate public interest and solicit citizen input, as well as identifying potential stakeholder partnerships (i.e., serving on the Stakeholder Committee, etc.).
- The identification of existing data, plans, policies, programs, studies, reports, and other technical information for review and incorporation into the planning process.
- The identification of any potential barriers to timely task completion and the means to overcome those barriers.
- A Draft outline for the MJHMP, as proposed by the Baker Team.

Concluding the Kick-Off Meeting, the Baker Team will initiate the FEMA hazard mitigation planning process outlined on the following pages.

B.2 Phase 1: Resource Organization

Phase 1: Resource Organization forms the basis of the planning process to develop the MJHMP. This phase includes the formation of the Steering Committee, as well as developing the community engagement strategy. Stakeholder coordination and community engagement ensures a coordinated, inclusive, and efficient process for

developing the MJHMP. The core concept behind this step in the planning process is not just complying with FEMA requirements, but creating a framework for successful plan development and implementation in future years. Stakeholder coordination and community engagement allows for:

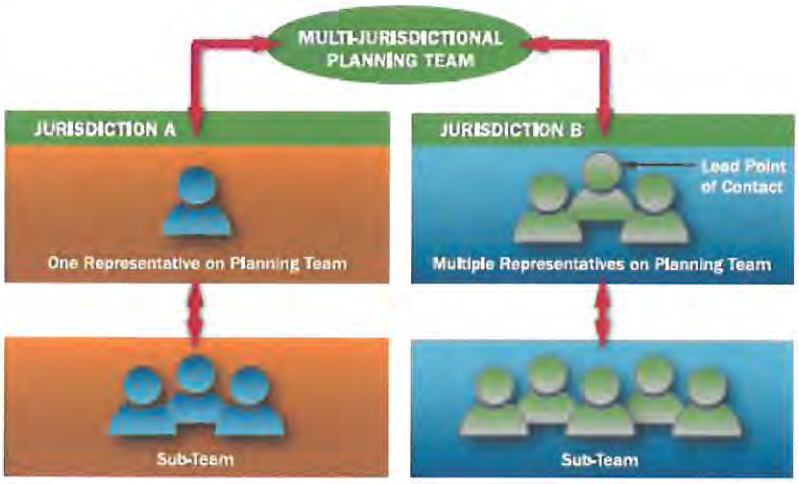
- Consolidation of data and information about natural hazards for the preparation of a concise, but useful MJHMP specific to the conditions of Glenn County;
- Identification of existing hazard mitigation activities currently taking place in the County and in the vicinity;
- Stakeholder buy-in and process improvements;
- Strengthening of existing and developing new partnerships for future collaboration; and
- Identification of areas of synergy for hazard mitigation actions and projects, as well as collaborative public education and awareness campaigns that communicate risk in Glenn County.

Stakeholder coordination and community engagement involves identifying the people, agencies, and organizations who will participate by providing input throughout the planning process. The "people" resource includes the Steering Committee (SC) and General Public.

B.2.1 Stakeholder Coordination

The MJHMP will be developed under the supervision of the Steering Committee (SC) that will be facilitated by the County Project Coordinator and the Baker Team. At a minimum, the SC would consist of County representatives, as well as at least one representative from each of the participating jurisdictions (i.e., incorporated Cities and special districts). Stakeholders representing other public and private entities could also be included in the SC. The SC members will ensure the implementation of an effective and on-going community engagement process.

With the facilitation of the Baker Team via conference call meetings, representatives from each of the participating jurisdictions will also be responsible for engaging in a concurrent, localized planning process specific to his/her jurisdiction. This representative will need to report back to his/her community on a regular basis, as well as gather feedback and input for the MJHMP. This ensures that the representative is not planning in a vacuum, but is working with entity staff to develop and prioritize mitigation actions specific to that jurisdiction, as well as to review and validate (or amend as appropriate to the specific jurisdiction) the hazards, vulnerabilities, impacts, goals, and plan maintenance processes identified during SC meetings. The graphic, shown, illustrates two options as to how these local planning teams can be structured. The method of representation should be based on each participating jurisdiction's size and level of effort required to assess unique risks and develop specific mitigation



actions. This jurisdiction-specific planning process will be documented in a Jurisdiction Annex Template that will be developed similar in format to the main MJHMP document.

B.2.2 Steering Committee Meetings

The Baker Team will facilitate a series of Steering Committee meetings to ensure continuous involvement of local officials of participating jurisdictions and stakeholders in the development of the MJHMP. These meetings will provide the Baker Team with the opportunity to obtain input throughout the drafting of the MJHMP, as well as refine specific aspects of the project approach as needed. The meetings will also serve to engage local leaders in a manner that will encourage them to take ownership of the MJHMP. Gaining local involvement and support in the planning process will result in a greater likelihood of plan implementation and maintenance in the future to reduce current and future hazard vulnerabilities. In addition to Committee members, the Baker Team will invite any local officials, business sector representatives, community groups, members of the public, or other organizations as deemed appropriate for purposes of each meeting.

The Baker Team will provide all necessary material needed to conduct the SC meetings under County leadership. The Baker Team recommends conducting five meetings with the SC to review and discuss the MJHMP activities. With five meetings, the Baker Team is going above and beyond minimum standard of three required meeting to provide a much higher level of service.

A summary of the meeting topics is provided in the table below:

Meeting	Summary of Meeting Topics
Meeting #1: **Hazard Mitigation Planning 101**	▪ Introduction to Hazard Mitigation Planning and the Process ▪ Explanation of roles and responsibilities ▪ Community Engagement Strategy Overview ▪ Potential Hazard Overview ▪ Preliminary Data Collection
Meeting #2: **Risk Assessment Workshop**	▪ Preliminary Results and Findings of Risk Assessment ▪ Community Asset Inventory Review ▪ Group Analysis and Risk Factor Development
Meeting #3: **Mitigation Strategy Workshop**	▪ Identification of Goals ▪ Discussion of Capabilities Assessment ▪ Development of Mitigation Actions
Meeting #4: **Plan Implementation and Maintenance Workshop**	▪ Prioritization of Mitigation Actions ▪ Development of Implementation Strategy for Mitigation Actions ▪ Development of Plan Maintenance Process ▪ Initial Jurisdiction Annex Template Completion
Meeting #5: **Draft Plan Review**	▪ Review of Initial Draft Plan

B.2.2 Community Engagement

As with other planning efforts, community engagement, a major and required component of the MJHMP planning process provides transparency and consensus building for the County and participating jurisdictions' decisions and ultimate success of the MJHMP (in terms of not just approval, but implementation of mitigation

actions). The Baker Team will work with the SC to develop a Community Engagement Strategy for the MJHMP. This will include community engagement meetings, as well as other outreach methods. These are discussed below.

B.2.2.1 Community Engagement Meetings

The Baker Team will facilitate two meetings (workshops/open house events) with the public to review and discuss the MJHMP. The initial meeting will occur toward the beginning of the planning process during the Risk Assessment phase. Once the Baker Team compiles, reviews, and assesses existing plans, studies, data, and other technical reports, hazard profile information will be presented to the general public for comment and feedback. At this meeting, which will be conducted as part of SC Meeting #2, the Baker Team will briefly describe what the MJHMP is, and discuss project timelines and milestone. The Baker Team will seek to obtain local knowledge or concerns regarding unique hazard risks not captured in the risk assessment to date. This meeting will also serve to educate the public on hazard mitigation principles and practices and begin soliciting their input into the design of mitigation goals, strategies, and projects for the participating jurisdictions to consider.

The second meeting will occur prior to submittal of the MJHMP to Cal OES and FEMA for review. The meeting will present the draft MJHMP to the public after the SC's comments have been incorporated. The public will be allowed to provide any comments or concerns.

The Baker Team will be available to the SC to present information, facilitate discussion, and answers questions regarding the MJHMP during these two meetings. The Baker Team will develop public notices, press releases, and advertisements and coordinate with the SC to promote attendance at the community engagement meetings. The Baker Team will work with the SC to coordinate with stakeholders that are not SC members, such as neighboring communities (i.e., adjacent counties and cities, Tribal Nations, etc.); local, State, and Federal agencies in the area, as well as businesses, academia, and other private/non-profit interests.

Successful Outreach

- Informs and educates about hazards and risks
- Invites interested parties to contribute their views and ideas for mitigation
- Identifies conflicts and incorporates different perspectives and priorities early in the process
- Provides data and information that improves overall quality and accuracy of the plan
- Ensures transparency and builds trust
- Maximizes opportunities for implementation through greater consensus and acceptance

B.2.2.2 Web-Based Participation

By utilizing multiple media formats, the Baker Team will work with County staff to provide clear messaging for all stakeholders throughout the duration of the project. Online outreach will be a key strategy in the planning process, providing a cost-effective means for reaching stakeholders and interested members of the public throughout the process. The Baker Team will assist the County in designing a page for the County's website that is specifically dedicated to this project; participating jurisdictions with websites can also link to this webpage. The webpage will provide information about the MJHMP, including information about the planning process, draft documents, and upcoming meetings. Website visitors will have an opportunity to provide input, comments on the elements of the MJHMP, and ask questions. They will also be able to sign up for email updates.

B.2.2.3 Additional Community Outreach Methods (Optional)

Additional community outreach methods are highlighted below. These, and any other community outreach methods, would be optional tasks developed as part of the community engagement strategy.

MJHMP Project Booth at Community Events. As an alternative to "traditional" community workshops, the Baker Team proposes a "go-to-them" approach. Using this approach, the Baker Team will coordinate with County and participating jurisdictions staff to set up an outreach booth at the Farmers' Markets in Orland and Willows and the Gonzales Flea Market at the County Fairgrounds at key milestones within the planning process. The Baker Team assumes two (2) Baker Team members will attend up to two (2) community events during the process.

Newsletter Articles. The Baker Team will draft two (2) articles for inclusion in the local media. The newsletter articles will be produced in concert with updates to the website and sent via email.

B.2.3 REVIEW EXISTING RESOURCE DOCUMENTS AND MAPPING

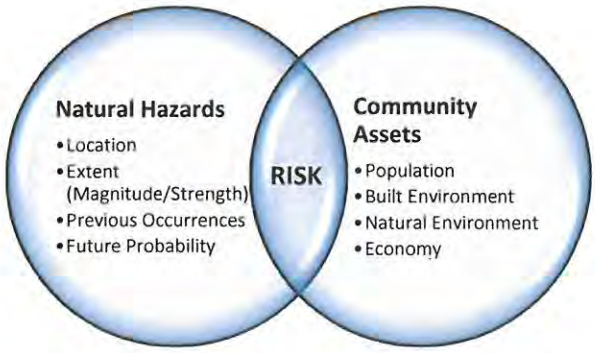
As part of the kick-off meeting, the Baker Team and County Staff will identify and review resource documents pertinent to the project, such as existing plans, studies, mapping, and data available from local, state, and federal sources. Additional resource documents and mapping will also be identified by SC members. It is anticipated these resources will include, but not be limited to the following:

- County/City General Plans and Area/Specific Plans
- Special District Long-Term Planning Documents
- Glenn County Community Wildfire Protection Plan
- Hazard Mitigation Plans of Neighboring Communities (e.g., the City of Willows HMP, adopted January 2010)
- Flood Insurance Rate Maps (FIRMs)
- Parks, Recreation, and Open Space Plans
- USGS Earthquake Shake Maps
- Stormwater Management Plans
- Agricultural Water Management Plans
- Regional Utility Systems
- County/City Parcel Information
- County/City Zoning Ordinances/Municipal
- Codes County/City Development Regulations
- Economic Development Plans
- Urban Water Management Plans
- 2013 CA State Hazard Mitigation Plan

A key component of the MJHMP will be early engagement of County, Regional, State, and Federal agencies that have oversight of the planning process. By engaging these entities early on in the process, the Baker Team will ensure that the most up-to-date and relevant data and information is incorporated into the MJHMP to reduce the need for revisions and comments during final review of the MJHMP.

B.3 Phase 2: Risk Assessment

In accordance with FEMA requirements, this step of the planning process identifies, profiles, and prioritizes hazards in Glenn County and assesses risk and vulnerability resulting from identified hazards for each participating jurisdiction. Results from this step will form the foundation for the subsequent identification of the appropriate mitigation actions for reducing losses.



B.3.1 HAZARD IDENTIFICATION AND PROFILES

The Baker Team will review the 2013 CA State Hazard Mitigation Plan, the existing City of Willows Local Hazard Mitigation Plan, neighboring communities' hazard mitigation plan, and past disaster declarations and occurrences to develop an initial list of hazards affecting Glenn County. The Baker Team will work with the SC to determine which hazards should be included in the MJHMP to give a complete picture of the hazard risk in the region.

Each hazard profile will include a description of the hazard, previous occurrences, location, extent (magnitude or strength), and probability of future occurrences. Location-based hazard data will be captured in a GIS database compatible with the County's GIS systems. The Baker Team will work with County staff to ensure all GIS data is accurate and appropriate for hazard profiling at the desired scale. Current and newly created (as needed) data will be used to develop mapping products (as much as possible) to illustrate location, extent, severity, and other information for hazards located in the County. The best available data will be used to complete this task.

Figure 3: Glenn County is susceptible to flood hazards, which have adverse impacts to Glenn County's residents, structures, and agricultural economy.

Based on an initial background review of Glenn County and past hazard events, the hazards to be profiled in the MJHMP include, but not limited to:

- Wildfires
- Flood
- Drought
- Extreme Temperatures
- Levee Failure
- Dam Failure
- Earthquake

B.3.2 ASSET INVENTORY AND VULNERABILITY ASSESSMENT

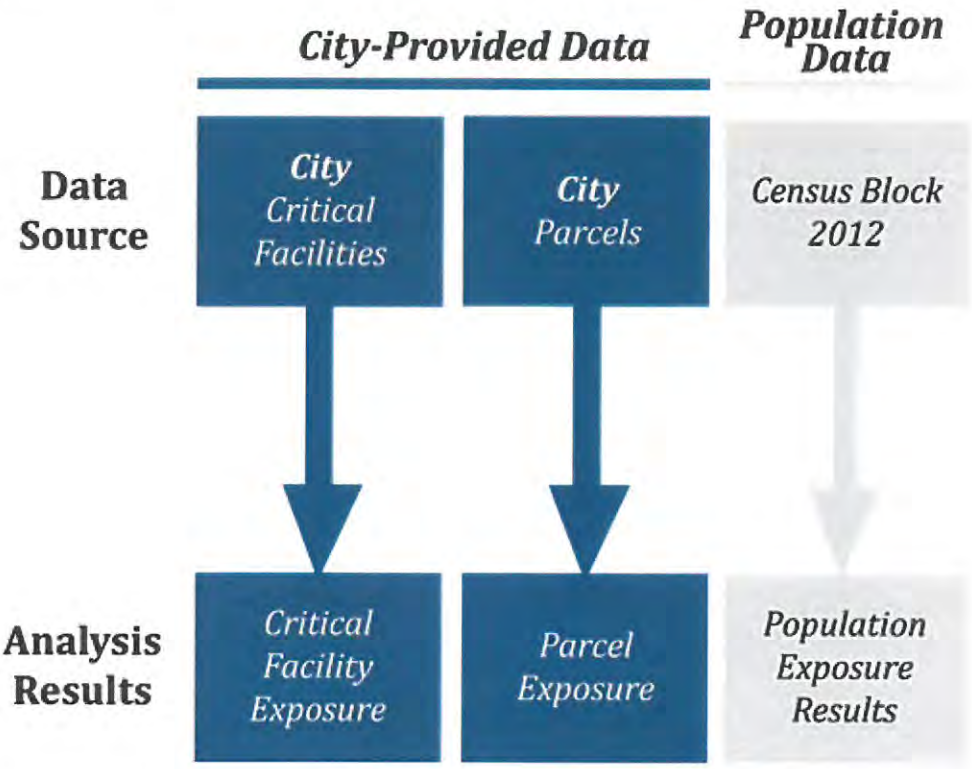
Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining "who" and "what" is susceptible to a specific hazard within Glenn County. This task develops a comprehensive asset inventory to assess vulnerability from identified hazards. Results from this step will form the foundation for the subsequent identification of the appropriate mitigation actions for reducing losses.

The MJHMP will include a general description of the population, as well as a current inventory of existing buildings, infrastructure, and critical facilities located within identified hazard area boundaries based on best available data within each participating jurisdiction. Impacts to community assets are usually represented by measures such as population at risk, percent damage, number of vulnerable structures, and potential dollar loss estimation. The risk assessment will also include address NFIP repetitive loss properties (RLP) by providing estimates of the numbers and types (residential, commercial, institutional, etc.) of RLPs in each participating jurisdiction. This type of information will provide a factual basis for developing effective mitigation strategies and assist damage assessments in the event of a disaster.

The Baker Team will focus on (1) Priority 1 critical facilities such as police stations, fire stations, public works yards, County administrative buildings, and medical facilities; and (2) Priority 2 critical facilities such as transportation infrastructure, utilities, and schools over other residential, commercial, or industrial structures. If data is available from the participating jurisdictions, the Baker Team will include localized building replacement

costs, which applied to the building infrastructure loss analysis. Potential loss estimates are not a requirement for MJHMP, but this information assists local officials and communities in decision-making about mitigation actions.

The below graphic illustrates an example of jurisdiction-specific inputs and Community Asset Exposure for a city, but this methodology can be used for a county or any other jurisdiction type. The Baker Team will overlay available hazard data layers with the information above to determine vulnerability of the participating jurisdictions. If digital parcel data and/or building footprints are available from the participating jurisdictions, the Baker Team will obtain and use that information to determine the types and numbers of structures at risk in the participating jurisdictions.



The risk assessment will also include a general overview of land uses and types of development occurring throughout the planning area. It will also include existing and future land uses and development densities in identified hazard areas, if possible. Based on the availability of information from the participating jurisdictions, the MJHMP will indicate where approved and/or planned development is likely to occur including any areas expected to be annexed by municipalities. This information will be used to assess the overall vulnerability and identify which future structures may be at risk. The risk assessment will provide a description of local development, redevelopment, and population trends in the discussion of anticipated future development. A draft Risk Assessment will be submitted to the SC for review.

B.4 Phase 3: Mitigation Strategy

The mitigation strategy is the explicit strategy that provides the blueprint for reducing the potential losses identified in the risk assessment for the participating jurisdictions, based on the County and participating

jurisdictions' existing authorities, policies, programs and resources, and the ability to expand and improve upon these existing tools. Developing the mitigation strategy involves identifying goals, assessing the capabilities of the participating jurisdictions, reviewing regional mitigation actions from surrounding counties and agencies, identifying new mitigation actions, and preparing preliminary implementation strategies for mitigation actions. A comprehensive mitigation strategy analyzes a wide range of mitigation actions from multiple forms of mitigation techniques, including structural project (buyouts, elevations, retrofits, etc.), non-structural project (policies, land use regulations, floodplain management ordinances, etc.), natural systems protection projects (sediment/erosion control, stream corridor restoration, wetland restoration/preservation, conservation easements, etc.), and .educational/awareness programs (real estate disclosures, websites with hazard information/maps, mailings to those in hazard-prone areas, etc.).

B.4.1 Identify Goals

The Baker Team will work closely with County staff and the SC to identify the mitigation goals and objectives to reduce or avoid long-term vulnerabilities to the identified hazards. The mitigation goals and objectives should address the following questions:

- Do the goals reflect the County and participating jurisdictions risk assessment?
- Do the goals support County and participating jurisdictions mitigation priorities?
- Do the goals reflect current state goals?

B.4.2 Develop Capabilities Assessment

A capabilities assessment is a comprehensive review of all the various mitigation capabilities and tools currently available to the County and participating jurisdictions to implement the mitigation actions that are prescribed in the mitigation strategy. Using a Capabilities Assessment Worksheet, the Baker Team will work with the County and participating jurisdictions to review current mitigation capabilities. This section will also describe the County and participating jurisdictions' past and current mitigation outreach, partnerships, and other efforts. For participating jurisdictions that are also National Flood Insurance Program (NFIP) participants, the MJHMP will describe these participating jurisdictions floodplain management program for continued compliance. The Baker Team will identify, analyze, and prioritize mitigation actions related to continued NFIP compliance and addressing RLPs.

B.4.3 Identify/Prioritize Mitigation Actions

The identification of high hazard areas in the risk assessment provides a starting point to develop appropriate mitigation actions that will address these hazard-prone areas/properties. The Baker Team will identify a comprehensive range of mitigation actions that are easy-to-understand, environmentally-sound, implementable, and considerate of the County and participating jurisdictions' current and near-term capabilities. Mitigation actions will also be developed with consideration for potential future state or federal funding through capital improvement bond programs and/or mitigation grant programs.

Based on current FEMA guidance, mitigation actions and projects means a hazard mitigation action, activity, process, or physical project designed to reduce or eliminate the long-term risks to from hazards. Mitigation actions are intended to reduce risk to existing buildings and infrastructure, as well as limit any risk to new development and redevelopment. Actions that are of an emergency response or operational preparedness are generally not accepted as mitigation actions by Cal OES and FEMA. Mitigation actions that address local planning and

Mitigation Action Types

- Local Planning and Regulations
- Structural and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness Programs

regulations may be incorporated into other planning documents such as General Plan and EOPs. Likewise, mitigation actions focusing on structure/infrastructure projects and natural systems protection may be incorporated into the capital improvement programs and other planning mechanisms, such as the stormwater management plans, urban water management plans, groundwater management plans, habitat conservation plans, etc.

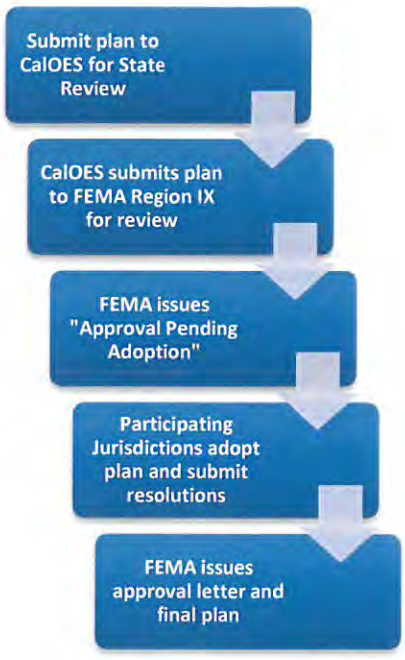
During this process, the Baker Team will work with the County and participating jurisdictions to develop mitigation actions based on the vulnerability and capability analyses for each participating jurisdiction. These identified mitigation actions will form the comprehensive mitigation strategy. Working with County and participating jurisdictions, the Baker Team will develop a process to prioritize identified mitigation actions based on criteria/factors determined by the SC. Once this has been determined, the Baker Team will work with the SC to prioritize the identified mitigation actions based on criteria determined by the SC. Prioritization criteria can include, but is not limited to:

- Social acceptance of the mitigation action
- Technical feasibility of the mitigation action
- Administrative staffing, funding, and maintenance required for the mitigation action
- Political acceptability of the mitigation action
- Legal authority to implement the mitigation action or other legal concerns
- Economic benefit of the mitigation action (including cost effectiveness)
- Environmental impact of the mitigation action

An implementation strategy for the prioritized mitigation actions will be developed using implementation worksheets. The worksheets will identify, for each prioritized mitigation action, the mitigation action department lead, funding and staffing resources needed to complete the measure, time frame for completion, and steps needed to implement each.

B.5 Phase 4: Plan Submittal/Adoption

This phase includes the compilation of the Draft document to be submitted to CalOES and FEMA Region IX for plan review and subsequent approval. The Plan Approval Process is highlighted in the graphic below. The following tasks reflect this Plan Approval Process.



B.5.1 Compile Draft Plan for Review by Committee/Public

Upon completion of the hazard profiles, risk assessment, and mitigation strategy, the Baker Team will compile the information into a Screencheck Draft version of the MJHMP. This Screencheck Draft of the MJHMP will include the Plan Maintenance section; the Baker Team will work with the SC to develop this section, which includes the procedures for monitoring, updating, and evaluating the MJHMP over the next 5 years; a description of how the County and participating jurisdictions will involve the public during the plan maintenance process over the next 5 years; and a description of the process and procedures the participating jurisdictions will use to incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, where and as appropriate.

Additionally, the Jurisdictional Annexes for each participating jurisdiction will be incorporated in the MJHMP. Each Jurisdictional Annex will include:

- Brief narrative of the local planning process, including meetings conducted and participants;
- Any hazards that are unique and/or varied from those affecting the overall planning area
- Repetitive Loss Properties, if applicable
- Jurisdiction-specific vulnerabilities and impacts
- Jurisdiction-specific capabilities assessment
- NFIP continued compliance floodplain management activities, if applicable
- Jurisdiction-specific mitigation actions/projects based on the jurisdiction's specific risks, vulnerabilities, and priorities

For participating jurisdictions that have an existing, previously-approved plan (i.e., the City of Willows, if it decides to participate), the Jurisdictional Annexes for these jurisdictions will also include the following:

- Description of changes in the planning process
- Description of changes to identified hazards
- Description of changes in development, if any, and its impact on the vulnerability of the jurisdiction
- Description of whether the goals in the previously-approved plan are still appropriate based on current conditions
- Status of the identified mitigation actions in the previously-approved plan, and description as to whether incomplete mitigation actions are no longer valid or included in the new plan
- Description of how the jurisdiction incorporated the previously-approved plan into existing planning mechanisms

Once the MJHMP is completed and all annexes and appendices are compiled, the Baker Team will review it to ensure all state and Federal regulations are met, and then distributed and presented to the SC for review and comment. Upon receipt of comments from the SC, the Baker Team will prepare a Public Review Draft MJHMP that addresses comments and incorporates the revisions requested by SC. This task assumes the Baker Team will receive one consolidated set of comments from County Staff.

Once complete this document will be ready for public distribution, which would include transmittal of the document to interested parties (as defined by the County and the SC) and local, State, and Federal agencies. The Baker Team highly recommends conducting the second Community Engagement Meeting at this time to allow for any public comment and feedback to be incorporated into the MJHMP prior to submitting to Cal OES and FEMA for review and respective governing or authoritative bodies for plan adoption.

B.5.2 Prepare Plan Submittal for CalOES/FEMA Region IX

Baker will compile all comments received on the Public Review Draft for inclusion as an Appendix item and revise the MJHMP, as necessary. The MJHMP will then be submitted to CAL OES for initial review; the Baker Team will address any comments/concerns from Cal OES before it is submitted to FEMA for formal review. The Baker Team will also prepare the FEMA Hazard Mitigation Plan Review Tool that will accompany the CAL OES and FEMA submission.

B.5.3 Obtain Conditional Approval from FEMA

If comments are provided by Cal OES and/or FEMA, requiring plan revisions, Baker will revise the plan prior to adoption by Glenn County and the participating jurisdictions. In the past, Baker has successfully completed plans that did not require revisions by FEMA prior to adoption, which is our goal for the Glenn County MJHMP.

However, if revisions are necessary, the Baker Team will work with FEMA to address them to ensure an "approvable pending adoption" (APA) determination.

B.5.4 ADOPT PLAN

Once the County's MJHMP has received an APA determination, the Baker Team will work with each participating jurisdiction to adopt the plan by resolution. The Baker Team will develop a sample adoption resolution that can be used by Glenn County and the participating jurisdictions. The Baker Team will also prepare a Staff Recommendation Memorandum to present to the Glenn County Board of Supervisors at a meeting for plan adoption. This Staff Recommendation Memorandum can also be used by the participating jurisdictions to present to their governing authorities. The Baker Project Manager will also attend the Glenn County Board of Supervisors meeting. The Baker Project Manager will not attend the adoption meetings for the participating jurisdictions, but can facilitate and provide support for the governing authority meetings of the participating jurisdictions.

In order for FEMA to approve the MJHMP, at least one of the participating jurisdictions must formally adopt the MJHMP within one calendar year of receipt of FEMA APA designation. Participants of the MJHMP will assume the expiration date five years form the first jurisdiction's approval date regardless of the other participant's subsequent adoption date(s). The five-year approval period does not get "re-set" each time another participating jurisdiction adopts the MJHMP. Thus, it is important to coordinate the adoption process to ensure that all participating jurisdictions are covered by the plan for the full 5 years.

After plan adoption and once the plan has received its final review and approval by FEMA, the Baker Team will submit the final adopted MJHMP to CalOES and FEMA and deliver final copies of the plan (digital and/or hard copies as defined in the contract) to the participating jurisdictions.

C. Project Team

The Baker Team is comprised of experts in hazard mitigation planning, emergency management, GIS and Hazus, outreach/communication, natural resource management/conservation, land use, policy and environmental planning in California. J. Carver Struve, who will serve as a Technical Advisor for the Baker Team, is a former State Hazard Mitigation Officer (SHMO) for the State of Maryland. A number of Baker Team members have experience in the specific cross-disciplines, which gives them a deep understanding and unique perspective of how to frame elements of the MJHMP document into other planning mechanisms and programs of Glenn County and participating jurisdictions, including the National Flood Insurance Program (NFIP), the Community Rating System (CRS), General Plan Elements, and Emergency Response Planning. Baker's Team of technical experts are proven, results-driven professionals capable of providing the highest degree of support to the County and participating jurisdictions. The following list highlights the many benefits the Baker Team brings to the Glenn County MJHMP:

- Recognized leaders in hazard mitigation locally and nationwide
- Strong Working Relationships and Partnerships with local, state, and federal agencies and organizations in California
- Proven experience complying with DMA 2000, 44CFR Part 201, Executive Order 11988, Floodplain Management, and Executive Order 11990
- Relevant Region hazard mitigation experience by supporting FEMA's Hazard Mitigation Technical Assistance Program (HMTAP)
- GIS and FEMA-trained Hazus professionals with experience conducting risk analysis runs for numerous local and state clients

Honoring the obligation to meet Cal OES and FEMA Hazard Mitigation Plan requirements and guidelines, the Baker Team understands the continued maintenance and resource burdens required to develop a MJHMP. The Baker Team includes members who are experienced in reviewing, analyzing, and extracting pre-existing data/information, as well as introducing new streamlined and integrated planning processes to match the County and participating jurisdictions' current resources to reduce staff burdens now and in the future.

Ms. Wynne Kwan will serve as the Project Manager, and will be supported by staff with expertise in community engagement, hazard mitigation planning, and GIS/spatial analysis. Michael Skowronek, AICP will serve as the Principal in Charge, with J. Carver Struve, CFM and Ethan Mobley, AICP serving as Technical Advisors. Brief descriptions of these key personnel are provided below. Resumes for each of the key personnel are provided in Section D, Qualifications.

C.1 Glenn County MJHMP Designated Project Manager

Wynne Kwan, AICP, LEED AP (BD+C), is a Senior Planner in Baker's Oakland Office, and has over 17 years of experience as an urban planning consultant for local, state, federal, and international public and private sector clients. Ms. Kwan is a certified planner with the American Institute of Certified Planners (AICP) and a Leadership in Energy and Environmental Design Accredited Professional (LEED AP). She is a member of the American Planning Association (APA), and Association of

CONTACT INFORMATION
Wynne Kwan, AICP, LEED AP (BD+C)
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1 Kaiser Plaza, Suite 1150
Oakland, California 94612
Phone: (510) 879-0959
Email: wkwan@mbakerintl.com

Environmental Professionals (AEP). She specializes in hazard and disaster mitigation planning, FEMA disaster response procedures, urban and environmental planning, public policy, public outreach, military master planning, economic and industrial development and strategy, and community development. Wynne has special expertise in the development and preparation of technical documentation, including hazard mitigation plans, master plans, environmental review/compliance documents, industrial development strategies, and policy and divestiture documentation/analysis.

Ms. Kwan has reviewed more than 100 hazard mitigation plans for FEMA Region IX.

As the Project Manager/Lead Mitigation Planner, Ms. Kwan provides primary hazard mitigation planning support to FEMA Region IX, which includes CA, NV, AZ, HI, and the Pacific territories, working closely with the Risk Analysis Branch Chief FEMA Region IX to promote hazard mitigation planning in communities. In this capacity, Ms. Kwan reviews and assesses local, tribal and state hazard mitigation plans, evaluating them for compliance with existing federal and state multi-hazard mitigation planning regulations and guidance. Ms. Kwan also provides technical assistance to communities, working with them to identify ways to develop compliant hazard mitigation plans, as well as identifying recommendations to improve plans so that communities are better positioned to receive disaster relief and mitigation grant assistance. Ms. Kwan has provided technical assistance to the Commonwealth of the Northern Mariana Islands, Mendocino County, Yolo County, Las Virgenes-Malibu Council of Governments, Riverside County, Napa County, and Kings County to develop their multi-jurisdictional hazard mitigation plans. Ms. Kwan also develops hazard mitigation plan guidance documents. Due to her role as Lead Mitigation Planner for FEMA Region IX, Ms. Kwan provides QA/QC reviews of plans prepared by other Baker staff for compliance with state and federal requirements.

Ms. Kwan has also provided technical support for a number of hazard mitigation and emergency management plans, including the Montgomery County (MD) Multi-Hazard Mitigation Plan, the Solano County Multi-Hazard Mitigation Plan Update, and the Delta Levee Emergency Management Plan. Ms. Kwan developed the planning process and coordinated the preparation of the 2012 MHMP Update for the unincorporated areas of Solano County; provided large-scale coordination with regional stakeholders in Solano County to capture localized hazard information; and created suitable mitigation actions to decrease the impacts of natural hazards on the County.

Prior to joining Baker, Ms. Kwan served as a consultant to FEMA. As part of the Pre-Disaster Mitigation National Grant Technical Review Project, she performed initial environmental/NEPA analyses of hazard mitigation projects submitted by various jurisdictions and other eligible entities. As a Project Officer, Ms. Kwan worked independently with FEMA Public Assistance Program applicants in Florida severely affected by Hurricane Charley, Frances, and Jeanne to complete Project Worksheets for FEMA reimbursement claims. She assessed the eligibility of facilities, work, and costs for eligible applicants and estimated hurricane damage costs, as well as responded to applicants' questions and concerns about the FEMA Public Assistance Program, the Stafford Act, and other disaster-specific policies.

C.2 Key Staff and Anticipated Total Effort

The adjacent table identifies the key professionals responsible for the completion of the Glenn County MJHMP and each staff member's anticipated total effort, expressed in percentages of person-hours.

Key Staff	Role	Percentage of Person-Hours Anticipated
Wynne Kwan, AICP, LEED AP	Project Manager | Point of Contact	27%
Michael Skowronek, GISP, CFM, AICP	Principal In Charge	3%
J. Carver Struve, CFM	Technical Advisors	1%
Ethan Mobley, AICP	Technical Advisors	3%
Lisa Messano, CFM	Community Engagement	9%
Jason Farrell	Hazard Mitigation Planning	13%
Renee Gleason-Hoppe, CEP-IT	Hazard Mitigation Planning	30%
Patrick Clancey	Hazard Mitigation Planning	2%
Jim McPherson, GISP	GIS / Spatial Analysis	3%
Richard Harmon	GIS / Spatial Analysis	8%

C.3 Key Staff

Ms. Kwan will be supported by the following key staff. They will provide their expertise in community engagement, hazard mitigation planning, and GIS/spatial analysis.

Michael J. Skowronek, GISP, CFM, AICP | Principal In Charge

Michael has 23 years of overall experience in planning, GIS, and program management. Specifically, Michael has over 15 years of experience in independently managing complex projects including all aspects of staff management/oversight, cost-control/budgeting/invoicing, scope of work change management, risk management, and client relations/communications. His diverse background, while working in both the public and private sectors, has been in the areas of comprehensive and environmental planning, hazard mitigation and risk communication, water resources, transportation/transit, economic development, and facilities management.

J. Carver Struve, CFM | Hazard Mitigation Technical Advisor

Mr. Struve provides leadership to Baker's hazard mitigation and emergency management practice, through coordination with Baker staff and clients nationwide. Previously, he delivered hazard mitigation and emergency planning solutions and lead a team of hazard mitigation specialists focused on serving the Mid- Atlantic and federal markets. Mr. Struve currently serves as a mitigation program lead under the FEMA Risk MAP program, and is a former State Hazard Mitigation Officer (SHMO) for the State of Maryland.

Ethan Mobley, AICP | Hazard Mitigation Technical Advisor

Ethan has over fifteen years of experience as a consultant for local, state, and federal agencies specializing in mitigation planning, natural resource management, construction management, Geographic Information Technology (GIT), and capital improvements planning. Ethan provides support and services to local communities and has planning experience for large federal clients, such as U.S. Army Corps of Engineers (USACE) and FEMA. Ethan is versatile in a multitude of software packages including GIS, economic analysis software, cost estimating software, risk assessment methodologies, and FEMA's National Flood Insurance Program (NFIP) data. Ethan serves Baker as a project manager for hazard mitigation and water resource projects for local, state and federal clients.

Ethan has been responsible for all aspects of hazard mitigation projects, including data collection, GIS analysis, and community outreach. He has organized and conducted public meetings, stakeholder workshops, and field-collection efforts for flood protection analysis using customized data to determine the potential impacts of flooding in a localized settings. He developed a foundation for cities across the United States to incorporate successful flood mitigation planning activities in day-to-day operations and capital improvement plans. He has also developed processes for natural hazard protection activities which focus on stakeholder coordination; risk assessment methodologies; and flood mitigation actions that are implementable in current funding environments.

Ethan has conducted flood mitigation workshops across multiple locations in Western U.S. Through "stakeholder leadership," he supported cities with public involvement campaigns and established appropriate project messaging for water resource projects, showcasing flood analysis data in simple, easy-to-comprehend maps, graphics, and charts to enhance the public's awareness of flood/stream alignment impacts. He has provided live interactive mapping sessions for residents interested in flood hazard characteristics for individual properties of choice.

Lisa M. Messano, CFM | Community Engagement Specialist

Lisa is responsible for outreach and risk communications for public outreach initiatives related to floodplain mapping, insurance and floodplain management. She develops targeted messaging, outreach materials, and strategies to engage local, State, and Regional stakeholders. She also manages conference preparations and handles coordination and collaboration to successfully communicate key program elements and accomplishments.

Jason Farrell | Hazard Mitigation Planner

Jason has experience in various aspects of emergency management having worked in both the public and private sectors. He has worked through state and federally declared disasters, assisting in the damage assessment process and subsequent briefings as well as coordinating public assistance efforts. Jason has extensive Emergency Operations Center experience, and has led various sections during that time. His focus has been on emergency management operations planning throughout his career and he holds a bachelor of science in emergency management from the University of Akron.

Renee Gleason-Hoppe, CEP-IT | Hazard Mitigation Planner

Rachel brings her detail-oriented environmental planning and stakeholder coordination experience to the Glenn County MJHMP. An Environmental Planner with Baker, Rachel prepares Environmental and Planning studies for public and private sector clients, under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Her responsibilities have included working in a generalist capacity in the preparation and review of CEQA documents and NEPA documents, as well as coordinating reviews of technical studies for state and federal compliance. Prior to joining Baker, Ms. Gleason-Hoppe worked as an analyst for a regional planning agency, the Western Riverside Council of Governments (WRCOG), where she assisted in the administration of the Transportation Uniform Mitigation Fee (TUMF) Program, a developer impact fee program intended to create a new source of revenue for roadway improvements. Her primary duties included coordinating with the 16 member jurisdictions of WRCOG to determine eligibility for transportation project reimbursement, programming projects on WRCOG's Transportation Improvement Plans, and quality control of agency documents and public advertisements. Rachel has also provided hazard mitigation planning and environmental support for the City of Duarte Local Hazard Mitigation Plan.

Patrick Clancey| Hazard Mitigation Planner

Patrick is a Technical Specialist in Baker's Oakland Office. Mr. Clancey is extremely qualified in the field of floodplain management. He provides technical support to FEMA in the Map Modernization Program, Risk MAP program, and various other flood mapping and management activities. His experience includes work on water resource projects for FEMA, processing MT-1 and MT-2 applications. He also has a background in analytical studies, which allows him to quickly adapt to the working environment, taking on more specialized and technical cases in a timely and efficient manner.

Jim McPherson, GISP | GIS / Spatial Analyst

Mr. McPherson has been utilizing Geographic Information Systems (GIS) technology for the past 14 years to provide support for a wide variety of projects including utility, environmental, engineering, and planning projects. He is experienced in database design and system design, for which he has helped to design and develop GIS geodatabases for cities and counties, as well as for numerous large and small projects. His work has included working on numerous General Plans, Housing Elements and Specific Plans for cities and counties. As part of these projects, Mr. McPherson has been responsible for setting up project databases and templates, as well as creating automated routines for data analysis and data creation. Mr. McPherson creates thematic maps to provide support for textual information found in documents. His work has been represented at several local, State and Regional user conferences. His experience extends to setting up field data collectors for hand-held GPS systems as well as utilizing cloud server technology for mobile devices including the iPad, iPhone, and Android phones. This technology allows field crews to edit live data sets and have those changes reflected real time on the web. Mr. McPherson has experience in creating and representing data for online interactive maps utilizing ArcSDE and ArcGIS server software. Mr. McPherson has a wide range of experience utilizing various systems including AutoCAD, ArcGIS, ArcInfo, and Oracle, SQL Server, SDE, Silverlight and other web technologies.

Richard Harmon | GIS / Spatial Analyst

Richard is a GIT Associate in the Oakland Baker office. In 2013, he provided on-site GIS assistance to the US Coast Guard Civil Engineering Unit in Oakland. Technical support included cartographic production, network analysis, data maintenance and other tasks needed. Richard also provides GIS assistance for FEMA, including Risk MAP production, LiDAR Topo review, and CNMS updates and clean up. Additionally, Richard provides GIS support for several California projects that include topo production, watershed digitization, and utility network updates. Prior to employment with Baker, Richard worked as a GIS Specialist at Laclede Group focusing on GPS data production and cartographic output. Richard has advanced working knowledge of Esri's ArcGIS software package with a focus in cartography, network analyst, and spatial analyst. Other software knowledge includes Hazus-MH 2.1, Global Mapper v1.1, and Adobe Illustrator CS3.

D. Qualifications

Michael Baker International is a full-service consulting firm providing planning, engineering, surveying, and emergency management services. Globally, Michael Baker International has more than 5,400 employees and has completed projects in 100 counties for more than 700 different agencies.

Baker has developed / updated 67 state and local hazard mitigation plans, including two State Enhanced Plans.

Michael Baker International has been providing hazard mitigation services to our clients since 1972 (39 years). Baker's multi-risk, multi-hazards approach has helped a multitude of federal, state, and local clients comprehensively plan and prepare for natural disasters, hazardous materials incidents, technological emergencies, internal/external risks, and terrorist threats. Representative clients include FEMA, the U.S. Coast Guard, the Customs and Border Protection (CBP), and other U.S. Department of Homeland Security (DHS) entities; the Environmental Protection Agency (EPA); the U.S. Department of Transportation (DOT); and other federal, state, and local governments and agencies. Baker's diverse staff of planners, engineers, scientists, architects, and GIS, Hazus, and outreach/communication specialists support a broad range of multi-disciplinary projects that span the full range of mitigation services in both pre-disaster and post-disaster environments

D.1 Local Hazard Mitigation Plan Experience

The Baker Team's unique experiences and seasoned staff provide a spectrum of perspectives, from plan development to plan review - which ultimately benefits our clients with sound consulting. Baker's hazard mitigation planning efforts produce streamlined plans that are compliant with FEMA requirements and guidance, as well as serve as a framework for successful integration with other planning efforts that lead to implementation.

Baker has a strong track record in supporting counties and cities in California and across the United States in a variety of emergency management planning tasks, specifically hazard mitigation and floodplain management planning, Geographic Information System (GIS), Hazus Analysis, and Community Rating System (CRS). In California, we have extensive involvement with hazard mitigation planning and emergency management efforts at the local, regional, and state levels. Representative projects include the Solano County Multi-Hazard Mitigation Plan Update, the Plumas County Multi-Hazard Mitigation Plan Update, the City of Shasta Lake Hazard Mitigation Plan, and the Napa County Operational Area Hazard Mitigation Plan. Detailed project descriptions for each are provided in this section.

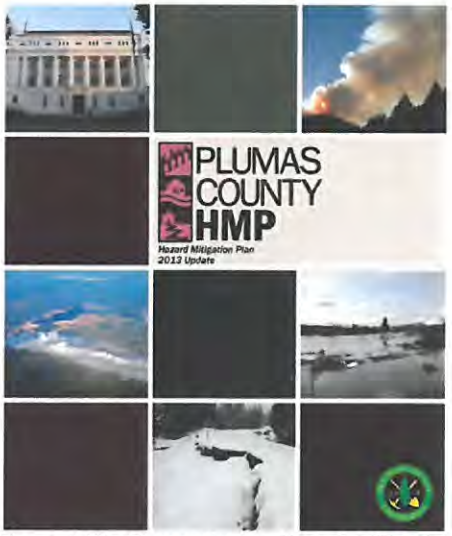


Figure 4 The Plumas County Hazard Mitigation Plan 2013 Update was adopted in August 2014 and received final FEMA approval in September 2014

In addition to our hazard mitigation experience, Baker's local offices have more than ten years of experience on flood management projects throughout the California which includes work with the California Department of Water Resources (DWR). In addition, Baker has provided Floodplain Modeling Coordination with the USACE, Sacramento District and Emergency Management Planning with local flood fight officials from across the Sacramento-San Joaquin River

Delta. Key staff have emergency dam failure projects throughout California (as part of a FEMA Region IX dam failure project); and have provided project management and two-dimensional modeling for the Central Valley Floodplain Evaluation and Delineation program, which is a key component of California's FloodSafe initiatives.

D.2 National Flood Insurance Program

Currently, the Baker and the staff highlighted in this proposal serve as the Production and Technical Services (PTS) contractors to FEMA Region IX for the Risk Mapping, Assessment and Planning (Risk MAP) program. In this capacity, Baker's Oakland office is the Regional Support Center (RSC) that provides support to FEMA for all aspects of implementing Risk MAP FEMA Region IX, which includes CA, AZ, NV, HI and Pacific territories.

As the FEMA Region IX Risk MAP PTS contractor, Baker provides service support for flood studies ranging from scoping/discovery to topographic data development, field survey, base map acquisition, hydrologic and hydraulic engineering analyses, GIS, flood hazard digital mapping, Digital Flood Insurance Rate Map (DFIRM) data development, levee assessment, public outreach/ communications, map adoption, risk assessment/ Hazus, risk communication, mitigation planning, mitigation grant application development, project management for hazard mitigation grant implementation, and other related services.

D. 3 Similar Project Experience

Baker believes that its clients' satisfaction and its repeat client base measures demonstrated excellence of a firm. We are proud of our record of 85 percent repeat clients, which increases year after year. Our clients themselves provide a more visible testimony of our demonstrated competence. We invite you to contact our past clients as outlined below. The most recent projects are presented in the table below identifying the components of each project. Baker has been a leader in hazard mitigation analysis, developing plans, guidelines, and providing training to our clients. The projects identified in the table below are projects within the last five years.

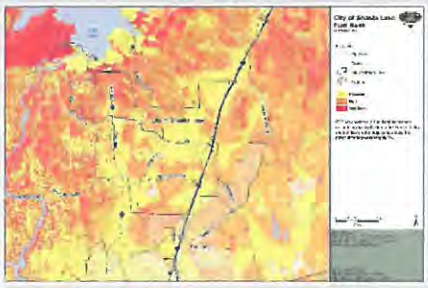
2014 City of Shasta Lake Hazard Mitigation Plan

Client: City of Shasta Lake, CA

Reference: Debbie Israel
Senior Planner, Development Services Department

(530) 275-7469 Direct
disrael@cityofshastalake.org

Dates: 7/10/2013 to 6/2014



The Baker Team's project approach provided a foundation for the City to incorporate successful implementation of hazard mitigation planning in its day-to-day operations. The Baker Team developed for the City a template for future updating activities focused on stakeholder coordination and outreach; risk assessment methodologies; and implementable mitigation actions that were clear, concise, and repeatable in current grant funding environments.

Through "stakeholder leadership," the Baker Team supported the City in a public involvement campaign. Establishing appropriate communication and project messaging, the Baker Team provided a foundation for future outreach and messaging regarding the City's natural hazard risks. By using multiple media formats and a consistent message, the Baker Team instilled a working desire to mitigate impacts to life and property from natural hazards. The Baker Team conducted a three-day workshop to confirm vulnerability analysis information with boots-on-the-ground efforts. The workshop provided an opportunity to work as a team, transparency in the planning process, a series of data collection exercises, methods for minimizing disruption and impacts to city operational and business processes, and public involvement.

The workshop showcased the planning process and hazard analysis in simple, easy-to-comprehend maps, graphics, charts, and tables to enhance the public's awareness of the natural hazards and their impacts on the City. The Baker Team also provided streaming video and live interactive mapping sessions for residents interested in hazard characteristics for individual properties of choice.

Napa Operational Area Hazard Mitigation Plan

Client: Napa County Emergency Services

Reference: Kevin C. Twohey
Emergency Services Coordinator
Volunteer Fire Department Liaison
County of Napa

(707) 299-1892 Direct
(707) 363-6221 Cell
kevin.twohey@countyofnapa.org

Dates: 3/2013 to 2/2014

Baker performed all necessary travel, professional analysis, and work required for the preparation of a revised and updated draft of the Napa Operational Area Hazard Mitigation Plan (NOAHMP).

The Baker Team updated the current plan with additional language and information that assisted readers in understanding hazard mitigation regulatory requirements and planning processes. The revised draft plan incorporated all required revisions included in the Federal Emergency Management Agency (FEMA) Regulation Checklist. The end result was an updated plan that complied with FEMA regulations, complete with the proper supporting documentation.

The primary objective of the project was to reconvene personnel resources and planning documents to assist Napa County and participating jurisdictions in plan revisions and updates. Baker led stakeholders through a facilitated planning effort to update sections of the NOAHMP that FEMA deemed deficient.

To ensure the implementation of an effective, on-going public involvement process and the mitigation actions by the governing bodies of the County and participating jurisdictions, Baker coordinated membership of this committee for current and future plan updates and revisions. The NOAHMP was approved by FEMA on January 29, 2014.

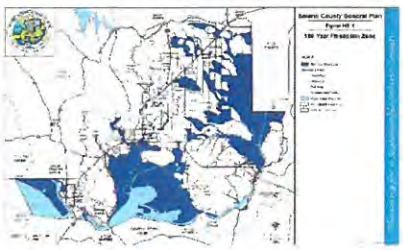
Solano County Multi-Hazard Mitigation

Client: Solano County Emergency Services

Reference: Don Ryan, Emergency Services Manager
Solano County Sheriff/OES

(707) 784-1600 Direct
(707) 688-3399 Cell
dlryan@solanocounty.com

Dates: 7/2012 to 2/2014



Baker Team members performed all necessary professional analysis and work required for the preparation of a Multi-Hazard Mitigation Plan (MHMP) Update, which incorporated all Community Rating System (CRS) 510 Series Floodplain Management Plan components. The Baker Team organized and facilitated the planning process; developed a public involvement strategy that incorporated social media technologies, such as Twitter, Facebook, and RSS Feeds; and facilitated two series of public workshops. The Baker Team compiled, reviewed, and analyzed data to identify and prioritize all probable hazards and developed overall vulnerability assessments and preliminary mitigation actions for priority hazards. Baker also developed charts and tables, GIS-based maps, and custom symbols for each identified hazard.

Based upon an updated, highly accurate inventory of population, the types and numbers of buildings, infrastructure, and critical facilities, and utilizing Level 2 Hazus, Baker developed customized spatial analysis methodologies. The Baker Team personalized the vulnerability assessments for each hazard to illustrate the location and extent, as well as the total population and assets at risk within the County. The goal of this task was to develop a parcel-level inventory of vulnerable structures and estimate damage based on flood depth and earthquake shake intensities. The Final MHMP document was approved by FEMA in April 2013.

Plumas County Multi-Hazard Mitigation

Client: Plumas County Public Health Department

Reference: Jerry Sipe
Plumas County Environmental Health/OES

(530) 283-6367 Direct
JerrySipe@countyofplumas.com

Dates: 7/2012 to 5/2014

Baker Team members performed all necessary professional analysis and work required for the preparation a Multi-Hazard Mitigation Plane (MHMP) Update.

During this process, the Baker Team created and facilitated a project team, which included the MHMP Planning Committee and Hazard Focus Groups. The MHMP Planning Committee consisted of local emergency managers; health officials; fire department staff; planning staff; and a spectrum of community stakeholders, such as Cal FIRE, Cal EMA, California Highway Patrol, Plumas National Forest, Sierra Institute, and U.S. Department of Agriculture Natural Resources Conservation Service.

The MHMP Planning Committee worked with County agencies and the public to identify hazards, critical infrastructure, and successful mitigation actions through "ground-truthing" areas prone to natural hazards. Information about damage to roads, critical infrastructure, and other community assets from past hazardous events was captured for incorporation into the MHMP Update. A series of public open houses were held in Portola, Greenville, Quincy, and Lake Almanor to showcase the hazard profiling process and present the data collected throughout the week. The public had the opportunity to interact with County and project staff and provide additional information and pictures of local natural hazard events.

Location-based hazard data was captured into a geographic information system (GIS) database compatible with the County's GIS systems. Using this data, the Baker Team presented maps at the public open houses to illustrate locations, magnitude/extent, and other information about the local hazards. These maps, were then refined with additional information received from the public.

Using a comprehensive asset inventory, the Project Team developed the vulnerability assessments from identified hazards and analyzed information such as population at risk, percent damage, number of vulnerable structures, and potential loss estimations. Once the vulnerability assessments were completed, the Project Team worked with local officials and subject matter experts to develop preliminary mitigation actions for priority hazards and developed implementation strategies for prioritized mitigation actions. Throughout the planning process, the Project Team developed forms and other templates to collect information from County staff and the public in a consistent manner. All information and data compiled throughout the planning process was included in the final MHMP Update document and reviewed against the current Federal Emergency Management Agency (FEMA) Hazard Mitigation Plan Review Tool to ensure compliance.

Project information and live updates were linked to a County website developed for the MHMP. Traditional media outlets, such as newspapers and press releases, were also utilized to reach out to residents who may not have access to social media outlets. Opportunities for the public to comment/provide feedback were provided at two public workshops series held during the development of the MHMP (after hazard identification and proposed mitigation action identification).

Delta Levee Emergency Management Plan; California Delta

Client: U.S. Army Corps of Engineers

Reference: Brooke Schlenker, Senior Planner

(916)-557-5299 (Direct)

Dates: 8/2010 to 8/2012

The Baker Team was the service provider for the Delta Levee Emergency Management Plan (Plan), which will enable first responders and flood fight personnel to quickly identify special emergency considerations, flood fight strategy, and emergency resources in a flood event. Baker led a regional GIS data collection effort to standardize the spatial information used by local, state, and Federal EOCs in the region.

The Baker Team addressed communication and interoperability challenges during a flood event throughout the Delta Region. Communication and interoperability during large flood events will rely on the mapping products developed during this project. Effective response to large incidents requires real-time collaboration among multiple agencies and spatial data interoperability is a critical component to effective emergency response management when responding to high water events in the Delta Region.

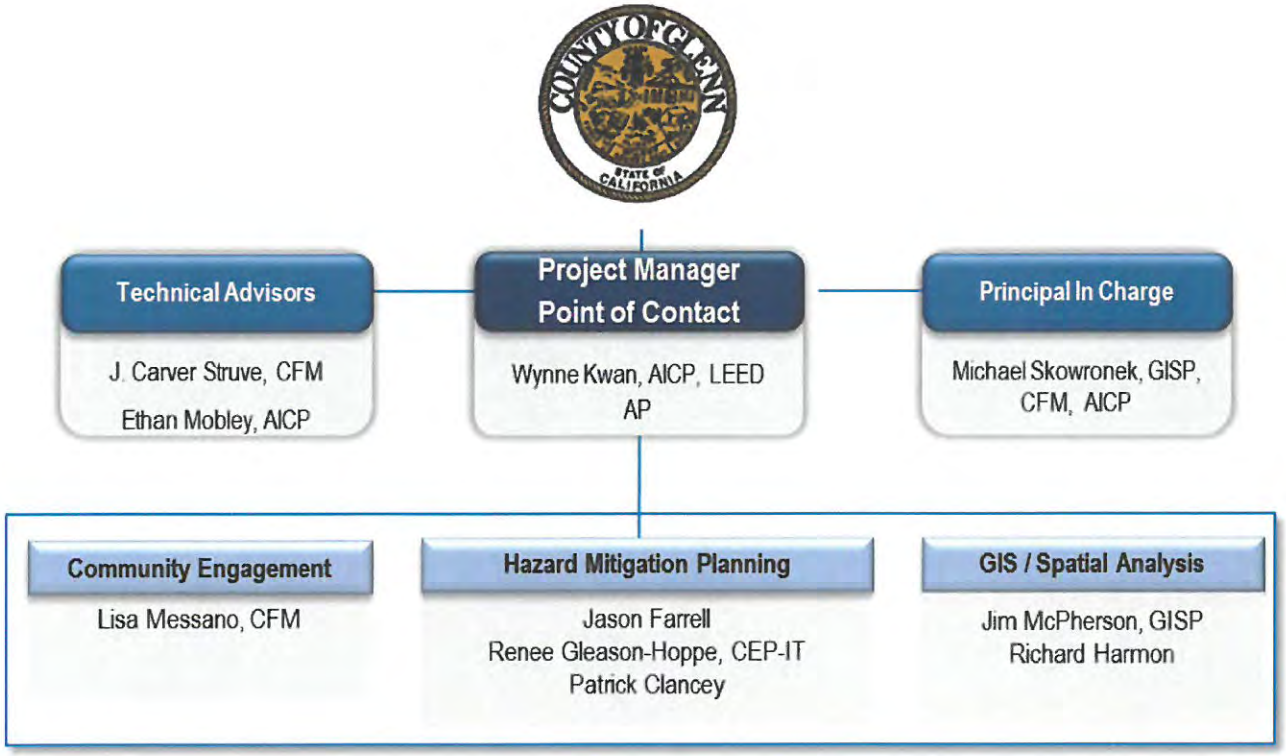
The Baker Team developed response reports and designed symbology for use in emergency response situations giving meaning to the symbols. Once learned, the emergency maps can be scanned and interpreted instantly by emergency managers in the EOC during a flood event.

Hazard mitigation projects started or conducted over the last five years in California include:

HMP / EOP Projects	Client	Location	Completion Date (est.)
Local Hazard Mitigation Plan /EOP Update	City of Huntington Beach	Huntington Beach, CA	6/30/2012
Local Hazard Mitigation Plan	City of Duarte	Duarte, CA	(Mid 2014 est.)
Local Hazard Mitigation Plan	City of Capitola	Capitola, CA	5/23/ 2013
County Operational Area Hazard Mitigation Plan	Napa County	Napa County, CA	6/13/2014
County Multi-Hazard Mitigation Plan	Plumas County	Plumas County, CA	5/28/2014
County Multi-Hazard Mitigation Plan	Solano County	Solano County, CA	6/30/2012
Local Hazard Mitigation Plan	City of Shasta Lake	Shasta County, CA	6/30/2014
Local Hazard Mitigation Plan	City of Lawndale	Los Angeles County, CA	2015
Local Hazard Mitigation Plan	City of McFarland	Kern County, CA	2015
Local Hazard Mitigation Plan/Safety Element Update	City of Wasco	Kern County, CA	2014
Safety Element Updates	City of Fullerton City of Buena Park City of Placentia City of Yorba Linda	Orange County, CA	2009-2014
Hazard Mitigation Plan Review Process Revision and Contract Assistance for Mitigation Plan Reviews	FEMA	FEMA Region IX	On-Going

D.4 Organizational Chart

The Organizational Chart illustrates the Baker Team's lines of authority and identifies key professionals responsible for the completion of the Glenn County MJHMP is shown below, as well as in Section C, Project Team.



D.5 Resumes

Resumes for all key personnel are provided below and on the following pages.

Wynne Kwan, AICP, LEED AP BD+C
Senior Planner
Project Role: Project Manager

Ms. Kwan, a Senior Planner with Baker, has extensive experience as an urban planning consultant for local, state, federal, and international public and private sector clients. Ms. Kwan is a certified planner with the American Institute of Certified Planners (AICP) and a Leadership in Energy and Environmental Design Accredited Professional (LEED AP). She is a member of the American Planning Association (APA), and Association of Environmental Professionals (AEP). She specializes in hazard and disaster mitigation planning, FEMA disaster response procedures, urban and environmental planning, public policy, public outreach, military master planning, economic and industrial development and strategy, and community development. Ms. Kwan has special expertise in the development and preparation of technical documentation, including hazard mitigation plans, master plans, space utilization studies, environmental review/compliance documents, industrial development strategies, and policy and divestiture documentation/analysis.

Years with Baker: 9
Years with Other Firms: 8

Education
M.S., 1997, Urban Planning, Columbia University

B.S., 1995, Arts and Design (Architecture)/Urban Studies and Planning, Massachusetts Institute of Technology

Licenses/Certifications
Open Water Diver, 2000

LEED Accredited Professional BD+C, 2009

American Institute of Certified Planners, California, 2008

Experience

Hazard Mitigation Plan Review Process Revision and Contract Assistance for Mitigation Plan Reviews, Nationwide. *Federal Emergency Management Agency (FEMA).* Task Manager. Serve as primary hazard mitigation planning support to FEMA Region IX, which includes CA, NV, AZ, HI, and the Pacific territories, working closely with the Risk Analysis Branch Chief FEMA Region IX to promote hazard mitigation planning in communities. Responsible for the review and assessment of local, tribal, and state hazard mitigation plans (HMP) for Region IX; compliance evaluation with existing multi-hazard mitigation planning guidance. Provide technical assistance to communities to identify ways to develop compliant hazard mitigation plans, as well as identifying recommendations to improve plans so that communities are better positioned to receive disaster relief and mitigation grant assistance. Prepare HMP guidance documents as needed. Trained and managed client summer interns. Provided Action Measure Support to FEMA Region IX, including assistance with the Regional Action Strategy, development of presentations for various conferences/webinars by FEMA staff, and training to FEMA customers on the mitigation action tracker. Participated on the FEMA Non-Regulatory Risk MAP Products Outreach Working Group to develop outreach materials that promote non-regulatory Risk MAP products.

Under this contract, Baker provides services to support risk management, hazard mitigation planning, and management and support for the Risk Mapping, Assessment, and Planning (Risk MAP) and Contract Assistance for Mitigation Plan Reviews (CAMPR) programs. Baker's services included conference participation, support for revision of the hazard mitigation plan review process, development of a tribal guide to hazard mitigation planning, and assistance to regional offices in providing training in the development of hazard mitigation plans.

Hazard Mitigation Plan, Plumas County, California. *Plumas County.* QA/QC Specialist. Provided QA/QC for the City of Shasta Lake LHMP Update document for compliance with state and FEMA regulations.

Hazard Mitigation Plan and General Plan Safety Element Update, Shasta Lake, California. *City of Shasta Lake, CA.* QA/QC Specialist. Provided QA/QC for the City of Shasta Lake LHMP Update document for compliance with state and FEMA regulations.

Hazard Mitigation Plan, Napa County, California. *Napa County.* QA/QC Specialist. Developed Scope of Work to address plan deficiencies after it was reviewed by FEMA. Provided QA/QC for the Napa Operational Area HMP Update document for compliance with state and FEMA regulations.

Multi-Hazard Mitigation Plan, Solano County, California. *Solano County.* Senior Planner. Developed the planning and coordination process for the preparation of the 2012 MHMP Update for the unincorporated areas of the county. Analyzed the county demographics and critical infrastructure; create a community profile; identified and profiled the county's natural hazards; conducted risk assessments for identified natural hazards; provided large-scale coordination with regional stakeholders in the county to capture localized hazard information; and created suitable mitigation actions to decrease their impact on the county.

Hazard Mitigation Plan Update, Montgomery County, Maryland. *Montgomery County Office of Emergency Management and Homeland Security (OEMHS).* Senior Planner. Prepared the drought/water storage and hazardous materials incidents hazard profiles for hazard mitigation plan. Identified location, magnitude/extent, past occurrences, probability of future occurrences, and vulnerabilities and impacts to the County from these hazards. Baker provided environmental engineering services to update the county's multijurisdictional hazard mitigation plan. Baker's services included identification and mapping of natural hazards; analysis of risks to property that is associated with hazard-prone areas; identification of programs and resources for hazards analysis, risk assessment, and hazard mitigation policies and activities; identification of mitigation policies that affect public and private entities; definition of community roles; and formulation of mitigation strategies to reduce future risks.

California Coastal Analysis and Mapping Project. *FEMA Region IX.* Senior Planner. Prepared the outreach implementation plan; developed stakeholder tiering strategy, developed and prepared briefing packages for Congressional Representatives, and organized and coordinated discovery meetings. Created the hazard mitigation planning series on the Coastal Beat e-bulletin and acted as the main author of articles for this series. Supported FEMA's External Affairs officer with outreach and coordination and assisted in the development of an outreach strategy for all studies in Region IX.

2004 Florida Hurricane Disaster Assistance, Florida. *Federal Emergency Management Agency (FEMA).* Public Assistance Project Officer/Community Assistance Officer. Worked independently with FEMA Public Assistance Program applicants in Florida severely affected by Hurricane Charley, Frances, and Jeanne to complete Project Worksheets for FEMA reimbursement claims. Assessed the eligibility of facilities, work, and costs for eligible applicants (electric cooperatives and city-owned electric departments) and estimated hurricane damage costs. Responded to applicants' questions and concerns about the FEMA Public Assistance Program, the Stafford Act, and other disaster-specific policies. Provided FEMA community assistance and outreach services immediately after the hurricane disaster events in Florida, working with various non-profit and community organizations, as well as private citizens

Michael Skowronek, GISP, CFM, AICP
Operations Manager
Project Role: Principal In Charge

Years with Baker: 10
Years with Other Firms: 13

Education
M.A., 1991, City Planning, Georgia Institute of Technology
B.A., 1987, Environmental Design, Texas A&M University

Licenses/Certifications
Certified GIS Professional
Certified Floodplain Manager
American Institute of Certified Planners

Mr. Skowronek is the Oakland Office Manager and a Senior Project Manager. He has 23 years of overall experience and over 15 years of experience in independently managing complex projects including all aspects of staff management/oversight, cost-control/budgeting/invoicing, scope of work change management, risk management, and client relations/communications.

Experience

FEMA Risk MAP program (2009-Present) and Regional Management Center 9 Lead for FEMA Map Modernization Program. (2004-2009). FEMA. Regional Service Center 9 Lead. Provided hands-on daily support to FEMA Region IX and the Region IX mapping partners in CA, AZ, NV, HI and Pacific Territories.

Local Hazard Mitigation Planning Projects in the West. Principal In-Charge. Managed staff and oversaw various projects including Solano County, CA Multi-Hazard Mitigation Plan; Plumas County, CA Hazard Mitigation Plan; City of Shasta Lake, CA Hazard Mitigation Plan and General Plan Safety Element Update; Napa County, CA Hazard Mitigation Plan; and State of Arizona Department of Emergency Management State Hazard Mitigation Plan.

Regional Task Order Manager for FEMA Region IX Risk MAP and Map Modernization Task Orders. Task Order Manager for 10 years of FEMA Regional task orders for work performed in the Oakland office. Baker performed the following: outreach for levee related mapping, independent QA/QC review of hydrologic and hydraulic analyses and Digital Flood Insurance Rate Map (DFIRM) / Flood Insurance Study (FIS) production.

Mapping Information Platform Support, Arizona. *JE Fuller/Hydrology & Geomorphology Inc.* Project Manager. Baker provided consulting services to JE Fuller to guide them on FEMA standards for data documentation and proper procedures for uploading FEMA-acceptable data to FEMA's Mapping Information Platform (MIP).

Levee Inventory Tools Software Development. *U.S. Army Corps of Engineers (USACE).* Project Manager. Baker created Geographic Information (GIS)-based Levee Inventory Tools software products for the National Levee Database, which provides comprehensive information regarding the locations and conditions of the nation's levees to facilitate flood risk communication, levee system evaluation, levee system inspections, flood plain management, and risk assessments.

SamTrans Needs Assessment, San Mateo County Transit District (SamTrans), San Carlos, California. *Peninsula Corridor Joint Powers Board.* Project Manager. Baker developed a GIS Needs Assessment, Implementation Strategy with Recommendations, and a proposed Geospatial Data Structure for SamTrans.

J. Carver Struve, CFM
Technical Director for Hazard Mitigation Planning
Project Role: Hazard Mitigation Technical Advisor

Years with Baker: 3
Years with Other Firms: 12

Degrees
M.S., 1998, Planning, The University of Tennessee, Knoxville

B.S., 1996, Urban Studies and Planning, Virginia Commonwealth University

Licenses/Certifications
Certified Floodplain Manager, 2005

Mr. Struve provides leadership to Baker's hazard mitigation and emergency management practice, through coordination with staff and clients nationwide. Previously, he delivered hazard mitigation and emergency planning solutions and lead a team of hazard mitigation specialists focused on serving the Mid-Atlantic and federal markets.

Experience

Hazard Mitigation Plan Update, and Plan Implementation Presentation, Shasta Lake, California. *City of Shasta Lake, CA.* Subject Matter Expert. Responsibilities included providing general subject matter expertise and providing final QA review for the City of Shasta Lake Hazard Mitigation Plan. Developed and presented a training workshop on implementation of the County's hazard mitigation plan. The training covered mitigation funding opportunities, project eligibility, FEMA Benefit Cost Analysis, environmental review, project implementation, close out and monitoring.

Rapid Initial Damage Assessment Training, Virginia Beach, Virginia. *City of Virginia Beach, Virginia.* Technical Advisor. Provided technical assistance for reimbursement under the FEMA Public Assistance Program. Baker provided annual rapid initial damage assessment training and data entry and database administration training for staff of the city's Department of Public Utilities engineering division under a five-year annual services contract for emergency operations planning. Baker's services included training course development, preparation of training materials, and preparation of users' manuals for the damage assessment database.

Grant Program Support, Prince George's County, Maryland. *Prince Georges County Government.* Subject Matter Expert. Responsible for providing project management for the Repetitive Loss Area Analysis (RLAA) task order. Lead the development of a RLAA report which details 16 repetitive loss properties in the County. Development of the report included information analysis, mapping, public outreach and mitigation strategy development components

Hazard Mitigation Plan Update, Montgomery County, Maryland. *Montgomery County Office of Emergency Management and Homeland Security (OEMHS).* Emergency Response Planner. Responsible for the update of a local hazard mitigation plan.

World Trade Center Water Intrusion Protection Plan, New York, New York. *Port Authority of New York and New Jersey.* Subject Matter Expert. Provided subject matter expertise for the development of hazard mitigation strategies for the World Trade Center Site. Baker developed a comprehensive water intrusion protection plan for the new World Trade Center. Baker's services included a complete flood risk assessment and analysis, the development of hazard mitigation strategies, order-of-magnitude cost estimates, and stakeholder coordination.

Multi-Hazard Mitigation Plan, Solano County, California. *Solano County.* Technical Advisor. Provided QA review and technical assistance for the update of a local hazard mitigation plan.

Hazard Mitigation Handbook Revision, Statewide, Pennsylvania. *Commonwealth of Pennsylvania.* Subject Matter Expert. Responsible for providing subject matter expertise for the revision of the PA Hazard Mitigation

Project Officer Handbook. Duties included researching and providing input on hazard mitigation guidance, and defining mitigation project requirements and processes contained in the handbook. Baker revised the Pennsylvania Hazard Mitigation Project Officer Handbook. Tasks included researching and consolidating hazard mitigation guidance, defining mitigation project responsibilities, and assembling and producing the handbook. The document enables hazard mitigation project officers to implement and complete mitigation projects, especially during a disaster declaration.

Development of the State of Maryland Enhanced Hazard Mitigation Plan, Maryland Emergency Management Agency, Reisterstown, Maryland. Acted as the primary project manager for the development and FEMA-approval of the Plan. Drafted most sections of the document, and was responsible for integrating all sections into the plan.

Update to the State of Maryland Hazard Mitigation Plan, Maryland Emergency Management Agency, Reisterstown, Maryland. Responsible for updating the Plan in accordance with FEMA Guidance, and securing approval of the update from FEMA.

Presentations

Carver Struve, Taking Action: Local Utilization of Risk MAP Products and Resources, FEMA Region IV Partners in Mitigation Workshop, Atlanta, GA, January 30, 2013

Carver Struve, Rapid Development of a Flood Mitigation Project: Decisions and Opportunities, Georgia Association of Floodplain Management 7th Annual Conference, Lake Lanier Islands, GA, March 28, 2012

Carver Struve, Hazard Mitigation Funding Now Available-Put it to work to Reduce the Flood Risk In your Community, Maryland Association of Floodplain and Stormwater Managers 6th Annual Conference, Linthicum, MD, October 10, 2010

Carver Struve, Updating Your Local Hazard Mitigation Plan, Maryland Emergency Management Association Conference, Ocean City, MD, June 2, 2010

Carver Struve, Mitigation Issues for Shelters, Maryland Severe Storms Conference, Linthicum, MD, April 22, 2009

Carver Struve, Nancy Carpenter, Hibachi Hersi, Ken Topping, Planning for a Disaster Resistant Community, American Planning Association Conference, Philadelphia, PA, April 14, 2007

Publications

Nancy Carpenter, Hibak Hersi, James Carver Struve, Kenneth Topping, 2007. Planning for a Disaster Resistant Community, Audio file. American Planning Association, S003A/S003B/S003C/S003D/5003E.

Ethan E. Mobley, AICP
Project Manager
Project Role: Hazard Mitigation Technical Advisor

Years with Baker: 9
Years with Other Firms: 7

Education
B.S., 2004, Urban Planning, Arizona State University

Licenses/Certifications
American Institute of Certified Planners, 2007

Ethan has over fifteen years of experience as a consultant for local, state, and federal agencies specializing in hazard mitigation planning, emergency management, natural resource management, construction management, Geographic Information Technology (GIT), and capital improvements planning. He provides support and services to local California counties and has planning experience for large federal clients, such as U.S. Army Corps of Engineers (USACE), FEMA, and the U.S. Department of Homeland Security (DHS). Ethan is versatile in a multitude of software packages including GIS, economic analysis software, cost estimating software, risk assessment methodologies, and NFIP data. Ethan serves Baker International as a project manager for hazard mitigation, emergency management, military master planning, and other local, state and federal projects.

Experience

Hazard Mitigation Plan, Plumas County, California. *Plumas County.* Project Manager. Responsible all aspects of project, including data collection, GIS analysis, and community outreach. Organized and executed public meetings and workshops; field-collected GPS data and photos for critical facilities with county stakeholders; performed detailed Level 2 Hazus analysis for flood, dam inundation, and earthquake damage using customized hazard and building inventory data; and performed GIS analyses to determine the potential impacts of wildfire, landslides, and other natural and man-made hazards.

Hazard Mitigation Plan and General Plan Safety Element Update, Shasta Lake, California. *City of Shasta Lake, CA.* Project Manager. Throughout the course of the Hazard Mitigation Plan Update continuously worked with City staff and the Baker Team members to ensure that tasks were completed on time and on budget, with the maximized use of resources. Discussed and finalized the project workplan, schedule, and deliverables, as well as develop a preliminary public involvement strategy. Conducted monthly progress meetings with City staff via conference call to provide updates on the various tasks of the project and what is expected in the near future. Provided project briefings to summarize monthly progress.

Multi-Hazard Mitigation Plan, Solano County, California. *Solano County.* Project Manager. Prepared the 2012 MHMP Update for the unincorporated areas of Solano County. Analyzed Solano County demographics and critical infrastructure, created community hazard profiles, identified and profiled Solano County's natural hazards, conducted risk assessments for identified natural hazards, provided large-scale coordination with regional stakeholders in Solano County to capture localized hazard information, and created suitable mitigation actions to decrease their impact on the county.

Hazard Mitigation Plan, Napa County, California. *Napa County.* Project Manager. Responsible for planning, schedule, budget, client relationship, and billing.

Delta Levee Emergency Management Plan. *U.S. Army Corps of Engineers (USACE), Sacramento District.* Project Manager. Enabled first responders and flood fight personnel to quickly identify vulnerable populations and critical infrastructure in a multi- hazard event (flooding resulting from major levee failure or high-water events). Managed the GIS data collection effort to standardize the spatial information used by local, state and federal

EOCs in the region. Identified resources that will enhance the ability of agencies within the delta region to respond to emergencies more efficiently. Addressed GIS interoperability between local, state and federal data sets within the Delta. Compiled a companion report, identifying current gaps in emergency management planning and providing corrective action framework for follow-up planning and agency coordination. Provided guidance for emergency managers to develop a multi-agency emergency response operations specifically addressing major levee failure in the Delta region. Provided stakeholder outreach through a series of meetings, interviews, and workshops to ensure close working relationships and expanded involvement. Facilitated workshops to work closely with stakeholders to develop emergency management procedures for local farmers and reclamation districts (RDs), county emergency management staff, the California Department of Water Resources (DWR) and California Emergency Management Agency (Cal EMA).

Dam Safety Geospatial Database. *FEMA Region IX.* Project Manager. Responsible for expanding the National Inventory of Dams (NID) database to include dams outside the NID from other State/regional agencies. Specific tasks included the preparation of dam owner questionnaire forms for interviews/information solicitation, collecting and reviewing dam locations/inundation mapping from NID and other State/regional agencies, developing a point-of-contact database, designing and implementing a data model for the FEMA-based dam hazard database, and populating the database with digitized dam location and inundation information. Provided presentations and workshops for stakeholder to share database with other agencies once up and running.

Homeland Security Needs Assessment and Emergency Response Plan, Statewide, Arizona. *Arizona Department of Transportation.* Planner. Baker prepared a homeland security needs assessment that examined a variety of elements, including vulnerability and protection of state transportation facilities, interoperable communications, staffing, training and exercises, response planning, evacuation planning, and continuity of operations. Developed mapping products for use in emergency management exercises. Designed and developed an all-hazard emergency response plan (ERP) that included specific annexes for natural disasters, hazardous materials, and terrorism. Reviewed existing plans, procedures, and checklists, and interviewed key client staff to obtain procedures. Clarified defined roles and responsibilities relevant to the ERP development and assessed their adequacy in addressing the threats identified in the vulnerability assessment. Ensured that the ERP was also incorporated into the state's response process.

Lisa M. Messano, CFM
Outreach and Communications Specialist
Project Role: Community Engagement Specialist

Years with Baker: 13
Years with Other Firms: 0

Education
B.A., 1993, Liberal Studies, San Francisco State University

Licenses/Certifications
Certified Floodplain Manager, California, 2008

Floodplain Management Association (FMA)

Ms. Messano is a Communications and Outreach Specialist whose experience includes leading FEMA's Map Modernization (Map Mod) national outreach and communication efforts for the national Map Mod NSP contract between 2005 – 2007. In 2008, her role expanded to that of leading regional, state-wide and local level outreach and communications efforts in CA, AZ, NV, HI and Pacific territories as a member of Regional Management Center 9 (RMC9) staff. Her RMC9 duties included Provisionally Accredited Levee (PAL) outreach and correspondence, floodplain management ordinance management and reviews to facilitate community map adoption, and wide ranging flood insurance support for communities receiving PALs and new countywide DFIRMs during Map Mod and Physical Map Revisions during Risk MAP. As a Project Manager, she has coordinated with federal, state and local agencies, associations, and stakeholder groups. Her professional experience includes developing branding, messaging, web site, newsletter and multi-media information for outreach and communication strategies focused on flood risk awareness. She currently leads BakerAECOM's outreach and correspondence efforts in CA, AZ, NV, HI and Pacific territories as part of the Regional Support Center 9 (RSC9) staff for the Risk MAP PTS contract, including the Outreach Implementation Plans for FEMA Region IX's California Coastal Analysis and Mapping Project's for the San Francisco Bay Area Coastal Study and the Open Pacific Coast Study.

Experience

Ross Valley Flood Protection & Watershed Program Communications & Public Outreach Services. *Marin County Flood Control and Water Conservation District.* Public Outreach Specialist. Responsibilities include the development and assistance in executing a proactive, stakeholder communication and public outreach plan that increases awareness, understanding, and support for the Ross Valley Flood Protection and Watershed Program among the residents, businesses, and all stakeholders of Flood Zone 9, the Ross Valley. The Strategic Communications Plan includes conducting a facilitated message mapping workshop with District staff; the development of a detailed rollout plan for communications and engagement activities to dovetail with elements of the 10-Year Work Plan; defining the roles of existing policy and technical advisory committees; revision of District collateral materials, including fact sheets, FAQs, review and recommendations for existing websites, high water mark campaign implementation; and other tasks, as needed.

Risk MAP Region 9 FY09. *FEMA.* Outreach Lead. Responsible for leading region-wide correspondence, establishment of an outreach framework for county-specific studies, Provisionally Accredited Levee (PAL) outreach coordination and correspondence, floodplain management ordinance reviews to facilitate community map adoption, and outreach efforts. Coordinated with federal, state and local agencies, associations, and stakeholder groups. Professional experience includes developing branding, messaging, web site, newsletter and multi-media information for outreach and communication strategies focused on flood risk awareness. Leads BakerAECOM's outreach and correspondence efforts in CA, AZ, NV, HI and Pacific territories, including the Outreach Implementation Plans for FEMA Region IX's California Coastal Analysis and Mapping Project's for the San Francisco Bay Area Coastal Study and the Open Pacific Coast Study

Regional Task Orders for the FEMA Risk MAP and Map Modernization Programs. *FEMA.* Outreach Lead for Mapping Around Levees Outreach Implementation Plan for Northern CA. Managed communication, materials, and presentations for community outreach meetings in support of the client's mapping around levee efforts in Northern California. This Regional Task Order supplemented FEMA's national effort for Flood Map Modernization (Map Mod). The work under this Regional Task Order was performed in the Baker Oakland, CA office. The NSP provided the following technical tasks: Outreach for Levee Related Mapping, Independent Quality Assurance/Quality (QA/QC) Control Review of Hydrologic Analyses, Independent Quality Assurance/Quality (QA/QC) Control Review of Hydraulic Analyses, and Digital Flood Insurance Rate Map (DFIRM) / Flood Insurance Study (FIS) Production and Post-Preliminary Processing, including Base Map Acquisition, Independent QA/QC Review of Floodplain Mapping (Engineering Review Task), Floodplain Mapping (GIS Mapping Task), DFIRM Database, Produce Preliminary Map Products, and Post-Preliminary Processing.

Floodplain Management Ordinance Review and Training, Regional. *FEMA.* Outreach and Ordinance/Compliance Lead. Reviewed community floodplain management ordinances and provided information to floodplain managers/administrators related to the ordinance adoption process and community-based outreach during the compliance period. Coordinated with the client to support approval of community ordinances in their database working toward map effective dates. As the agency's National Service Provider, Baker provided assistance to the Floodplain Management Branch with community enrollment and eligibility activities, compliance activities, training and technology transfer, and needs assessment and planning. Tasks included assessing needs and capabilities to support flood-map adoption, providing technical assistance, developing customer-service initiatives, developing workshops and training programs, and supporting post-disaster activities.

Technical and Data Management for FEMA Map Mod Nationwide. *FEMA.* Public Relations Specialist. Supported national outreach and communications efforts for the client's Map Modernization (Map Mod) efforts. Baker provided FEMA's Map Mod with technical and management support for a variety of activities leading to the development of Digital Flood Insurance Rate Maps (DFIRM) and supporting the Map Mod program in all 10 FEMA Regions under a Task Order as part of Baker's National Service Provider (NSP) contract with FEMA. Outreach-related NSP support tasks included support and attendance at conferences, stakeholder group coordination, preparation of project-based materials, and collaboration with Regional Management Center outreach leads to develop best practices.

Jason T. Farrell, CFM
Technical Specialist
Project Role: Hazard Mitigation Planner

Mr. Farrell has experience in various aspects of emergency management having worked in both the public and private sectors. Jason has worked through state and federally declared disasters, assisting in the damage assessment process and subsequent briefings. Mr. Farrell has focused on emergency management operations planning throughout his career and holds a Bachelors of Emergency Management from the University of Akron.

Years with Baker: 3
Years with Other Firms: 3

Degrees
M.P.A., 2011, Public Administration, University of Akron

B.S., 2008, Emergency Management, University of Akron

B.A., 2002, History, The Ohio State University

Licenses/Certifications
ASFPM Certified Floodplain Manager, 2011

Experience

Hazard Mitigation Plan Integration Task Order under Risk MAP. *FEMA.* Technical Specialist. Assisted in the revision of the FEMA Plan Review Tool document, in order to accommodate other plan types as substitutes for traditional mitigation plans. Documented comments and critique generated on conference calls with client for inclusion in future updates. Responsible for technical writing of document, as well as addressing stakeholder comments and making requested revisions to the document.

Climate Change Adaptation Task Order under Risk MAP. *FEMA.* Technical Specialist. Assisted in the development of the FEMA Climate Adaptation planner information toolkit. Responsible for researching various resources to be included in the toolkit, and providing a summary of those resources for review.

Coast Smart Grant Application. *Prince George's County, MD.* Technical Specialist. Worked as a member of the grant writing team and was responsible for researching and documenting potential projects that could be funded through this grant opportunity.

Belmont County Hazard Mitigation Plan Update. *Belmont County, Ohio.* Technical Specialist. Conducted all meetings, prepared minutes from these minutes and distributed to planning committee. Drafted and wrote the hazard mitigation plan update. Responsible for State and Federal submission as well as addressing plan comments.

Pennsylvania State Hazard Mitigation Plan Update. *State of Pennsylvania.* Technical Specialist. Responsible for updating the Environmental Hazards, Nuclear Incident, Terrorism, Transportation Accident, Urban Fire and Utility Interruption sections through detailed research on each hazard.

Colorado State Hazard Mitigation Plan Update. *State of Colorado.* Technical Specialist. Conducted detailed review of County-level plan risk assessments for inclusion in the State Plan update.

Queen Anne's County Hazard Mitigation Plan Update. *Queen Anne's County, Maryland.* Technical Specialist. Responsible for completion of the risk assessment and compilation of the draft plan. Coordination between the County and Baker was key to developing a draft plan for submission to the Maryland Emergency Management Agency (MEMA).

State of Wisconsin BCA Services. *Wisconsin EMA.* Technical Specialist. Responsible for reviewing data and running benefit cost analysis based on information provided by sub-applicants. These results were used to determine project eligibility and worthiness for inclusion in the state application for mitigation funds.

State of Missouri Enhanced Mitigation Plan Update. *Missouri State Emergency Management Agency.* Technical Specialist. Responsible for several hazard identification and risk assessment updates, including flooding and severe summer storms. Historical data was collected to fully profile and update hazards. This included the use of HAZUS and GIS applications, as well as independent data from NOAA and other federal sources.

State of Missouri HMGP Application Reviews. *Missouri State Emergency Management Agency (SEMA).* Technical Specialist. SEMA forwarded Hazard Mitigation Grant Program (HMGP) applications for review and analysis. Responsible for reviewing applications for completeness and summarizing deficiencies for the client.

City of Shasta Lake Hazard Mitigation Plan Update. *City of Shasta Lake, CA.* Technical Specialist. Responsible for updating a variety of hazard analyses and preparation of the other sections of the plan for draft review by the client. Participated in various public outreach efforts related to the planning process. Led one of three field survey teams in researching the flood hazard present within the City of Shasta Lake. Responsible for drafting and providing detailed meeting minutes resulting from planning meetings.

HMP Implementation Grant Application. *City of Shasta Lake, CA.* Technical Specialist. Researched and developed Notice of Interest (NOI) materials to assist the client in applying for grant funds to implement various HMP strategies.

Renee M. Gleason-Hoppe, CEP-IT
Associate / Environmental Planner
Project Role: Hazard Mitigation Planner

Years with Baker: 7
Years with Other Firms: 1

Education
B.A., 2002, English, California State University at San Bernardino

Licenses/Certifications
Certified Environmental Professional, 2013

As an Environmental Planner at Baker, Ms. Gleason prepares Environmental and Planning studies for public and private sector clients, under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Her responsibilities have included working in a generalist capacity in the preparation and review of CEQA documents including Environmental Impact Reports (EIR), Mitigated Negative Declarations (MND), Negative Declarations (ND), Categorical Exemptions (CE) and Initial Studies; NEPA documents including Environmental Impact Statements (EIS), Environmental Assessments (EA) and Categorical Exclusions; and Hazard Mitigation Planning documents. She also functions as an Environmental Justice (EJ) specialist in compliance with NEPA and Executive Order 12898, and has prepared several EJ and community impact assessment documents for a variety of projects types.

Prior to joining Baker, Ms. Gleason worked as an analyst for a regional planning agency, the Western Riverside Council of Governments (WRCOG), where she assisted in the administration of the Transportation Uniform Mitigation Fee (TUMF) Program, a developer impact fee program intended to create a new source of revenue for roadway improvements. Her primary duties included coordinating with the 16 member jurisdictions of WRCOG to determine eligibility for transportation project reimbursement, programming projects on WRCOG's Transportation Improvement Plans, and quality control of agency documents and public advertisements.

Experience:

Duarte Local Hazard Mitigation Plan. *City of Duarte, CA.* Planner. Baker prepared a Local Hazard Mitigation Plan for the City pursuant to the requirements of the Disaster Mitigation Act of 2000. The Plan included identification and profiling of the City's identified natural hazards, vulnerability assessment, mitigation strategies, and plan implementation and maintenance.

Lawndale Local Hazard Mitigation Plan. *City of Lawndale, CA.* Planner. Baker is currently preparing a Local Hazard Mitigation Plan for the City pursuant to the requirements of the Disaster Mitigation Act of 2000. The Plan includes identification and profiling of the City's identified natural hazards, vulnerability assessment, mitigation strategies, and plan implementation and maintenance, and involves public participation during the planning process including public workshops and outreach.

McFarland Local Hazard Mitigation Plan. *City of McFarland, CA.* Planner. Baker is currently preparing a Local Hazard Mitigation Plan for the City pursuant to the requirements of the Disaster Mitigation Act of 2000. The Plan includes identification and profiling of the City's identified natural hazards, vulnerability assessment, mitigation strategies, and plan implementation and maintenance, and involves public participation during the planning process including public workshops and outreach.

Butterfield Specific Plan. *City of Banning, CA.* Planner. Baker prepared an Environmental Impact Report for the Butterfield Specific Plan, which is a 1,543-acre development including, golf course, school sites, open space, commercial uses, and up to 5,387 residential units. Critical environmental issues include aesthetics, transportation and circulation, global warming, hydrology and water quality, and biological resources.

Ellis Specific Plan EIR. *City of Tracy, CA.* Planner. The SEIR is required by settlement agreements entered into by the City of Tracy and the Sierra Club on the previously certified EIR for the adopted Specific Plan. Critical issues, beyond compliance with the respective settlement agreements, are coordination with the Tracy Municipal Airport/San Joaquin County Airport Land Use Commission (ALUC) with respect to the airport approach zone, compliance with California Senate Bill (SB) 610 and SB 221, securing an adequate and reliable water supply for build-out of the Specific Plan, ensuring adequate wastewater treatment capacity and storm water management, and addressing regional transportation impacts, improvements, and fees.

Wine Country Community Plan EIR. *Riverside, County, CA.* Environmental Planner. The County of Riverside has selected the Baker Team for the Wine Country Community Plan EIR. The Temecula Valley Wine Country region is currently experiencing an unprecedented level of development interest, with more than 30 new projects in process with the County of Riverside. Accordingly, it has become necessary for the County to initiate an effort to comprehensively review this region's vision, policies and development standards. The resultant Temecula Valley Wine Country Community Plan is intended to provide a blueprint for growth to ensure that future development activities will enhance the quality of life for existing and future residents. Ms. Gleason managed preparation of the Transportation/Traffic section of this document.

Soil Safe EIR. *City of Colton, CA.* Planner. Baker prepared an EIR for the Soil Safe Project in Colton, California. The project proposed the reclamation of approximately 29 acres of land currently located within the Santa Ana River floodplain. To achieve this, the project proposed mixing approximately 500,000 cubic yards of imported fill with Portland cement and placing this fill within the subject properties until the desired grade is achieved. Once the desired grade is achieved, the project is considered complete and the project applicant will remove all onsite equipment. At that time, the property owner (Maturin Group) will be left with approximately 29 acres of property that is no longer located within the 100-year flood plain of the Santa Ana River. Major environmental issues include aesthetics, biological resources, and transportation due to the truck traffic. This project received an AEP award in 2011. Ms. Gleason managed preparation of the Transportation/Traffic section of this document.

Patrick Clancey
Technical Specialist
Project Role: Hazard Mitigation Planner

Years with Baker: 7
Years with Other Firms: 3

Education
B.A., 2005, Physics and Math, Saint Olaf College

Mr. Clancey is extremely qualified in the field of floodplain management. His experience includes work on water resource projects for FEMA, processing MT-1 and MT-2 applications. He also has a background in analytical studies, which allows him to quickly adapt to the working environment, taking on more specialized and technical cases in a timely and efficient manner.

Experience

Regional Task Orders for the Flood Map Modernization Program, Nationwide. *FEMA.* Analyst. Helped with hydrology and hydraulics in Yuba County, concerning the lower Feather River studies. Baker is performing various tasks leading to the development of digital flood insurance rate maps (DFIRM) and supporting the Map Modernization program in all 10 FEMA Regions. Support tasks include maintenance and management of the web-based Mapping Information Portal (MIP), outreach, cooperating technical partner coordination, coastal guideline and specification updates, technical assistance, project monitoring, support and attendance at conferences, training, post-preliminary support, physical map revisions, floodplain boundary standard documentation, levee research and database support, and other general technical support.

Revised Flood Insurance Studies, Arkansas, Louisiana, New Mexico, Oklahoma, & Texas. *U.S. Federal Emergency Management Agency (FEMA), Region VI.* Analyst. Assisted in compiling the FIS text for Ashley and Chicot Counties. FEMA's Region VI office selected Baker's Team in 2002 as an IDIQ contractor to produce Revised Flood Insurance Studies (RFISs), disaster recovery maps, and technical assistance related to joint mapping activities initiated under the Cooperating Technical Partner (CTP) initiatives. Baker is the lead partner in a joint venture named Comprehensive Flood Risk Resources & Response (CF3R). Task Orders were awarded for communities subject to riverine and/or coastal flooding located within Region VI comprised of Louisiana, Arkansas, Texas, Oklahoma, and New Mexico.

Annualized Flood Loss Estimation Study, Continental United States. *Federal Emergency Management Agency (FEMA).* Analyst. Responsibilities included hydrology and hydraulic modeling. As the managing partner of a project limited liability corporation, Baker provided project management services and performed an annualized flood loss estimation study for 10-, 50-, 100- 200- and 500-year flood return periods for 1,117 riverine counties and 89 coastal counties throughout the continental United States. Baker performed hydrologic and hydraulic analyses; developed digital elevation models, and developed loss estimates, using HAZUS-MH MR4; and is preparing loss estimation tables and export files, loss ratio results in table and geographic information systems (GIS) format; and annualized loss estimates for each county in table and GIS format.

Floodplain Hazard Mapping Services, Central Valley, California. *California Department of Water Resources.* Analyst. Responsible for review of Paradise Creek. As a member of a consultant team, Baker provided engineering services and recommendations to improve flood hazard mapping and planning in central California in support of the client's FloodSAFE program. The overall goal of the program is to develop levee flood protection zones that alert property owners to flooding risks. Baker's tasks included performing hydraulic and hydrologic studies to analyze accredited and disaccredited levees, bypass structures, dams, and other structures that regulate flow; applying automated floodplain mapping tools to develop engineering and GIS products; and providing floodplain management support.

Jim E. McPherson, GISP
Associate / Sr. GIS Analyst
Project Role: GIS/Spatial Analyst

Years with Baker: 14
Years with Other Firms: 0

Degrees
B.A., 2000, Geography, California State University at Long Beach

Certificate 2009, Advanced Microsoft Access

Certificate, 2008, Community Viz Placeways

Certificate, 2007, ArcGIS Server Configuration and Tuning for SQL Server, ESRI

Certificate, 2007, Introduction to the Multi-User Geodatabase, ESRI

Certificate, 2005, Designing Geodatabases

Certificate, 2004, Geodatabase, ESRI

Certificate, 2002, AutoCAD 2000

Certificate, 2000, ArcView 3.2, ESRI

Licenses/Certifications
Certified GIS Professional, 2008

Mr. McPherson has been utilizing Geographic Information Systems (GIS) technology to provide support for a wide variety of projects including utility, environmental, engineering, and planning projects. He is experienced in database design and system design, for which he has helped design and developed GIS Geodatabase's for Cities and Counties, as well as for numerous large and small projects. His work has included working on numerous General Plans, Housing Elements and Specific Plans for Cities and Counties. As part of these projects Mr. McPherson has been responsible for setting up project databases, templates as well as creating automated routines for data analysis and data creation. Mr. McPherson creates thematic maps to provide support for textual information found in documents. His work has been represented at several Local, State and Regional user conferences. His experience extends to setting up field data collectors for hand held GPS systems as well as utilizing Cloud server technology for mobile devices including, iPad, iPhone and Android phones. This technology allows field crews to edit live data sets in Baker's offices and have those changes reflected real time on the web. Mr. McPherson has experience in creating and representing data for online interactive maps utilizing ArcSDE and ArcGIS server software. Mr. McPherson has a wide range of experience utilizing various systems including AutoCAD, ArcGIS, ArcInfo, and Oracle, SQL Server, SDE, Silverlight and other web technologies.

Experience

Lawndale Local Hazard Mitigation Plan. *City of Lawndale, CA.* GIS Analyst. Baker is currently preparing a Local Hazard Mitigation Plan for the City pursuant to the requirements of the Disaster Mitigation Act of 2000. The Plan includes identification and profiling of the City's identified natural hazards, vulnerability assessment, mitigation strategies, and plan implementation and maintenance, and involves public participation during the planning process including public workshops and outreach. Coordinate data collection, create thematic maps for presentation, determined a flood impact analysis, and ran a Hazus model to determine estimate fiscal impacts from earthquake impacts.

McFarland Local Hazard Mitigation Plan. *City of McFarland, CA.* GIS Analyst. Baker is currently preparing a Local Hazard Mitigation Plan for the City pursuant to the requirements of the Disaster Mitigation Act of 2000. The Plan includes identification and profiling of the City's identified natural hazards, vulnerability assessment, mitigation strategies, and plan implementation and maintenance, and involves public participation during the planning process including public workshops and outreach. Coordinate data collection, create thematic maps for presentation, determined a flood impact analysis, and ran a Hazus model to determine estimate fiscal impacts from flood impacts.

City of Shasta Lake Hazard Mitigation Plan and General Plan Safety Element Update. *City of Shasta Lake, CA.* GIS Analyst. Baker is currently preparing a Local Hazard Mitigation Plan for the City pursuant to the

requirements of the Disaster Mitigation Act of 2000. The Plan includes identification and profiling of the City's identified natural hazards, vulnerability assessment, mitigation strategies, and plan implementation and maintenance, and involves public participation during the planning process including public workshops and outreach. Created thematic maps to support the plan to show various hazards within the City, including fire hazard, flood impacts, and potential landslides, as well as population and Social vulnerabilities. Assisted planners in the quantification of impacts to the above mentioned impact areas.

General Plan Update, EIR, and Climate Action Plan. *City of Murrieta, CA.* Senior GIS Analyst. Baker is comprehensively updating the City's 1994 General Plan and General Plan EIR. Oversaw the GIS needs for the project which included: data creation, validating, and research, as well as data analysis, and overseeing the creation of thematic maps. Worked closely with project planners to compare factors between the existing general plan and the various land use alternatives. Worked closely with Baker planners and City staff to help identify the on the ground land use to determine the population delta's between current use's and proposed scenarios. Data layers collected and created for the project were then used to create thematic maps to support the various elements in the plan including existing, future and on the ground Land use, Trails, Food outlets, various agency boundaries and road noise studies.

Buena Park General Plan Update and EIR. *City of Buena Park, CA.* Senior GIS Analyst. Developed and maintained the GIS database for the life of the project. Developed methods to quickly calculate land use projections and calculations within the database to assist planners in making informed decisions. As part of the plan, Mr. McPherson assisted City and staff planners in identifying and updating the on the ground land use on a parcel by parcel basis. As part of the project team Mr. McPherson also supported the plan by creating GIS based thematic maps for the various elements within the plan.

Fullerton Plan 2030 General Plan Update EIR. *City of Fullerton, CA.* Senior GIS Analyst. Reviewed and updated the City's existing GIS data as well as create new data for the project. Worked closely with project planners to quantify land use changes between the City's current plan and project alternatives. Developed routines to expedite the analysis of land use alternative as the planners explored various options. Created thematic maps for the project to present the various elements using GIS data.

Richard W. Harmon
GIT Associate
Project Role: GIS/Spatial Analyst

Years with Baker: 1
Years with Other Firms: 8

Education
B.A., 2005, Earth and Planetary Sciences, Washington University at St. Louis

Mr. Harmon is a GIT Associate in Baker's Oakland office. In 2013, he provided on-site GIS assistance with the Coast Guard's Civil Engineering Unit in Oakland. Technical support included cartographic production, network analysis, data maintenance and other tasks needed. Mr. Harmon also provides GIS assistance for FEMA including Risk MAP production, LiDAR Topo review, and CNMS updates and clean up. Additionally, Mr. Harmon provides GIS support for several California projects that include topo production, watershed digitization, and utility network updates. Prior to employment with Baker, Mr. Harmon worked as a GIS Specialist at Laclede Group focusing on GPS data production and cartographic output. Mr. Harmon has advanced working knowledge of Esri's ArcGIS software package with a focus in cartography, network analyst, and spatial analyst. Other software knowledge includes Hazus-MH 2.1, Global Mapper v1.1, and Adobe Illustrator CS3.

Experience

On-Site Geographic Information System Planning Support, Oakland, California. *U.S. Coast Guard, MLCP.* GIS Associate. Primary responsibility was to create maps as needed by CEU Oakland/SILC staff. Also, used knowledge of ArcGIS (ArcMAP, ArcCatalog, network analyst, spatial analyst and maplex), online resources, and client documents to achieve the desired product. Maps often required data analysis through ArcGIS. Other responsibilities included updating/maintaining existing GIS data on the Coast Guard's network. Added value by providing a set of GIS skills and knowledge otherwise absent from the client's staff. Baker provided on-site geographic information system (GIS) support for a variety of efforts related to the execution, creation, and implementation of shore infrastructure planning projects. Baker's services included master planning, GIS data coordination, presentation support, project-siting support, environmental compliance support, agency coordination, housing requirements and space planning support, capital investment strategy support, report preparation, and training.

GIS Land Base Data Maintenance Program, Statewide, California and, Nevada. *AT&T (Formerly SBC Technology Resources, Inc., Formerly Pacific Bell Telephone Co.).* GIS Associate. Provided research and GIS data editing for the update and verification of the landmark feature class. Baker provides creation and enhancement services to AT&T West GIS for its accurate street centerline and land base database covering California and Nevada. The digital land base contains over 12 million parcels for a seamless fabric across both California and Nevada. Baker has co-located staff on site to sustain the land base and add new business capabilities for AT&T. This is the only truly seamless, statewide spatially accurate digital map for these states.

Hazard Mitigation Plan and General Plan Safety Element Update, Shasta Lake, California. *City of Shasta Lake, CA.* GIS Associate. Responsibilities include collecting GPS data on Shasta Lake hydrants and creating a hydrants map for the City of Shasta Lake. A Trimble GeoXH 6000 GPS unit was used for the GPS data collection.

Hazard Mitigation Plan Update, Montgomery County, Maryland. *Montgomery County Office of Emergency Management and Homeland Security (OEMHS).* GIS Associate. Responsible for technical support. Baker provided environmental engineering services to update the county's multijurisdictional hazard mitigation plan. Baker's services included identification and mapping of natural hazards; analysis of risks to property that is associated with hazard-prone areas; identification of programs and resources for hazards analysis, risk assessment, and hazard mitigation policies and activities; identification of mitigation policies that affect public

and private entities; definition of community roles; and formulation of mitigation strategies to reduce future risks.

Hazard Mitigation Plan Update, Jefferson County, Ohio. *Jefferson County.* GIS Associate. Responsible for technical support. Baker provided environmental engineering services to update the county's multijurisdictional hazard mitigation plan. Baker's services included identification and mapping of natural hazards; analysis of risks to property that is associated with hazard-prone areas; identification of programs and resources for hazards analysis, risk assessment, and hazard mitigation policies and activities; identification of mitigation policies that affect public and private entities; definition of community roles; and formulation of mitigation strategies to reduce future risks.

Oro Verde Solar. *SunEdison, LLC.* GIS Associate. Responsible for technical support. Baker assisted with site due diligence by researching local and regional GIS data and developed base maps in support of the environmental document. Assisted in the set up and modeling of the 2D hydrologic modeling for surface water run off for various storm events. Used the modeling results to help perform analysis and provided cartographic exhibits for the stormwater report. This report assisted the client in obtaining their stormwater permits.

Risk MAP Std Ops 5 LLC. *FEMA.* GIS Associate. Responsible for technical support. Baker's production services involved completion of multi-year study projects that produce digital Flood Insurance Rate Maps (DFIRM). Study projects included field surveys, hydrologic and hydraulic analyses, floodplain boundary delineation, digital map creation, flood risk assessments, and mitigation planning.

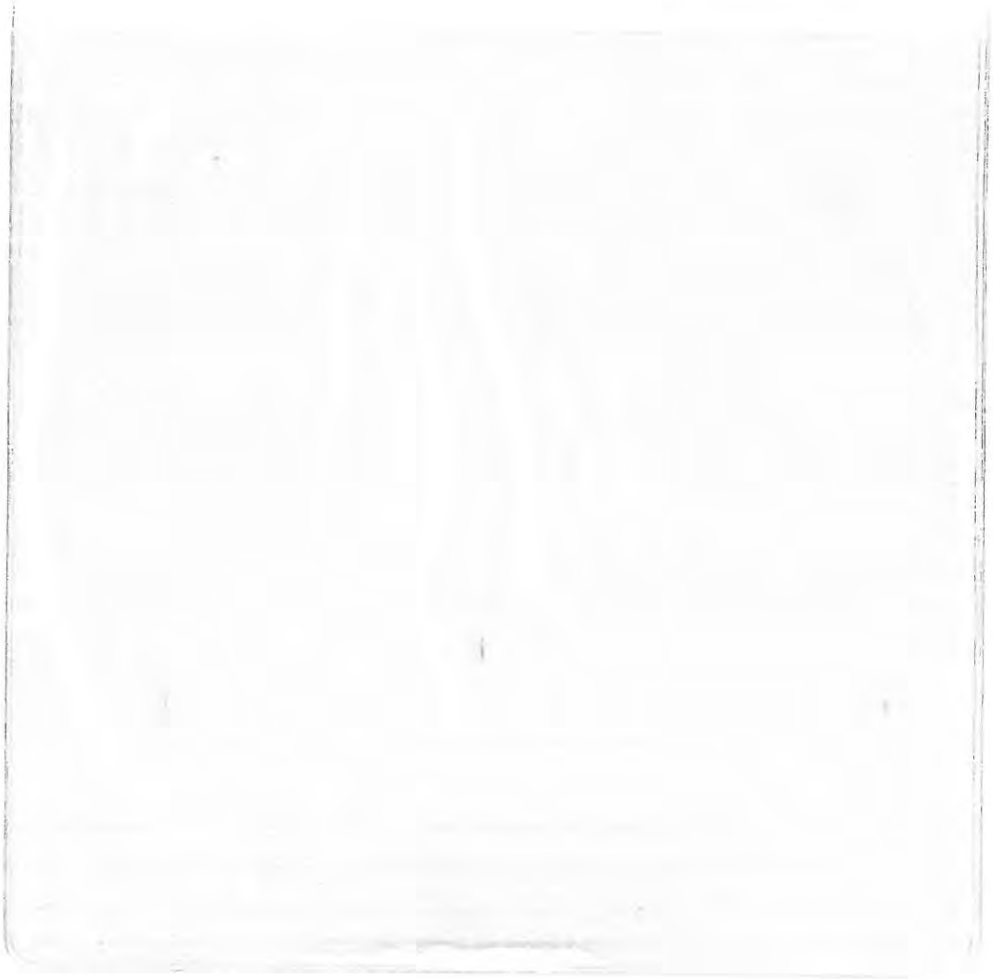
San Bernardino County. *County of San Bernardino.* GIS Associate. Responsible for technical support. Responsible for producing a watershed layer for the client. Specifically tasked with georeferencing and digitizing a set of watershed documents provided by the client. All work was done in ArcGIS. GIS group has been working with the County of San Bernardino on numerous tasks, which include data compilation, database design, and web programming. Coordinated with multiple cities, agencies, and water districts to collect various GIS data to support the County's stormwater permit program. Designed and developed a regional geodatabase to support the County's regional GIS efforts. This data is used for various online databases and online web maps.

Santa Clara River Levee (SCR-3), Downstream Highway 101, California. *Ventura County Watershed Protection Dist.* GIS Associate. Responsible for technical support. Baker is working with the County of Ventura to evaluate the Santa Clara River. Assisting the Stormwater Department with the data collection, creation of a project database as well as various data sets and modeling. Worked with our offshore partner, NeST, to take scans of historic topo and create digital topography of specific areas within the river and perform a historic change analysis of the Santa Clara River. This analysis will help the County and Baker's engineers understand how the river has changed historically over the years and between various storm events.

GIS Technical Support. *American Red Cross Silicon Valley Chapter.* GIS Analyst. Performed geospatial analysis to determine current shelter requirements compared to existing shelter capacities using relevant earthquake models in Hazus-MH 2.1. Utilized Hazus-MH to generate shelter needs by census tract.

E. Work Samples

A compact disc (CD) has been included with this submittal with Baker's Work Sample, Plumas County Hazard Mitigation Plan 2013 Update. In addition to the HMP, the CD also includes the Plumas County Resolution of Plan Adoption, FEMA's Approval Pending Adoption Designation Letter, and FEMA's Final Approval Letter.



PLUMAS COUNTY HMP

Hazard Mitigation Plan
2013 Update

PLUMAS COUNTY HAZARD MITIGATION PLAN (HMP)

An Update to the 2006 Plumas County MHMP

JULY 2013

PREPARED FOR:
PLUMAS COUNTY

Prepared by:

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Section 1. Introduction

Natural disasters cause death and injuries, as well as significant damage to our communities, businesses, public infrastructure, and environment. The impacts of these damages result in the displacement of people and tremendous costs due to response and recovery dollars, economic loss and burden. The Plumas County Hazard Mitigation Plan (HMP) is an effort undertaken by the County to mitigate the effects of natural hazards and return to "the norm" earlier with lessened impacts.

Hazard mitigation is defined by the Federal Emergency Management Agency (FEMA) as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event."

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. While natural disasters cannot be prevented from occurring, the effects of natural disasters can be reduced or eliminated through a well-organized public education and awareness effort, preparedness activities and mitigation actions.

After disasters, repairs and reconstruction are often completed in such a way as to simply restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the replication of pre-disaster conditions results in a cycle of damage, reconstruction, and repeated damage. Hazard mitigation ensures that such cycles are broken and that post-disaster repairs and reconstruction result in increased resiliency for Plumas County.

1.1 *Background and Purpose*

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. Many disasters cause extreme burden to county governments and small communities throughout California. In an attempt to reduce the community burden, Plumas County developed the 2006 Multi-Hazard Mitigation Plan in concordance with the Disaster Mitigation Act of 2000 (DMA 2000), which provides the legislative basis for FEMA hazard mitigation planning requirements and funding before and after a hazard event. FEMA requires an update to a HMP every 5 years. In response, Plumas County elected to allocate funding from the 2008 Disaster Recover Initiative (DRI)[1] for the time and effort required to fulfill update cycle requirements.

Over the past 60 years, Plumas County has experienced numerous natural disasters; disaster proclamations, declarations, and recorded natural hazard events each provide a hazard footprint across Plumas County. This is important, as historic hazard events can help shape future mitigation planning and actions. Since 1975, 12 federally-declared disasters have been documented in Plumas County, including one drought, four severe storm events, five flooding events, and two fires. In addition to the federally-declared disasters, the California Emergency Management Agency's (Cal EMA) Emergency and

[1] Made available after statewide fires in 2008.

Disaster Proclamations/Executive Orders lists the 1996 torrential winds and rain, the 1980 April storms, and the 1969 severe storm events affecting Plumas County. Lastly, the Plumas County Board of Supervisors declared a Proclamation of Local Emergency as a result of the Chips Wildfire burning in Plumas National Forest in July 2012. Together, these natural hazard events provide a baseline understanding of the natural hazard risks surrounding life and property within Plumas County. This understanding of the nature of the risks gives a foundation for developing solutions to mitigate or eliminate potential impacts through public education and outreach, preparedness activities, and mitigation actions.

For those hazards that can be mitigated, Plumas County must be prepared to implement efficient and effective short and long-term actions where needed. The purpose of the Plumas County HMP Update is to provide the County with a blueprint for hazard mitigation action planning. Furthermore, the plan identifies resources, information, and strategies for risk reduction, and provides a tool to measure the success of mitigation implementation on a continual basis. The strategies identified in the HMP were developed with the following intentions:

- Risk reduction from natural hazards through a set of defined mitigation actions.
- Establishment of a basis for coordination and collaboration among participating agencies and public.
- Assisting in meeting the requirements of federal assistance programs.[2]

The HMP does not supersede any other county plans, including the County's General Plan, but rather enhances the County's ability to communicate and mitigate natural hazard risk. Information in this plan will be used to help guide and coordinate mitigation activities and decisions for County personnel. 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 from natural hazards.

1.2 *Authority*

The Plumas County HMP is the official statement of the County's commitment to ensuring a resilient community; this plan serves as a tool to assist decision makers in mitigation activities. This plan update 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 DMA emphasizes the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations establishes 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).

[2] The HMP is developed to ensure eligibility for federal and state disaster assistance, including Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation (PDM), Hazard Mitigation Grant Programs (HMGP), Flood Mitigation Assistance Program (FMA), and other hazard mitigation program dollars from across a wide range of state and federal funding opportunities.

As described in this plan, Plumas County is subject to many kinds of hazards; thus, access to these federal disaster assistance and hazard mitigation funding is vital to ensure a more resilient community.

1.3 *Plan Organization*

The HMP is organized into seven sections to reflect the logical procession of activities undertaken to develop the plan and includes all relevant documentation required to meet the necessary criteria for FEMA approval. Each section is briefly described below.

- **Section 2, Community Profile** describes the County's history, geography, topography, climate, population, economy, housing, and land use and development trends in Plumas County.
- **Section 3, What's New** provides background to the 2006 MHMP and the 2013 HMP Update and details the process undertaken by the HMP Update Planning Committee to review, assess, and update the 2006 Plumas County MHMP. This section also describes the changes and additions that have been identified to develop the updated plan.
- **Section 4, The Planning Process** describes the 10-Step HMP Planning Process, as well as the meetings and outreach activities undertaken to engage County officials, staff, and the public.
- **Section 5, Natural Hazard Risk Assessment** identifies and prioritizes natural hazards affecting Plumas County, and assesses the County's vulnerability from the identified hazards.
- **Section 6, Mitigation Strategy** identifies mitigation goals, assesses the County's capabilities to implement mitigation actions, reviews the status of previously identified mitigation actions, and identifies and prioritizes new mitigation actions.
- **Section 7, Plan Implementation and Maintenance** discusses plan adoption and implementation, as well as the process to monitor, evaluate, update, and maintain the HMP. This section also includes a discussion on continued public involvement.

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Section 2. Community Profile

The Community Profile summarizes the County's history and existing environmental and socioeconomic conditions in the unincorporated areas of the County. Environmental and socioeconomic factors include geography, topography, climate, population, economic, housing, and land use and development trends.

2.1 *History (Referenced from Plumas County General Plan)*

The area currently known as Plumas County has been a site for human activity since the Stone Ages approximately 8,000 to 10,000 years ago. As glaciers receded from the Sierra Nevada and the Cascades, humans migrated to the foothills and valleys protected by higher elevation. Since then, humans have become an integral part of the ecology in Plumas County. This is particularly apparent through documented use of fire to facilitate the propagation and gathering of plant species used for medicinal purposes, food, and other needs. Native peoples harvested or extracted and then processed stone, acorn, pine nut, basketry fiber, and other resources for their sustenance. This activity also resulted in visible alterations to the land and natural resources across Plumas County.

The Mountain Maidu were the last tribal group present in Plumas County when European migrants began to settle in the area. Some sources say the Mountain Maidu people have lived in various locations in Plumas County from hundreds to thousands of years and still do today. Other tribes, such as the Washoe and the Paiute, have also utilized the area but did not settle permanently. The existence of the Mountain Maidu people was disrupted in the 1850s by the gold-seeking miners, who, overnight, transformed Plumas County into a gold mining region. Rivers were diverted and ditches were dug to bring water from distant sources for mining purposes.

The North, Middle, and South forks of the Feather River were named in 1821 by Captain Luis Arguello as the Rio de las Plumas ("River of Feathers") after the Spanish explorer saw what looked like bird feathers floating in the water. "Plumas," the Spanish word for "feathers," later became the name for the county. The river and its forks were the primary sites of early mining activity, with many smaller camps located on their tributaries. Gold mining remained the main industry in the area for the next five decades. In March of 1854, Plumas County was formed from the eastern and largest portion of Butte County with the town of Quincy chosen as the county seat. A large part of Plumas County was carved off to form present day Lassen County in 1864, shortly after Plumas County annexed a small portion of Sierra County, which included the town of La Porte.

2.2 *Geography, Topography, and Climate*

2.2.1 Geography

Plumas County is uniquely located at the northern end of the granitic Sierra Nevada where the range intersects with the volcanic Cascade Range. It is this geology that has laid the foundation for the diverse mineral resources and forest lands that are second only to the North Coast forests in production. Plumas County is also home to the largest high elevation valley-meadow complex in California, and is characterized by a large network of streams and rivers that are all part of the greater Feather River Watershed. The Feather River Watershed is the largest watershed in the Sierra Nevada, and includes

almost all of Plumas County. It contributes to the water supply of over 25 million Californians (60 percent of California's population).

The County has a total area of 2,613.48 square miles, of which 2,553.69 square miles is land and 59.79 square miles is water. It is bounded by Shasta County to the northwest; Lassen County to the north and east; Sierra County, Yuba County, and Butte County to the south; and Tehama County and Butte County to the west. Sixty-five (65) percent of the County's land area is public lands managed by the United States Forest Service, the majority of which falls within the Plumas National Forest and other areas within the Lassen, Toiyabe, and Tahoe National Forests. Additionally, the County contains a portion of the Lassen Volcanic National Park and is home to the Plumas Eureka State Park. Approximately 29 percent of the County's land area, or 482,908 acres, are privately-owned lands. Of the privately-owned lands, 33.4 percent are located within County planning areas. See Figure 2-1 for the location and extent of Plumas County.

2.2.2 Topography

Plumas County is topographically diverse. The elevation ranges from 1,180 feet in the Sierra Valley, to 8,376 feet in the Sierra Nevada range. The western portion of the County lies in the Sierra Nevada and is characterized by steep slopes, which become valleys and gentler rolling hills in the eastern portion of the County. This variation in topography has implications on the County's weather patterns, amount and type of precipitation, and overall vulnerabilities to natural hazards. Refer to Section 5.6 for the specific severe weather implications of Plumas County's varying topography.

2.2.3 Climate

Plumas County has a Mediterranean climate, with a mean annual temperature of 49 to 57 degrees Fahrenheit. Precipitation varies from 70 inches on the western slope to 12 inches on the eastern slope of the Sierra Nevada. Mean annual precipitation is 43 inches, which falls mostly as rain below 4,000 feet and as snow above 4,000 feet elevation.

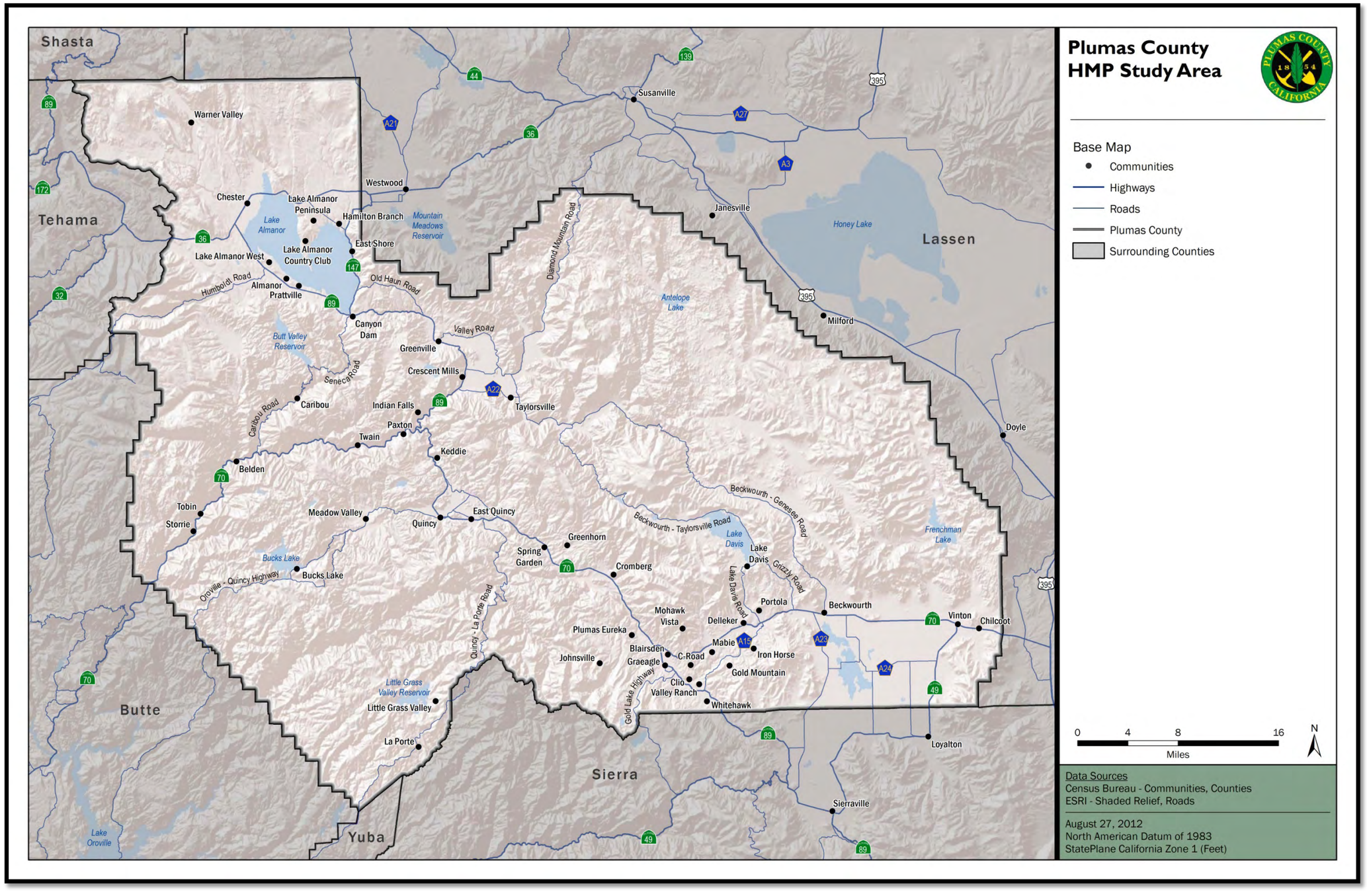
2.3 *Socioeconomic Factors*

The population, economic, and housing factors in the unincorporated areas of Plumas County are described in this section. Understanding these socioeconomic factors is imperative to determining the potential impacts a natural hazard event can have on the County's population and economy.

2.3.1 Population

According to the 2010 U.S. Census Data, Plumas County's total population is 20,007 residents[3]. Plumas County is one of California's most rural counties with 7.8 people per square mile, and is one of three counties in California to have experienced a loss in population over the past 10 years. Population within Plumas County in generally concentrated in the high mountain valleys. These areas include Sierra, American and Indian Valley. See Figure 2-2 for population distribution. Portola is the only incorporated city in the County, with a population of 2,104 and East Quincy, a census designated place, has the highest total population in the County with 2,489 residents. The racial makeup of Plumas County is primarily White (89 percent). African-Americans make up 1.0 percent of Plumas County's population, while Native Americans make up 2.7percent of the population.

[3] 2010 U.S. Census population may not account for seasonal residents.



Plumas County HMP Study Area

Base Map
- Communities
- Highways
- Roads
- Plumas County
- Surrounding Counties

0 4 8 16 Miles

N

Data Sources
Census Bureau - Communities, Counties
ESRI - Shaded Relief, Roads

August 27, 2012
North American Datum of 1983
StatePlane California Zone 1 (Feet)

Figure 2-1: HMP Study Area

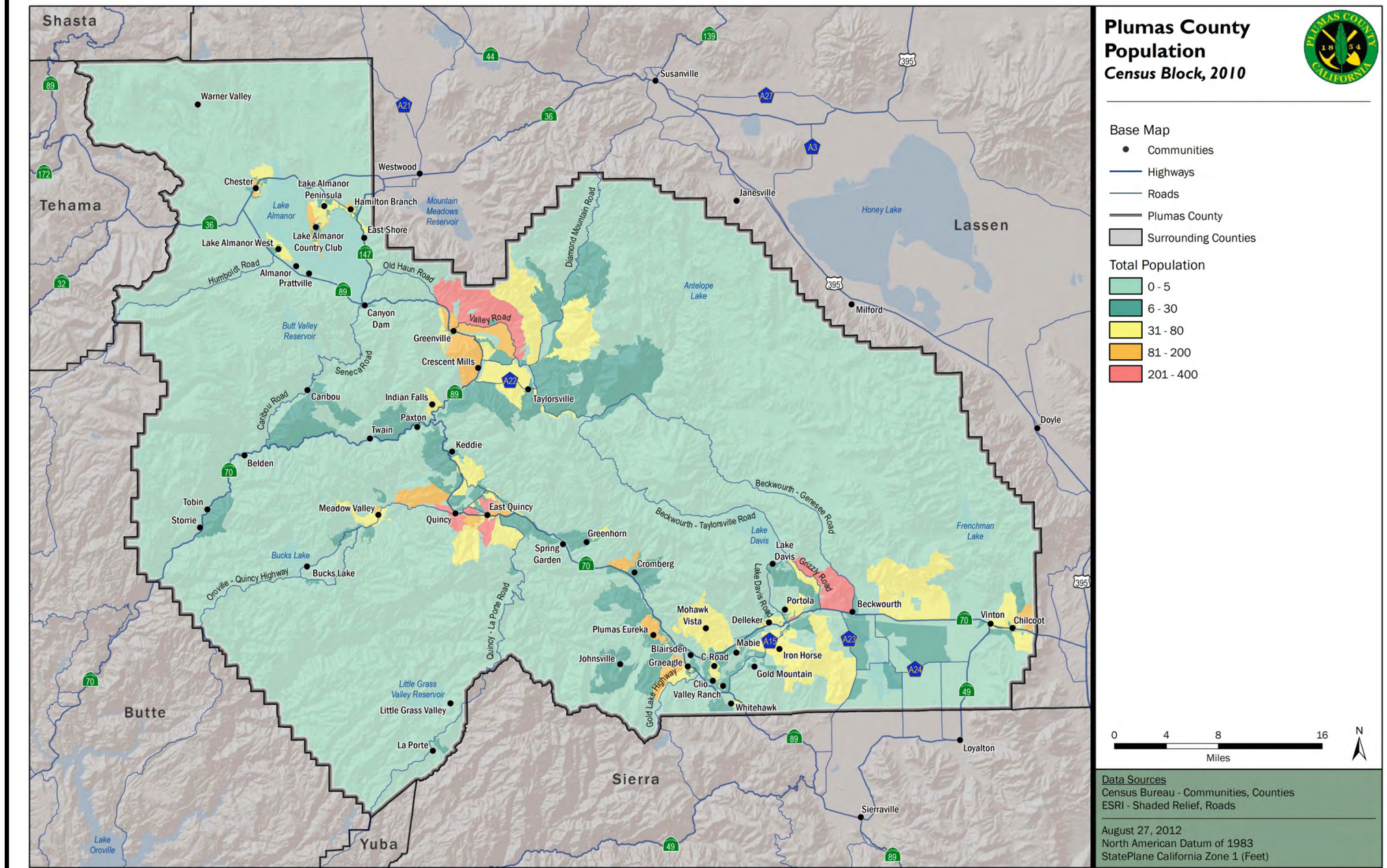


Figure 2-2: Plumas County Population (2010) by Census Block

2.3.2 Employment

According to the 2007-2011 American Community Survey, U.S. Census Data, there are 16,864 people over 16 years of age, of which 9,272 are in the labor force. Out of the 9,272 people in the labor force, 7,948 are employed, and 1,319 are unemployed. Of the employed population 34.6% work in management, business science, and arts occupations; 23% work in service occupations; 18.6% work in sales and office occupations; 14.4% work in natural resources, construction, and maintenance; and 9.4% work in production, transportation, and material moving occupations. The median household income in Plumas County is $44,151.

The biggest industry type with respect to employers in the area (27.2%) is currently educational services, health care, and social services. Some of the largest employment centers in the County include:

- Plumas County Government
- Union Pacific Railroad
- Sierra Pacific Industries (Private Mill)
- National Forest Service
- 3 – Local Hospitals
    - Quincy - Plumas District Hospital
    - Chester - Seneca District Hospital
    - Portola - Eastern Plumas District Hospital
- Feather River College

2.3.3 Housing

According to the 2007-2011 American Community Survey, U.S. Census Data, there are 15,501 housing units in Plumas County. Of the total housing units, 9,434 are occupied and 6,067 are vacant. Plumas County has a significant transient or "snowbird" population, which means many of the residents are not permanent and either own second homes or only live in Plumas County seasonally. For this reason, the housing vacancy rate is more accurate during the off-season (i.e. winter) months of the year. The majority of homes in Plumas County (79.6%) are 1-unit detached homes. The second largest type is mobile homes, which make up 10.4% of the total housing stock. The majority of homes in Plumas County are also owner-occupied (69.9%), with the remaining 30.1% categorized as renter-occupied units. On average, 97.2% of housing units have one occupant or less per room. Of the housing stock, approximately 26.8% are worth $300,000-$500,000 and 25.3% are worth $200,000-$300,000 in value.

2.4 *Land Use and Future Expansion Areas*

This section describes the land use and development trends in Plumas County. Information in this section can be used to help guide and coordinate future mitigation activities and decisions for anticipated development. The General Plan (GP) designates land uses throughout the County, including the unincorporated areas. The GP describes four planning areas and an Expansion Area (Town or Community). These planning areas are described below.

Towns are places where the highest complement of public infrastructure and services are available or can be made available. Such services consist of community water service, community sewer service,

maintained year-round roads, fire, police and emergency medical services. In addition, towns serve as both the commercial and public services hubs for both local residents as well as surrounding communities. Representative areas include Chester, Lake Almanor Peninsula/Hamilton Branch, Greenville, East Quincy, Quincy, Graeagle, Delleker, and the City of Portola.

Communities are places where some public infrastructure and services are available. Few commercial services are present and these services generally are of the type, size, and scale that serve local residents. Representative areas include Crescent Mills, Taylorsville, Clio, Beckwourth, Vinton/Chilcoot and La Porte.

Rural Places are defined as having little to no public infrastructure and services. If commercial services are present they tend to be small and often seasonal. Rural places may also consist of a grouping of homes. Planning area and rural place boundaries may be one in the same. There is little or no identified expansion area. Representative areas include Prattville, East Shore of Lake Almanor, Canyon Dam, Indian Falls, Keddie, Meadow Valley, Spanish Ranch, Tollgate, Bucks Lake, Twain, Belden, Tobin, Greenhorn Ranch, Sloat/Cromberg, Blairsden, C-Road, Mohawk Vista, Lake Davis and Little Grass Valley.

Master Planned Community boundaries have been described or prescribed through their approvals and/or environmental documentation. The planning area and master planned community boundary are one in the same. There is no identified expansion area, as development potential has been specifically defined. Representative areas include Lake Almanor West, Gold Mountain, Valley Ranch, Grizzly Ranch and Whitehawk Ranch.

Expansion Area (Town or Community) is an area delineated within the General Plan Land Use Map that identifies potential future expansion of a Town or Community Boundary to accommodate additional growth, based upon the ability to provide services to the area.

Table 2-1 provides a breakdown of the General Plan land use designations by towns, communities, rural places, master planned communities, City of Portola Sphere of Influence, and expansion areas in Plumas County. The majority of Plumas County's land remains in protected National Forest (65 percent); however, a majority of the remaining land (16,033.17 acres) is designated as "town" in the General Plan. Within towns, single-family residential makes up the largest land use at approximately 6,752.41 acres. Resorts and recreation (2,172.28 acres) and commercial (1,018.66 acres) land uses also make up a significant portion of towns. Communities are similar to towns in terms of their overall land use, but at a much smaller scale. Generally, there is more suburban housing and less commercial and retail services, as well as public infrastructure. Rural areas are characterized by rural housing, suburban housing, and secondary suburban housing. With little to no public services, rural areas have a significant amount of timber resource land (1,174.87 acres) and general open space.

Table 2-1: General Plan Land Use Designations (Acres)

Land Use Type	Towns	Communities	Rural Places	Master Planned Communities	City of Portola Sphere of Influence	Expansion Areas
Significant Wetlands	38.07	n/a	3.56	n/a	n/a	0.77
Agricultural Preserve	3.42	11.78	13.38	217.43	949.34	786.98
Agriculture and Grazing	56.95	2.46	71.96	0.00068	n/a	65.77
Timber Resource Land	239.3	0.02	1,174.87	152.09	40.3	3,288.07
Mining Resource	53.36	n/a	4.78	n/a	76.46	128.05
Single-Family Residential	6,752.41	467.01	539.94	482.93	119.77	66.22
Multiple-Family Residential	677.61	3.97	0.00000022	n/a	2.1	7.93
Rural Residential	609.4	0.73	2,100.22	n/a	283.65	3,568.14
Suburban Residential	104.45	197.13	1,194.66	1,457.75	317.82	4,192.20
Secondary Suburban Residential	292.29	56.99	4,383.74	1,692.84	922.1	5,953.03
Limited Access Rural Residential	0.79	n/a	115.71	0.47	7.22	430.29
Commercial	1,018.66	128.69	44.1	0.67	51.41	525.26
Industrial	523.99	128.36	177.34	5.05	179.36	1,237.92
Resort and Recreation	2,172.28	41.95	713.26	126.94	15.27	908.64
Lake	0.06	n/a	14.08	0.02	n/a	n/a
City of Portola	3,490.13	n/a	n/a	n/a	0.0038	n/a
Total Acres	**16,033.17**	**1,039.09**	**10,551.60**	**4,136.19**	**2,964.80**	**21,159.27**

Also, Table 2-1 shows that the largest land use designation expansion is expected to be rural residential, suburban residential, and secondary suburban residential. Another significant expansion area noted in the General Plan is timber resource land; this land use designation is expected to increase by 3,288.07 acres. See Figure 2-3 for general land use across Plumas County. See General Plan maps for locations of future expansion.

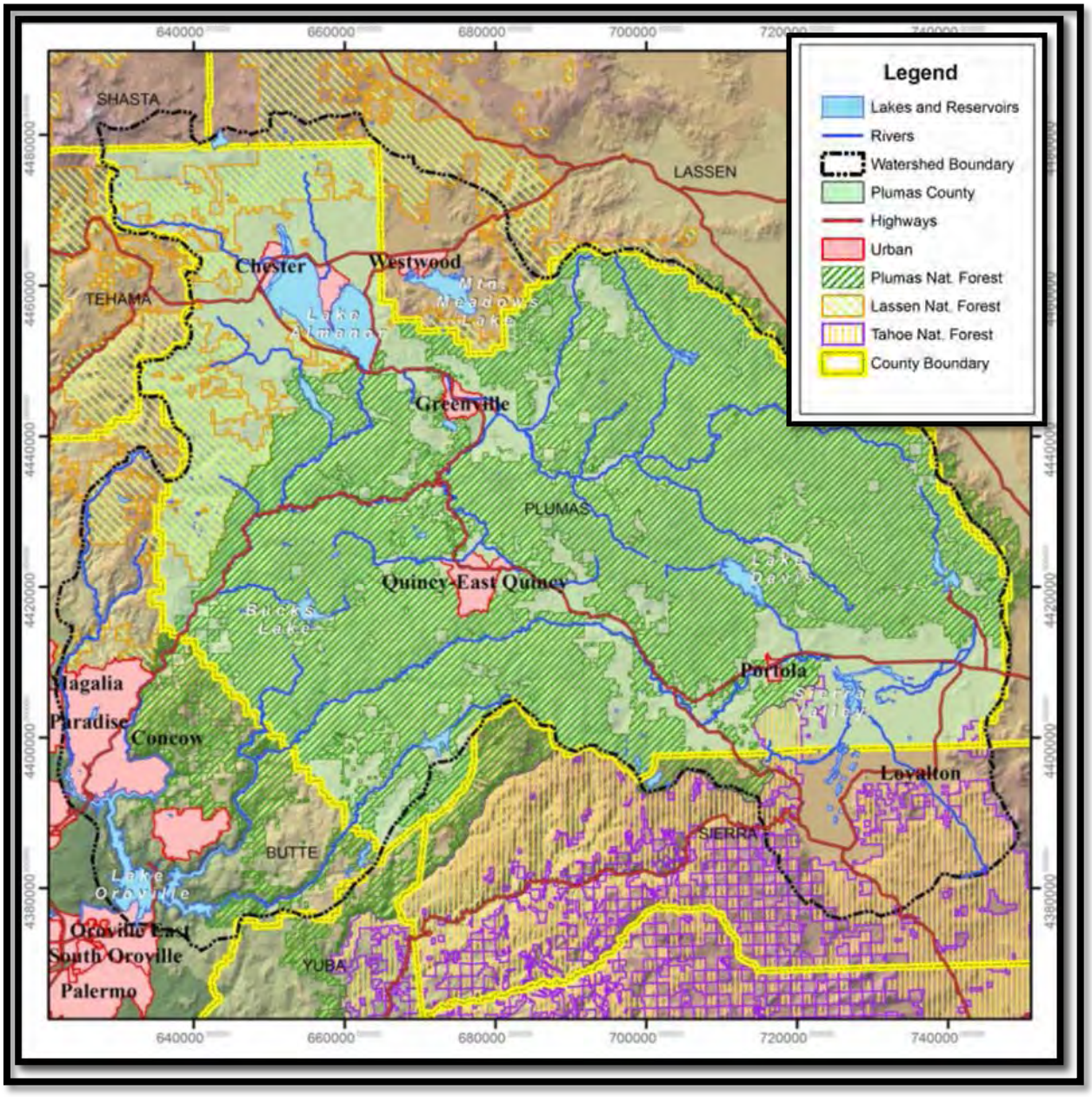


Figure 2-3: Plumas County General Land Use

Section 3. What's New

This section of the plan includes background information on the 2006 MHMP and the 2013 HMP Updates. The 2006 Mitigation Actions have been changed, updated, and revised to reflect new priorities in the 2013 HMP. The sections below describe the background and planning process for 2013 changes and updates.

3.1 *2006 MHMP and 2012 HMP Update Background*

On September 13th, 2005, Plumas County adopted their first Hazard Mitigation Plan as required by the DMA 2000. The 2006 MHMP focused on the incorporated and unincorporated areas of the County and provided a high-level overview of the hazards affecting the County. The hazards identified in the 2006 MHMP included flooding, winter storms, wildfire, drought, hazardous materials, dam failure, earthquake, and terrorism. The plan also included a vulnerability assessment and mitigation actions to decrease the impacts of these hazards on the County.

The mitigation actions in the 2006 MHMP focused on six classifications. These classifications include:

1. Preventative Activities – intended to reduce a County's vulnerability to future hazard events through the implementation of codes and regulations.
2. Property Protection – intended to protect existing structures by retrofitting, relocating or modifying the structure to withstand a hazard event.
3. Natural Resources Protection – to reduce the effects of hazards on the natural resources within a region by preserving and/or restoring natural areas along with their mitigation functions.
4. Structural Projects – reduce the impacts of a hazard event by modifying the physical environment to withstand the particular hazard.
5. Emergency Services – to minimize the impact of a hazard by preparing these services to respond efficiently and rapidly during and after a hazard event.
6. Public Information and Awareness – to advise residents, potential buyers and visitors about hazards, potentially hazardous areas and mitigation techniques.

3.2 *Successful Mitigation Activities Since 2006*

The 2006 Plumas County MHMP, adopted and approved by Plumas County Board of Supervisors, Cal EMA and FEMA, has been implemented through various on-going projects, plans and programs. In regards to the mitigation action items and strategy developed in 2006, Plumas County has been making significant improvements toward lowering natural hazard risk to life and property within the county. Significant risk reduction efforts have been made for floodplain management, flood damage prevention, and fire hazard abatement. These successful policies, programs, and projects are summarized below.

3.2.1 Floodplain Management

In 2011, at the request of the County, FEMA tasked the California Department of Water Resources (DWR) to conduct detailed hydrologic and hydraulic analyses of flood hazards in the Sierra Valley, impacting both Sierra County and Plumas County. This study is currently in progress, and preliminary results have already been identified. Upon approval of the completed analyses through an independent

review, FEMA will initiate the process of updating the relevant FEMA Flood Insurance Rate Map (FIRM) panels. . The extent of the Sierra Valley study is depicted in the work map (Figure 3-1) provided. For further details on the new FEMA projects located within Plumas County Visit:

http://www.r9map.org/Pages/ProjectDetailsPage.aspx?choLoco=32&choProj=252

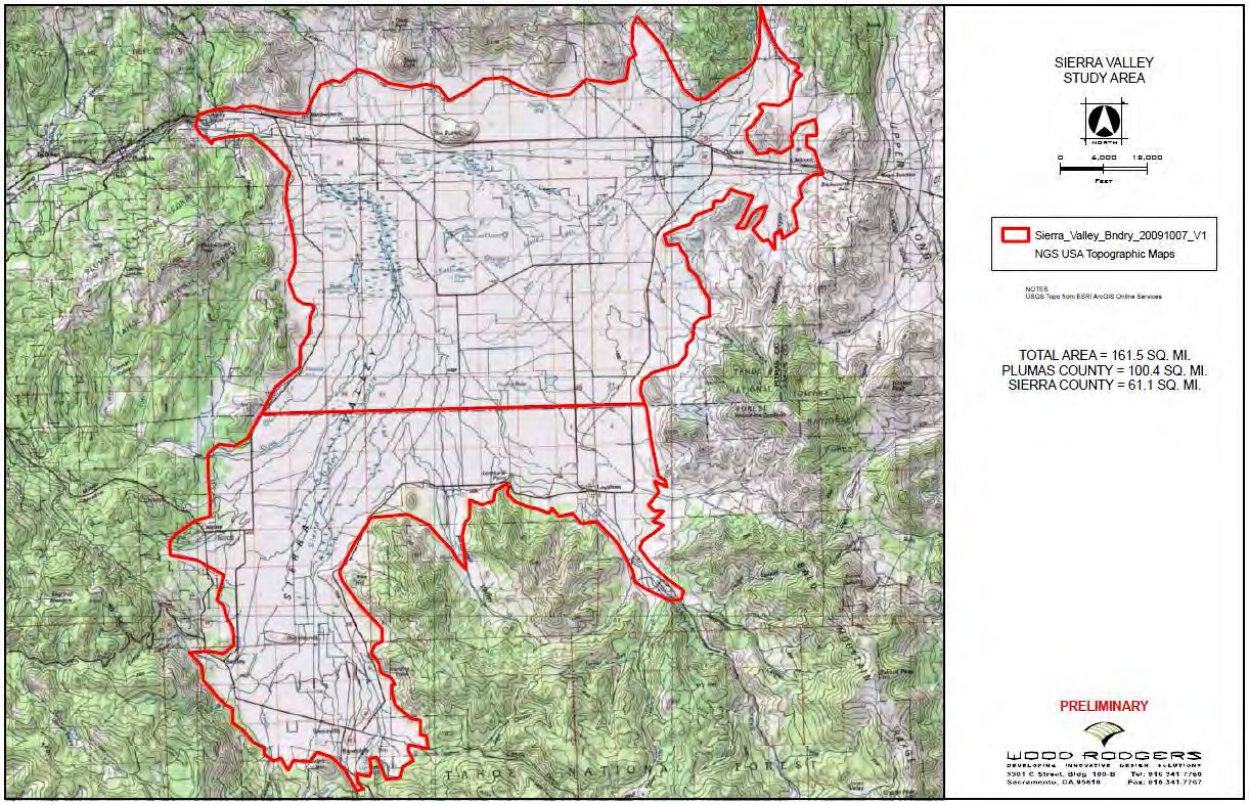


Figure 3-1: FEMA Sierra Valley Study Area

3.2.2 Building and Construction Codes for Flood and Climate Hazard Abatement

As a result of the 2006 MHMP, Plumas County has adopted and enforces new building codes and regulations that protect new development and buildings from flooding. These codes are described below:

3.2.2.1 Section 8-1.07 – Amendment of Section 1057 of the California Building Code: Ice Dam Protection

Since 2008, Plumas County requires additional flashing for ice dam protection and areas subject to wind-driven snow or roof ice buildup due to the severe climate. The following requirements satisfy the ice dam flashing requirements:

a. At eaves: An approved self-adhering, polymer-modified, bituminous sheet (or approved equal) shall be applied from eaves up the roof sheathing to a point of at least thirty inches (30") inside the exterior wall line (plate line) measured along the plane of the roof. When the roof overhang at the eaves is in excess of thirty inches (30"), such as covered porches, the ice dam flashing is

required to extend only thirty inches (30") below the exterior wall line measured along the plane of the roof.

b. At valleys: An approved self-adhering, polymer-modified, bituminous sheet (or approved equal) shall be applied the full length of all valleys, extending thirty inches (30") each side of the valley centerline.

c. At pitch changes: An approved self-adhering, polymer-modified, bituminous sheet (or approved equal) shall be applied the full length of all pitch changes (steeper to less steep only) and shall extend a minimum of thirty inches (30") above and thirty inches (30") below the pitch change. The lower edge of the material shall be applied shingle fashion to the roofing paper (sub-base roofing felt) for roof deck protection.

d. Exceptions: Subdivisions (a) through (c) above shall not apply:
    1. When located totally above unheated spaces (i.e., garages, porches, breezeways, carports, etc.);
    2. At eaves for metal roofing;
    3. At pitch changes for metal roofing when the metal roof sheathing is installed without any seams, laps, or splices at the pitch change; or,
    4. On built-up roofing.

3.2.2.2 Section 8-1.08 – Amendment of Section 1805 of the California Building Code: Frost Depth Required

Section 1805 of the California Building Code is amended by the addition of the following paragraph, which amends section 1805.2.1(1) by the addition of the following:

Since 2008, Plumas County requires footings and foundations to be of a depth sufficient to prevent disturbance due to frost because of the severe winter climatic conditions. Footings and foundations shall be constructed of masonry, concrete, or approved treated wood, per Chapter 18, Volume 2 of the California Building Code. All footings and foundations shall be placed a minimum of twelve inches (12") into native undisturbed soil and shall have a total depth of not less than eighteen inches (18") below finish grade unless another depth is recommended by a foundation investigation.

3.2.2.3 Section 9-4.606 – Construction Standards

Since, 2006, the structural section of the roadbed shall conform to the following thicknesses, or alternative thicknesses, utilizing the California Design Method and approved by the Public Works Director.

c. Culverts. Necessary culverts shall be installed before applying sub-base or base rocks, and the backfill shall be compacted to a relative compaction of at least ninety (90%) percent. The minimum size of culvert shall be eighteen (18") inches by eleven (11") inches arch or fifteen (15") inches round. If concrete culvert pipe is used, that part under the roadbed shall be the reinforced heavy wall type. Culverts shall have a minimum cover of twelve (12") inches below the surface. Culverts shall be located and sized in conformance with an engineered drainage plan for the road.

3.2.3 Fire Protection

In 2008, Plumas County adopted a section of the California Fire Code to reduce fire hazard risk on existing properties and for new construction.

3.2.3.1 Section 8-1.09 – Enforcement of Section 112.1.1 of the California Fire Code

Since 2008, Plumas County hereby appoints the Building Official to enforce Fire, Life Safety Standards of the State Fire Marshal for R-3's including egress windows, sprinklers, exits, smoke detectors, and Wildland Urban Interface Safety, per Section 111.2 of the California Fire Code.

3.2.4 Mitigation Projects Since 2006

Between 2006 and 2012, a number of mitigation projects have been initiated by various County departments. Mitigation projects include flood proofing, drainage maintenance, and fuel reduction. This section highlights these mitigation efforts.

3.2.4.1 Public Works Improvements

3.2.4.1.1 Humbug Road:

In the summer of 2000, a large wildfire started by a Union Pacific Railroad maintenance crew burned onto lands of the Lassen and Plumas National Forests. The railroad was found at fault for starting the Storrie Fire and was ordered to pay the National Forest Service a settlement. The monies are to be spent primarily on the restoration of the fire burn area. Plumas County Road 307 known as the "Humbug Road," was, and still is, the primary access into the fire burn area.

The Humbug Road project involved improving drivability and reducing watershed impacts of the Humbug County Road, a native surface road requiring maintenance to decrease impacts to watershed. The project included, among various treatments, replacing and adding drainage culverts and adding aggregate surfacing. The Plumas County Public Works Department provided time and material for the construction and upgrade of drainage facilities in the project area. There were 21 pipes placed in a four-mile section of the road and typical work consisted of:

- Trenching across road sections
- Placing a corrugated metal pipe (cmp) for drainage
- Backfilling around trench locations
- Rocking the inlet and outlet of each pipe section

3.2.4.1.2 Big Creek Road Improvements

To improve drainage and reduce risk of road washout, a 102-foot long bridge replacement project over Grizzly Creek was implemented in 2012. See Figure 3-4 and Figure 3-5. The bridge was constructed with precast concrete girders with a cast-in-place concrete deck. The remainder of the work in this segment consists mostly of pavement rehabilitation with some drainage improvements. See Figure 3-4 and Figure 3-5 for before and after photos.

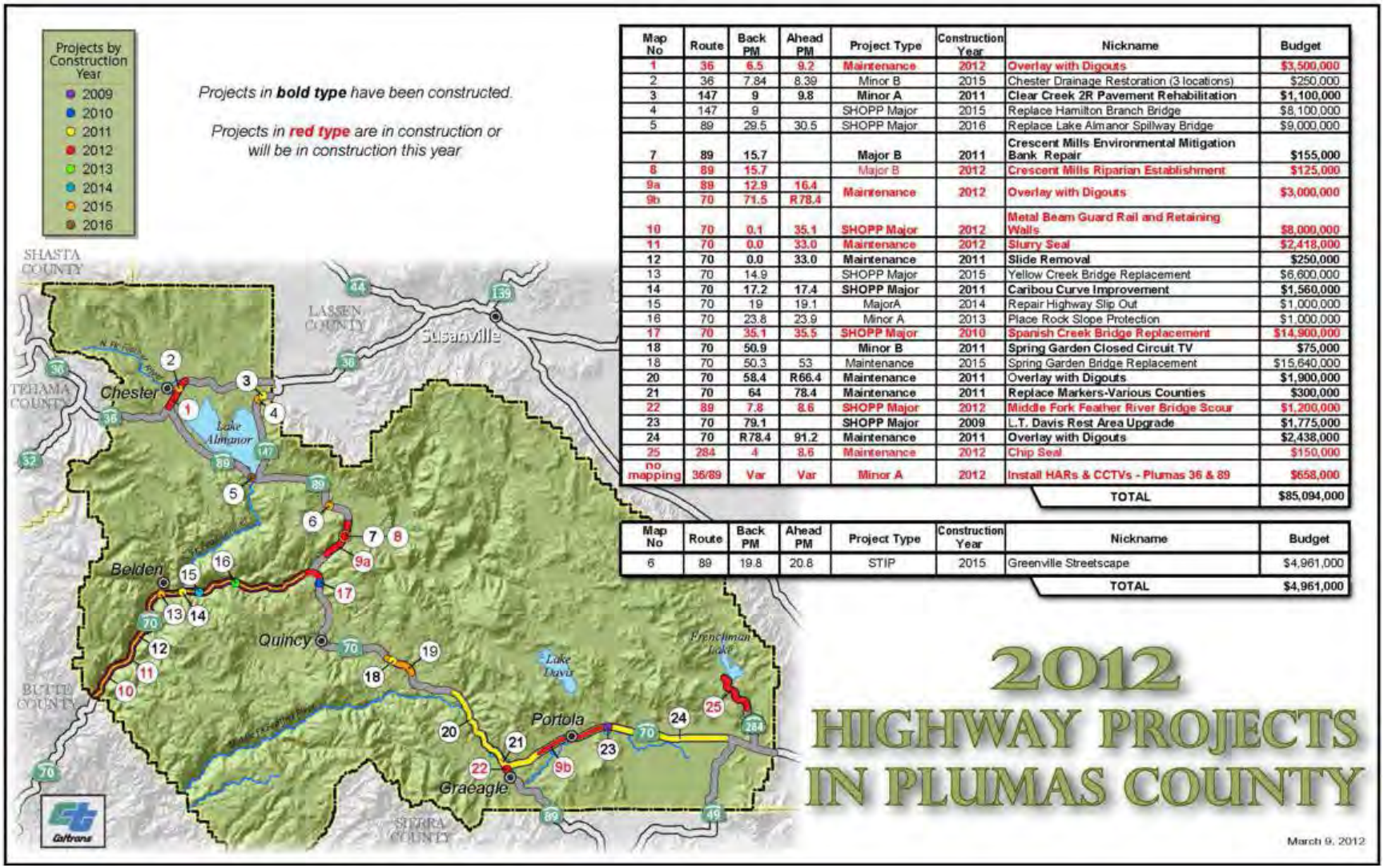
Every year the California Department of Transportation (Caltrans) and project contractors conducted work along State Route (SR) 70, SR 89, and SR 36. See Figure 3-6 for locations of 2012 Caltrans highway restoration and repair projects.

Figure 3-2: Humbug Road (Storrie Fire Access Road) Prior to Improvements

Figure 3-3: Humbug Road after Improvements

Figure 3-4: Grizzly Creek Bridge before Replacement

Figure 3-5: Grizzly Creek Bridge Replacement in Progress



Map No	Route	Back PM	Ahead PM	Project Type	Construction Year	Nickname	Budget
1	36	6.5	9.2	Maintenance	2012	Overlay with Digouts	$3,500,000
2	36	7.84	8.39	Minor B	2015	Chester Drainage Restoration (3 locations)	$250,000
3	147	9	9.8	Minor A	2011	Clear Creek 2R Pavement Rehabilitation	$1,100,000
4	147	9		SHOPP Major	2015	Replace Hamilton Branch Bridge	$8,100,000
5	89	29.5	30.5	SHOPP Major	2016	Replace Lake Almanor Spillway Bridge	$9,000,000
7	89	15.7		Major B	2011	Crescent Mills Environmental Mitigation Bank Repair	$155,000
8	89	15.7		Major B	2012	Crescent Mills Riparian Establishment	$125,000
9a	89	12.9	16.4	Maintenance	2012	Overlay with Digouts	$3,000,000
9b	70	71.5	R78.4				
10	70	0.1	35.1	SHOPP Major	2012	Metal Beam Guard Rail and Retaining Walls	$8,000,000
11	70	0.0	33.0	Maintenance	2012	Slurry Seal	$2,418,000
12	70	0.0	33.0	Maintenance	2011	Slide Removal	$250,000
13	70	14.9		SHOPP Major	2015	Yellow Creek Bridge Replacement	$6,600,000
14	70	17.2	17.4	SHOPP Major	2011	Caribou Curve Improvement	$1,560,000
15	70	19	19.1	MajorA	2014	Repair Highway Slip Out	$1,000,000
16	70	23.8	23.9	Minor A	2013	Place Rock Slope Protection	$1,000,000
17	70	35.1	35.5	SHOPP Major	2010	Spanish Creek Bridge Replacement	$14,900,000
18	70	50.9		Minor B	2011	Spring Garden Closed Circuit TV	$75,000
18	70	50.3	53	Maintenance	2015	Spring Garden Bridge Replacement	$15,640,000
20	70	58.4	R66.4	Maintenance	2011	Overlay with Digouts	$1,900,000
21	70	64	78.4	Maintenance	2011	Replace Markers-Various Counties	$300,000
22	89	7.8	8.6	SHOPP Major	2012	Middle Fork Feather River Bridge Scour	$1,200,000
23	70	79.1		SHOPP Major	2009	L.T. Davis Rest Area Upgrade	$1,775,000
24	70	R78.4	91.2	Maintenance	2011	Overlay with Digouts	$2,438,000
25	284	4	8.6	Maintenance	2012	Chip Seal	$150,000
no mapping	36/89	Var	Var	Minor A	2012	Install HARs & CCTVs - Plumas 36 & 89	$658,000
						TOTAL	$85,094,000

Map No	Route	Back PM	Ahead PM	Project Type	Construction Year	Nickname	Budget
6	89	19.8	20.8	STIP	2015	Greenville Streetscape	$4,961,000
						TOTAL	$4,961,000

Figure 3-6: Caltrans 2012 Highway Projects

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3.2.4.2 Wildland Fire Mitigation

The Plumas County Fire Safe Council, along with CAL FIRE, State Parks, the Natural Resources Conservation Service, the Herger Feinstein Quincy Library Group, and Industrial Timberlands, has completed and is in the process of planning a number of fuel reduction/fire mitigation projects. Due to wildfire suppression and historic land management practices, unnaturally high accumulations of biomass have collected in the surrounding forests, which can lead to wildfires in ecosystems where such fires were once rare. Thus, Plumas County has proposed activities to reduce forest biomass fuels by manually removing forest debris and small shrubs that contribute to the spread of wildfire. Fuel reduction projects are critical to protecting citizens and natural resources from wildfire threats. Refer to Figure 3-9 for all fuel reduction projects completed up to April 24, 2012.

A typical fuel reduction project requires coordination with land owners and the treatment of anywhere from a few to several hundred acres of forest land. Two Plumas County fuel reduction projects are summarized below.

3.2.4.2.1 Indian Falls Community HFR (Hazardous Fuel Reduction) Defense Zone

This project involved the treatment of 50 acres of hazardous fuels in the Indian Falls community common areas. The project was initiated by the Plumas County Fire Safe Council and was completed in December 2006 by Brian Weyland, a contractor with Weyland Resources. The total cost of the project was $56,800. Refer to Figure 3-7 for the subject parcels in Indian Falls.

3.2.4.2.2 Whitehawk Ranch Community Fuel Reduction

This project involved the treatment of approximately 100 acres of hazardous fuels within the Whitehawk Community. The project was initiated by the Plumas County Fire Safe Council and was completed in October 2007 by contractors Pete Thill and Paul Rouen. Refer to Figure 3-8 for the subject parcels in Indian Falls.

Figure 3-7: Indian Falls Community – After HFR project

Figure 3-8: Whitehawk Ranch Fuel Reduction Before and After

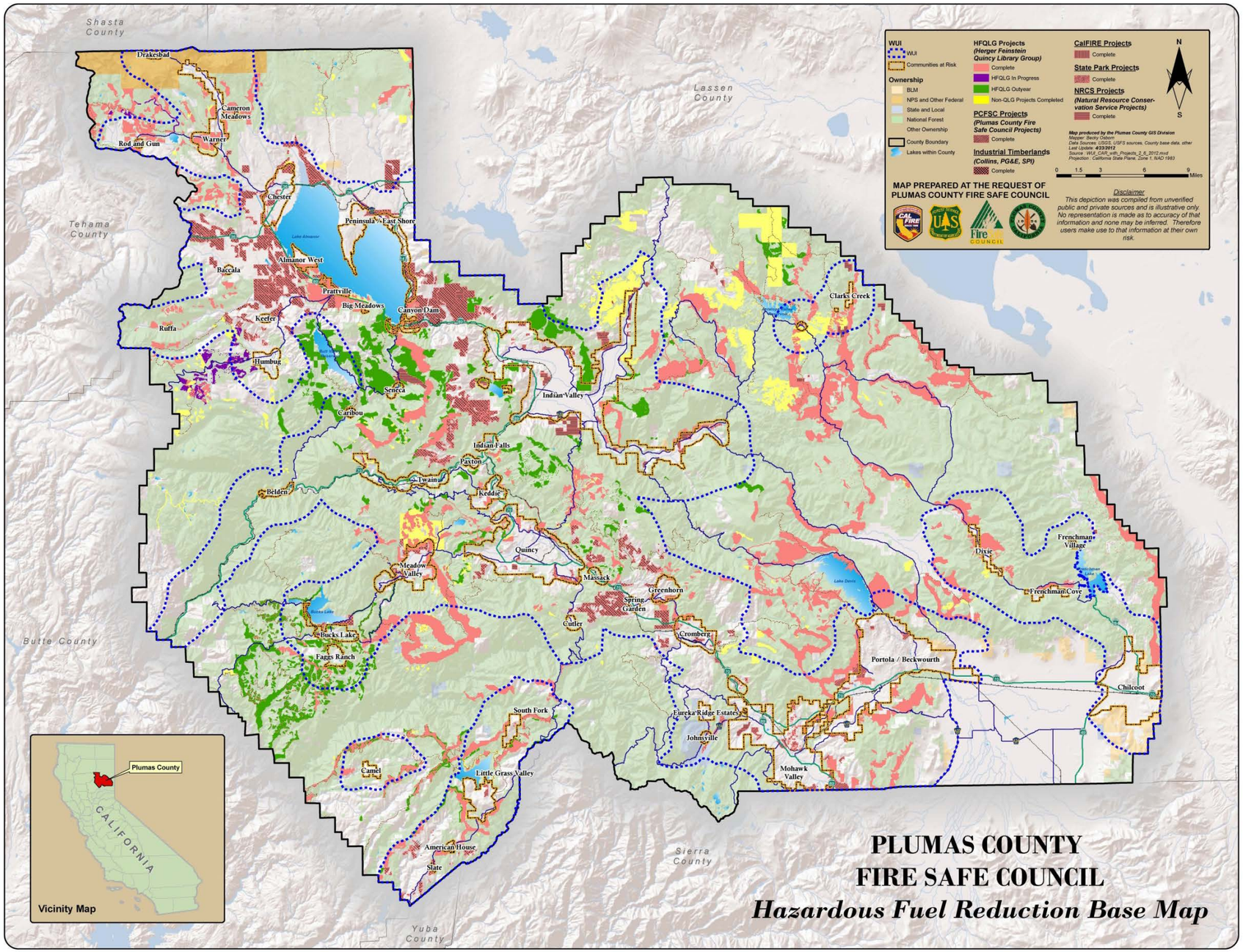

Figure 3-9: Plumas County Hazardous Fuel Reduction Projects

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3.3 *What's New in the HMP Update*

For the 2013 HMP Update, the Plumas County HMP Planning Committee reviewed and analyzed the 2006 MHMP. This included the review of the planning process, historical disasters, hazard and risk assessment, mitigation goals, mitigation actions, and plan maintenance and updating process sections.

Note: Plumas County has not seen major changes in development since the last update cycle. Therefore, the plan has not been changed to reflect changes in development. Plumas County is very rural in nature, with an approximate population density of 8 people per square mile. If any changes in development occur, future updates will account for new development patterns.

In coordination with the HMP Update Planning Committee, the HMP Update Project Team decided to completely revamp 2013 HMP document with Plumas County-specific hazard information to fully capture the County's unique hazard environment and focus limited resources on relevant mitigation efforts. Table 3-1: Changes to the Plan Components, details the changes incorporated into the 2013 Plumas County HMP. These changes include an expanded community profile, extensive public outreach strategy, in-depth hazard profiles, detailed risk assessments including detailed overlay analysis, specific mitigation actions, and a specific maintenance and updating process for the next five years.

Table 3-1: Changes to the Plan Components

2006 Plumas County MHMP Sections	Changes Incorporated into the updated HMP
Introduction	▪ The 2013 HMP includes an expanded community profile section with updated demographic and other County-specific data to inform readers of the changes in the planning area. This is important, as hazard mitigation can be conducted early and ahead of population growth and future development.
Planning Process	▪ In order to meet DMA 2000 criteria, the 2013 HMP includes detailed documentation about the planning process. The 2013 HMP planning process, its participants, and the meetings/workshops conducted have been thoroughly documented to meet FEMA requirements. See Section 4 and Appendix B. ▪ Also included as part of the planning process is the documentation of the public outreach strategy and public participation in the plan development. See Section 4 and Appendix B
Historical Disasters	▪ Historical disaster information has been updated since the adoption of the 2006 MHMP. New information from the public, as well as the Plumas County Historical Museum, is now included as part of the hazard profiles. See information and photos throughout Section 5. ▪ The HMP now includes disasters that were not federally-declared in Plumas County, but resulted in substantial losses and damages to the County. This addition is specifically related to the 2012 Chips Fire, which caused significant damage in the County. Please refer to Section 5.3 for more information.

2006 Plumas County MHMP Sections	Changes Incorporated into the updated HMP
Hazard Profile and Risk Assessment	▪ The 2006 Plumas County MHMP hazards have been updated and changed based upon Planning Committee priorities, FEMA guidance, and risk assessment outcomes. ▪ The 2006 Plumas County HMP hazard profiles and risk assessments have been updated with new and current data from the County. ▪ Potential impacts to the County from identified hazards have been described in terms of exposure analysis of population, County parcel values, and critical facilities in the County. This was done to aid hazard mitigation planners to compare hazard risk for each hazard and provide data on how exposure to populations and assets change with each hazard. See Section 5 for more information on hazard risk and the related exposure.
Goals, Objectives and Mitigation Actions	▪ To meet FEMA requirements, the Planning Committee reviewed the 2006 MHMP goals and determined current day validity. Due to changes in County priorities, goals and objectives have been updated to meet the current hazard environments. ▪ The HMP now includes an expanded County-specific capabilities assessment for implementing the mitigation actions. By understanding capabilities to conduct mitigation actions within the County, the Planning Committee developed mitigation actions that meet current-day and near-term resources. ▪ The 2013 HMP includes detailed mitigation actions based upon the risk assessment and capabilities to carry out mitigation actions over the next 5 years. Newly identified and prioritized County-specific mitigation actions can be found in Section 6 and Appendix D.
Plan Maintenance and Updating Process	▪ The 2013 HMP now includes an expanded implementation strategy for selected mitigation actions. Implementation strategies provide a detailed step-by-step process for which mitigation champions throughout the County can follow when implementing mitigation actions. Implementation strategy worksheets can be found in Appendix E. ▪ Following FEMA guidance, the 2013 HMP provides expanded plan maintenance and update processes. This is done to provide the County mitigation champions and administrators a consistent method to update and report on plan progress and successes, and/or difficulties in implementing mitigation actions. See Section 7 for more information. ▪ The 2013 HMP now includes plan monitoring and evaluation progress reporting forms which will be updated on an annual basis. The Annual Review Questionnaire and Mitigation Action Progress Report forms will assist the monitoring and evaluation process and reduce the burden of future plan updates. Reporting forms can be found in Appendix E.

Section 4. The Planning Process

This section describes each stage of the planning process used to develop the 2013 Plumas County HMP. The HMP planning process provides a framework for document development and follows the FEMA recommended steps. The Plumas County HMP follows a prescribed series of planning steps which includes organizing resources, assessing risk, developing the mitigation plan, drafting the plan, reviewing and revising the plan, and adopting and submitting the plan for approval. Each is described in this section.

4.1 *Planning Process*

Hazard mitigation planning in the United States is guided by the statutory regulations described in the DMA 2000 and implemented through 44 Code of Federal Regulations (CFR) Part 201 and 206. FEMA's HMP guidelines outline a four-step planning process for the development and approval of HMPs. Table 4-1 lists the specific CFR excerpts that identify the requirements for approval.

Table 4-1: DMA 2000 CFR Breakdown

DMA 2000 (44 CFR 201.6)	Plan Section
(1) Organize Resources	**Section 4**
201.6(c)(1)	Organize to prepare the plan
201.6(b)(1)	Involve the public
201.6(b)(2) and (3)	Coordinate with other agencies
(2) Assess Risks	**Section 5**
201.6(c)(2)(i)	Assess the hazard
201.6(c)(2)(ii) and (iii)	Assess the problem
(3) Develop the Mitigation Plan	**Section 6**
201.6(c)(3)(i)	Set goals
201.6(c)(3)(ii)	Review possible activities (actions)
201.6(c)(3)(iii)	Draft an action plan
(4) Plan Maintenance	**Section 7**
201.6(c)(5)	Adopt the plan
201.6(c)(4)	Implement, evaluate, and revise

For the development of the updated Plumas County HMP, a planning process was customized to address Plumas County's unique population and demographic. However, all the basic federal guidance documents and regulations are met through the customized process. As shown in Figure 4-1, the HMP planning process (and documented in the corresponding sections) included organizing resources, assessing risk, developing the mitigation action strategy, drafting the plan, reviewing and revising the plan, and adopting and submitting the plan.

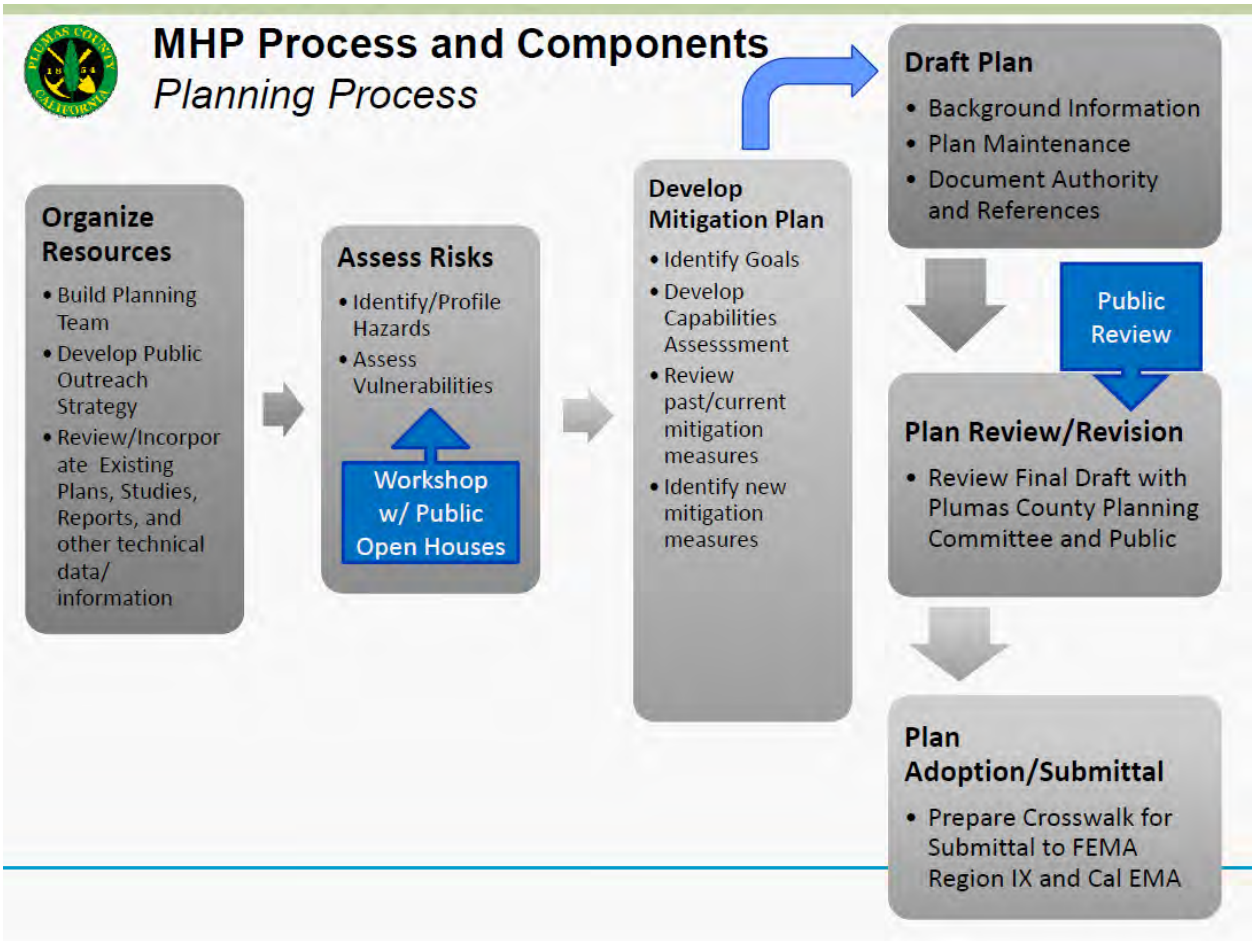


Figure 4-1: Plumas County HMP Planning Process

4.2 *Organize Resources*

This section describes the first step of the 2013 Plumas County HMP planning process – Organizing Resources. It outlines the HMP Update Planning Team, and includes information on the development of the HMP Update Planning Committee and Hazard Focus Groups. The figure in Section 4.2.1.1 illustrates the level of participation for each group that participated in the HMP Update planning process. As part of this step, a variety of existing plans, studies, reports, and other technical data/information was reviewed and incorporated into the HMP document, as appropriate.

4.2.1 Build Planning Team

The Planning Team is responsible for the back bone of the planning process and will provide direction for the development of the HMP Update. For this planning process, the Planning Team consisted of a HMP Planning Committee and Hazard Focus Groups. The Planning Team consists of key decision makers in specific government functions, and also represents the public face of the HMP Update Planning Process.

4.2.1.1 *Planning Committee*

The HMP Planning Committee guides the process and ensures the mitigation plan meets the goals of the County, State and Federal Hazard Mitigation Plan requirements. The HMP Planning Committee includes Plumas County Staff, as well as interested stakeholders, who actively participated in the planning process, such as:

- Attended and actively participated in a series of structured coordination meetings
- Assisted in the collection of valuable local information and other requested data
- Made decisions on plan process and content
- Identified mitigation actions for the HMP
- Reviewed/provided comments on plan drafts
- Coordinated/participated in public input process

The preparation of the HMP Update required a series of Planning Committee meetings, hazard focus group meetings and workshops intended to facilitate discussion and initiate data collection efforts with local community officials. More importantly, the meetings and workshops prompted continuous input and feedback from local officials throughout the update process.

Before initiation of the planning process an invite letter was sent by Plumas County Public Health to provide an opportunity for neighboring communities, local and regional agencies, and other interests to be involved in the planning process to participate in the Planning Committee. See Figure 4-2 for a sample copy of the Planning Committee participation invite letter. E-Mails and phone calls were used to invite Hazard Focus Group Members to participate after initial contact was established. Invitations to participate included links to current website material and other planning information related to the 2012 Plumas County Hazard Mitigation Plan update. Table 4-2 provides a list of the HMP Planning Committee members who provided input in the planning process.

Table 4-2: 2013 HMP Planning Committee

Name	Organization	Role
Shane Vargas	CAL FIRE	Wildfire Hazard Focus Team
Jerilyn Anderson	Cal EMA	Cal EMA Preparedness Representative
Bruce Carpenter	California Highway Patrol	Dam Failure Hazard Focus Group
Keith Mahan	Plumas County Ag Commissioner	Drought Hazard Focus Group
Terry Swofford	Plumas County Supervisor, District 1.	County Board Representation
John Cunningham	Plumas County Building Official	Building Code Coordinator
David Keller	Plumas County Community Development Commission	Grant Writing
Jim Perez	Plumas County Environmental Health	Mitigation Plan Development

Jerry Hurley	Plumas County Fire Safe Council	Wildfire Hazard Focus Team
Sue McCourt	Plumas County Fire Prevention Specialist	Wildfire Hazard Focus Team
Jerry Sipe	Plumas County OES	Project Manager / Overall Mitigation Plan Development
Rebecca Herrin	Plumas County Planning Department	General Plan Coordination
Becky Osborn	Plumas County GIS Planner	General Plan and GIS Lead
Tina Venable	Plumas County Public Health	Public Health Coordinator
Louise Steenkamp	Plumas County Public Health	Public Health Coordinator
Joe Blackwell	Plumas County Public Works	Workshop Coordinator / Mitigation Action Development
Mike Grant	Plumas County Sherriff's Office	Dam Failure Hazard Focus Group
Pete Duncan	Plumas National Forest	Wildfire Hazard Focus Team
Lori Pini	Plumas County Public Health	Public Outreach Coordinator / Website Update
Dan Martynn	NRCS	Flood Mitigation Focus Group / Watershed Coordinator
Jerry Blinn	Plumas County Public Works	Flood / Landslide / Hazard Focus Group Mitigation Action Development

4.2.1.2 Hazard Focus Groups

Hazard Focus Groups were created as teams of HMP Planning Committee members and subject matter experts to focus on flood and wildfire hazards within Plumas County. Together with the HMP Consultant Team, the Flood and Wildfire Hazard Focus Groups reviewed information created for the hazard profiles and developed mitigation actions to address these specific hazards. These groups met sporadically via conference calls and communicated through email throughout the HMP planning process.

4.2.1.3 HMP Consultant Team

To provide assistance to the HMP Planning Team, the County enlisted Michael Baker Jr., Inc. (Baker) due to the expertise it has in assisting public sector entities with developing hazard mitigation planning and strategies for particular hazard prone areas. Baker supported the County through facilitation of the planning process, data collection, and meeting material and document development. The HMP Consultant Team, as shown in Table 4-3, consists of a variety of hazard mitigation professionals.

Table 4-3: HMP Consultant Team

HMP Update Project Team	HMP Update Project Team Role
Ethan Mobley, AICP	Project Manager
Jason Farrell, CFM	Senior Planner
Desirae Hoffman	Planner
Nathaniel Mirin, GISP	GIS Specialist/Spatial Analyst
Jack Eldridge	NFIP Program, Senior Technical Advisor

Plumas County Office of Emergency Services

270 County Hospital Road #127
Phone: (530) 283-6332

September 7, 2012

USDA Natural Resource Conservation Service
Dan Martynn
159 Lawrence Street
Quincy, CA 95971

Re: Multi-Hazard Mitigation Plan

Dear Mr. Martynn,

Plumas County has begun the process to prepare its Multi-Hazard Mitigation Plan (MHMP) Update, which will serve as a blueprint for reducing property damage and saving lives from the effects of future natural disasters in the County. The MHMP will identify the natural hazards that affect Plumas County and various mitigation actions/strategies to address those hazards. More information about the MHMP can be found at the project website: http://www.countyofplumas.com/index.aspx?NID=2214

As part of the planning process, Plumas County, with assistance from a hazard mitigation consultant, Michael Baker Jr., Inc. (Baker), is forming a Planning Committee consisting of both County government employees and other key stakeholders. To provide organization in the process, first we would like to kick the planning processes off with County Government staff. The purpose of the first Planning Committee meeting is to have members meet, organize and provide input on the hazards, mitigation actions, and other components of the MHMP planning process. Later in the planning process, we will start engaging community stakeholders (interested citizens, businesses, Federal and State Agencies, etc.).

A meeting will be held to kick-off the Multi-Hazard Mitigation Planning process on Wednesday, September 19, 2012 at 1:00pm at the Plumas County Library conference room, located at 445 Jackson Street in Quincy.

If you are unable to attend this meeting but still wish to participate in the planning process, additional information regarding future meetings, draft documents for review, and other project milestones will be provided through the website: http://www.countyofplumas.com/index.aspx?NID=2214

If you have any additional questions, please do not hesitate to contact me at (530)-283-6367 or by email at JerrySipe@countyofplumas.com or Lori Pini (530) 283-6988; LoriPini@countyofplumas.com

Sincerely,

Jerry Sipe,
Director of Office of Emergency Services

Figure 4-2: Planning Committee Invite Letter

4.2.1.4 Planning Committee Meetings

The HMP Planning Committee met throughout the development of the updated HMP document. Some meetings were conducted in person, while others were conducted via conference calls and webinars. Table 4-4 summarizes the meetings conducted throughout the planning process, including meeting date, type, and topics discussed. Meeting documentation, including agendas, hazard maps, PowerPoint presentations, sign-in sheets, and other relevant handouts, are provided in Appendix B.

Figure 4-3: Planning Committee Meeting #3

Figure 4-4: October 2012 Open House

Table 4-4: Meeting Summary

Date	Meeting Type	Topics
September 19, 2012	Planning Committee Meeting #1	*Part 1:* *Project Overview* *HMP Update Process and Components* *Overview of Existing MHMP* *Project Timeline* *Part 2:* *Planning Area Population / Land Use / Economics Resources* *Public Outreach Strategy* *Workshop Process, Format and Advertisement*
October 2012	Hazard ID and Profiling Workshops and Hazard Mitigation Open House Series	*Hazard Mitigation, What is it?* *Hazard Identification / Profile Development* *(4) Open House Events*
November 2012	Wildland Fire Focus Group	*Fire Hazard Regulatory Environment* *Fire Hazard Profile* *Sample Mitigation Actions*
February 2013	Planning Committee Meeting #2	*Hazard Review and Assessment* *Goals and Objectives Review*
March 2013	Planning Committee Meeting #3	*Capabilities Assessment* *Goals and Objectives Refinement*
April through May, 2013	Planning Committee Focus Group Meetings	*Mitigation Strategy and Mitigation Action Implementation*
June 3 to 5, 2013	Public Review and Participation	*Plan Review and Mitigation Action Prioritization.*

4.2.2 Public Outreach

Public outreach is a major and required component of the HMP Update. The Plumas County HMP Public Outreach Strategy was developed to maximize public involvement in the HMP planning process. The HMP Public Outreach Strategy details the utilization of websites, local media, and community-based services and establishments to engage the public throughout the HMP planning process. This section provides additional information on the project website and workshop process used during the HMP plan development.

4.2.2.1 Plumas County Hazard Mitigation Website

Online tools provide an efficient and easily-manageable platform to inform the public on the HMP planning process. The HMP project website is located at:

http://www.plumascounty.us/index.aspx?nid=2214

The website includes Information about the planning process, on-line documents, historic disaster photos, and other up-to-date information on meetings and other related project news. This website serves as a document repository for the Plumas County HMP. Since the Plumas County HMP must be updated every five years to ensure the plan remains current with natural hazard events, the webpage will remain permanently active to document past, current, and future hazard mitigation planning efforts for the public and county officials alike.

4.2.2.2 Hazard Mitigation Open House Workshops

In order to capture the hazards and critical infrastructure throughout Plumas County's 2,600 square miles, the HMP Planning Team worked with County agencies and the public in scheduled locations. The week-long "workshop" from October 22 to 26, 2012 consisted of field work and a series of open houses to provide information about local hazards within the County. During the October workshops, the HMP Planning Team worked with agencies in the field to identify hazards, critical infrastructure, and successful mitigation actions by "ground-truthing" areas prone to natural disasters. As part of this process, the HMP Planning Team worked with the Public Works Roads Department to capture historic damage to roads and other community infrastructure.

During the October Workshops, a number of public open houses were held in Portola, Greenville, Quincy, and Lake Almanor. The open houses showcased the hazard profiling process and the data collected during ground-truthing exercises. The public was able to learn about the HMP planning process and review the updated HMP Update documents, as well as provide input on the planning process and data/information collected to date. The open houses provided opportunities for the public to interact with County and Project staff. The public was asked to provide information about and pictures of local hazards. The HMP Planning Team collected historic photos from citizens and the Plumas County Museum in Quincy. Photos and other information collected during the October Open House Series are included throughout the hazard profiles provided in Section 5.

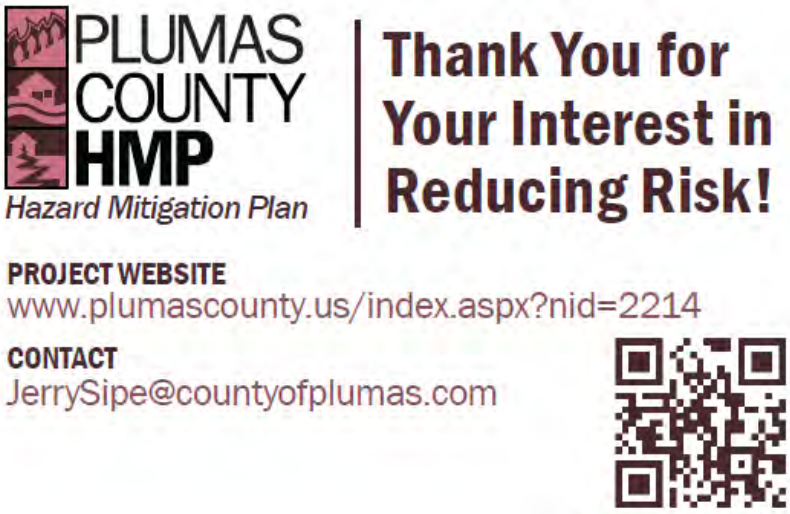
Figure 4-5: Greenville Town Hall Meeting

Figure 4-6: Chester Town Hall Meeting

4.2.2.3 Publicizing the Plan

The HMP Planning Team created public notices and press releases to publicize the HMP Update and associated planning processes. Public notices were published in a local newspaper production line called "The Regional". The Regional by Feather River Publishing Company runs a printed release every Wednesday. Printed press releases were coordinated with announcements on the Plumas County webpage. Additionally, Plumas County Public Health circulated postcard sized flyers at flu shot distribution locations and other Public Health outreach opportunities. The public notices and press releases for the HMP update process are included in Appendix B.

In addition to the public input received during the Open House Series, the draft final HMP document was posted on the Plumas County Hazard Mitigation website for general public review and comment and a document review open house was conducted before plan finalization. The HMP was also made available for review at the Plumas County Public Health Building. The updated HMPA was also available for review and comment at the Plumas County Public Library prior to adoption. These efforts provided citizens with several opportunities to review the content of each of the Plan's sections, to ask questions and suggest possible final revisions.



4.2.3 Review and Incorporate Existing Information

The HMP Planning Committee to reviewed and assessed existing plans, studies, and data available from local, state, and federal sources. Documents reviewed and incorporated as part of the HMP planning process were used to develop hazard profiles and mitigation actions. Table 4-5 provides a list of data and area of inclusion during for the 2012 Plan Development.

Existing Plans, Studies, Reports, and Other Technical Data/Information	Area of Inclusion.
2004, 2007, and 2010 California State Enhanced MHMP	Hazard Profiles.
Plumas County GP and Specific Plans (Specifically the Safety Element)	Hazard Profiles / Regulatory Environment
Plumas County Emergency Operations Plan (EOP) and Associated Annexes	Hazard Profiles
Plumas County Fire Safe Council work and associated GIS Data	Wildfire Hazard Profiles and Mitigation Actions
California Drought Contingency Plan	Drought Profile and Drought Mitigation Plan Development
California Drought Report 2010	Drought Profile and Drought Mitigation Plan Development
The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)	Earthquake Hazard Profile Development
Sierra Valley FEMA DFIRM Study Map	Flood Hazard Profile and Development of FEMA special flood hazard area depth grids.
FEMA Hazard Mitigation How-to Guides	2012 Hazard Mitigation Plan Development, Start to Finish
Plumas County Digital Flood Insurance Rate Map (DFIRM) panels	Flood Hazard Profile and Development of FEMA special flood hazard area depth grids.
FEMA Flood studies underway that may identify new special flood hazard areas	Flood Hazard Profile and Development of FEMA special flood hazard area depth grids.
Existing County Zoning and Floodplain Management Ordinances	Flood Hazard Regulatory Environment and Mitigation Strategy
Repetitive Loss Areas and Properties, flood insurance policies and claims records.	Flood Hazard Profile / Repetitive Flood Loss Section
FEMA E-74 Reducing the Risks of Nonstructural Earthquake Damage – A Practical Guide	Earthquake Mitigation Strategy
FEMA Local Mitigation Planning Handbook	Local Plan Integration Methods
FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards, January 2013	Mitigation Strategy Development
Recommended Procedures For Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslide Hazards In California	Landslide Mitigation Strategy Development

USGS Landslide Types and Processes (White Paper)	Landslide Mitigation Strategy Development
Surrounding Local Hazard Mitigation Plans: ABAG, City of Roseville, Placer County, City of Portola, Huron County, and Solano County.	Hazard Profiles and Mitigation Strategy Development
NOAA Record Storm Events	Severe Weather Hazard Profile
Emergency Preparedness Guide For Residents of Plumas County	Plan Integration
Who's Who in the Feather River Watershed	Planning Committee Invitations and Stakeholder outreach.
USGS, Remediation Control Strategies and Cost Data for an Economic Analysis of a Mercury Total Maximum Daily Load in California	Geo Hazard Profiles.
13 Fuels Key Guide, Documented by Albini (1976) and Rothermel (1972).	Wildfire Hazard Profile.
Plumas County Hazardous Fuel Assessment and Strategy	Wildfire Hazard Profile and Mitigation Strategy.
California Fire Alliance Community Wildfire Protection Plan Guidance	Wildfire Hazard Profile
CAL FIRE 2010 Strategic Fire Plan	Wildfire Hazard Profile
CAL FIRE, Fire Mitigation Webpage and GIS Data http://hazardmitigation.calema.ca.gov/hazards/natural/fire	Wildfire Hazard Profile
American Planning Association – California Chapter; Planning for Wildfires, A Regulatory Agency Response	Wildfire Hazard Profile
Chips Fire Burn Report 2012	Wildfire Hazard Profile
California Geological Survey (CGS) Landslide GIS Data and Mapping Information	Landslide Hazard Profile and Mitigation Strategy Development

4.2.4 Assess Risks

In accordance with FEMA requirements, the HMP Planning Committee identified and prioritized the natural hazards affecting Plumas County and assessed the vulnerability from them. Results from this phase of the HMP planning process aided subsequent identification of appropriate mitigation actions to reduce risk in specific locations and hazards. This section of the HMP Update planning process is detailed in Section 5.

4.2.4.1 Identify/Profile Hazards

Based on a review of past hazards, as well as a review of the existing plans, reports, and other technical studies/data/information, the HMP Planning Committee determined if the existing hazards were still valid, and identified new hazards that could affect Plumas County. Updated content for each hazard profile is provided in Section 5.

4.2.4.2 Assess Vulnerabilities

Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining which areas within Plumas County are vulnerable to specific hazard events. The vulnerability assessment included field visits and GIS overlaying method for hazard risk assessments. Using these methodologies, vulnerable populations, infrastructure, and potential loss estimates

impacted by natural hazards were determined. Detailed information on vulnerability assessment for each hazard is provided in Section 5.

4.2.5 Develop Mitigation Plan

The HMP Update was prepared in accordance with DMA 2000 and FEMA's HMP guidance documents. As such, this document provides an explicit strategy and blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and Plumas County's ability to expand on and improve these existing tools. Developing the mitigation plan involved identifying goals, assessing existing capabilities, reviewing the 2006 mitigation actions, and identifying new mitigation actions. This step of the HMP planning process is detailed in Section 6 and summarized below.

4.2.5.1 Identify Goals

The HMP Planning Committee reviewed the 2006 MHMP goals, hazards profiles, and vulnerability assessments, and developed new goals and objectives for the 2013 HMP based current and revised information. The Goals and Objectives are presented in Section 1 and again in Section 5.

4.2.5.2 Develop Capabilities Assessment

A capabilities assessment is a comprehensive review of all the various mitigation capabilities and tools currently available to Plumas County to implement the mitigation actions that are prescribed in the HMP Update. The HMP Planning Committee identified the technical, financial, and administrative capabilities to implement mitigation actions, as detailed in Section 5.

4.2.5.3 Identify Mitigation Actions

As part of the HMP planning process, the HMP Planning Committee reviewed and analyzed the status of the mitigation actions identified in the 2006 Plumas County MHMP and provided data and information on the status of the existing mitigation actions. Once the review and analysis of the 2006 MHMP mitigation actions was complete, the HMP Consultant Team and Hazard Focus Groups worked together to identify and develop new mitigation actions with implementation elements. Mitigation actions were prioritized and detailed implementation strategies were developed during Planning Committee Meeting #3. A detailed approach of the review of the existing mitigation actions, identification and prioritization of new mitigation actions, and the creation of the implementation strategy is provided in Section 6.

4.2.5.4 Draft HMP Update

Once the risk assessment and mitigation strategy were completed, information, data, and associated narratives were compiled into the 2013 Plumas County HMP. Section 3 provides detailed information on "what's new" and updated as part of the 2013 plan.

4.2.5.5 Plan Review and Revision

Once the "Draft" 2013 Plumas County HMP was completed, a public and government review period was established for official review and revision. Public comments were accepted, reviewed, and incorporated into this update. Applicable comments from the public have been received and addressed prior to the Board of Supervisors (BOS) *"authorization to submit"* to FEMA and Cal EMA review parties.

4.2.5.6 Plan Adoption and Submittal

This plan has been submitted and approved by FEMA and adopted by the BOS as the official statement of Plumas County hazards. A copy of the Board of Supervisors resolution is provided in Appendix A.

4.2.5.7 Plan Maintenance

Updated plan maintenance procedures, found in Section 7, include the measures Plumas County and participating agencies will take to ensure the HMP's continuous long-term implementation. The procedures also include the manner in which the HMP will be regularly monitored, reported upon, evaluated, and updated to remain a current and meaningful planning document.

Section 5. Natural Hazard Risk Assessment

Natural Hazard Risk Assessment is the process of measuring the potential impact to life, property and economic impacts resulting from natural hazards. The intent of the Risk Assessment is to identify, as much as practicable given existing/available data, the qualitative and quantitative vulnerabilities of a community. The results of the risk assessment provide a framework that develops better understanding of potential impacts to the community and a foundation in which to develop and prioritize mitigation actions (see Section 6). Mitigation actions can reduce damage from natural disasters and an implementation strategy can direct scarce resources to areas of greatest vulnerability described in this section.

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

1) Identify Hazards.
2) Profile Hazard Events.
3) Inventory Assets.
4) Estimate Losses.

Information gathered during the Plumas County planning process related to the above four steps are incorporated into the following discussions in this chapter.

Section 5.1: Hazard Identification identifies and prioritizes the natural hazards that threaten Plumas County. The reasoning for omitting some hazards from further consideration is also provided in this discussion.

Section 5.2 through Section 5.9: Hazard Profiles describe each of the natural hazards that pose a threat to Plumas County. Information includes the location, extent/magnitude/severity, previous occurrences, and the likelihood of future occurrences.

Section 5.10: Vulnerability Assessment presents Plumas County's exposure to natural hazards, as it identifies at-risk populations and assets, including County-owned facilities and other critical facilities. Where the information was available, potential dollar loss estimates for facilities are provided to show a partial representation of the financial cost of a disaster to a community.

5.1 *Identifying the Hazards*

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. The Plumas County HMP Planning Team reviewed a number of previously prepared hazard mitigation plans and other relevant documents to determine the whole universe of natural hazards that have the potential to affect the County. Table 5-1 provides a crosswalk of hazards identified in the County's 2006 MHMP, General Plan Safety Element, Emergency Operations Plan, and 2010 California State Hazard Mitigation Plan. 11 relevant hazards were identified based on a thorough document review. The crosswalk is a tool to assist development of a preliminary hazards list providing a framework for Plumas County Steering Committee members to begin thinking about which hazards were truly relevant to Plumas County. For example, terrorism threats were considered to be of little relevance to Plumas County, while wildfire, flooding, and earthquake were indicated in almost all hazard documentation.

Table 5-1: Document Review Crosswalk

Hazards	Plumas County 2006 MHMP	Plumas County General Plan	Plumas County EOP	2010 CA State MHMP	Preliminary Hazards to address in HMP Update
Geologic and Seismic Hazards				■	■
Earthquake/Seismic Shaking	■	■		■	■
Landslides / Rockslides	■	■		■	■
Erosion				■	■
Volcano				■	
Dam Failure			■	■	■
Drought	■			■	■
Flooding	■	■	■	■	■
Climate Change				■	■
Wildfire	■	■	■	■	■
Severe Weather and Storms				■	■
Extreme Heat				■	
Freeze				■	

In addition to a document review, previous hazard occurrences were used to identify hazards for this HMP. Previous hazard occurrences provide a historical view of hazards that have affected the County in the past, and thus provide a window into the potential hazards that can affect the County in the future. Information about Federal and State disaster declarations in Plumas County was compiled from FEMA and Cal EMA's databases, as shown in Table 5-2. Though not a complete snapshot of hazard incidences in Plumas County (since not all hazard events are federally or state declared), Table 5-2 provided the Plumas County Steering Committee with solidified accounts of the types and extent of disasters that have affected the County dating back to 1955 when flooding affected entire regions of Plumas County. As indicated in Table 5-2, large regional incidents have affected Plumas County, including state wide flooding in 1986 and 1997. Most recently, severe wildfires were declared in Plumas County during the 2008 fire season, causing extensive damage in the County and across California. .

Table 5-2: Federal and State Declared Disasters

Disaster Name	Disaster Type	Disaster Cause	Disaster#	Year	Deaths*	Injuries*	Cost of Damage*
Mid-Year Fires	Fire	Fire	EM-3287	2008			N/A
Winter Storms	Flood	Storms	DR-1628	2005-06			$128,964,501
August Fires	Fire	Fire	EM-3140	1999			$1,154,573
January Floods	Flood	Storms	DR-1155	1997	8		$194,352,509
Torrential Winds and Rain	Flood	Storms	GP96-01	1996			N/A
Severe Winter Storms	Flood	Storms	DR-1044	1995	11		$21,948,347
Late Winter Storms	Flood	Storms	DR-979	1992	20	10	$226,018,111
Wildland Fires	Fire	Fire	GP	1987	3	76	$18,000,000
Storms	Flood	Storms	DR-758	1986	13	67	$407,538,904
April Storms	Flood	Storms	80-01 -80-25	1980			N/A
Northern California Flooding	Flood	Flood	DR-283	1970			$27,657,478
Storms	Flood	Storms	DR-253	1969			N/A
Late Winter Storms	Flood	Storms	DR-183	1964			$213,149,000
Floods and Rains	Flood	Storms	N/A	1963			N/A
Widespread Fires	Fire	Fire	N/A	1960			$3,075,000

Source: FEMA: California State Disaster History; CAL EMA: Emergency & Disaster Proclamations and Executive Orders by Date (November 2003-Current)

****Note: Emergency & Disaster Proclamations, deaths, injuries and cost of damage is for total event. Event may be spread over multiple jurisdictions.***

Based on the review of hazards identified in similar and relevant documents and previous incidents, as well as historical knowledge of localized events, and natural hazard trends, the HMP Planning Team drilled down the preliminary list of hazards to eight (8) hazards with significant potential to occur in the County: Wildfire, Flooding, Geologic Hazards (Seismic Activity and Slope Failure), Severe Weather (Winter and Summer Storms), Dam Failure, Drought and Climate Change. Due to limited resources to implement mitigation actions, a streamlined list of identified hazards ensures that appropriate levels of efforts are allocated to the hazards determined to have the largest potential impacts on the County.

5.2 *Hazard Profiles*

Plumas County's identified hazards are profiled individually in this section, in order of priority. The hazard profiles in this section provide a baseline for the Vulnerability Assessment, where the vulnerability is quantified in terms of population and assets affected for each of the priority hazards. For reference, each hazard symbol, as shown below, is placed at the beginning of each profile.

 -Wildfire

 -Drought

 -Flooding

 -Climate Change

 -Dam Failure

 -Seismic (Geologic Hazard)

 -Severe Weather

 -Slope Failure (Geologic Hazard)

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5.3 *Wildfire Hazard Profile*

Wildfire events are unwanted wildland fires, including unauthorized human-caused fires, escaped debris burns, and other ignition sources that lead to fire over wildland areas. Throughout California and Plumas County communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem.

Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Human access to wildland areas, such as large extents of forestland, increases the risk of fire due to a greater chance for human carelessness and historical fire management practices. With exception to a few low-lying meadow valleys, such as the Sierra, American, and Indian Valleys, wildfire danger is a predominate natural hazard across the mountainous and fuel rich areas of Plumas County.

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. Short and long-term economic losses could also result due to loss of business and other economic drivers associated with the Plumas County summer season activities. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

According to the Butte Fire Management Plan, 10 of the 13 NFFL fuel models are represented within the County. The fuel models include a variety of typical fuel complexes with the general types being grass and grass-dominated, chaparral and shrub fields, timber litter, and slash. There is dense forest on the Westside, which includes douglas fir and oak hardwoods, heavy mixed conifer with both pine and fir species dominating, pure fir and sub alpine fir stands, and lodge pole stands surrounding high mountain lakes and meadows (some with stringers of aspens). The eastside forest is comprised of ponderosa pine stands; all interspersed with brush fields and plantations from prior large fires and forest management activities.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are 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 volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches, to dead standing trees, live trees, brush, and cured grasses. Manmade structures are also considered a fuel source, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. As a result of effective fire suppression since the 1930s vegetation throughout the county has continued to grow and accumulate and hazardous fuels have increased. As such, certain areas in and surrounding Plumas County are

extremely vulnerable to fires as a result of dense vegetation combined with a growing number of structures being built near and within rural lands. These high fuel hazards, coupled with a greater potential for ignitions, increase the susceptibility of the County to a catastrophic wildfire.

- Topography – An area's terrain and slope 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 fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought the threat of wildfire increases. Wind is the most treacherous weather factor. The greater the wind, the faster a fire can spread and the more intense it can be. Winds can be significant at times in Plumas County. Wind from the Central Valley is especially conducive to hot, dry conditions, in the Sierra Foothills, which can lead to extreme fire danger. Wind shifts, in addition to wind speed, can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Most wind shifts in Plumas County occur in the Feather River Canyon. As part of a weather system, lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Factors contributing to the wildfire risk in Plumas County include:

- Overstocked forests, severely overgrown vegetation, and lack of defensible space around structures;
- Excessive vegetation along roadsides and hanging over roads, fire engine access, and evacuation routes;
- Drought and overstocked forests with increased beetle infestation or kill in weakened and stressed trees;
- Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response as well as the many subdivisions that have only one means of ingress/egress;
- Inadequate or missing street signs on private roads and house address signs;
- Nature and frequency of lightning ignitions; and increasing population density leading to more ignitions.

CAL FIRE has mapped fuel hazards in the County based on vegetation, fire history, and slope, with the hazards ranked as medium, high or very high. This data shows that fuel hazards are generally high throughout the entire county. According to the CAL FIRE state model the highest fuel hazards occur along the Feather River Canyon, and the north eastern portion of Plumas County along Wildcat and Story Ridge on the Lassen / Plumas National Forest Boarder.

5.3.1 Regulatory Environment

The regulatory setting for fire protection and management in Plumas County is comprised of multiple jurisdictions. Wildfires and structure fires are managed separately with local, state, and federal involvement occurring at defined geographical boundaries known as "Responsibility Areas". This system of responsibility, although fully encompassing, requires coordination among all levels of government as well as community service districts and local residents.

5.3.1.1 Federal

The U.S. Forest Service (USFS) plays a major role in wildfire protection on federal lands, including most wildfire prevention law enforcement, wildfire response and overall operations in Plumas County. Although the Federal Responsibility Area (FRA) technically comprises 65 percent of Plumas County, the USFS is also responsible for fire suppression in the State Responsibility Areas (SRA) via an "equal land swap" agreement made with the California Department of Forestry and Fire Protection (CAL FIRE). Through this agreement the USFS takes responsibility for fire suppression on private land previously monitored by the state, with the exception of the Lake Almanor Basin. Although the USFS is responsible for fire suppression in SRA's it has not been delegated law enforcement authority by the Sheriff to administer local codes.

5.3.1.2 State

The California Department of Forestry and Fire Protection (CAL FIRE) has statutory responsibility for wildfire protection on private lands in California. However, since wildfire protection for vegetation fire on private lands has been granted to the USFS through an equal land swap agreement, the USFS enforces the state laws associated with fire protection in SRAs within Plumas County. Granting the USFS the SRAs fire protection responsibilities was a strategic decision made on behalf of both entities since the USFS already has established access and existing infrastructure to manage forest protection in Plumas County. Consequently, the responsibility of wildfire suppression on private land in Plumas County is under the jurisdiction of the USFS, except for the Lake Almanor Basin, where CAL FIRE has remained the responsible agency.

5.3.1.3 Local

Fire protection for all other fire emergencies, including structures and vehicles, is the responsibility of the local district. The Local Responsibility Area (LRA) in Plumas County includes the City of Portola, portions of American, and Sierra Valleys. Fire protection for structure fires is provided to some of the communities by nineteen fire departments located throughout the county. Some of these departments have a paid Chief and staff, however more commonly these departments are comprised entirely of volunteers.

5.3.1.3.1 Plumas County Codes for Wildfire Hazards

Plumas County has adopted the State of California's Health and Safety Code to reduce fire hazard risk on existing properties and for new construction.

Following is a summary of some of the relevant sections in each code.

Health and Safety Code

Parts 5 and 6 of the Health and Safety Code address abatement of hazardous weeds and rubbish for the prevention of fires.

Section 14875; defines weeds that could potentially endanger public safety by creating a fire hazard.

"Weeds," as used in this part, means all weeds growing upon streets, sidewalks, or private property in any county, including any fire protection district and includes any of the following:

(a) Weeds which bear seeds of a downy or wingy nature.
(b) Sagebrush, chaparral, and any other brush or weeds which attain such large growth as to become, when dry, a fire menace to adjacent improved property.
(c) Weeds which are otherwise noxious or dangerous.
(d) Poison oak and poison ivy when the conditions of growth are such as to constitute a menace to the public health.
(e) Dry grass, stubble, brush, litter, or other flammable material which endangers the public safety by creating a fire hazard in an urbanized portion of an unincorporated area which has been zoned for single and multiple residence purposes.

Section 14880; allows the board of supervisors to declare weeds a public nuisance.

Whenever weeds are growing upon any street, sidewalk, or on private property in any county, the board of supervisors, by resolution, may declare the weeds a public nuisance.

Section 14890; allows the board of supervisors to designate the person to give notice to destroy weeds:

The board of supervisors shall designate the person to give notice to destroy weeds. This may be any one of the following:

(a) The county agricultural commissioner.
(b) The county forester.
(c) The county board of forestry.
(d) Any other officer, board, or commission.

Health and Safety Code

Part 2 of the Public Resources Code addresses the protection of forest, range and forage lands.

Note: Plumas County has not adopted Public Resources Codes (PRC) 4290 (Fire Safe Regulations) in its entirety. Instead, Plumas County adopted its own version of PRC 4290 which was certified in lieu of PRC 4290 by the Board of Forestry. Plumas County Code (PCC) State Responsibility Area Fire Safe Regulations start are located in PPC Section 9-9.101.

Section 4290; implements fire safety standards related to defensible space

(a) The board shall adopt regulations implementing minimum fire safety standards related to defensible space which are applicable to state responsibility area lands under the authority of the department. These regulations apply to the perimeters and access to all residential, commercial, and industrial building construction within state responsibility areas approved after January 1, 1991. The board may not adopt building standards, as defined in Section 18909 of the Health and Safety Code, under the authority of this section. As an integral part of fire safety standards, the State Fire Marshal has the authority to adopt regulations for roof coverings and openings into the attic areas of buildings specified in Section 13108.5 of the Health and Safety Code. The regulations apply to the placement of mobile homes as defined by National Fire Protection Association standards. These regulations do not apply where an application for a building permit was filed prior to January 1, 1991, or to parcel or tentative maps or other developments approved prior to January 1, 1991, if the final map for the tentative map is approved within the time prescribed by the local ordinance. The regulations shall include all of the following:

1) *Road standards for fire equipment access.*
2) *Standards for signs identifying streets, roads, and buildings.*
3) *Minimum private water supply reserves for emergency fire use.*
4) *Fuel breaks and greenbelts.*

(b) These regulations do not supersede local regulations which equal or exceed minimum regulations adopted by the state.

Section 4291; outlines the requirements for maintaining adjacent landscapes near structures

Any person that owns, leases, controls, operates, or maintains any building or structure in, upon, or adjoining any mountainous area or forest-covered lands, brush-covered lands, or grass-covered lands, or any land which is covered with flammable material, shall at all times do all of the following:

(a) Maintain around and adjacent to such building or structure a firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This subdivision does not apply to single specimens of trees, ornamental shrubbery, or similar plants which are

used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

(b) Maintain around and adjacent to any such building or structure additional fire protection or firebreak made by removing all brush, flammable vegetation, or combustible growth which is located from 30 feet to 100 feet from such building or structure or to the property line, whichever is nearer, as may be required by the director if he finds that, because of extra hazardous conditions, a firebreak of only 30 feet around such building or structure is not sufficient to provide reasonable fire safety. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(c) Remove that portion of any tree which extends within 10 feet of the outlet of any chimney or stovepipe.

(d) Maintain any tree adjacent to or overhanging any building free of dead or dying wood.

(e) Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

(f) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that is attached to any fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed of nonflammable material with openings of not more than one-half inch in size.

(g) Except as provided in Section 18930 of the Health and Safety Code, the director may adopt regulations exempting structures with exteriors constructed entirely of nonflammable materials, or conditioned upon the contents and composition of same, he may vary the requirements respecting the removing or clearing away of flammable vegetation or other combustible growth with respect to the area surrounding said structures. No such exemption or variance shall apply unless and until the occupant thereof, or if there be no occupant, then the owner thereof, files with the department, in such form as the director shall prescribe, a written consent to the inspection of the interior and contents of such structure to ascertain whether the provisions hereof and the regulations adopted hereunder are complied with at all times.

Sec 8-14.01 – 8-14.03 Plumas County, California, Code of Ordinances; Title 8 – Building Regulations

Section 8-14.01

Disposal of flammable vegetation and fuels removed during construction shall be completed before final inspection.

Section 8-14.02

(a) *General. Driveways shall be provided and maintained in accordance with the provisions of this section. Driveways shall be constructed as provided by Chapter 4 of Title 9 of this Code, commencing with Section 9-4.101*

(b) *Where required. Driveways shall be required for every building hereafter constructed when no portion of an exterior wall of the first story is located within 150 feet of a road which provides access to the property.*

EXCEPTIONS: Exceptions from the provisions of this section may be made as provided in Section 9-9.202 of Chapter 9 of Title 9 of this Code. More than one driveway may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access. For high-piled combustible storage, see Section 81-109 of this Uniform Fire Code.

(a) *Permissible modifications. Vertical clearances or widths required by this section shall be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.*

(b) *Obstruction. The required width of any driveway shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.*

(c) *Signs. When required, approved signs or other approved notices shall be provided and maintained for driveways to identify such roads and prohibiting their obstruction.*

(d) *Gates. Gate entrances shall be at least two (2') feet wider than the width of the traffic lanes serving that gate. All gates providing access from a road to a driveway shall be located at least thirty (30') feet from the roadway and shall open to allow a vehicle to stop without obstructing traffic on that road.*

(e) *Where a one-way road with a single traffic lane provides access a gated entrance, a forty (40') foot turning radius shall be provided.*

(f) *Administration. It shall be the duty of the chief and the Building Official to administer the provisions of this section. Before issuing a building permit for new construction not related to an existing structure and before issuing a permit for siting of a manufactured home (as defined by the National Fire Protection Association, National Fire Code, Section 501A, Standards for Fire Safety, Criteria for Manufactured Home Installations, Sites and Communities, Chapter 1, Section 1-2, Definitions, page 4, 1987 edition and Health and Safety Code Sections 18007, 18008, and 19971), the Building Official shall require submittal of plans for required driveway construction. The County Engineer shall review those plans and may impose any needed conditions for their conformance with the provisions of this section. If a driveway will have any grade in excess of thirteen (13%) percent, a registered engineer shall prepare the plans. The driveway shall be constructed before final inspection or issuance of a certificate of occupancy as decided by the Building Official. The Building Official shall establish a procedure for coordination with the chiefs in the issuance of building permits.*

(g) *Reports of violations of this section shall be given to the Headquarters of the Ranger Units of the California Department of Forestry and Fire Protection which administer State Responsibility Area fire protection in Plumas County.*

(h) *Certain words and phrases used in this section are defined as set forth below:*

1) *"Driveway" shall mean a vehicular access that serves no more than two buildings, with no more than three dwellings on a single parcel, and any number of appurtenant buildings, when no portion of an exterior wall of the first story of*

any one of those structures is within 150 feet of a road which provides access to the property.

2) *"One-way road" shall mean a roadway designed for traffic flow in one direction only.*

3) *"Roadway" shall mean any surface designed, improved, or ordinarily used for vehicle travel including appurtenant structures.*

Sec 8-14.03

Addresses and road signs shall be posted and installed as provided for in Chapter 8 of Title 9 of this Code, commencing with Section 9-8.101. Reports of violations of this section shall be given to the Headquarters of the Ranger Units of the California Department of Forestry and Fire Protection which administer State Responsibility Area fire protection in Plumas County.

5.3.1.3.2 Local Community Codes

Plumas Eureka Community Services District

The Board of Directors of the Plumas Eureka Community Services District finds and declares that the real property within its boundaries constitutes an urban area in a rural forest setting with a consequent high danger in fire season to the start or expansion of wildland fire. The failure to maintain real property as set forth in California Public Resources Code Section 4291 constitutes a public nuisance. The purpose of the ordinance is to establish conditions which must be met uniformly throughout the Plumas Eureka Community Services District and which, if violated, must be abated by the property owner or the Plumas Eureka Community Services District if the property owner fails, refuses or neglects to do so in a timely fashion.

Greenhorn Community Services District

The Board of Supervisors of the County of Plumas, acting in its ex-officio capacity as the Governing Board of the Greenhorn Community Services District requires a Fire Fuel Clear Zone Ordinance of 100 feet around structures. The responsibility for enforcing the 100 foot perimeter is given to the Fire Chief of the CSD Fire Department.

Covenants, Conditions and Restrictions of West Almanor Community Club
Article 3.19; Clearing of Trees

All lots shall be kept in as natural condition as possible. Before trees are removed from a lot, the owner shall obtain approval pursuant to Article 84. Clearing of trees shall be limited to the minimum required for approved residential use, including access, and shall not exceed clearing of more than sixty percent of the total lot area unless specifically approved in advance by the Architectural Committee or the Board. For purposes of this Declaration, a tree shall mean any plant having a trunk diameter greater than six inches. Trees closer than five feet from concrete footing and foundations must be removed, but all standing trees on the lot are to be preserved if possible, trimmed up six feet from ground level. To prevent excess cutting, trees to be preserved should be clearly tagged. All dead combustible material

[4] CC&R Article 8 defines Architectural Committee functions

must be removed from the setback area and within thirty feet of any structure. All vegetation on lots, whether the lot is developed or undeveloped, shall be maintained in a neat and natural condition and shall be trimmed, cultivated, and managed to encourage healthy conditions.

5.3.2 Past Occurrences

Since 1900, 340 wildland fires have occurred in Plumas County. These events range from one acre to more than 75,000 acres (CAL FIRE 2011)[5]. Of these documented occurrences, 11 had a perimeter greater than 10,000 acres. See Figure 5-1 for location and extent of each fire.

In Plumas County there are approximately 170 ignitions per year, with over half being caused by lightning. Since 1988 approximately 15% of acres burned were caused by railroad ignitions, 18% were cause by equipment use, and 19% were attributed to unknown causes. Plumas County has averaged about 16,623 acres burned per year over the last 25 years. The majority of fires, 91%, are caught on initial attack and suppressed at less than 10 acres. The 9% that escape initial attack are responsible for 99% of the aces burned. The majority of fires, 87%, occur from May through September[6].

The 2012 Chips Fire owns the largest burn perimeter of 75,431 acres, of which 66,669 acres are located within the Plumas and Lassen National Forests; the remaining 8,762 acres are located on private land. While the Chips burn perimeter is the largest in recorded county history it was not the most severe. Only 35% of the burn area is classified as Moderate or High burn severity, see Table 5-3 (BAER report 9/12/2012). At this time of this report the cause of the fire is still under investigation and the totality of the damage is yet to be determined. See Figure 5-2 and Figure 5-3 for Chips fire photos documenting the 2013 devastation.

[5] Data source is 2012 burn perimeters from CAL FIRE

[6] Data source for whole paragraph is combination of 1985-2010 ignitions dataset and 2012 burn perimeters

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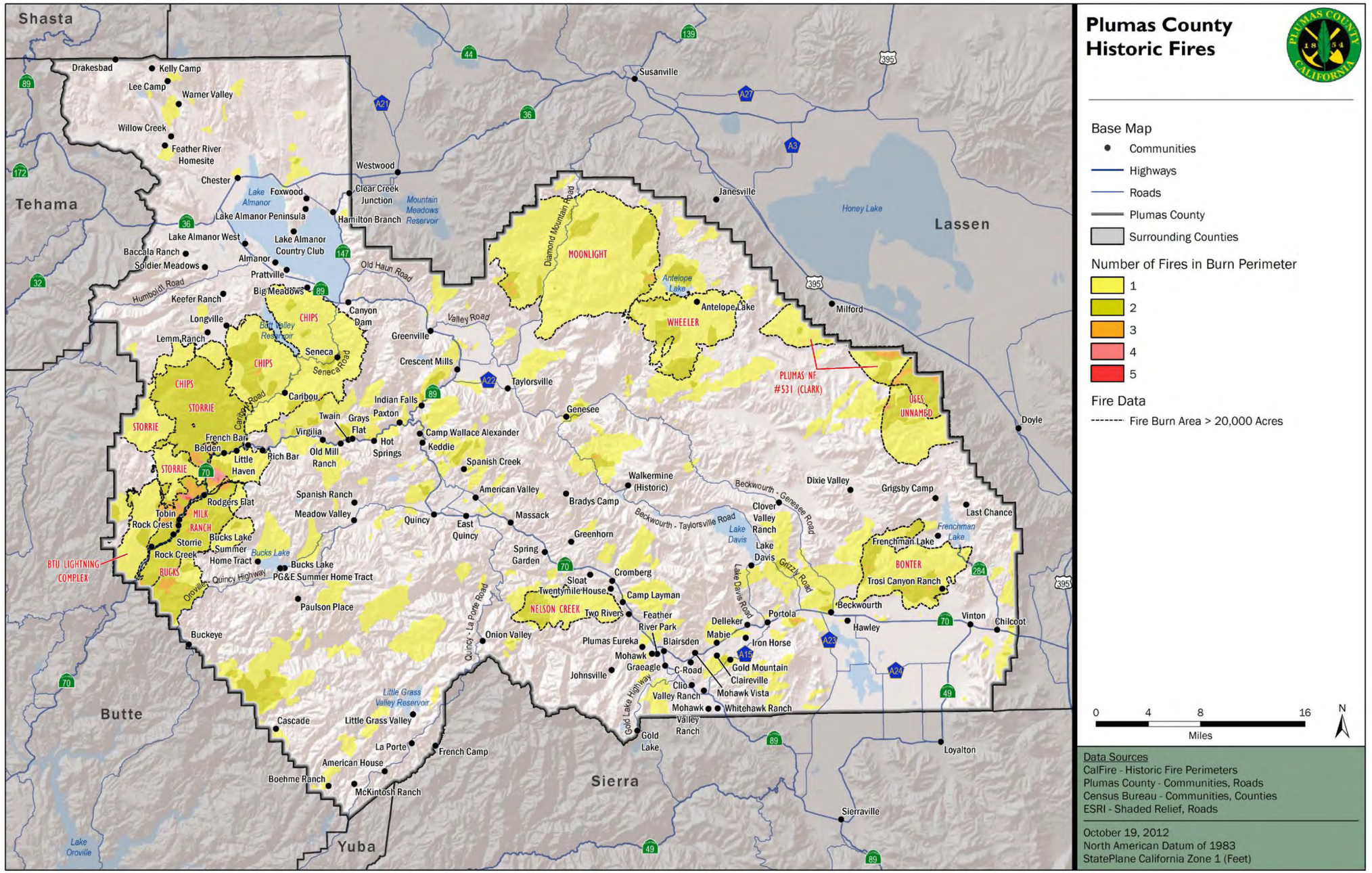

Figure 5-1: Historical Fires

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Table 5-3: Chips Fire Burn Severity Classification:

Burn Severity	Plumas NF (acres)	Lassen NF (acres)	Private (acres)	Total (acres)	Percent of Burned Area (%)
Very Low/ Unburned	12,939	6,656	3,542	23,137	30%
Low	17,078	6,437	3,289	26,804	35%
Moderate	15,216	4,595	1,863	21,674	29%
High	3,064	684	68	3,816	6%
Total	**48,297**	**18,372**	**8,763**	**75,431**	**100%**

Source: BAER report (9/12/2012)

Figure 5-2: Chips Fire High Burn Severity area

Figure 5-3: Area inside Chips Fire Burn Perimeter; mix of high and low burn severity

The 2007 Moonlight Fire was one of the most destructive fires in Plumas County history with a burn perimeter of 64,997 acres. Seven structures were destroyed, 2 residences and 5 outbuildings, and 1 outbuilding was damaged. An additional 25 residences and 10 outbuildings were threatened due to their location within the interior of the fire containment lines. 34 injuries and zero deaths were reported. The total cost of fighting the fire was $31.5 million, utilizing 42 engines, one helicopter, 11 dozers, 34 water tenders, 11 fire crews, and 707 total fire personnel (http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=216). The blaze was caused by employees of Sierra Pacific Industries and a contractor who struck a rock with a dozer, causing sparks to ignite the dry ground in the area. The federal government was able to successfully sue the logging company for $122.5 million in damages resulting from the fire that killed 15 million trees (http://usnews.nbcnews.com/_news/2012/07/18/12804544-logging-company-to-pay-record-1225m-in-damages-over-2007-california-wildfire?lite). See Figure 5-4 for a photo documenting the historical burn area.

Other important wildfire occurrences over the past 25 years in Plumas County are listed in Table 5-4.

Figure 5-4: Moonlight Fire burn area shows foundation remaining from destroyed structure

Table 5-4: Plumas County Wildfire Occurrences

Year	FIRE NAME	ID No.	Acres Impacted
1988	UNNAMED	N/A	10
	UNNAMED	N/A	20
	UNNAMED	N/A	22
	UNNAMED	N/A	35
	UNNAMED	N/A	10
	UNNAMED	N/A	120
	UNNAMED	N/A	783
	UNNAMED	N/A	11
	UNNAMED	N/A	578
1989	UNNAMED	N/A	12
	EAGLE	00000724	4,400
	RACK	N/A	3,250
	LAYMAN	N/A	4,945
1990	HARTMAN	N/A	80
	UNNAMED	N/A	15
	UNNAMED	N/A	15
	WALKER	N/A	1,100
	GREENHORN	N/A	480
	WILDCAT	N/A	15
1996	CATEYES	N/A	10
	COOKS	N/A	1,138
	MADDALENA	N/A	4,660
	KUSS	N/A	13
	STAG	N/A	15
	GREENE	N/A	25
	TOWER	N/A	64
	MARTINECK	N/A	330
1997	RUSH	N/A	4
1999	HORTON 2	N/A	4,366
	CLAREMONT	N/A	178
	STAG	N/A	467
	DEVILS GAP	N/A	1,450
	LOOKOUT	N/A	2,630
	PIDGEON	N/A	4,713
	BUCKS	N/A	34,175
	CHROME	N/A	110
	UNNAMED	N/A	3,625
2000	STORRIE	N/A	55,261
2001	STREAM	N/A	3,560
2002	FERRIS	N/A	18
	POPLAR	N/A	63
	VINTON	N/A	13

2003	CORRECO	N/A	80
	CHILCOOT	N/A	5,635
	CINDER	N/A	100
2004	MISSION	N/A	15
	STONY	N/A	78
	MARTIN	N/A	131
	COTTONWOOD	N/A	560
	KETTLE	N/A	12
2005	NUGGET	N/A	18
	BELL	N/A	35
2006	GREASE	00000551	366
	FLOURNOY	N/A	20
	INDIAN	00000371	16
	SAGE	00000371	17
	FITCH	N/A	29
	BUTTES	N/A	30
	BOULDER COMPLEX	00000371	3,500
	HUNGRY	00000371	512
	BOULDER	00000371	2,920
	FOOT	N/A	40
2007	MARBLE	00000098	27
	CLIFTON	00000012	67
	MOONLIGHT	00000098	64,995
	DAVIS	00000055	31
	BABCOCK PEAK	00000056	400
	WHEELER	00000053	22,906
2008	KEDDIE	N/A	77
	SLATE	N/A	10
	CREST	N/A	39
	BIG	N/A	74
	HARTMAN	N/A	331
	LITTLE	N/A	1,450
	COLD	N/A	5,512
	SOUTH-FREY	00000052	11,000
	SCOTCH	N/A	13,009
	CUB	00000013	14,936
	BTU LIGHTNING COMPLEX	007660	53,699
	MCRAE	00000083	18
	OLIVER	00000023	44
	RICH	N/A	5,572
2009	MILFORD GRADE	000009	226
	SILVER	000092	307
	ELEPHANT	000071	445
2010	WOODY	0751	15
	ROCK	752	63
	BAR	0700	1,040
	MEADOW VIEW	0664	15
	GULCH	0669	105
2011	ADAMS	00000017	27
2012	PEAK	N/A	781
	CHIPS	N/A	79,399

Source: California Department of Forestry and Fire Protection (2011)

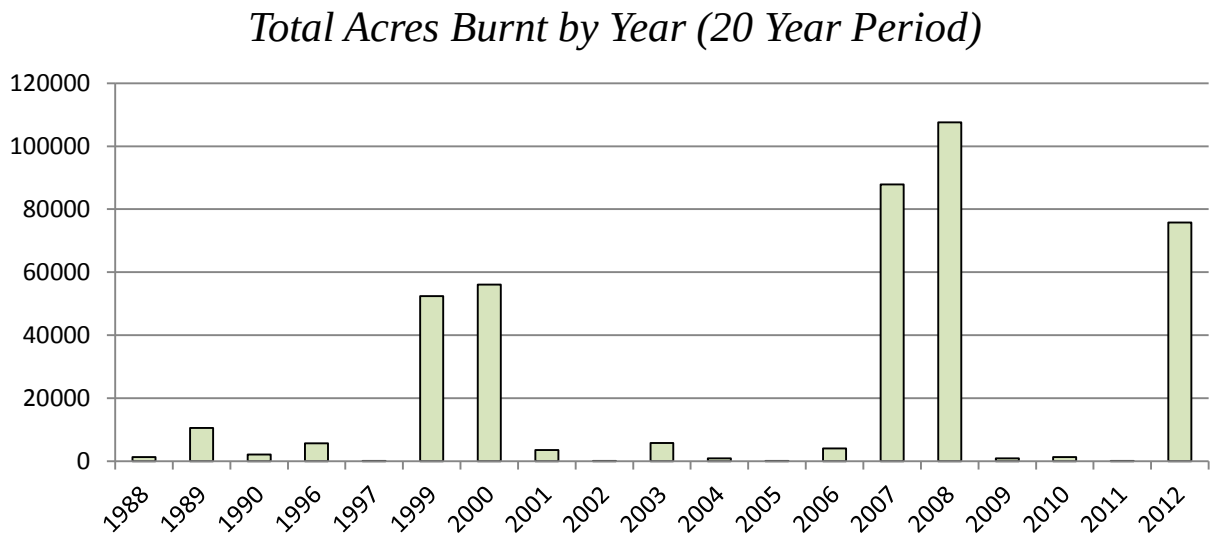
5.3.3 Location/Geographic Extent

Information from CAL FIRE and USFS help illustrate the areas at risk to a wildfire event. The areas with the highest risk of wildfire are spread throughout the County and are generally located in areas with greater fuel loads resulting from denser forestation. The area that has seen the highest number of fires is the Feather River Canyon along the CA-70 corridor due to the high volume of auto and rail traffic, and also its accessibility to the population increases its risk for human-triggered fires. It is more relevant to identify areas of lower fire hazard, which are the larger valleys such as Indian, American, and Sierra, and also the high elevation peaks that receive the most precipitation.

5.3.4 Magnitude/Severity

The magnitude and severity of a wildfire event is measured by calculating the number of acres burned in a specific wildfire event and the severity of the burn classifications. Using the information provided in Table 5-4, Figure 5-5 highlights the numbers of acres burned for each recorded wildfire event since 1988 in Plumas County.

Figure 5-5: Number of Acres Burnt by Year



Source: California Department of Forestry and Fire Protection (2011), 2012 -2013 Plumas County HMP Data Gathering,

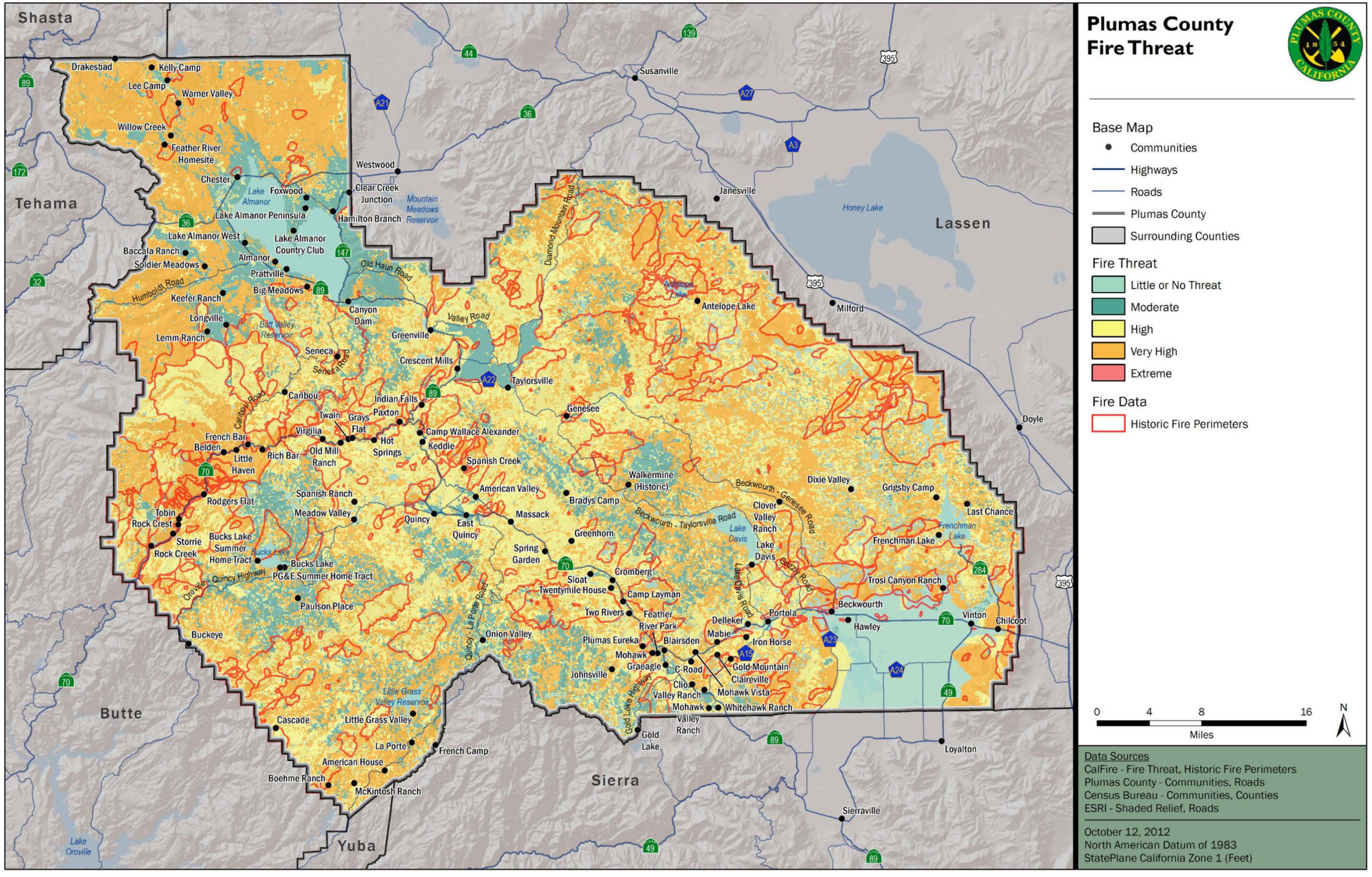
5.3.5 Frequency/Probability of Future Occurrences

In Plumas County, wildfire season commences in early spring through late fall every year during the hotter, dryer months. Topography, weather, and vegetation provide the ingredients for destructive wildfires that can spread rapidly throughout the County.

CAL FIRE adopted Fire Hazard Severity Zone maps for SRA in November 2007. Fire Hazard mapping is a way to measure the physical behavior to predict the damage a fire is likely to cause. Fire hazard measurement includes vegetative fuels, probability of 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 CAL FIRE model used to develop the information in accounts for topography, especially the steepness of the slopes (fires burn faster as they burn up-slope.). Weather (temperature, humidity, and wind) also has a significant influence on fire behavior. As a result, vast areas in the SRAs shown in the Fire Hazard Map are rated as high, very high and extreme fire hazard in the unincorporated areas of the County. The areas depicted as high, very high and extreme in are of particular concern and potential fire risk in these are constantly increasing as human development and the wildland urban interface areas expand. See Figure 5-6 for Hazard Severity Zones in Plumas County.



Plumas County Fire Threat

Base Map
- Communities
- Highways
- Roads
- Plumas County
- Surrounding Counties

Fire Threat
- Little or No Threat
- Moderate
- High
- Very High
- Extreme

Fire Data
- Historic Fire Perimeters

0 4 8 16 Miles

N

Data Sources
CalFire - Fire Threat, Historic Fire Perimeters
Plumas County - Communities, Roads
Census Bureau - Communities, Counties
ESRI - Shaded Relief, Roads

October 12, 2012
North American Datum of 1983
StatePlane California Zone 1 (Feet)

Figure 5-6: Wildfire Threat and Historic Wildfires Overlay

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5.4 *Flood Hazard Profile*

Flood reduction, prevention, and mitigation are a major challenge to Plumas County residents and floodplain managers alike. Many areas of Plumas County are at risk to flooding, especially property near rivers and along valley floors. Plumas County is almost entirely contained within the Upper Feather River Watershed creating a unique relationship between flooding issues in different geographic areas as water travels down from the high elevation headlands into the larger valleys and river canyons. Flood prone areas within Plumas County can be organized by elevation within the watershed, thus examining the impact of water as it travels downhill on its journey to the Central Valley. The primary areas discussed in the following sections are: Sierra Valley, Chester, Indian Valley, American Valley, and the North Fork Feather River Canyon. Localized flooding associated with creek or stream overflow occurs in Plumas County when rainfall runoff volumes exceed the design capacity of drainage facilities or a lack of flood control structures in place. Heavy seasonal rainfall, which typically occurs from November through March, often results in stream overflows.

5.4.1 Regulatory Environment

The regulatory environment for flood control at the local, state, and federal level is complex, difficult to navigate, and varies based upon flood control structure, location of water bodies, and local participation in state and federal programs. This section focuses on the regulations that Plumas County uses to regulate development within the floodplain. This section also highlights some of the new requirements from the State of California as well as the National Flood Insurance Program (NFIP).

5.4.1.1 Local Building Codes

Plumas County has a number of building codes and construction best management practices in place to reduce flood risk for new construction, substantial improvements, or other man-made changes. The Building Department, as the floodplain administrator for the County, determines if new construction will have to meet certain flood zone construction criteria.

The County Engineer, the Building Official, the Director of Environmental Health, and the Planning Director have authority to perform Flood Zone Determinations. Upon application for a development permit the application and plans are reviewed to determine whether or not the site of the proposed structure is within any Special Flood Hazard Area (SFHA) designated by FEMA on regulatory Flood Insurance Rate Maps (FIRMs). More information on FEMA flood hazard areas is provided further on in this section.

New construction and substantial improvements of any structure shall have the lowest floor, including the basement, elevated at least one foot above the base flood elevation. On completion of the structure, the elevation of the lowest floor shall be certified by a registered professional engineer or surveyor, and shall be verified by the Building Official, to be properly elevated. The certification and verification shall be provided to the Building Official and the County Engineer. All new construction and substantial improvement with fully enclosed area 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 flood water (Plumas County Code or Ordinances, Sec. 8-17.301. - Standards of construction).

5.4.1.1.1 National Flood Insurance Program (NFIP)

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, Plumas County Officials are dedicated to protecting homes with more than 160 policies currently in force. FEMA has prepared a detailed Flood Insurance Study (FIS) for areas of Plumas County; the study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance flood (100-year flood, base flood) and the 0.2-percent annual chance flood (500-year flood). Base flood elevations and the boundaries of the 0.1% and 0.2% Annual Chance floodplains are shown on FIRMs. More information on location and geographic extent are provided in Section 5.3.3.

NFIP Community Overview

- 163 policies in force
- $37,987,500 insurance in force
- 34 paid losses
- $680,554 total paid losses
- 6 substantial damage claims since 1978

Plumas County entered the NFIP on December 20th, 1974, and its initial FIRM became effective on September 24th, 1984. As a participant in the NFIP the County is dedicated to regulating development in the FEMA floodplain areas in accordance with NFIP criteria.

Structures permitted or built in the County before the NFIP regulatory requirements were incorporated into the County ordinances (before the effective date of the County's FIRM) are called "pre-FIRM" structures. For the Plumas County unincorporated areas, pre-FIRM structures are those permitted or built before September 24th, 1984.

For more information on California Regulation and the NFIP, please see California's Department of Water Resources Quick Guide in Appendix C.

5.4.1.2 Central Valley Flood Protection Plan

Legislation spearheaded by the California Department of Water Resources (DWR) to provide protection to people and property in areas especially prone to flooding was enacted by State Legislation in 2007 in the California Central Valley. State legislative requirements provide Plumas County local planning responsibilities for floodplain management (e.g., general plans, zoning ordinances, development agreements, tentative maps, and other actions).

Some of the requirements of the 2007 flood risk management legislation apply Statewide, while other legislation is additive and provides provisions applicable to lands within the Sacramento-San Joaquin Valley (SSJV), and further to lands also within the Sacramento-San Joaquin Drainage District (SSJDD).

Plumas County is within the SSJV. Please see Appendix C for more information on implementing California Flood Legislation into local planning. Government Codes 65302 and 8685.9 are of particular importance to hazard mitigation planning.

Figure 5-7: Sacramento-San Joaquin Valley (SSJV)

5.4.1.2.1 Government Code 65302

Government Code 65302 authorizes, but does not require, cities and counties to adopt a local hazard mitigation plan specified in the Federal Disaster Mitigation Act of 2000 in conjunction with the safety element of the general plan.

5.4.1.2.2 Government Code 8685.9

Government Code 8685.9 prohibits the State share for any eligible project under the California Disaster Assistance Act from exceeding 75 percent of total State eligible costs, unless the local agency is located within a city, county, or city and county that has adopted a local hazard mitigation plan in accordance with the Federal DMA 2000 as part of the safety element of its general plan. In other words, the Legislature may provide for a State share of local costs that exceeds 75% of total State eligible costs if the local jurisdiction/agency has an adopted local hazard mitigation plan.

Most importantly, the General Plan Safety Element will be required to reference information about floodplain management and flood hazards within Plumas County. For further information, the crosswalks in Appendix C provide a checklist of the regulatory environment for California and SSJV.

Government Code Section 8685.9 now provides a financial incentive for implementation of Government Code Section 65302.6, which allows local jurisdictions that adopt a LHMP as part of the safety element. The financial incentive is realized when local jurisdictions incur State-eligible, post-disaster costs under CDAA.

5.4.2 Past Occurrences

Localized and regional flooding in Plumas County has been a continuous occurrence dating back to at least 1893 when Quincy experienced its first photographed flood. Major Disaster Declarations at the Federal level have occurred 9 times as a result of major regional flooding caused by severe storms and heavy rains in California. State Emergency Disaster Proclamations for flood damage as result of severe storms and heavy rains have been declared 10 times from 1950 to present. A total of 11 flood events have received a Federal or State disaster declaration; Table 5-2 for complete list of declared disasters.

1893 flooding in Quincy taken from the old Courthouse roof looking north.
Figure 5-8: 1893 Quincy Flooding

Winter storms in 1986 and 1997 caused tremendous flood damage to properties and infrastructure throughout the Upper Feather River Watershed. Both floods were state and federally declared disasters.

From February 8-20, 1986, a large storm lasting 13 days precipitated rain and snow across Northern California. Plumas County was located within the interior of the storm extent and experienced tremendous rainfall, causing the ground to saturate and allowed surface water to flow freely. As rain fell over the county filling creeks and drainage ditches it also flowed downhill through the Feather River system, incrementally adding more water to the lower elevation valleys and the river canyons. By the 11th day of the storm the capacity of the hydrologic system was exceeded and extensive damage was experienced throughout Plumas County. The most visually impressive damage was found in the North Fork Feather River Canyon, along CA-70 and the Railroad, due to the large volume of water that was funneled through the canyon.

The flood damage was extensive, as numerous bridges were severely damaged or destroyed, large sections of roadway and railroad were wiped out, many houses were flooded with over one foot of water, and debris was deposited in throughout Plumas County. Train service was disrupted for at least 3 days through the Feather River Canyon and several state highways were temporarily out of commission to public traffic for several weeks. In addition, many residential wells were flooded.

High waters scoured away the railroad bed in the Feather River Canyon during 1986 flood. (Source: "The Storm of '86" by Robert Moon, Feather River Publishing, Quincy, CA, 1986.)

Figure 5-9: Feather River Canyon 1986 Flooding

Indian Creek Bridge in Taylorsville destroyed by high waters and debris during 1986 flood. (Source: "The Storm of '86" by Robert Moon, Feather River Publishing, Quincy, CA, 1986.)

Figure 5-10: Indian Creek Bridge 1986 Flooding

Historic Mohawk Valley Bridge destroyed by high waters during 1986 flood. (Source: "The Storm of '86" by Robert Moon, Feather River Publishing, Quincy, CA, 1986.)

Figure 5-11: Mohawk Valley Bridge 1986

Winter storms in late December 1996 through January 1997 poured tremendous amounts of rain throughout Plumas County. Such as in 1986, the ground became saturated and the river system overflowed with excess water. On January 2nd the State declared a disaster and on January 4th a Federal disaster was declared. The extent and severity of flooding and related damage exceeded the 1986 event throughout Plumas County, from the high-elevation valleys to the low-elevation river canyons. The type of damage experienced was similar to that in 1986.

Erosion from floodwaters caused home to fall into Indian Creek in Genesee during 1997 floods. (Source: Feather River Bulletin, Wednesday, Jan. 29, 1997).

Figure 5-12: Indian Creek in Genesee 1997

Damage to home Genesee home resulting from 1997 flood. (Source: Feather River Bulletin, Wednesday, Jan. 8, 1997).

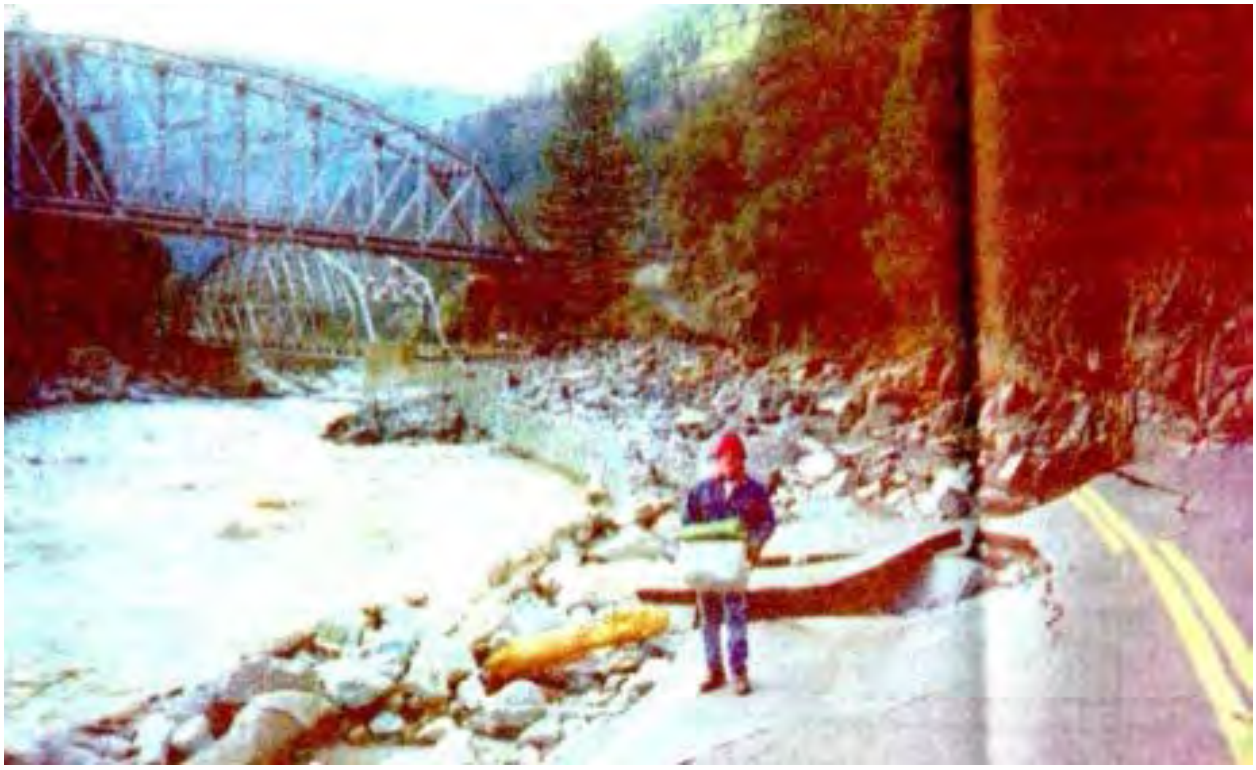
Figure 5-13: Flood damage in Genesee 1997

Waist-deep water in home due to 1997 flood. (Source: Feather River Bulletin, Wednesday, Jan. 15, 1997).

Figure 5-14: 1997 Flood Damage

Sloat Bridge washed away on January 1st, 1997. Source: Image captured by Plumas County Road Department on January 4th, 1997.

Figure 5-15: 1997 Bridge Washout



CA-70 near Tobin destroyed by flood waters during 1997 event. (Source: Feather River Bulletin, Wednesday, Jan. 15, 1997).

Figure 5-16: 1997 Flooding in Tobin

Figure 5-17: Plumas District Hospital 1986

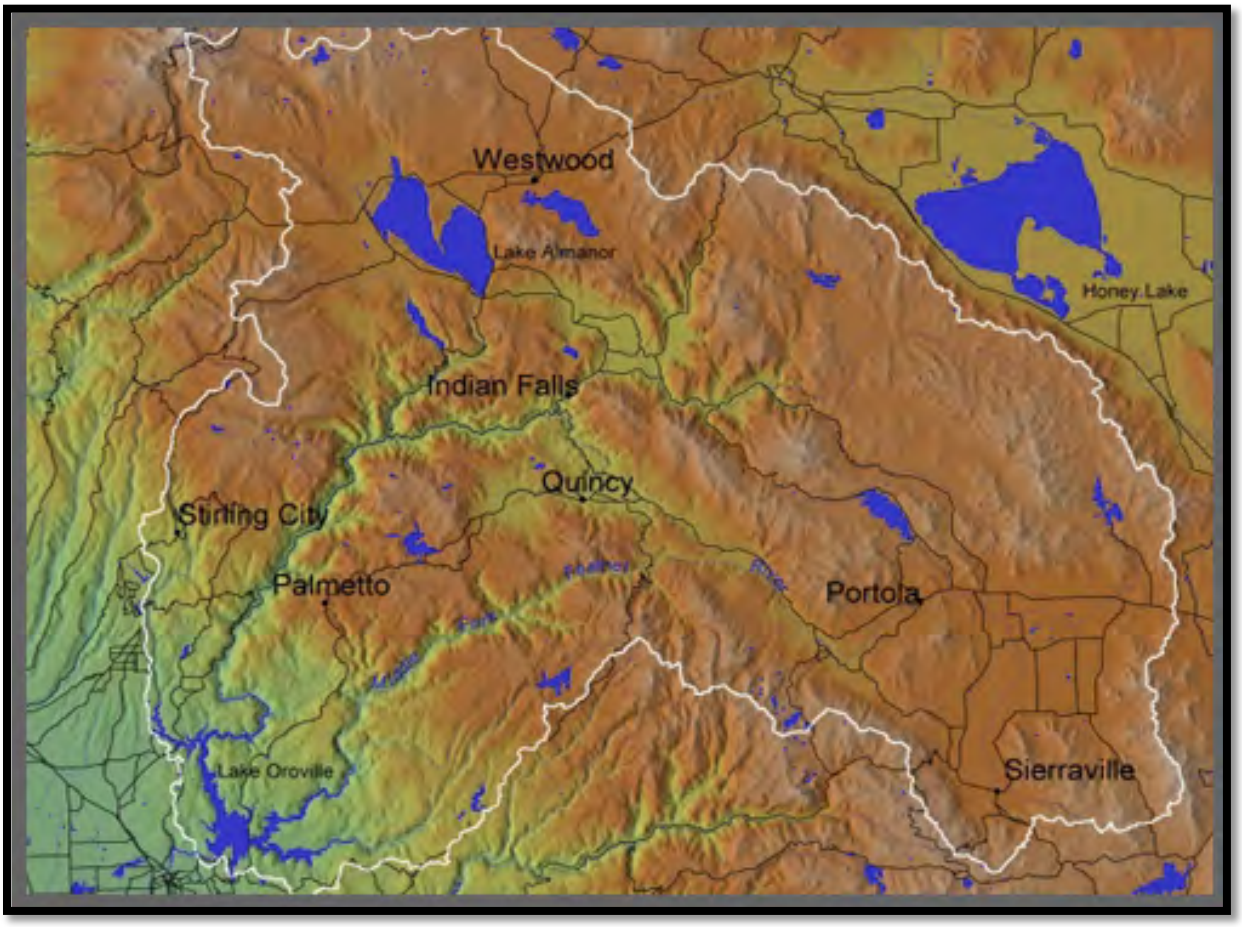
Photo captured along CA-70 in the North Fork Feather River Canyon in Butte County, less than 1 mile downstream from the Plumas County border. High water marks from 1986 and 1997 flood events

Figure 5-18: Feather River High Water

5.4.3 Location/Geographic Extent

There are 94 watershed basins, at the Hydrologic Unit Code 12-digit (HUC-12), that extend across Plumas County. Many of these watersheds may be at risk of flooding, in particular those that encompass the larger valleys that have been developed. Due to Plumas County's location within the Sierra-Nevada Mountain Range 99% of the precipitation that falls in the county flows into either the

North, Middle, or South Fork of the Feather River, and ultimately into Lake Oroville Reservoir in the foothills. See Figure 5-19.



(Source: Feather River Coordinated Resource Management, Plumas Corporation).

Figure 5-19: Upper Feather River Watershed

Flood prone areas within Plumas County can be organized by elevation within the Upper Feather River watershed, thus examining the impact of water as it travels downhill on its journey to the Central Valley. The primary areas at risk of loss from flooding are: Sierra Valley, Chester, Indian Valley, American Valley, and the North Fork Feather River Canyon.

A majority of the flood risk within Plumas County is specifically subject to inundation as a result of heavy rainfall and resulting stream overflows. In the unincorporated portions of Plumas County, a majority of flood risk is located in alpine valleys, which collect large amounts of runoff, and areas close to regional watershed flooding sources, such as the North Fork Feather River. The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies, and helps identify the location and extent of flooding in areas across Plumas County. This area is also referred to as the Special Flood Hazard Area (SFHA) and is a

convenient tool for assessing vulnerability and risk in flood-prone communities[7]. Figure 5-20 shows modeled 1% Annual Chance and 0.2% Annual Chance FEMA floodplains. Plumas County contains over 86,000 acres of identified flood hazard areas. Table 5-5 provides the total area for both the 1% and 0.2% Annual Chance flood hazard areas.

Table 5-5: Flood Hazard Area

Flood Hazard Type	Square Miles	Acres
1% Annual Chance	132.45	84,766.65
0.2% Annual Chance	2.24	1,431.69
Grand Total	**134.69**	**86,198.34**

[7] Experience has shown that FEMA maps in the rural areas of Plumas County are not always accurate. A prime example is the Sierra Valley area. Plumas County is working with FEMA on updating flood hazard mapping in that area. FEMA flood insurance data is not always indicative of flood losses as not every property that floods has flood insurance.

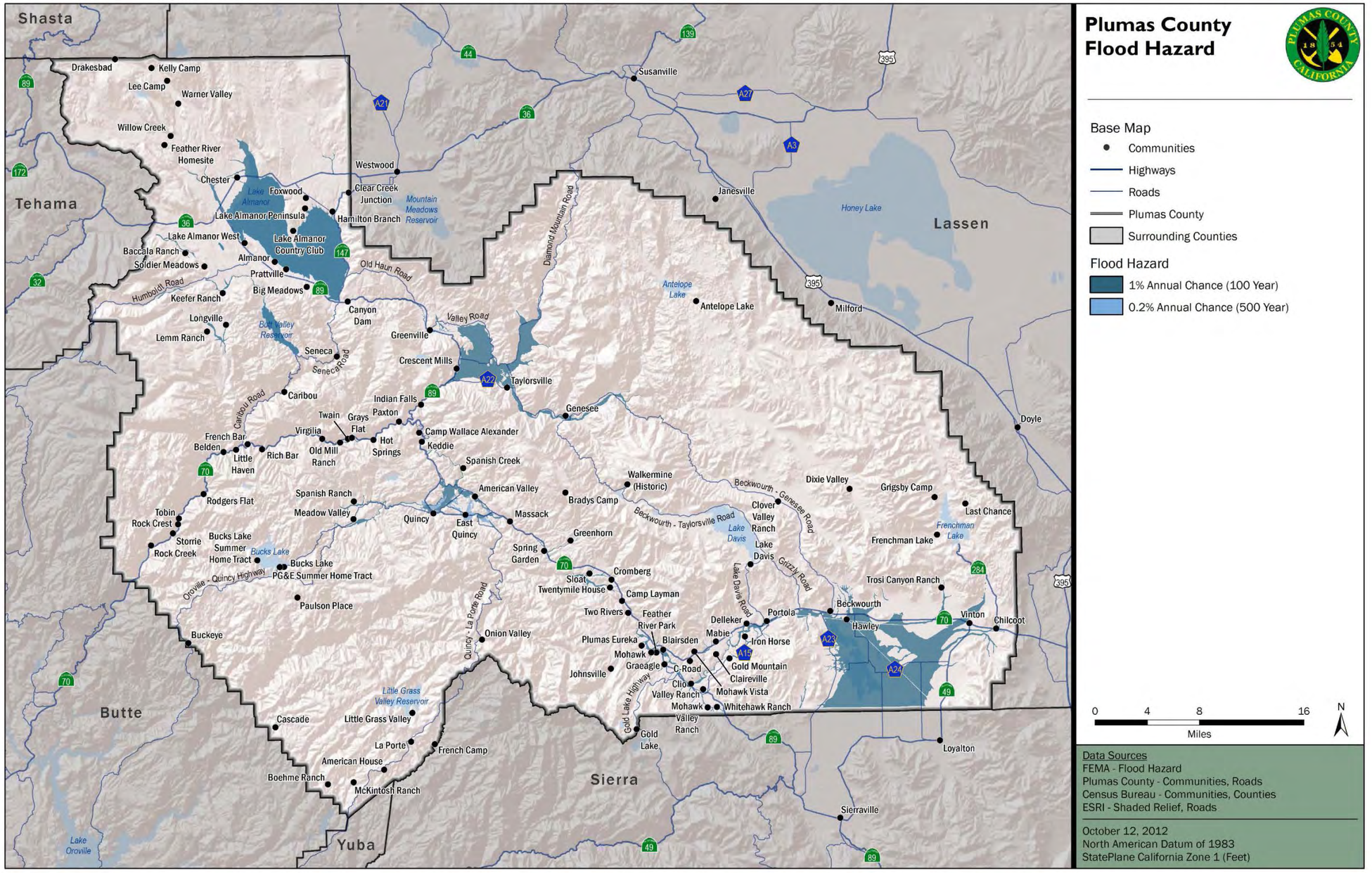


Figure 5-20: Flood Hazard Map

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5.4.3.1 Sierra Valley

The Sierra Valley is a large intermountain valley on the eastern edge of Plumas County. It has an area of 120,000 acres and is primarily located in Plumas County, but also extends southward into Sierra County. The valley has an average elevation of 4,850 feet and serves as the headwaters for the Middle Fork Feather River. The Sierra Valley has minimal topographic relief and flooding is generally shallow and low velocity. During large storms, such as those in 1986 and 1997, the entire valley will fill with several feet of water. Table 5-6 provides a summary of the primary flooding problems in the Sierra Valley. See Figure 5-21 through Figure 5-25 for photos and description of Sierra Valley.

Table 5-6: Sierra Valley Flooding Issues

Area	Issues
Marble Hot Springs Road	▪ Annual flooding in various locations from rain and irrigation ▪ 0.7 mile stretch east of the historic bridge experiences repeated flooding ▪ Closed in winter due to snow ▪ Primary evacuation route
Rocky Point Road (Old Highway 70)	▪ Experiences shoulder and bank erosion and repeated flooding ▪ Will flood nearly up to road centerline during major events ▪ One or two homes have been damaged
Harriet Lane	▪ Experiences sheet flow across road ▪ Often inundates nearby agricultural/ranch facilities, specifically around Island Ranch ▪ Road has sub-layer integrity issues and contains clay road base requiring constant repair ▪ Major corridor for Hay transportation
Dyson Lane	▪ Experiences sheet flow and shallow flooding ▪ Flooded with entire valley in 1992 ▪ 0.1 mile low spot across the valley drainage area ▪ Serves local population and as a bypass

HMP project team member Ethan pointing to the high water mark during a 1992 valley flood event. Photo captured by project team along Rocky Point Road.

Figure 5-21: Sierra Valley high water mark.

Turn on Marble Hot Springs Road experiences repetitive flooding. Photo captured by project team.

Figure 5-22: Sierra Valley, Marble Hot Spring Road

Shoulder bank erosion around culvert on Rocky Point Road. Photo captured by project team.

Figure 5-23: Rock Point Road

Harriet Lane experiences sheet flow. Photo captured by project team.

Figure 5-24: Harriet Lane

1/10 mile low spot experiences flooding on Dyson Lane. Photo captured by project team.

Figure 5-25: Dyson Lane

5.4.3.2 Chester/Lake Almanor

Lake Almanor is a higher elevation alpine reservoir located in the northwestern portion of Plumas County. Chester is the largest community of several that surround the lake and is located at the inlet of the North Fork Feather River. The outflow of the North Fork Feather River is controlled by Canyon Dam at the southern edge of the lake. The dam and outflow rates are managed and maintained by Pacific Gas and Electric Company (PG&E). The Canyon dam spillway elevation is 4,505 FT and PG&E property ownership around the lake resides at the 4,500 FT. Currently, PG&E's FERC license allows lake levels to be operated at 4,494 FT.

Flooding issues in this region are minimal due to the construction of the Chester Flood Control Channel, or ACE bypass, a large diversion channel from the North Fork Feather River upstream of Chester/Lake Almanor. The diversion channel allows river water to enter once it reaches a certain height and directs it around Chester into Lake Almanor. The bypass also has a secondary set-back levee system outside of the channel for extreme flooding events.

The hydrography in the Lake Almanor area is important to understand as all water that flows through this region travels down into the Feather River Canyon that contains major road and rail transportation routes and a number of communities. See Figure 5-26 and Figure 5-27 for photos and descriptions of the Chester Bypass.

Project Team member Ethan Mobley indicates the height water has previously filled channel. Photo captured by project team.

Figure 5-26: Chester Flood Control Channel, North Fork Feather River.

Inlet to Chester Flood Control Channel from North Fork Feather River. Photo captured by project team.

Figure 5-27: Chester area flood control

5.4.3.3 Indian Valley

Indian Valley is located in the north-central portion of Plumas County at an average elevation of 3,500 feet. It contains several developed communities and is also utilized for farming. Indian Valley is the meeting place of four creeks: Wolf Creek, Cooks Creek, Lights Creek, and Indian Creek. Indian Creek is the dominant stream reach as the other three creeks confluence with it, and then exits the valley past Arlington Bridge.

Indian Valley exhibits a number of flooding issues due to its flat topography and hydrography. Much of the water that flows through the Upper Feather River watershed makes its way through Indian Valley on its journey into the Feather River Canyon. Table 5-7 provides a summary of the primary flooding issues in Indian Valley: Figure 5-28 through Figure 5-34 provide photos and descriptions of Sierra Valley flooding issues.

Table 5-7: Summary of Indian Valley Flooding Issues

Area	Issues
Williams Creek @ North Valley Road	▪ Road over culverts that drain water from upstream private land into the valley ▪ Road has been overtopped resulting from debris blockage in culverts ▪ Road Department uses logging equipment/poles to remove debris during high flows preventing flooding, which is a dangerous activity ▪ Major flooding in 1986 and 1997 ▪ Roadway serves large populations in Taylorsville and Diamond Valley and is heavily trafficked during winter due to its tendency to receive less snow and ice than alternative routes
Cassidy's Turn	▪ Shows high water mark from 1997 flood
Stampfli Lane	▪ Cross-valley road traveling E-W sits at low point in drainage area ▪ Annual flooding of 0.5-1.0 feet of water on roadway often renders road impassible ▪ Repeated flooding of residential structures ▪ Poor drainage, flooding is caused by saturation of adjacent agricultural fields
Mt. Hough Estates	▪ Low-lying subdivision, portion of which has repeated flooding ▪ Houses appear to be slab-on-grade ▪ Typically during valley-flooding events ▪ Residents aware of impending flooding by the presence of water in neighboring fields
Old Wagon Road, Crescent Mills	▪ Residential structure flooded repeatedly (5-6 times) ▪ High water mark 6 feet high in some locations ▪ House built at drain point for basin

Area	Issues
Arlington Bridge (State# 09C-007)	▪ Bridge overtopped by 3 feet during 1997 flood ▪ Flows often approach height of bridge deck ▪ Major drainage point for entire valley ▪ Sedimentation issues on downstream side ▪ Adding culverts may improve drainage
Genesee Road @ Little Grizzly Creek	▪ Flooding can close road cutting off access for 15-20 homes

Culverts often clog with debris during storms and can cause the road to overtop. Photo captured by project team.

Figure 5-28: North Valley Road crossing Williams Creek.

Road Department District 2 foreman identifies high water mark from 1997 flood. Photo captured by project team.

Figure 5-29: Indian Valley High Water

Ponding area of Stampfli Lane has poor drainage and floods annually. Photo captured by project team.

Figure 5-30: Indian Valley Flooding Location

Low-lying area of Mt. Hough Estates subdivision subject to flooding from Indian Valley creeks. Photo captured by project team.

Figure 5-31: Mt. Hough Estates, Indian Valley

Residential structure in Crescent Mills built at drain point of basin experiences repeated flooding. Photo captured by project team.

Figure 5-32: Crescent Mills Repetitive Flood Area

Stream flowing under Arlington Bridge. Photo captured by PC Public Works from bridge, looking north.

Figure 5-33: Headwaters of the Feather River

Location along Genesee Road where flood waters can cover road and cut off access. Photo captured by project team.

Figure 5-34: Genesee Road Evacuation Issues

5.4.3.4 American Valley

American Valley is located in the geographic center of Plumas County and sits at an average elevation of 3,500 feet. In American Valley, Greenhorn Creek confluences with Spanish Creek upstream near the Town of Quincy. A majority of the flooding issues are caused by localized drainage as opposed to valley-flooding events. The water in Spanish Creek that passes through American Valley confluences with Indian Creek flowing out of Indian Valley into the Feather River Canyon. Table 5-8 provides a summary of the primary flooding issues in American Valley. Figure 5-35 through Figure 5-43 provides photos and descriptions of American Valley flooding issues.

Table 5-8: American Valley Flooding Issue Summary

Area	Issues
Les Schwab	▪ Storm grate behind facility becomes clogged with debris causing water to overtop and flow into building ▪ Typically only floods with major events, not large storms; recalled events were in 1986, 1993, and 1997 ▪ Overtopping waters also flow into a nearby home and businesses further downhill
Quincy Café	▪ Water can overtop edges of earthen ditch ▪ Water flooding from behind Les Schwab will flow down street and into businesses in strip mall ▪ Historic flooding up to 2 feet of water in strip mall businesses
Henchels	▪ Storm drain on small creek gets clogged with debris and backs up, causing water to flow onto roadway and into the school and neighboring building across the street ▪ Grate is not easily accessible
Old Sewer Plant (at bike path)	▪ Drainage path takes 90-degree turn into culverts underneath bike path ▪ Water drains poorly and overtops path
West Ranch Road (at CA-70)	▪ Road needs to be elevated and larger pipes installed
East Quincy Drains	▪ Drainage problems at high water ▪ Pipes/drainage too small and becomes clogged with debris
Vieira's Field	▪ Better/safer access and larger pipe
Chandler Road (West)	▪ Beddell Ranch and Green Bridge areas often flood ▪ Easy fix is to elevate road and install culverts where needed
Oakland Camp Road	▪ Floods from intersection with Chandler Road to Oakland Camp gate ▪ Easy fix is to elevate road and install culverts where needed

Area	Issues
Gansner Creek	▪ Storm grate on south side of West Main Street becomes clogged with debris causing water to overtop and flow across road ▪ Flood water flows down into hospital flooding the ambulance entrance, ER entrance, and X-ray doors ▪ Hospital flooded in 1986, 1993, and 1997
Mill Creek	▪ Runs behind and alongside private property ▪ Small drain on private property can clog with debris ▪ During heavy rains and large-scale events water will bypass drain and flow down gravel road toward CA-70
Clear Creek	▪ Located in Meadow Valley outside of American Valley ▪ Grate clogs with debris causing water to back up ▪ Water can back up high enough to swirl around the base of Meadow Valley Road potentially causing erosion and damage to roadway ▪ System is stressed several times annually

Storm grate behind Les Schwab becomes clogged with debris causing flooding. Photo captured by project team.

Figure 5-35: American Valley drainage inlet.

Strip mall containing Plumas Café and other businesses. Water can overtop earthen ditch on right, or flow down street on left when storm drain floods behind Les Schwab. Photo captured by project team.

Figure 5-36: American Valley drainage Issues

Henchels storm grate, small grate for localized drainage clogs with debris and causing flooding over roadway. Photo captured by project team October 2012.

Figure 5-37: American Valley drainage issues

Flood water from Henchels flows across street and into school. Photo captured by project team.

Figure 5-38: American Valley Historic Flooding

Water overtops drainage at culverts where forced to take 90-degree right turn. Photo captured by project team.

Figure 5-39: American Valley historic drainage issue

View of Plumas District Hospital from storm grate along Gansner Creek. Apparent that Hospital is down slope from culvert and subject to flooding from overtopping water. Photo captured by project team.

Figure 5-40: Gansner Creek at Plumas District Hospital

Plumas District Hospital downhill from West Main Street, susceptible to flooding from waters overtopping storm grate on Gansner Creek. Photo scanned by project team, from historic photos on file with PC District Hospital.

Figure 5-41: Gansner Creek at Plumas District Hospital

Small drain for Mill Creek can be bypassed during larger storms causing water to flow down adjacent gravel road. Photo captured by project team.

Figure 5-42: Mill Creek drainage inlet.

Culvert on Clear Creek in Meadow Valley becomes clogged with debris. Rising and swirling water poses erosion issue that could jeopardize roadway. Photo captured by project team.

Figure 5-43: Culver on Clear Creek in Meadow Valley

5.4.3.5 Feather River Canyon

The Feather River Canyon is a narrow river valley occupied by the North Fork Feather River and East Branch North Fork Feather River. At its upstream end is the confluence of Indian Creek, flowing from Indian Valley, and Spanish Creek, flowing from American Valley; here is the beginning of the East Branch North Fork Feather River. The East Branch meets the North Fork Feather River, flowing from Lake Almanor, about two miles upstream from Belden.

The Feather River Canyon is occupied by CA-70 and the Union Pacific Railroad, which comprise the two major E-W transportation routes through Plumas County. The canyon is home to a number of small towns adjacent to the river banks, highway, and train tracks.

Flooding issues in the Canyon are primarily related to larger events involving the North Fork Feather River, such as the 1986 and 1997 floods. Typical damage is washouts to roadways or train tracks. Much of the precipitation that falls in Plumas County flows through the Canyon.

5.4.4 Magnitude / Severity

As mentioned previously in this section, Plumas County is required to assemble a plan that addresses areas of repetitive loss (RL) and Severe Repetitive Loss (SRL) claims as prescribed by the FEMA's National Flood Insurance Program (NFIP) and Hazard Mitigation Program. The first step to conducting a basic Repetitive Loss Area Analysis (RLAA) is to designate the areas that will be considered for depicting magnitude and severity of the flooding problems in each area. It is important to understand the difference between a repetitive loss *property* and a repetitive loss *area* as both are important in distinguishing an area for analysis.

A RL *property* is a FEMA designation defined as an insured property that has made two or more claims of more than $1,000 in any rolling 10-year period since 1978. The term "rolling 10-year period" means that a claim of $1,000 can be made in 1991 and another claim for $2,500 in 2000; or one claim in 2001 and another in 2007, as long as both qualifying claims happen within 10 years of each other. Claims must be at least 10 days apart but within 10 years of each other. RL properties may be classified as a Severe Repetitive Loss property under certain conditions. A Severe Repetitive Loss property (SRL) has had four or more claims of at least $5,000, or at least two claims that cumulatively exceed the buildings reported value. A property that sustains repetitive flooding may or may not be on Plumas County's RL property list for a number of reasons:

- Not everyone is required to carry flood insurance. Structures carrying federally-backed mortgages that are in a SFHA are required to carry flood insurance in Plumas County;
- Owners who have completed the terms of the mortgage or who purchased their property outright may not choose to carry flood insurance and instead bear the costs of recovery on their own;
- The owner of a flooded property that does carry flood insurance may choose not to file a claim;
- Even insured properties that are flooded regularly with filed claims may not meet the $1,000 minimum threshold to be recognized as an RL property; or

- The owner adopted mitigation measures that reduce the impact of flooding on the structure, removing it from the RL threat and the RL list (in accordance with FEMA's mitigation reporting requirements).

Many jurisdictions are required to address only the individual properties on the updated FEMA RL list. A property appears on FEMA's RL inventory because the structure had flood insurance and received two or more claims. These properties are merely representative of the community's overall repetitive flooding problem.

Extensive FEMA NFIP databases are used to track claims for every participating community including unincorporated Plumas County. Currently, unincorporated portions of Plumas County contain five RL properties under their jurisdictional umbrella (one additional property experienced repetitive loss in 1986 and 1997 but does not qualify because the claims were not within 10 years). The total dollar amount of claims paid to date by the NFIP is $169,555 of structural and $44,513 content claims. Together, the total claims paid by the NFIP are in excess of $214,068 for the unincorporated areas of the County. In order to make the NFIP a viable program it works to reduce the flood risk in the community and develop mitigation measure to reduce insurance payouts.

A property does not have to be currently carrying a flood insurance policy to be considered a RL or SRL property. Often homes in communities are not carrying flood insurance but are still on the community's repetitive loss list. The "repetitive loss" designation follows a property from owner to owner; from insurance policy to no insurance policy, and even after the property has been mitigated. Having an insurance policy and making claims that fall into the repetitive loss criteria will put a property on the RL list. Even after the policy on a property has lapsed or been terminated, the property will remain on Plumas County's RL list.

FEMA databases maintain all NFIP claims which allow for the examination of single-loss (SL) properties in addition to RL properties. Unincorporated Plumas County has 28 properties that have filed single-loss NFIP claims. The total dollar amount of claims paid to date by the NFIP is $420,770 (SL claims data does not differentiate between building and contents). This section will provide an overview of the general areas in Plumas County that have experienced losses due to flooding.

The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property.

5.4.4.1 Plumas Eureka Loss Area

Plumas Eureka is a small community in the Mohawk area near Graeagle. It is situated on the banks of the upper reaches of the Middle Fork Feather River east of the Sierra crest. Seven of the 34 properties that have filed NFIP claims are located in this area.

Claims Data: FEMA has reported six (6) SL properties and one (1) RL property8 along the Middle Fork Feather River. The SL properties account for $59,690 in claims and the RL property accounts for $29,748 in claims.

Building	Contents[9]	Losses	Paid	Average
$89,438	$0	8	$89,438	$11,180

5.4.4.2 American Valley Loss Area

American Valley is located in the center of Plumas County and is home to Quincy, the county seat. Greenhorn Creek and Spanish Creek flow through the valley. Seven properties have filed NFIP claims in American Valley. The properties are spread out across the valley; several are near the creeks and are subject to overbank flooding, while some are subject to localized drainage flooding within the developed area.

Claims Data: FEMA has reported six (6) SL properties and one (1) RL property in American Valley. The SL properties account for $7,068 in claims and the RL property accounts for $11,070 in claims.

Building	Contents[5]	Losses	Paid	Average
$18,138	$0	8	$18,138	$2,267

5.4.4.3 Mt. Hough Estates Loss Area

Mt. Hough Estates is a low-lying subdivision on the western edge of Indian Valley. It is subject to valley flooding events and shallow floodwaters often creep up the meadow near the subdivision. Six properties have filed NFIP claims in this area.

Claims Data: FEMA has reported five (5) SL properties and one (1) RL property in Mt. Hough Estates. The SL properties account for $120,479 in claims and the RL property accounts for $43,457 in claims.

Building	Contents[5]	Losses	Paid	Average
$163,936	$0	7	$163,936	$23,419

5.4.4.4 Genesee Loss Area

The valley area between Taylorsville and Genesee has recorded three NFIP claims, and an area several miles upstream of Genesee had a single NFIP claim. The flooding in this area results from Indian Creek.

Claims Data: FEMA has reported three (3) SL properties and one (1) RL property in the Genesee area. The SL properties account for $118,742 in claims and the RL property accounts for $2,557 in claims.

Building	Contents[5]	Losses	Paid	Average
$118,742	$2,557	5	$121,299	$24,260

[8] Claims filed in 1986 and 1997, technically not RL property but did have multiple losses

[9] SL claims data does not differentiate between building and contents losses; building totals may contain contents losses

5.4.4.5 Twain Loss Area

A stretch of the CA-70 corridor around Twain has recorded six NFIP claims to three properties. This area is located in the Feather River Canyon along the East Branch North Fork Feather River.

Claims Data: FEMA has reported one (1) SL property and two (2) RL properties in the Twain area. The SL property accounts for $51,602 in claims and the RL properties account for $156,984 in claims.

Building	Contents[5]	Losses	Paid	Average
$166,630	$41,956	6	$208,586	$34,764

5.4.4.6 Sloat Loss Area

The area around Sloat in the Middle Fork Feather River valley has recorded two NFIP claims.

Claims Data: FEMA has reported two (2) SL properties in the Sloat area. The SL properties account for $6,430 in claims.

Building	Contents[5]	Losses	Paid	Average
$6,430	$0	2	$6,430	$3,215

5.4.4.7 Other Loss Areas

Five additional NFIP claims for SL properties have been recorded in Plumas County. These properties are scattered across the county and are not grouped geographically with any other NFIP claims. They are generally located in the areas around Chester, Chilcoot, Clio, Crescent Mills, and Antelope Lake.

Claims Data: FEMA has reported 5 (5) SL properties generally located in the areas around Chester, Chilcoot, Clio, Crescent Mills, and Antelope Lake. The SL properties account for $56,759[10] in claims.

Building	Contents[5]	Losses	Paid	Average
$56,759	$0	5	$56,759	$11,352

5.4.4.8 Flood Warning and Notification

The degree of damage from flood hazards can be reduced with longer periods of warning time and proper notification before flood waters arrive. Warning times of 12 hours or more have proven adequate for preparing communities for flooding and reducing flood damages. More than 12 hours advanced warning of a flood can reduce a community's flood damage by approximately 40% in comparison with unprepared communities (Read Sturgess and Associates 2000). In addition, seasonal notification for flooding can enhance awareness for citizens at risk, and when communicated effectively advance notification can reach target audiences on a large scale. Plumas County coordinates with National Weather Service in Reno, NV and the California Department of Water Resources to do flood forecasting in localized areas. Flood forecasts change depending on precipitation

[10] Only the property located in the Crescent Mills area filed a non-zero dollar claim.

5.5 *Geologic Hazards*

Geologic hazards pose a substantial danger to property and human safety, and are present due to the risk of naturally occurring geologic events, features and human development. Common geologic hazards present in Plumas County include seismic shaking or "earthquake" and slope failure. The information provided in this section will detail geologic hazards specific to Plumas County.

5.5.1 Earthquake

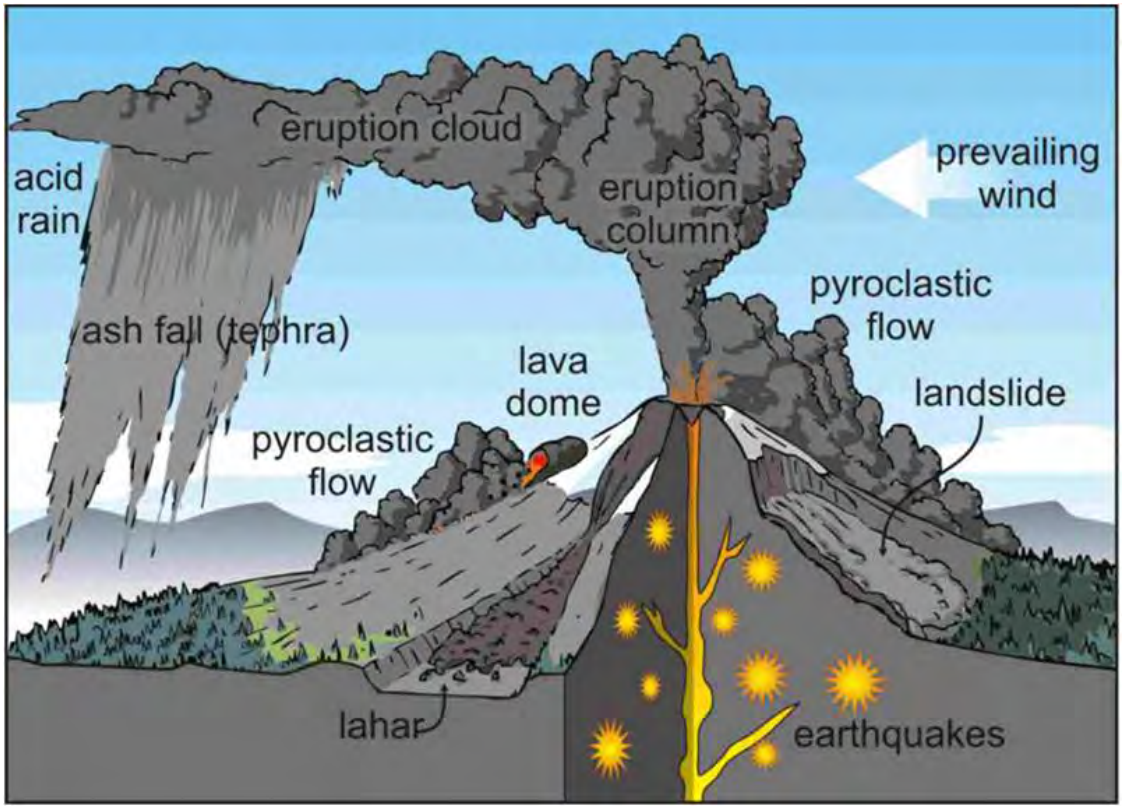
The term "earthquake" refers to the vibration of the Earth's surface caused by movement along a fault, by a volcanic eruption, or even by manmade explosions. The vibration can be violent and cause widespread damage and injury, or may be barely felt. Most destructive earthquakes are caused by movements along faults. An earthquake is both the sudden slip on an active earth fault and the resulting shaking and radiated seismic energy caused by the slip (USGS 2009). 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. 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 Section 5.4.4 for more information on earthquake magnitude and potential ground shake maps). Seismic shaking is typically the greatest cause of loss to structures during earthquakes.

Earthquakes can also cause seiches, landslides, and dam failures. A seiche is a periodic oscillation of a body of water resulting from seismic shaking or other factors that could cause flooding. Earthquake-induced seiches are considered a risk in the Eastern Sierras especially in nearby Lake Tahoe in Placer County. Earthquakes may also cause landslides, particularly during the wet season, in areas of high water or saturated soils. The most likely areas for earthquake-induced landslides correlate to areas of high landslide potential discussed later in this section. Finally, earthquakes can cause dams to fail (see Section 5.7 Dam Failure).

5.5.2 Volcano (*Referenced from Lassen County Multi-Jurisdictional HMP*)

A volcano is an opening in the ground where magma forces its way to the surface. Magma which reaches the earth's surface is called lava. Volcanoes can be active (erupting), dormant (sleeping) or extinct (no eruption for 10,000 years and unlikely to erupt again). More than 50 volcanoes in the United States have erupted one or more times in the past 200 years. The most volcanically active regions of the Nation are in Alaska, Hawaii, California, Oregon, and Washington. Volcanoes produce a wide variety of natural hazards that can cause death and injury and destroy property hundreds of miles away and even affect global climate. Source: worldlywise.pbworks.com.

Figure 5-44 provides a simplified sketch of a volcano typical of those found in the Western United States and Alaska, but many of these hazards also pose risks at other volcanoes, such as those in Hawaii. Some hazards, such as lahars and landslides, can occur even when a volcano is not erupting.



Source: worldlywise.pbworks.com.

Figure 5-44: Volcano Cut-away diagram.

The effects of volcanic eruptions can be divided into primary and secondary effects. The primary effects are immediate and come from the eruption itself whereas the secondary effects result from the primary effects.

Primary effects of a volcanic eruption include:

Volcanic gases - All magma contains dissolved gases that are release during and between eruptions. These gases are mainly steam, carbon dioxide and compounds of sulphur and chlorine.

Lava flows - Streams of molten rock.

Pyroclastic flows - Hhigh speed avalanches of hot ash, rock fragments and gas which move down the sides of a volcano. These flows occur when the vent area or ash column collapses.

Tephra - Explosive power of an eruption causes old lava to be blasted into tiny pieces and hurled into the air. The fragments are tephra.

Secondary effects of a volcanic eruption include:

Lahars - A mixture of water, rock, ash, sand and mud that originate from the slopes of a volcano. Lahars often happen because of heavy rainfall eroding volcanic deposits or heat from a volcanic vent suddenly melting snow and ice.

Landslides - Heat from cooling magma can cause hydrothermal alteration of the rocks, turning sections of them into clay. This weakens the rocks and increases the risk of slope failures.

Flooding - Explosive eruptions can change the surface areas around a volcano and disrupt drainage patterns, leading to long-term flooding.

Other secondary effects include:

- Food / water supply interrupted.
- Economic loss.
- Uninsured Losses.
- Unemployment.
- Long-term issues with logging and tourism industry.

5.5.3 Slope Failure

5.5.3.1 Landslides

A landslide is the movement of soil, rock, or other earth materials, downhill in response to gravity. Landslides include rock falls and topples, debris flows and debris avalanches, earthflows, mudflows, creep, and lateral spread of rock or soil. Slope failure (Landslides and or Avalanche) occur when the force pulling the material on the slope in a downward direction under gravitational influence exceeds the strength of the earth materials that compose the slope (USGS 2004). These materials may move by falling, toppling, sliding, spreading, and/or flowing. Strength of soil, rock (or snow), steepness of slope, and weight of the hillside material all play an important role in the stability of hillside areas.

Landslides frequently occur in areas where the soil is saturated from heavy rains or snowmelt. They can also be started by earthquakes, volcanic activity, changes in groundwater, disturbance or change of a slope by man-made construction activities, or any combination of these factors.

Similar to soil base landslides rock falls, or topples, are usually sudden and occur on steep slopes. In a rock fall, rocks may fall, bounce, or roll down the slope. A topple occurs when part of a steep slope breaks loose and rotates forward.

5.5.3.2 Avalanche

Avalanches consist of a rapid flow of snow down a slope. They often reoccur in the same areas annually and can be triggered by varying weather patterns and human activity. 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 Placer County where combinations of the above criteria occur.

5.5.3.3 Slope Erosion

Landslides often accompany other natural hazard events, such as floods, wildfires, or earthquakes. Landslides can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, as well as injuries and death.

5.5.4 Regulatory Environment

Numerous building and zoning codes exist at a state and local level to decrease the impact of geologic hazard events on residents and infrastructure. Building and zoning codes include the 2010 California Standards Building Code (CSBC) and Plumas County Codes. To protect lives and infrastructure in Plumas County, the Building Department is responsible for code enforcement and ensures citizens follow building and zoning codes that mitigate geologic hazards. .

The 2010 CSBC is based on the International Building Codes (IBC), which is widely used throughout the United States. CSBC was modified for California's conditions to include more detailed and stringent building requirements. The Plumas County Building Department utilizes the 2010 CSBC to regulate the infrastructure and development within the county. For new buildings, Plumas County includes earthquake safety provisions, with enhancements for essential services buildings, hospitals, and public schools.

5.5.4.1 Plumas County General Plan Safety Element:

The Plumas County GP Safety Element includes the following policies for lowering the impacts of earthquakes on infrastructure within the County:

- Require new development proposals in moderate or high seismic hazard areas to consider risks caused by seismic activity and to include project features that minimize these risks.
- Review and limit the location and intensity of development and placement of infrastructure in identified earthquake fault zones.
- Identify and minimize potential hazards to life and property caused by fault displacement and its impact on facilities that attract large numbers of people, are open to the public, and/or provide essential community services.
- Based on the susceptibility of the bank to lurching caused by seismic shaking, require minimum setbacks for construction along creeks, between the creek bank and structure.
- Restrict the crossing of ground failure areas by new public and private transmission facilities, including gas, oil transmission, power, sewer, and water distribution lines.

- Require geotechnical investigation for buildings meant for public occupancy within earthquake fault zones.
- Require geotechnical evaluation and recommendations of new development in moderate or higher-earthquake fault zones.
- Require new development to incorporate project features that avoid or minimize the impacts of earthquakes.

In addition to the County enforcing seismic standards, Plumas County has adopted the CBSC for development in hillside areas in the County. Investigations and practices that are typically required for hillside development include the following:

- Conduct thorough geologic geotechnical studies by qualified engineering geologists and geotechnical engineers.
- Require both engineering geologists and geotechnical engineers during construction to confirm preliminary findings reported during initial studies.
- Require certification of the proposed building site stability in relation to the adverse effects of rain and earthquakes prior to the issuance of building permits.
- Mandate coordination between the civil engineer and the project engineering geologist and geotechnical engineer during construction grading.
- Require mitigation of onsite hazards caused by grading that may affect adjoining properties, including erosion and slope instability.

5.5.5 Past Occurrences

5.5.5.1 Earthquake

Plumas County-area historical earthquake activity is significantly below California state average. However, Plumas County has a 360% greater than the overall U.S. average. See Table 5-9 for a list of major historical earthquakes.

Table 5-9: Major historic earthquakes in the Plumas County area greater than magnitude 5.0

Year	Magnitude	Depth (Kilometers)	Place Name	Distance from Place
1867	4	N/A	French Camp	6.1
1875	5.8	N/A	Antelope Lake	4.0
1885	5.7	N/A	Antelope Lake	16.1
1888	5.9	N/A	Gold Lake	2.2
1889	5.9	N/A	Clear Creek Junction	24.0
1931	4	N/A	Delleker	1.5
1934	4.5	N/A	Hot Springs	2.2
1941	4.5	N/A	Hot Springs	2.2
1946	5	N/A	Drakesbad	6.4
1947	4.2	N/A	Hawley	14.9

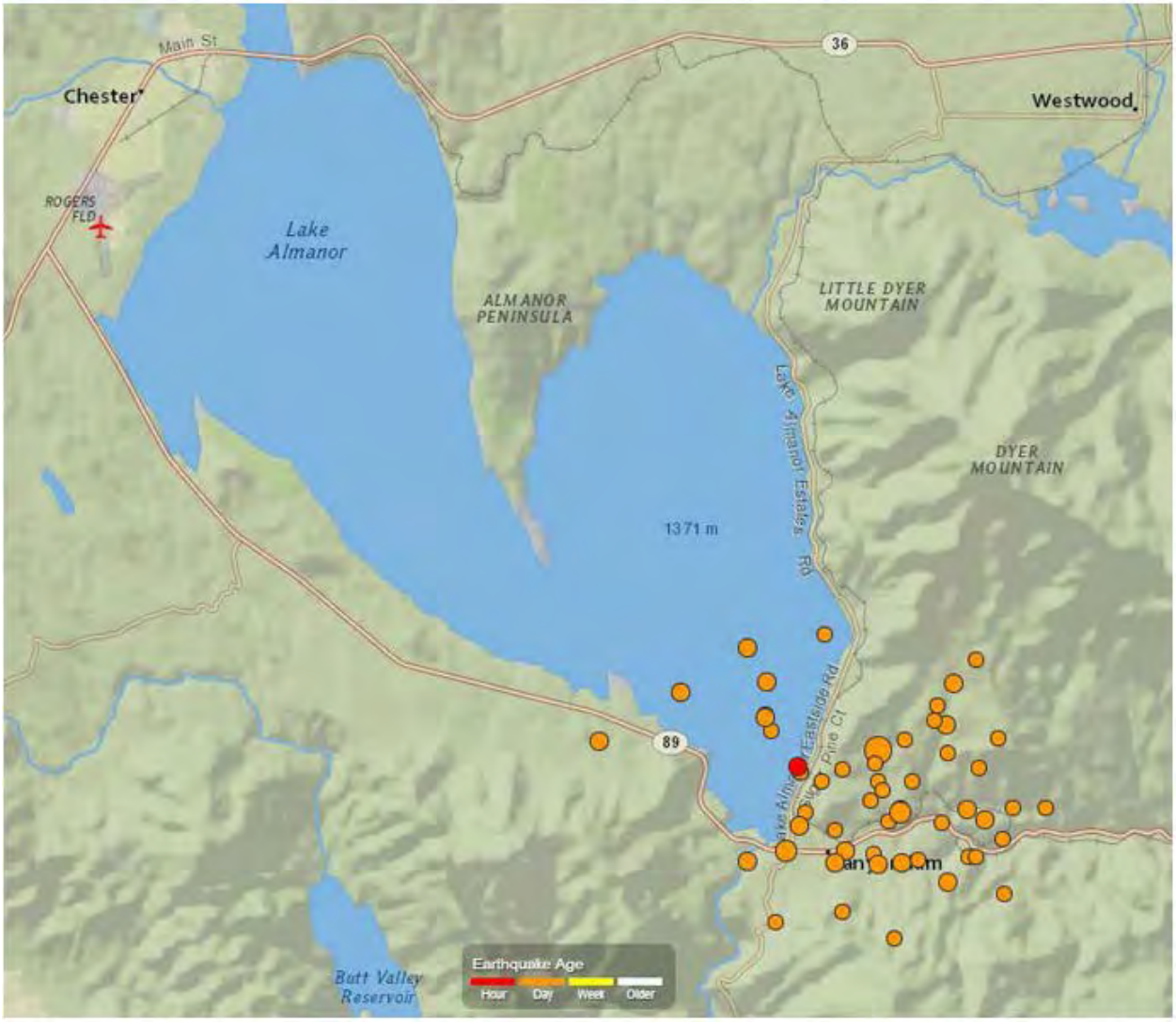
Year	Magnitude	Depth (Kilometers)	Place Name	Distance from Place
1947	4.4	N/A	Antelope Lake	9.3
1948	4	N/A	French Camp	9.7
1948	6	N/A	Chilcoot	17.4
1949	4.3	N/A	Chilcoot	17.4
1949	4.8	N/A	Chilcoot	17.4
1949	4.5	N/A	Lake Almanor West	2.3
1950	5.5	N/A	Drakesbad	3.5
1950	4.1	N/A	Whitehawk Ranch	7.7
1950	4.1	N/A	Drakesbad	5.7
1950	4.6	N/A	Drakesbad	5.7
1950	4.5	N/A	Drakesbad	5.7
1950	4	N/A	Drakesbad	5.7
1950	4.1	N/A	Drakesbad	5.7
1950	4.1	N/A	Last Chance	11.4
1950	4.5	N/A	Last Chance	11.4
1950	4	N/A	Last Chance	11.4
1950	4	N/A	Last Chance	11.4
1950	4	N/A	Last Chance	11.4
1950	4	N/A	Last Chance	11.4
1950	5.6	N/A	Last Chance	11.4
1950	4.1	N/A	Last Chance	11.4
1950	4.4	N/A	Last Chance	11.4
1950	4	N/A	Last Chance	11.4
1951	4.2	N/A	Genesee	3.5
1952	4.3	N/A	Genesee	2.7
1958	4.6	N/A	Whitehawk Ranch	16.5
1959	5.6	N/A	Vinton	5.9
1959	4.5	N/A	Mohawk Valley Ranch	3.2
1959	4.1	N/A	Chilcoot	7.1
1960	4.4	N/A	Whitehawk Ranch	9.0
1965	4.3	N/A	Chester	1.5
1965	4	N/A	Baccala Ranch	9.0
1972	4.1	N/A	Belden	3.1
1976	4.5	5	Antelope Lake	15.8
1976	4.2	5	Antelope Lake	17.3
1979	5.2	17	Last Chance	7.4
1982	4	5	Bradys Camp	2.2
1992	4	13	Vinton	7.8
1992	4	8	Bradys Camp	1.6

Year	Magnitude	Depth (Kilometers)	Place Name	Distance from Place
1992	4.2	16	Massack	2.0
1995	4.3	12	Twentymile House	1.9
1996	4	5	American Valley	2.7
1997	4.3	5	Massack	1.1
1998	4.1	10	Lake Davis	2.4
1998	4.1	16	Johnsville	1.5
2001	5.2	17	Two Rivers	1.2
2001	4.3	18	Two Rivers	2.2
2008	4.5	0	American Valley	1.1
2011	4.7	16	Whitehawk Ranch	8.2

Source: California Geologic Survey, 2012.

In additions to the entrees in Table 5-9, a series of earthquakes occurred near Lake Almanor on May 24, 2013. The series of earthquakes included a 5.7 magnitude earthquake near Canyon Dam, near the southern end of Lake Almanor. See Figure 5-45 for location of the May 24th earthquake series. Injuries were reported and damage to infrastructure and homes were sustained. Lake Almanor Mutual Water Company sustained a water main rupture which resulted in water supply loss, and 600 PG&E customers on the Lake Almanor peninsula lost power.

As a result of the 5.7 event, Plumas County BOS provided instituted an emergency proclamation. This provides businesses and homeowners official documentation in potential damage claim activity. Over one million dollars in damages were reported and over 50 homes in the Lake Almanor basin were impacted. Broken or toppled chimneys were the most common report, however broken water lines caused flooding and water damage. At least one residential structure was shifted off its foundation as a result of ground shaking. Figure 5-46 depicts damage to a home in the Lake Almanor area.



Source: United States Geologic Survey earthquake map

Figure 5-45: Canyon Dam Earthquakes

Note: According to the USGS, Volcanic activity is not expected as a result of the earthquakes, although changes may occur in hydrothermal areas for a few days following the nearby earthquakes (National Park Services n.d.).

Figure 5-46: Canyon Dam Earthquake Damage

5.5.5.2 Slope Failure

There has been no disaster declarations associated with slope failure in Plumas County. There have been a few isolated incidences of landslides and slope failure. These include one avalanche, two rock topples, and several landslides. Table 5-10 provides a brief summary on each.

Table 5-10: Major Landslides and Slope Failures

Year	Type	Damage	Injury or Death	Area
2006	Rockslide	State Route 70	No	1.5 miles west of Pulga
2007	Rock Fall	Rail Cars and Environment	No	MP 251 on State Highway 70, between Tobin and Rock Creek
2007	Rock Fall	Rail Cars and Environment	No	Storrie Resort on the Feather River

Year	Type	Damage	Injury or Death	Area
2009	Rock Slide	State Route 70	Yes	Rich Bar
2010	Landslide	USFS Road (Scales Road)	No	Scales Road
2010	Rockslide	State Route 70	No	Between Greenville Way and Elephant Butte Tunnel
2012	Avalanche	Timber Stock	No	Sloat
2012	Rock Fall	BNSF Locomotive Damage	No	Between Rich Bar and Twain on the Feather River
2013	Slope Erosion	To Co Hwy A14	No	Johnsville
2013	Rockslide	Damage to County Rd 411 5.3 west of SR70 at Quincy	No	Bucks Lake

Source: 2013 HMP Data Gathering. Web Based Searches, Plumas County OES, and Plumas County Department of Public Works.

Notable Slope failures of record include Feather River Canyon in 2007 and 2012 and at active bank erosion location near Johnsville on Jamison Creek:

- **Union Pacific Rail Car Derail 2007 –** A boulder dislodged from a Feather River Canyon slope, and struck a Union Pacific rail car, on June 30th 2007 causing 22 cars to derail. During the derailment two liquid containers cars were punctured. One liquid container car leaked 20,000 Gallons of peanut oil into the Feather River; the other punctured car leaked an estimated 30,000 gallons of highly flammable denatured alcohol into the surrounding environment. The Plumas County Sheriff's Office, County Environmental Health and other state and local response crews were involved in the hazard event. See Figure 5-47 and Figure 5-48.
- **Burlington Northern Santa Fe Railway (BNSF) Locomotive Strike Boulder (2012) -** Diesel fuel spilled into the Feather River after a BNSF Railway locomotive struck a boulder early Friday morning about 24 miles west of Quincy. The accident was reported at 1:47 a.m. after the engine struck the rock as it was traveling between Rich Bar and Twain. The rock punctured a diesel fuel tank on the lead locomotive, spilling fuel along the tracks and into the track ballast. Railroad personnel estimate that up to 3,200 gallons of diesel may have been released. Some of the fuel reached the Feather River. Petroleum sheen was observed at various locations on the Feather River from the spill site to below Belden, a distance of seven or eight miles. With the assistance of a PG&E helicopter, booms were set up in five locations on the river to help collect the fuel. Although, it was a BNSF locomotive that hit the rock, the stretch of track belongs to the Union Pacific. Both Union Pacific and BNSF were involved in the containment and cleanup.
- **Slope Failure / Erosion –** Major slop failure has occurred on Johnsville Road / County Highway A14 approximately 4.6 miles west of the intersection of the intersection of SR89 at Blairsdale /

Graeagle. See Figure 5-49. The slope failure condition has been prevalent for more than 5 years, and is a result of weak soils, slop and water related erosion. This particular roadway is the only paved road that connects Graeagle to Johnsville. The only other transportation route connecting Johnsville is a dirt road which is essentially impassable in the winter. As a safety precaution, the roadway shoulder has been narrowed several times in order to avoid the on-site erosion issues. Slope saturation by water is a primary cause of landslide issue at this location.

Figure 5-47: 2007 Rockslide causing derailment

Figure 5-48: 2007 Rockslide causing derailment

Figure 5-49: Slope Failure near Johnsville on County Highway A14

5.5.5.3 Volcano (Referenced from Lassen County Multi-Jurisdictional HMP)

Due to the location near a tectonic plate boundary, the Cascade Mountains have experienced more than 50 earthquakes and eruptions over the past 4,000 years. The Cascades have formed as a result of the seduction of the small Juan de Fuca plate (oceanic) under the large North American plate (continental). The Cascades extend northward from Lassen Peak (also known as Mount Lassen) in northern California to the confluence of the Nicola and Thompson Rivers in British Columbia. Figure 5-50 from the USGS shows eruptions in Cascade Mountain Range over the last 4000 years.

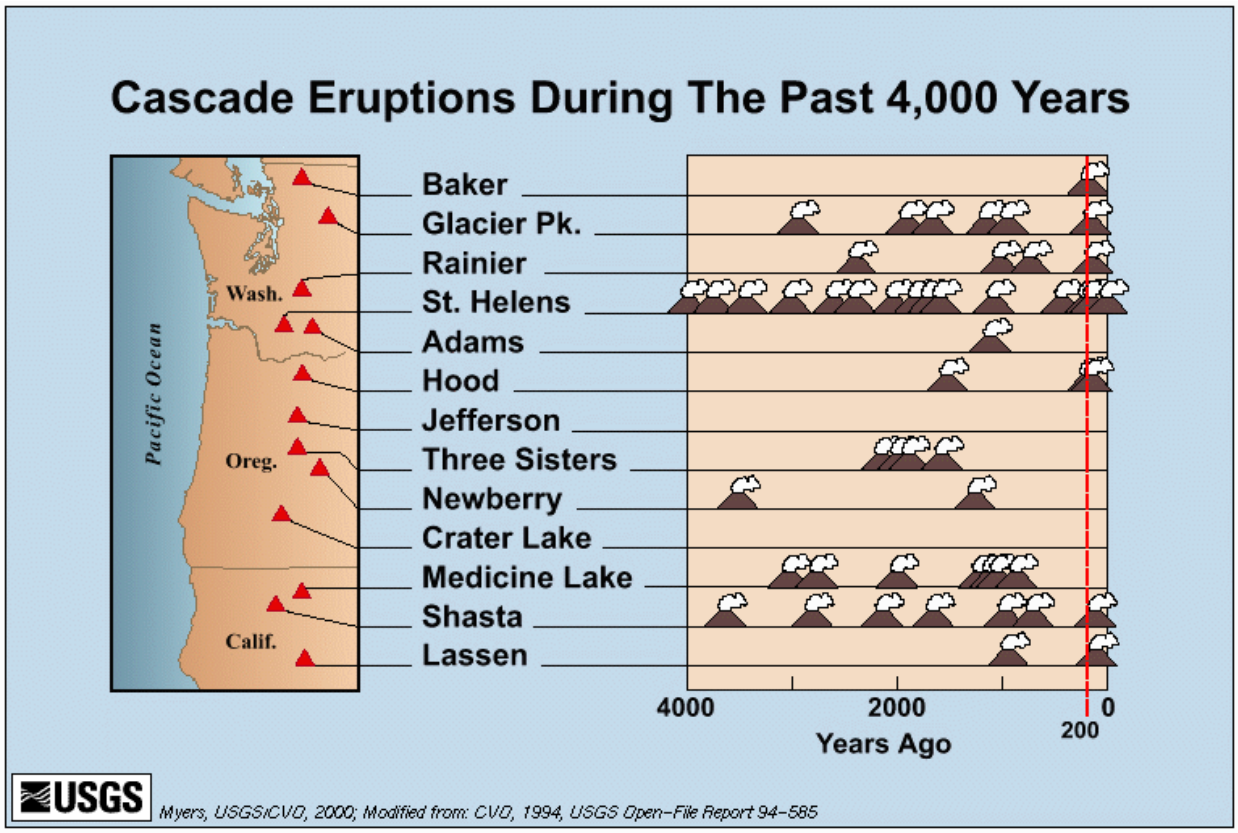


Figure 5-50: Historic Volcanic Eruptions

On May 22, 1915, an explosive eruption at Lassen Peak, the southernmost active volcano in the Cascade Range, devastated nearby areas and rained volcanic ash as far away as 200 miles to the east. This explosion was the most powerful in a 1914-1917 series of eruptions that were the last to occur in the Cascades before the 1980 eruption of Mt. St. Helens. Lassen Peak, is the largest of a group of more than 30 volcanic domes erupted over the past 300,000 years in Lassen Volcanic National Park. The following picture (Figure 5-51) from the National Park Services provides an illustration of the Lassen Peak eruption (Lassen County March 2010).

Figure 5-51: Mt. Lassen Volcanic Eruption

5.5.6 Location/Geographic Extent

5.5.6.1 Earthquake

The risk of seismic hazards to residents of Plumas County is based on the approximate location of earthquake faults within and outside of the County. Several potentially active faults pass through Plumas County. The Almanor Fault, Butt Creek Fault Zone and the Mohawk Valley Fault are shown in Figure 5-53 and Figure 5-55. The Indian Valley Fault is also considered an active fault located within the County. Additionally, the Honey Lake and Fort Sage Faults are two active faults located east of the County. Although several faults are within and near the County, seismic hazard mapping indicates that the County has low seismic hazard potential. Additionally, the County is not located within a delineated Alquist-Priolo Earthquake Fault Zone (Plumas County 2012) which activates special regulations, reporting and building requirements.

5.5.6.2 Slope Failure

5.5.6.2.1 Landslides

Most landslide hazards are primarily associated with mountainous regions; however, landslides can occur in areas of low relief. Areas with steep slopes in the County could be prone to landslides, mud slides and even avalanches. Landslides, slope failure and avalanche are dependent on slope (angle of

the hillside), geology, rainfall, excavation or seismic activity. Areas that have recently been subject to wildfire are susceptible to mud slides and debris flow as well.

As seen in Figure 5-54, the volcanic soils in the eastern portion of the Plumas National Forest are prone to landslides. The figure also shows that areas concentrated along the North and Middle Forks of the Feather River are also susceptible to landslides. The Feather River Canyon is especially prone to rock slides due to the steep canyon walls. Nearly every year, rock slides become big enough to warrant an emergency construction for rock removal projects.

Asbestos is a naturally occurring fibrous material found throughout California. Disturbance of rocks and soil containing asbestos could lead to several public health issues. Figure 5-55 identifies areas with the potential to contain naturally occurring asbestos. The highest concentration naturally occurring asbestos is found in the western portion of the County.

5.5.6.2.2 Erosion

Rates of erosion are contingent on a number of factors, including the type of soil material and structure, slope, water runoff and levels of human activity. Overall, the County is primarily characterized as having a moderate potential for soil erosion (See Table 5-11). Areas classified as having a low or high potential for erosion are also found in the County, with a fairly significant portion of the County unclassified or not mapped. Areas with a high potential for erosion are identified on and coincide with locations located at higher elevations in the County. For erosion potential location on a map see Figure 5-55

Table 5-11: Soil Erosion Potential in Plumas County

Soil Erosion Potential* Acres in the County	
High	2,040
Moderate	1,178,600
Low	31,590
Not Mapped	460,240

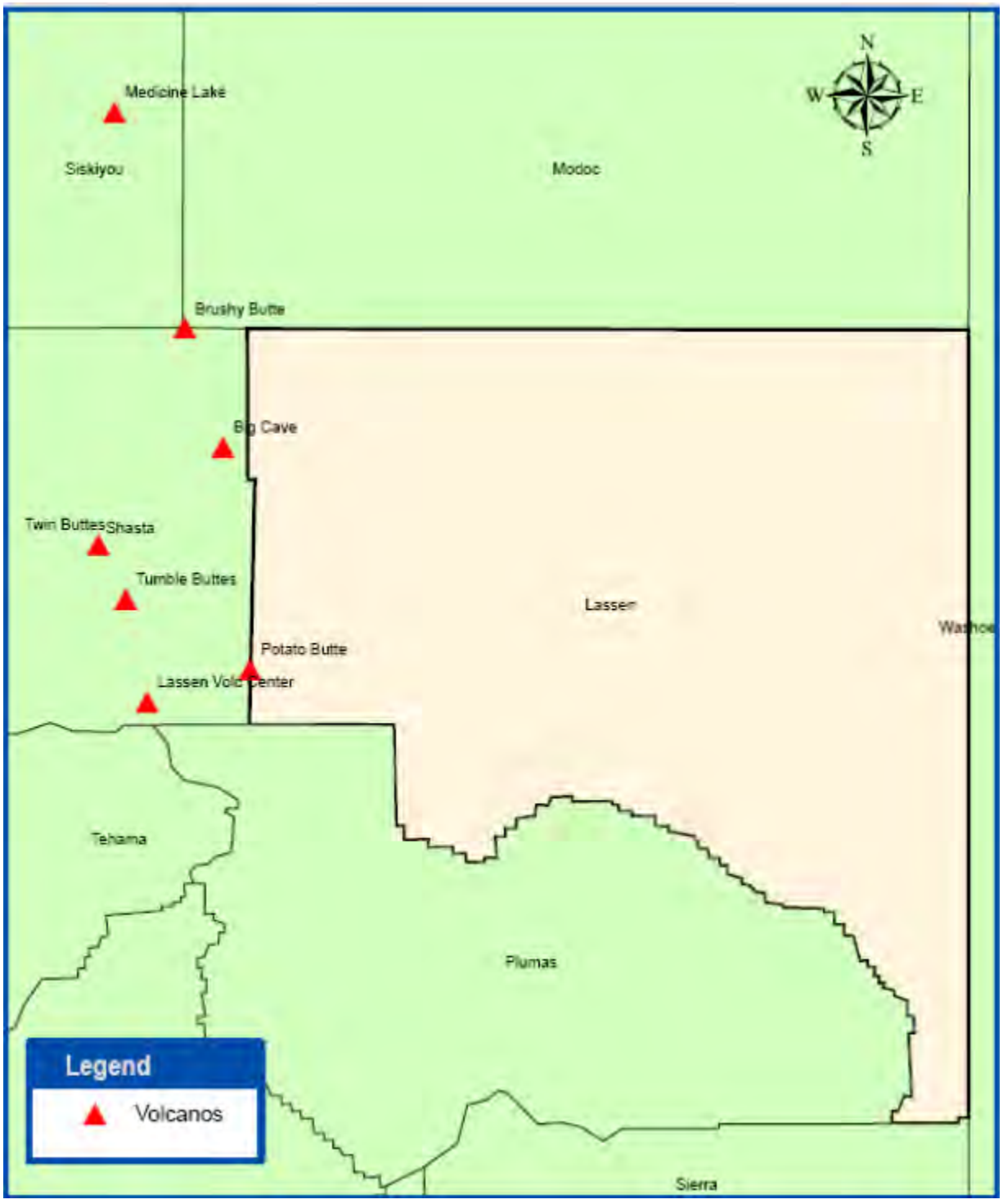
Erosion potential is based on k factor, which is an indication of a soil's inherent susceptibility to erosion, absent of slope and groundcover factors.

5.5.6.2.3 Avalanche

Historically, avalanches occur within the County between the months of December and March, following snowstorms. Although avalanches have occurred on slopes of many angles, they most often occur on slopes ranging between 30 degrees and 45 degrees. Therefore ski resorts, residences, roads, businesses, and other structures and activities in these areas are vulnerable.

5.5.6.3 Volcano

According to the information from Lassen National Park, the greater Lassen area has been volcanically active for about three millions years. Recently the region has seen eruptions from Cinder Cone (~350 years ago) and Lassen Peak (~100 years ago). While the area sleeps now, steam vents, boiling springs, and bubbling mudpots remain active--direct evidence that the volcanic center still smolders. Figure 5-52 provides an overview of the volcanoes located within the vicinity of Plumas and Lassen County.



Source: Lassen County Multi-Jurisdictional Hazard Mitigation Plan

Figure 5-52: Volcanos in the Plumas-Lassen Region.

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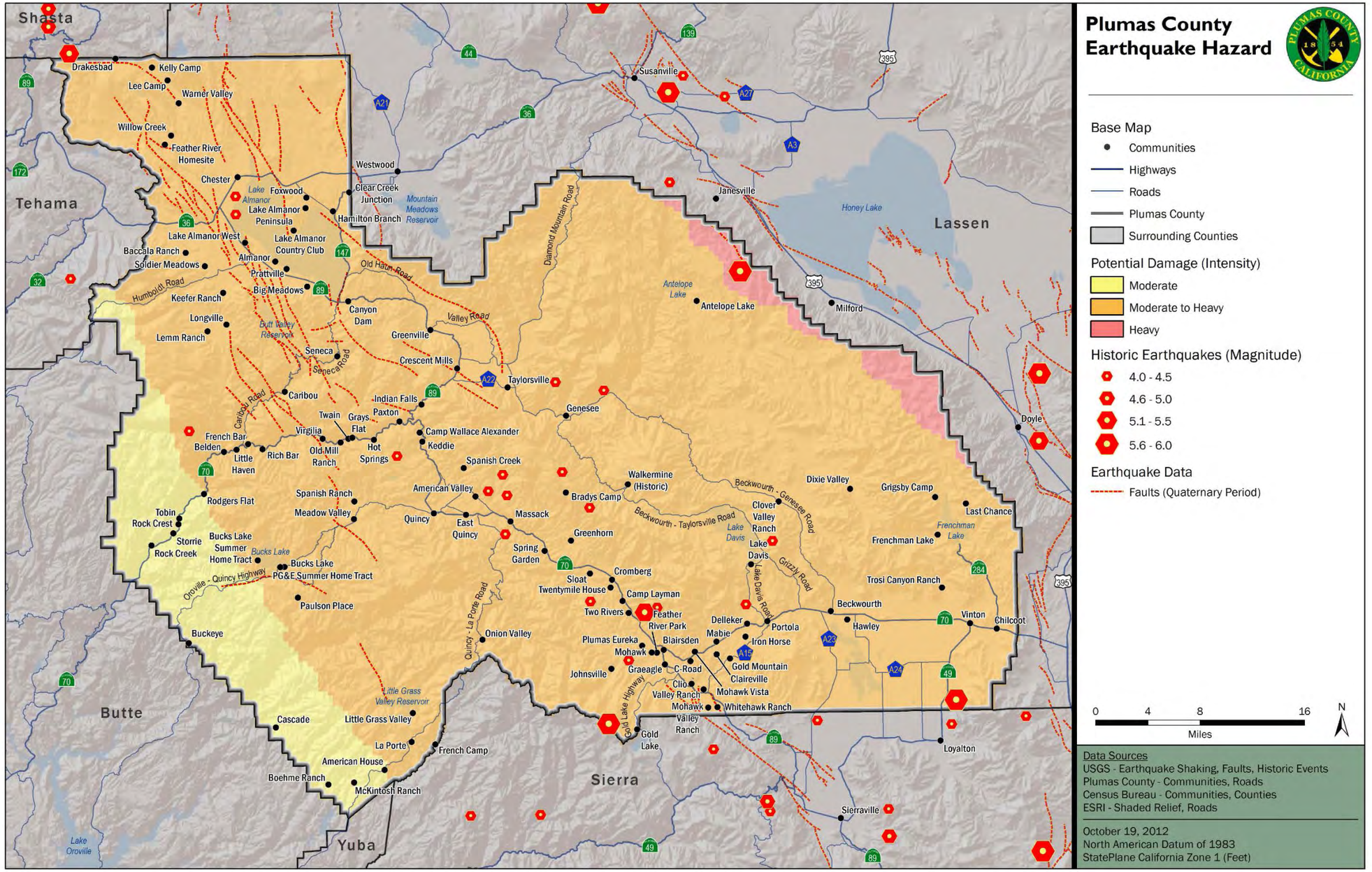


Figure 5-53: Earthquake Shake Intensity Map

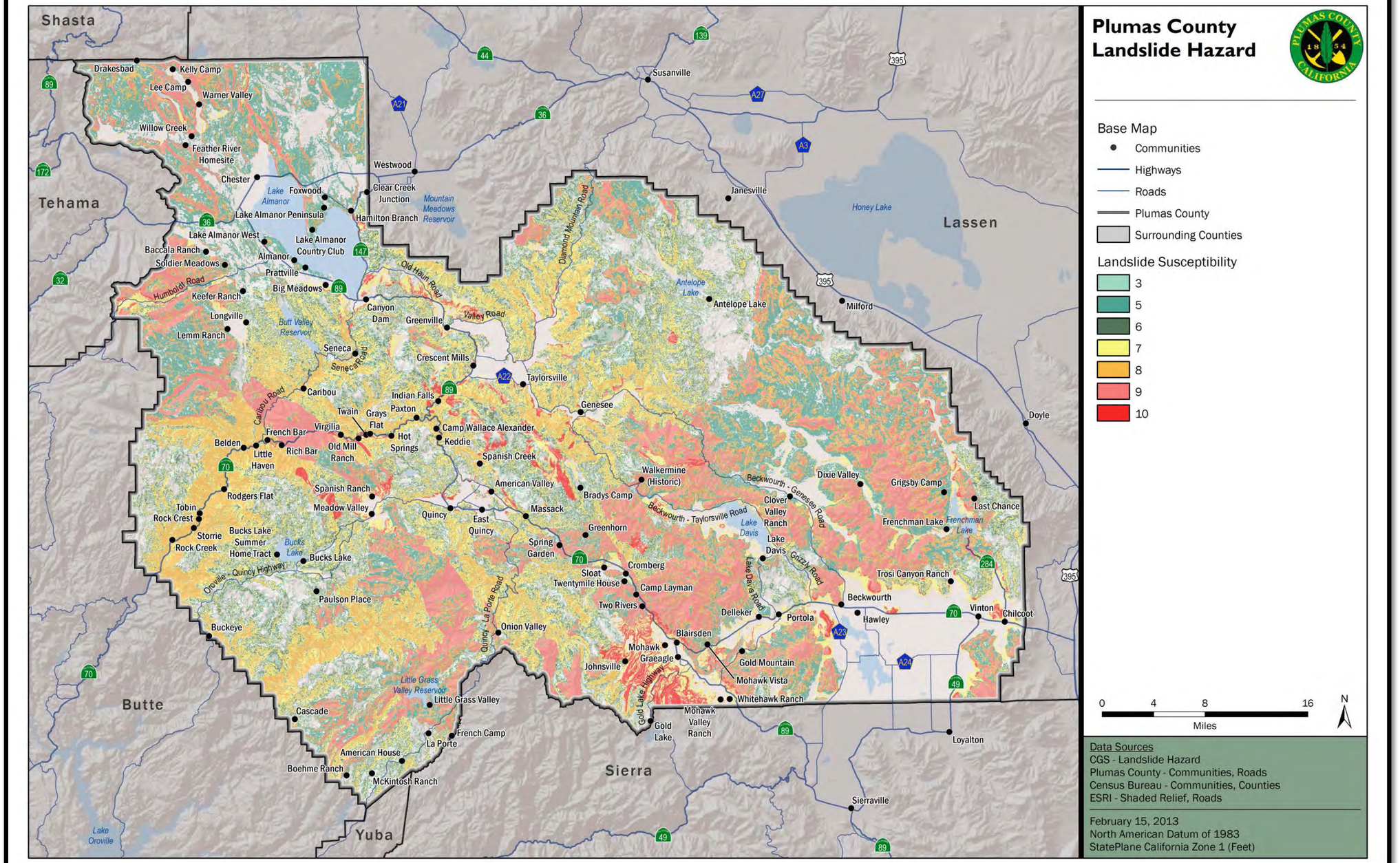


Figure 5-54: Landslide Hazard Map

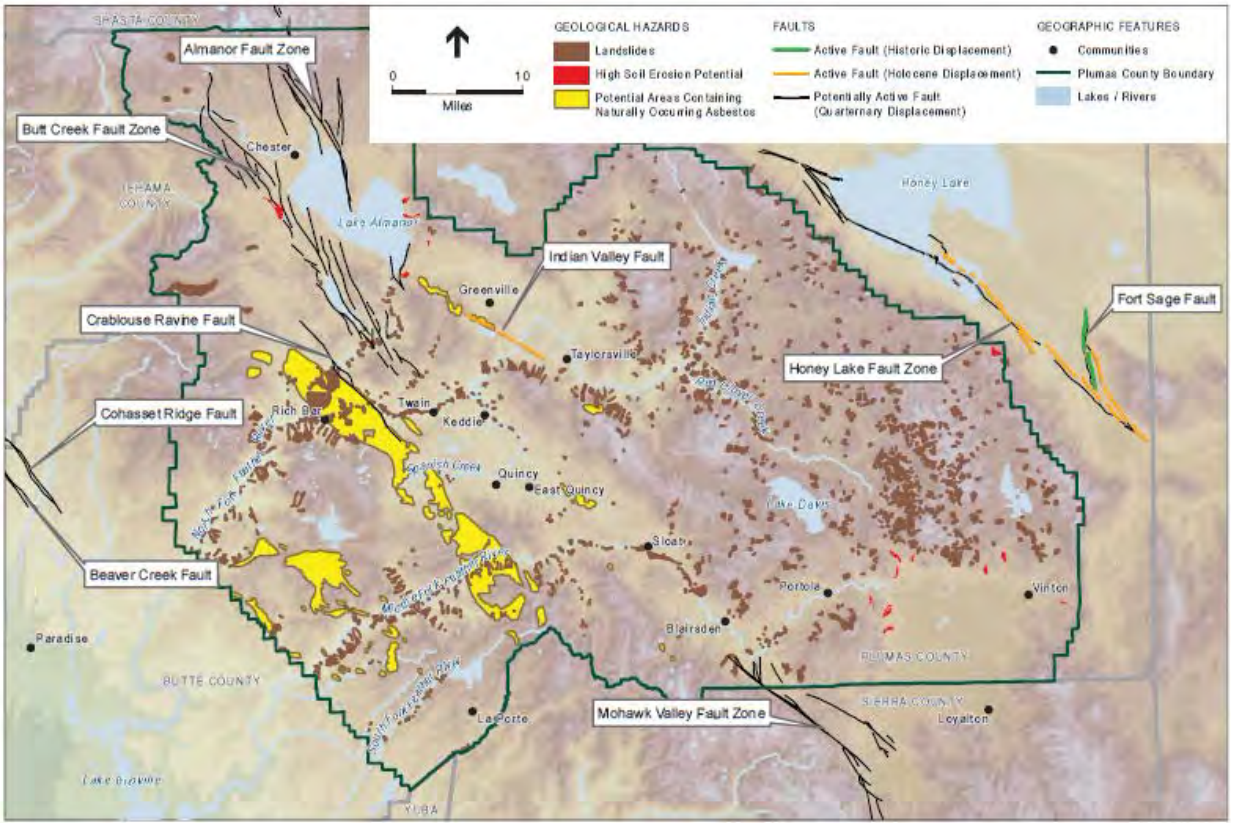


Figure 5-55: Geologic Hazard Map

5.5.7 Magnitude/Severity

5.5.7.1 Earthquake

The most common method for measuring earthquakes is magnitude, which measures the strengths of earthquake. Although the Richter scale is known as the measurement for magnitude, the majority of scientists currently use either the Mw Scale or Modified Mercalli Intensity (MMI) Scale. The effects of an earthquake in a particular location are measured by intensity. Earthquake intensity decreases with increasing distance from the epicenter of the earthquake.

The magnitude of an earthquake is related to the total area of the fault that ruptured, as well as the amount of offset (displacement) across the fault. As shown in Table 5-12, there are seven earthquake magnitude classes, ranging from great to micro. A great class of magnitude can cause tremendous damage to infrastructure in Plumas County, compared to a micro class, which results in minor damage to infrastructure.

Table 5-12: Moment Magnitude Scale

Earthquake Magnitude Classes		
Magnitude Class	**Magnitude Range (M = Magnitude)**	
Great	M > 8	Tremendous damage
Major	7 <= M < 7.9	Widespread heavy damage
Strong	6 <= M < 6.9	Severe damage
Moderate	5 <= M < 5.9	Considerable damage
Light	4 <= M < 4.9	Moderate damage
Minor	3 <= M < 3.9	Rarely causes damage.
Micro	M < 3	Minor damage

The MMI Scale measures earthquake intensity as shown in Table 5-13. The MMI Scale has 12 intensity levels. Each level is defined by a group of observable earthquake effects, such as ground shaking and/or damage to infrastructure. Levels I through VI describe what people see and feel during a small to moderate earthquake. Levels VII through XII describe damage to infrastructure during a moderate to catastrophic earthquake.

Table 5-13: Modified Mercalli Scale

Earthquake Magnitude and Intensity		
Magnitude (M_w)	**Intensity (Modified Mercalli Scale)**	**Description**
1.0 – 3.0	I	I. Not felt except by very few people under especially favorable conditions.
3.0 – 3.9	II – III	II. Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
		III. Felt quite noticeably indoors. Many do not recognize it as an earthquake. Standing motorcars may rock slightly.
4.0 – 4.9	IV – V	IV. Felt by many who are indoors; felt by a few outdoors. At night, some awakened. Dishes, windows and doors rattle.
		V. Felt by nearly everyone; many awakened. Some dishes and windows broken; some cracked plaster; unstable objects overturned.
5.0 – 5.9	VI – VII	VI. Felt by everyone; many frightened and run outdoors. Some heavy furniture moved; some fallen plaster or damaged chimneys.
		VII. Most people alarmed and run outside. Damage negligible in well-constructed buildings; considerable damage in poorly constructed buildings.

Earthquake Magnitude and Intensity		
Magnitude (M_w)	**Intensity (Modified Mercalli Scale)**	**Description**
6.0 – 6.9	VII – IX	VIII. Damage slight in special designed structures; considerable in ordinary buildings; great in poorly built structures. Heavy furniture overturned. Chimneys, monuments, etc. may topple.
		IX. Damage considerable in specially designed structures. Buildings shift from foundations and collapse. Ground cracked. Underground pipes broken.
7.0 and Higher	VIII and Higher	X. Some well-built wooden structures destroyed. Most masonry structures destroyed. Ground badly cracked. Landslides on steep slopes.
		XI. Few, if any, masonry structures remain standing. Railroad rails bent; bridges destroyed. Broad fissure in ground.
		XII. Virtually total destruction. Waves seen on ground. Objects thrown into the air.

5.5.7.2 Slope Failure

Severity of landslides and slope failure are dependent on the area and amount of material. Currently this type of geologic hazard is not classified into magnitude or severity scales.

5.5.7.3 Volcano (Referenced from Lassen County Multi-Jurisdictional HMP)

There is a four-tiered Volcano Alert Level that uses the terms Normal, Advisory, Watch, and Warning (from background levels to highest threat). See Table 5-14. The Volcano Alert Levels are intended to inform people on the ground about a volcano's status and are issued in conjunction with the Aviation Color Code. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details about the nature of the unrest or eruption and about potential or current hazards and likely outcomes. The table on the following page illustrates the Alert Level as well as the associated volcanic state.

Table 5-14: Volcano Alert State

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

5.5.8 Frequency/Probability of Future Occurrences

5.5.8.1 Earthquake

Not Likely - Earthquakes over a magnitude of 6.0 affecting the Plumas County in the last 140 years have occurred once. It is unlikely that an earth quake of magnitude of 6.0 or greater will occur over the next 20 year. However, earthquakes occur less frequently than other primary natural hazard events, they have accounted for the greatest combined losses (deaths, injuries, and damage costs) in disasters since 1950 in California and have the greatest catastrophic disaster potential (Cal EMA 2010). Slope Failure

5.5.8.2 Slope Failure

Likely - The probability of future landslides, slope erosion and avalanche events occurring in the unincorporated areas of Plumas County is likely. It is estimated that the mean number of future damaging landslide events in Plumas County is approximately one event per year. Probability of future occurrences is dependent upon seasonal precipitation and seismic shaking.

Injuries and loss of life from an avalanche are usually due to people recreating in remote areas at the wrong time. Given the topography and amount of snow falling on an annual basis in Plumas County, avalanches and resulting damages, including injuries and loss of life, may occur on a sporadic interval.

5.5.8.3 Volcano (Referenced from Lassen County Multi-Jurisdictional HMP)

Because geologically recent volcanic activity in an area is the best guide to forecasting future eruptions, scientists study the lava flows, ash, and other deposits from past eruptions. Volcanoes in the Plumas-Lassen area tend to erupt infrequently, and may be inactive for periods lasting centuries or even millennia. The most recent eruptions in the Plumas-Lassen area were the relatively small events that occurred at Lassen Peak between 1914 and 1917. The most recent large eruption produced Chaos Crags[11] about 1,100 years ago.

Such large eruptions in the Lassen area have an average recurrence interval of about 10,000 years. However, the geologic history of the Lassen area indicates that volcanism there is episodic, having periods of relatively frequent eruptions separated by long quiet intervals. For example, the last large event before the Chaos Crags eruption was the one that built Lassen Peak 27,000 years ago.

After the eruption of Mount St. Helens in 1980, the U.S. Geological Survey (USGS) intensified its monitoring of active and potentially active volcanoes in the Cascade Range. Monitoring of the Lassen area includes periodic measurements of ground deformation and volcanic gas emissions and continuous transmission of data from a local network of nine seismometers to USGS offices in Menlo Park, California. Should indications of a significant increase in volcanic activity be detected, the USGS will immediately deploy scientists and specially designed portable monitoring instruments to evaluate the threat. In addition, the National Park Service (NPS) has developed an emergency response plan that would be activated to protect the public in the event of an impending eruption.

[11] Chaos Crags is the youngest group of lava domes in Lassen Volcanic National Park, California, having been formed as five dacite domes 1,100-1,000 years ago

5.6 *Severe Weather*

Severe weather can be defined as any destructive weather event that has the potential to damage property or cause loss of life. For example, excessive localized precipitation over a short period of time may result in related flash floods that threaten life and property. In regards to Plumas County, severe summer weather usually occurs as localized storms that bring heavy rain, lightning, strong winds, and microbursts. A severe winter storm in Plumas County would typically result in heavy snowfall or hail.

Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph), which can be destructive to roofs, buildings, automobiles, vegetation, and crops. Thunderstorms and 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. Additionally, indirect lightning damage can also occur when electrical currents pass through or near an object.

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. Strong winds can also damage roofs of houses, topple trees, snap power lines, shatter windows, and overturn mobile homes. Microbursts, which are created by a downdraft of air in a thunderstorm, can produce wind speeds as high as 150 mph.[12] Similar to a tornado, microbursts are characterized by extremely high wind speeds; however, they push wind out in a downburst instead of pulling wind inward as a tornado does.

Extreme snow events are also likely in Plumas County, particularly in higher elevation areas. Winter snow storms can include heavy snow, ice, and blizzard conditions. Heavy snow can immobilize a region stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and down trees and power lines. The cost of snow removal, damage repair, and business losses can have a tremendous impact on communities.

5.6.1 Regulatory Environment

There are negligible formal regulations that pertain to generalized severe weather events.

5.6.2 Past Occurrences

Since 1964, nine federally or state declared severe weather events have occurred in Plumas County as shown in Table 5-15. According to FEMA Declarations and Cal EMA Emergency and Disaster Proclamations (November 1964 to present), these events include: severe winter and summer storms, flooding, landslides, and heavy rain.

[12] NOAA National Weather Service

Table 5-15: Severe Weather; Past Disaster Declarations, Proclamation and Other Recorded Events

Past Disasters in Plumas County							
Disaster Number	**Declaration Date**	**Disaster Type**	**Incident Type**	**Explanation**	**Deaths**	**Injuries**	**Cost***
Federal and State Declarations							
183	12/24/1964	DR	Severe Storm(s)	HEAVY RAINS & FLOODING			$213,149,000
253	1/26/1969	DR	Severe Storm(s)	SEVERE STORMS & FLOODING			Unknown
283	2/16/1970	DR	Severe Storm(s)	SEVERE STORMS & FLOODING			$27,657,478
758	2/21/1986	DR	Severe Storm(s)	SEVERE STORMS & FLOODING	13	67	$407,538,904
979	2/3/1993	DR	Severe Storm(s)	SEVERE WINTER STORM, MUD & LAND SLIDES, & FLOODING	20	10	$226,018,111
1044	1/10/1995	DR	Severe Storm(s)	SEVERE WINTER STORMS, FLOODING, LANDSLIDES, MUD FLOWS	11		$221,948,347
1046	3/12/1995	DR	Severe Storm(s)	SEVERE WINTER STORMS, FLOODING LANDSLIDES, MUD FLOW			Unknown
1155	1/4/1997	DR	Severe Storm(s)	SEVERE STORMS, FLOODING, MUD AND LANDSLIDES	8		$194,352,509
1628	2/3/2006	DR	Severe Storm(s)	SEVERE STORMS, FLOODING, MUDSLIDES, AND LANDSLIDES			$128,964,501

Events may have occurred over multiple counties, so damage may represent only a fraction of the total event damage and may be not specific to Plumas County

5.6.3 Location/Geographic Extent

Plumas County is located in the Sierra Nevada region of the State of California. Severe weather affects all areas of Plumas County but differs significantly by region. Throughout areas of the county there are significant variations in the average temperature and amount of precipitation received due to topography.

According to the U.S. Environmental Protection Agency (EPA) Plumas County is located within the Sierra Nevada eco-region. The Sierra Nevada eco-region is characterized by a severe to mild mid-latitude climate with Mediterranean characteristics. They include mild to hot, dry summers and cool to cold, wet winters. The mean annual temperature ranges from approximately -3°C (at high elevations) to 17°C (at low elevations) in the southwest. The frost-free period ranges from 30 to 320 days depending on region. The mean annual precipitation is 1,070 mm, ranging from 150 mm in the Sierra Valley to over 2,500 mm on high elevation peaks.

5.6.4 Magnitude/Severity of Storms

Plumas County is located in the Northern portion of the Sierra Nevada region and has significant topographic variation, which causes it to experience a more severe and geographically variable winter climate. The highest precipitation amounts are seen in the Western portion of the county where there is an orographic lift that forces air from low elevations to a higher elevation, quickly cooling down the air and raising the relative humidity to 100%. Under the right conditions orographic lifts create rain shadows where high amounts of precipitation are found on the crests of mountain ranges, but as the air descends to the leeward side of the mountain it warms and dries. In Plumas County the leeward side of the mountains represents the Eastern portion of the county where precipitation typically averages around two inches in the wettest months of the year (as seen in Figure 5-56). Areas west of the mountains, however, experience much higher precipitation levels. For example, Bucks Creek averages nearly 12 inches per month in December and January (see Figure 5-57).

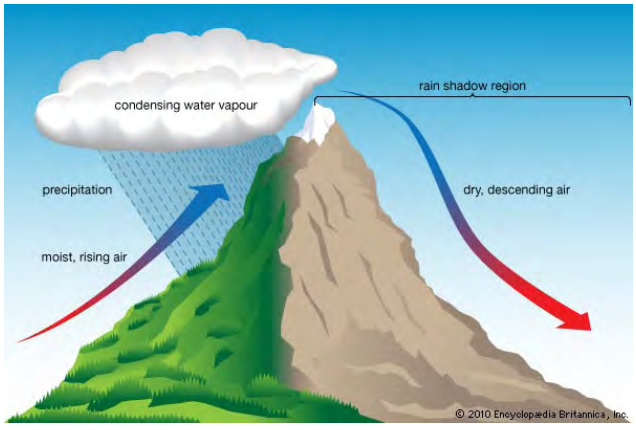


Figure 5-56: Orographic Lift and Rain shadow Effect

This climate regime is typified by annual precipitation from late October through May, with much more seasonally dependent precipitation in the Western portion of the county. The most severe storms occur during the winter months when Plumas County experiences periods of heavy rain and snow on an annual recurring basis. Though difficult to capture magnitude and severity of severe storms in a generalized region, two data sources can be used to develop a general sense of the magnitude and severity of severe storms within Plumas County. Data from both Spatial Hazard Events and Losses Database for the United States (SHELDUS) and the National Climatic Data Center (NCDC) Storm Events Database can be used to analyze the trends in severe weather patterns.

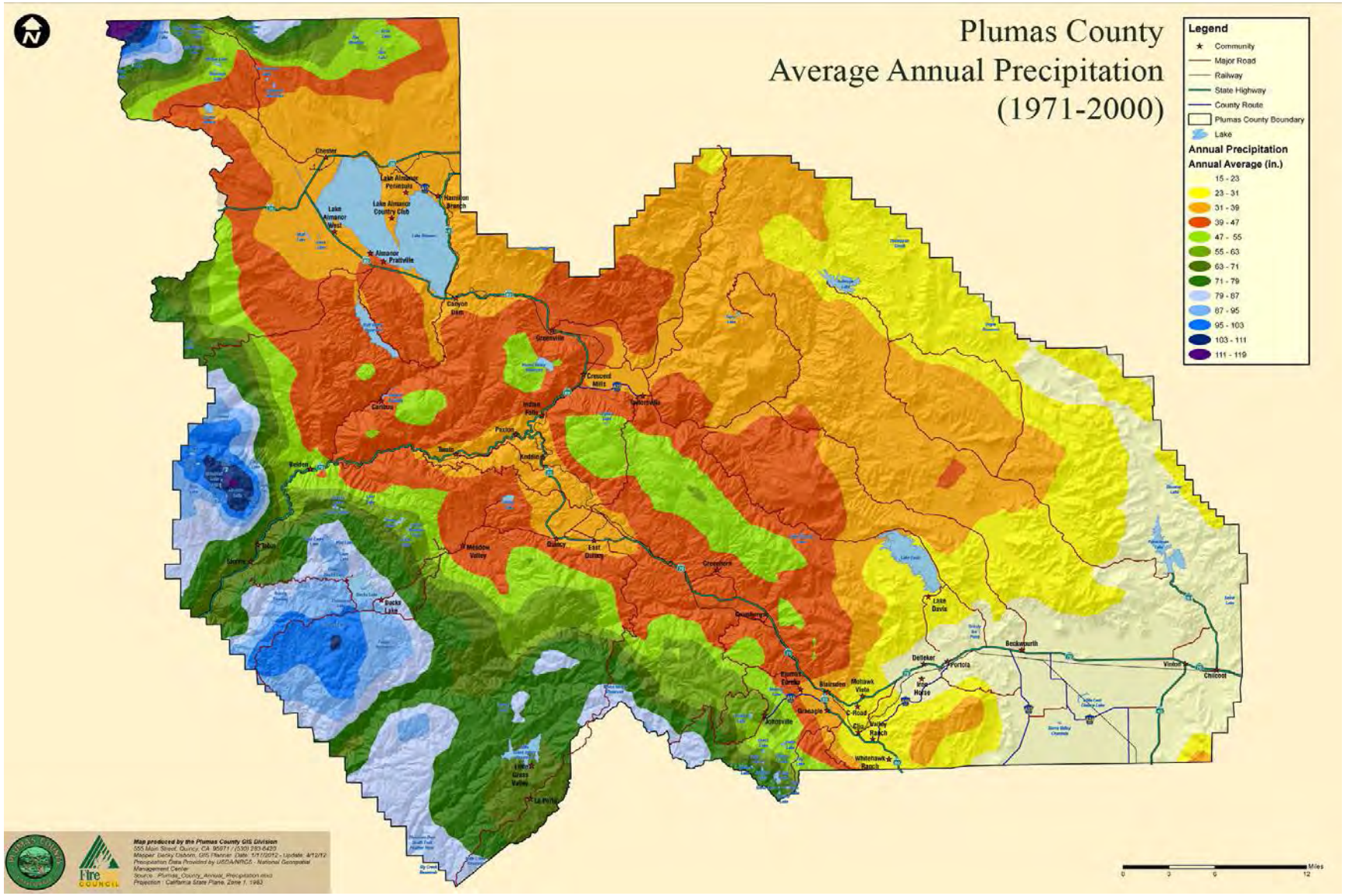


Figure 5-57: Annual Precipitation Map

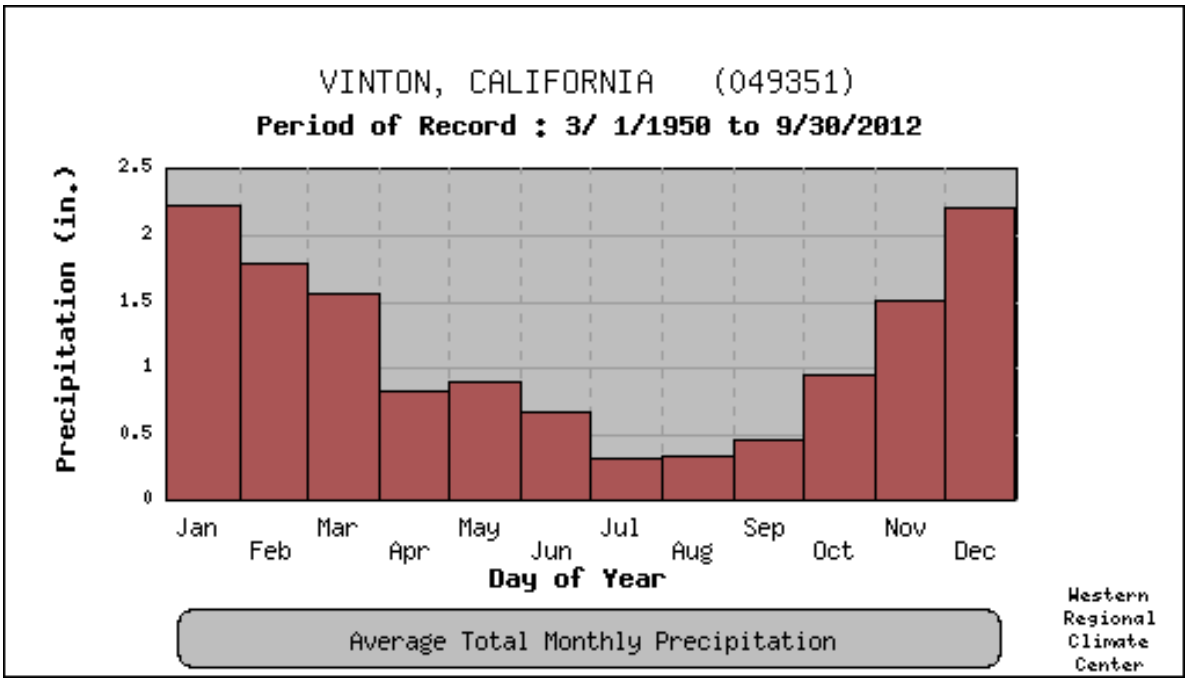


Figure 5-58: Vinton, California Average Monthly Precipitation

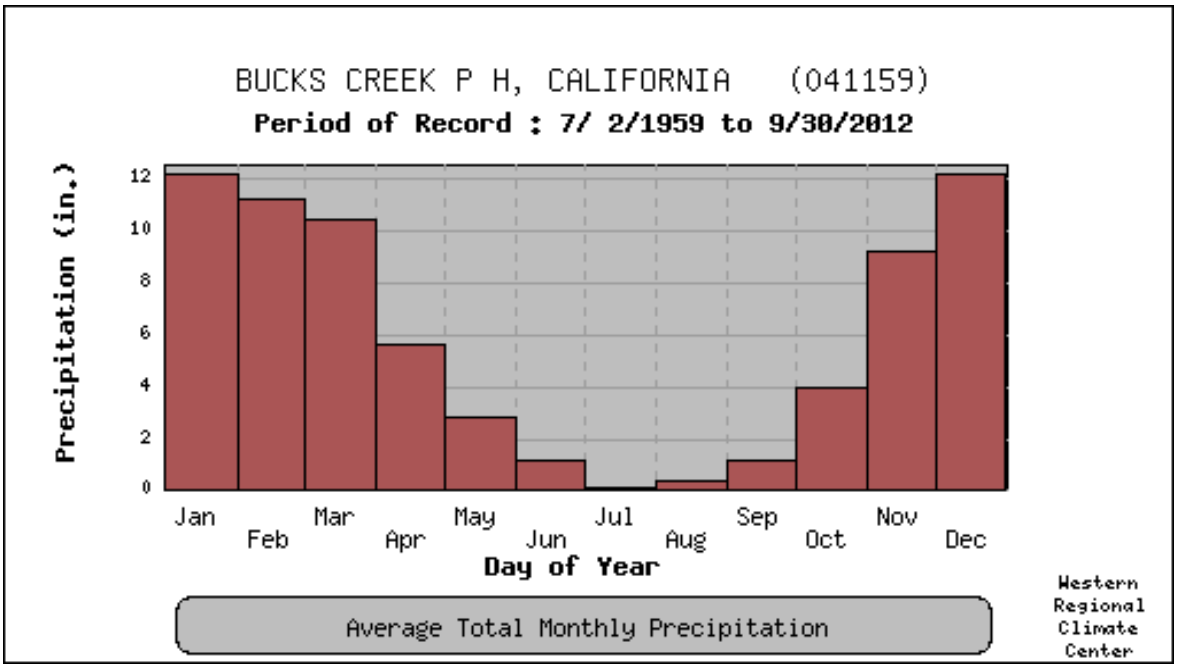
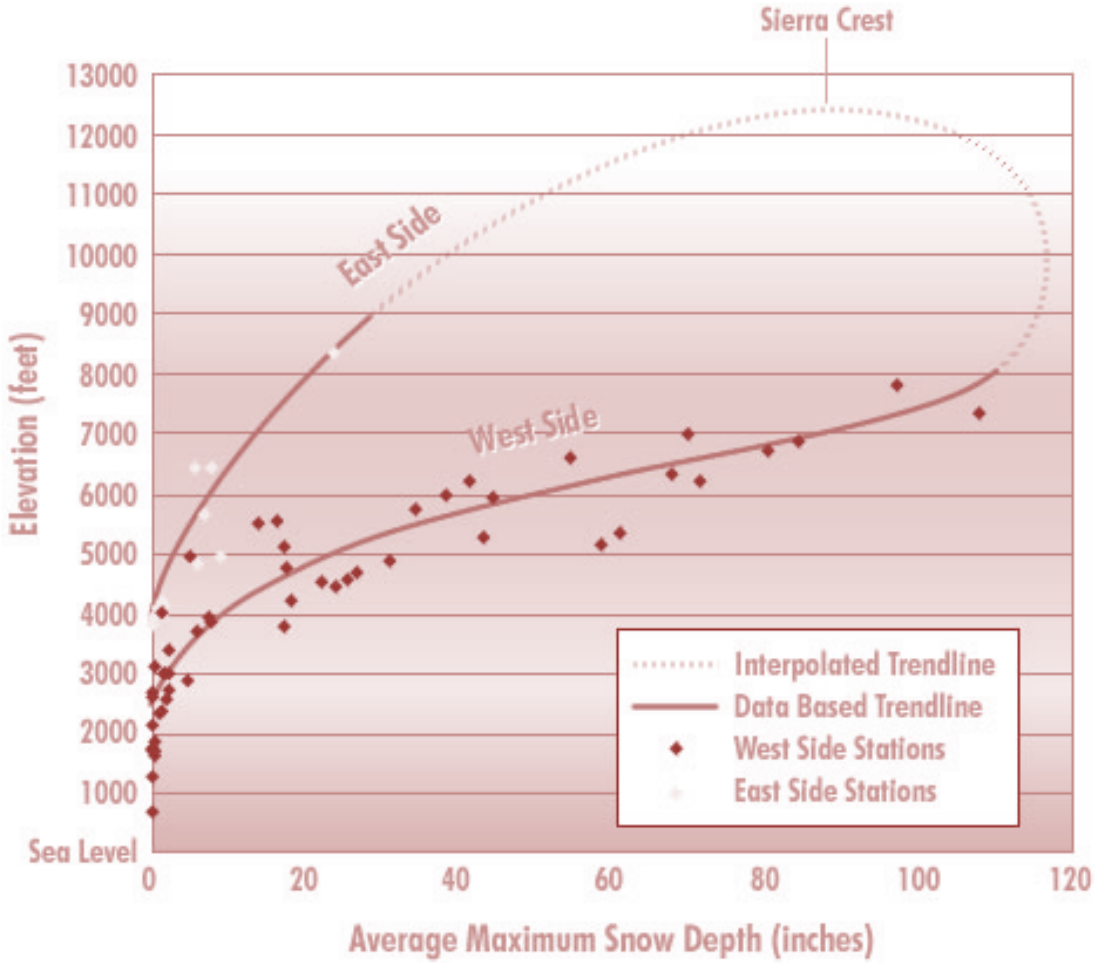


Figure 5-59: Bucks Creek, California Average Monthly Precipitation

Severe snow storms are some of the most common extreme weather events that occur in Plumas County. Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting and dangerous wind chills. Strong winds combined with intense snow storms can 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, significantly increasing the likeliness of serious vehicle accidents.

There have been many extreme snow events that have occurred in Plumas County, most notably in the high elevation regions such as Chester and La Porte. However, lower elevation areas such as Quincy are also susceptible to extreme snow events. As seen in Figure 5-58 and Figure 5-59 the extreme snow events have included up to 60 inches of snow in Quincy and 45 inches of snow in Chester in one month. Two notable snow seasons occurred in 1951-1952, and 1992-1993. During these years the Chester area received a total of 362 inches of snow in 1951-52 and 295 inches in 1992-93. Figure 5-60 and Figure 5-61 show extreme snow events in Chester from 1951-1952 and 2011. See Figure 5-62 and Figure 5-63 for photos of a 1951 and 2011 snow events.



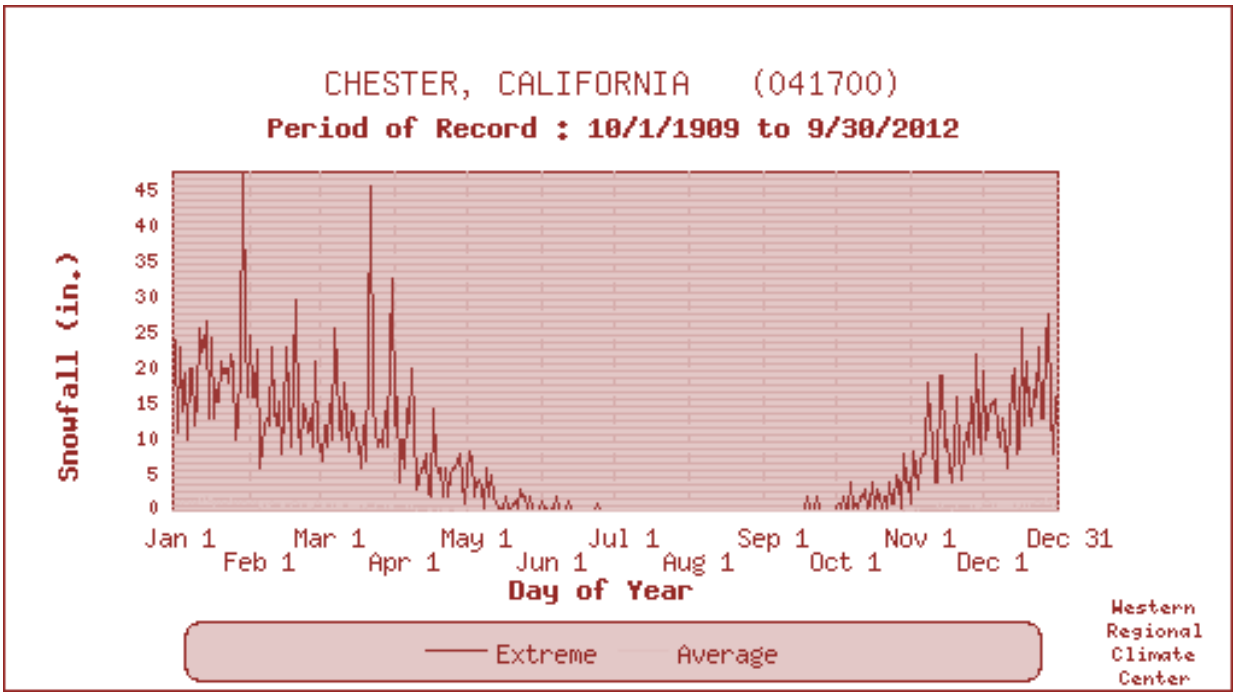


Figure 5-60: Chester, California Average and Extreme Monthly Snowfall

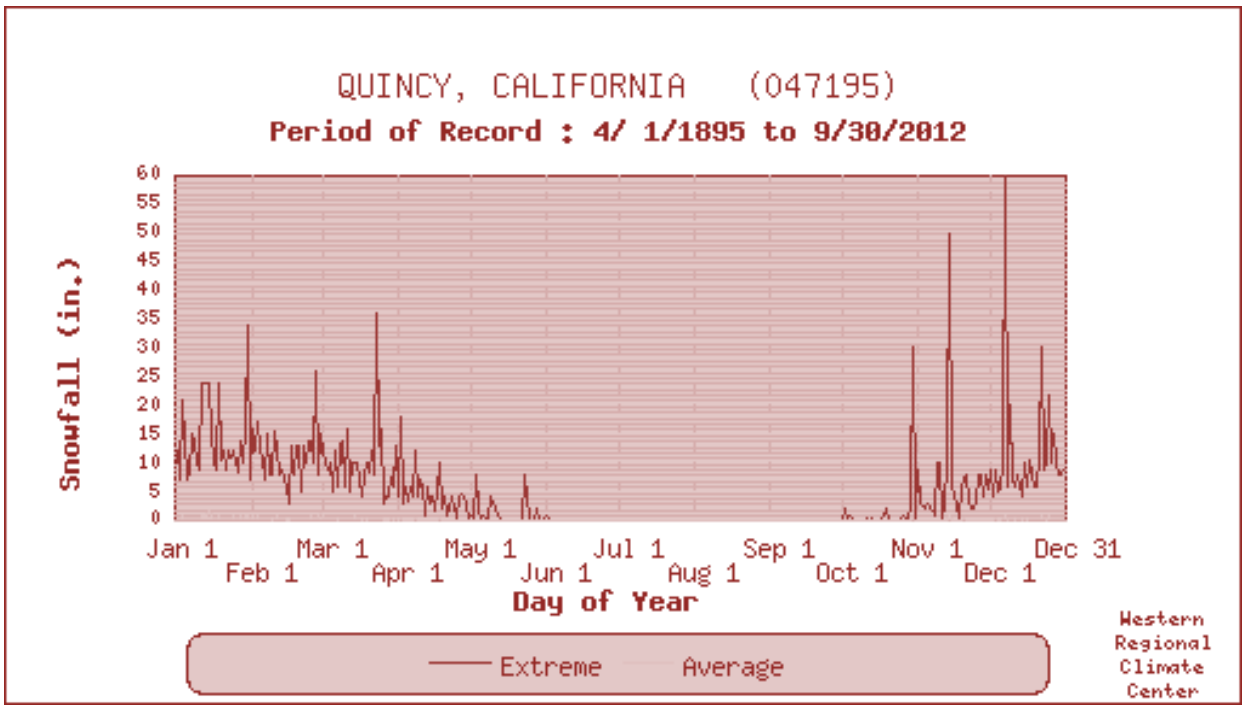


Figure 5-61: Quincy, California Average and Extreme Monthly Snowfall

Figure 5-62: City of Chester 1951-1952 Snow Event

Figure 5-63: City of Chester 2011 Snow Event

5.6.4.1 SHELDUS Data

To develop a snapshot of severe weather magnitude and severity in Plumas County, data from SHELDUS was used to generate Table 5-16. SHELDUS is a county-level data set for the United States that tracks 18 types of natural hazard events (or a combination thereof) along with associated property and crop losses, injuries, and fatalities for the period 1960-2010. Produced by the Hazards Research Lab at the University of South Carolina, this database combines information from several sources (including the NCDC). Only events that generated more than $50,000 in damage were included in Table 5-12. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the affected counties (e.g., if four counties were affected, then a quarter of the dollar losses, injuries, and deaths were attributed to each county). Events that were reported by the NCDC with a specific dollar amount are included in SHELDUS.

The NCDC Events and SHELDUS tables below summarize severe weather events that occurred in Plumas County. Only a few of the events actually resulted in state and federal disaster declarations. It is further 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 these inconsistencies are recognized this data provides value by describing the County's "big picture" severe weather hazard environment.

5.6.4.2 National Climatic Data Center (NCDC) Events

In addition to the federally declared events in Plumas County and SHELDUS, the National Oceanic and Atmospheric Administration's (NOAA) NCDC has been tracking severe weather in Plumas County from 2006 through 2012. NCDC's Storm Events Database contains detailed data on six severe weather events for Plumas County. The information below summarizes the magnitude and severity of these events.

Event One: Sloat

On October 19th, 2007, a strong cold front moved through the northern and central Sierra and western Nevada. Strong wind and locally heavy rainfall accompanied the cold front. A trained weather spotter reported a storm total of 1.25 inches of rainfall at Sloat.

Event Two: Tobin

On March 2nd, 2009, a cold winter storm brought one to five feet of storm total snow accumulation to the higher mountains of the southern Cascades and to the northern Sierra Nevada. Snow levels dropped to near 4000 feet during the latter part of the storm. Gusty winds brought reduced visibilities and broad drifting of snow. This system also generated thunderstorms in the Central Valley bringing heavy rain, flash flooding, and other severe effects. Large amounts of hail were reported over Shasta and Glenn Counties, larger than quarter size and more than 6 inches deep in some areas. Flash flooding and slides closed Highway 70 with minor flooding over a number of rural roads. Numerous car accidents from wet roads were reported across the area, as well as trees falling from a combination of wet ground and wind. CHP closed the west bound lane of Highway 70 in the Rich Bar area due to a rock slide resulting from heavy rainfall on a burn area.

Table 5-16: SHELDUS Severe Weather Hazard Data 1960-2005*

Severe Weather Type	Count of Hazard	Fatalities	Injuries	Property Damage**	Crop Damage**
Drought	1	0	0	$17,517	$-
Flooding	4	1.64	2.18	$66,352,875	$1,314
Flooding - Severe Storm/Thunder Storm	2	0	0	$443,966	$183,929
Flooding - Severe Storm/Thunder Storm - Wind	1	0	0	$-	$16,540,887
Flooding - Wind - Winter Weather	1	0	0	$2,118	$-
Flooding - Winter Weather	2	0	0	$31,134	$-
Fog	1	0	0	$435	$-
Hail	2	0	0	$130	$6,131
Hail - Severe Storm/Thunder Storm - Wind - Winter Weather	1	0.03	0.02	$634	$-
Heat	1	0	1.03	$-	$-
Landslide	1	0	0	$763	$-
Landslide - Winter Weather	1	1	0	$4,470	$-
Lightning	5	1.57	7.29	$7,083,321	$-
Lightning - Severe Storm/Thunder Storm	1	0	0	$1,314	$1,314
Lightning - Wind - Winter Weather	1	0	0.07	$8,759	$876
Severe Storm/Thunder Storm	9	0.8	0.3	$5,399,270	$122,632
Severe Storm/Thunder Storm - Wind	9	0.93	2.83	$1,387,676	$266,480
Severe Storm/Thunder Storm - Wind - Winter Weather	3	0.03	0	$109,704	$59,195
Severe Storm/Thunder Storm - Winter Weather	1	0	0	$24,524	$-
Wildfire	3	0	0	$31,199,838	$-
Wind	22	0.15	0.37	$3,281,888	$3,708
Wind - Winter Weather	3	0.07	0.43	$5,035	$0
Winter Weather	30	0.28	2.34	$960,072	$252,706,299
Grand Total	**105**	**6.5**	**16.86**	**$116,315,443**	**$269,892,765**

Source: SHELDUS, Hazards Research Lab, University of South Carolina, www.sheldus.org/
**Events may have occurred over multiple counties, so damage may represent only a fraction of the total event damage and may be not specific to Plumas County*
***Property and Crop Damage are adjusted for 2011.*

Event Three: Cromberg

Strong thunderstorms occurred across the eastern Sierra and western Nevada the afternoon and evening of May 28th, 2009. A trained weather spotter reported 1-inch diameter hail in Cromberg.

Event Four: Portola

On June 3rd, 2009, thunderstorms and heavy rainfall affected northeastern California. The Plumas County Sheriff's Department reported that a woman was struck by lightning at her home in Portola. She was transported by helicopter to the U.C. Davis Medical Center. She never regained consciousness and died from her injuries on June 11th.

Event Five: Chester Airport

On July 28th, 2009, an upper level low pressure system on the coast coupled with an unstable atmosphere brought isolated thunderstorms over the mountains of interior northern California. Hail was reported locally in western Plumas County each day. A Co-operative observer estimated hail from dime to penny sized.

Event Six: Wonderland

On July 29th, 2009, an upper level low pressure system on the coast coupled with an unstable atmosphere brought isolated thunderstorms over the mountains of interior northern California. Hail was reported locally in western Plumas County each day. Lassen Volcanic National Park rangers reported quarter sized hail.

5.6.5 Frequency/Probability of Future Occurrences

Severe weather will continue to occur annually throughout Plumas County. The frequency and probability of future occurrences is highly likely. Due to past existing weather patterns and climate change increases in the probability of future occurrences of severe weather events in the county are anticipated to continue.

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5.7 *Dam Failure*

A dam failure is usually the result of neglect, poor design, and/or structural damage caused by a major event such as an earthquake. When a dam failure occurs, an enormous quantity of water is suddenly released, destroying infrastructure and flooding the area downstream of the dam (ABAG 2011).

Dams are man-made structures built for a variety of uses. Uses include agriculture, flood protection, power generation, recreation, and water supply. Dam failure can occur with little warning. As outlined by FEMA, dam failure can occur due to one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam.
- Deliberate acts of sabotage to the dam.
- Structural failure of materials used in dam construction.
- Movement and/or failure of the foundation supporting the dam.
- Settlement and cracking of concrete in the dam.
- Piping and internal erosion of soil in the dams.
- Inadequate maintenance and upkeep of the dam.

5.7.1 Regulatory Environment

Dam regulatory requirements at a federal, state, and local level are critical for the safeguarding of agriculture, economy, power supply, and quality of life in Plumas County. At the federal level, FEMA is working to protect communities from dam failure through the National Dam Safety Program (NDSP). The Water Resources and Development Act of 1996 formally established the NDSP. The NDSP is a partnership of the states, federal agencies, and other stakeholders to encourage individual and community responsibility for dam safety. The Dam Safety and Security Act of 2002, signed into law on December 2, 2002, reauthorized the NDSP for 4 more years and added enhancements to the 1996 Act that are designed to safeguard dams against terrorist attacks (FEMA 2010).

The USACE maintains the National Inventory of Dams (NID), since its inception in 1972. Dams included in the NID are either greater than 25 feet high, hold more than 50 acre-feet of water, or are considered a significant hazard if they were to fail. Dams are classified based on the severity or magnitude of the potential devastation and losses of human life, economic, and environmental resources. Dam hazard classifications are defined as follows:

- High Hazard - loss of one human life is likely if a dam failure should occur.
- Significant Hazard - possible loss of human life and likely significant property or environmental destruction if a dam failure should occur.
- Low Hazard - no probable loss of human life and low economic, and/or environmental losses if a dam failure should occur.

At a state level, laws pertaining to the California dam safety program were originally adopted in 1929. Under this program, the DWR's Division of safety of Dams (DsoD) independently reviews and evaluates designs of new dams. DWR performs frequent inspections of dams under construction and of those recently completed to verify compliance with approved plans and specifications.

Due to the near failure of the Lower San Fernando Dam during the 1971 San Fernando earthquake, the State of California (Cal EMA) passed a law requiring dam owners to develop maps depicting areas that might be inundated due to dam failure. Cal EMA approves the dam inundation maps and distributes them to local governmental agencies, who in turn adopt emergency procedures for the evacuation and control of areas in the event of a dam failure. This law requires that each map be produced only once, without any requirements for updating.

Under the regulation of DsoD, dam owners and operators in Plumas County are required to routinely inspect their facilities. These inspections and evaluations will alert owners and operators to potential dam failures and allow immediate action to remedy the problem.

5.7.2 Past Occurrences

A dam failure event has never occurred in Plumas County. However, there have been four dam failures in surrounding counties, and 11 dam failures in California. One dam failure event near Plumas County was the failure of a Folsom Dam spillway gate. In July 17, 1995, nearly 40 percent of Folsom Lake drained before the spillway could be repaired. Nearly 40,000 cubic feet (1,100m^3) flowed through the broken gate. The United States Bureau of Reclamation (USBOR) attributed the failure to a design flaw.

Another dam failure occurred in Placer County on the Lower Hell Hole Dam on December 22, 1964. The dam location was approximately 100 miles east of Sacramento, California on the Rubicon River. The failure was caused by erosion that was a result of constructing the dam during a period of record rains. The 30,000 acre foot flood from the dam failure destroyed two suspension bridges and one steel girder State Highway bridge. The incident resulted in $160,000,000 in lawsuits filed for damages.

A dam failure at Lava Cap Mine tailings dam also occurred near Nevada City, California in the winter of 1997. The failure was caused by a rotted log in the dam which released 10,000 cubic yards of arsenic-tainted tailings into Little Clipper Creek and Lost Lake.

5.7.3 Location/Geographic Extent

According to data provided in the NID, there are 23 recorded dams within Plumas County. There are 8 High Hazard, 11 Significant Hazard, and 4 low hazard dams exist throughout the Feather River watershed. Refer to Figure 5-64 for the specific dam locations in Plumas County and Table 5-17 for more information on individual dams.

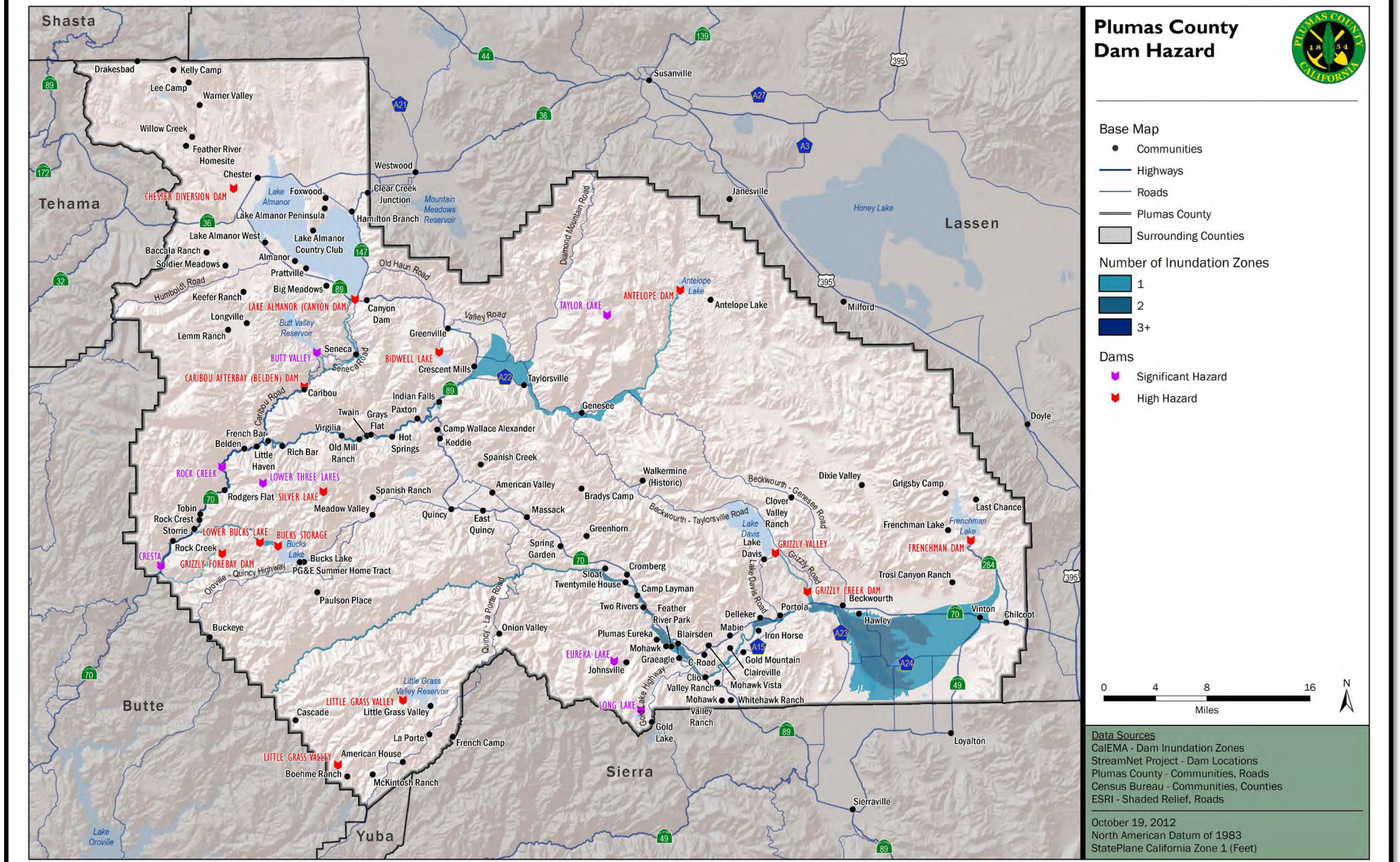

Figure 5-64: Dam Hazard Map

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Table 5-17: NID Recorded Dams within Plumas County

Dam Name	NID Id.	Hazard Class	Nearest Pop.	Dist. to Nearest Pop.	River	Owner Name	Year Built	Hgt.	Max. Storage	Norm. Storage	Max. Discharge	EAP	Inund Zone
Antelope	CA00037	S	Taylorsville	18	Indian Creek	DWR	1964	113	-	22566	30200	Y	Y
Belden Forebay	CA00413	H	Little Haven	7	North Fork Feather River	PG&E	1958	152	2477	2480	37000	Y	Y
Bidwell Lake (Round Valley)	CA00530	S	Greenville	2	Canyon Cr	Indian Valley CSD	-	35	-	5200	2575	Y	Y
Bucks Lake	CA00332	H	Pulga	20	Brush Creek	PG&E	1928	123	105605	102000	15000	Y	Y
Butt Valley	CA00326	H	Little Haven	11	Butt Creek	PG&E	1924	80	49897	49800	20000	Y	Y
Chester Diversion	CA01173	S	Chester	1	Nfk Feather Rv	Recl Board Sac-San Joaquin	1975	47	-	75	73400	Y	-
Cresta	CA00329	S	Pulga	7	North Fork Feather River	PG&E	1949	113	4140	2000	132000	Y	Y
Eureka	CA00031	S	Blairsden	5	Eureka Creek	State Dept. of Parks & Rec	1866	29	-	220	465	Y	-
Frenchman	CA00032	H	Vinton	8	Lit Last Chance Cr	DWR	1961	129	-	55477	173	Y	Y
Grizzly Creek	CA00532	S	Portola	5	Big Grizzly Cr	Jared Stein	1915	39	-	140	2490	Y	-
Grizzly Forebay	CA00333	S	Pulga	14	Grizzly Creek	PG&E	1928	98	1,112	1,110	3,200	Y	Y
Grizzly Valley (Lake Davis)	CA00039	H	Portola	8	Big Grizzly Cr	DWR	1966	115	-	83,000	3,450	Y	Y
Lake Almanor	CA00327	H	Seneca	5	North Fork	PG&E	1927	135	1,142,964	1,140,000	70,000	Y	Y

					Feather River								
Little Grass Valley	CA00269	H	Lumpkin	10	Sfk Feather Rv	SFWPA[13]	1961	210	0	93,010	21,350	Y	-
Long Lake	CA00534	S	Blairsden	6	Gray Eagle Creek	Graeagle Water Co	1938	12	0	1,478	625	Y	Y
Lower Bucks Lake	CA00331	S	Pulga	18	Brush Creek	PG&E	1928	99	5840	5,840	15,375	Y	Y
Rock Creek	CA00330	H	Tobin	4	North Fork Feather River	PG&E	1950	115	548	2,300	400	Y	Y
Silver Lake	CA00531	S	Quincy	10	Silver Creek	Soper-Wheeler Company	1906	21	0	650	715	Y	-
Slate Creek Diversion	CA00271	S	American House	2	Slate Creek	SFWPA	1961	72	0	643	39,100	Y	-
South Fork Diversion	CA00270	L	Forbestown	10	Sfk Feather Rv	SFWPA	1961	70	0	88	30,000	Y	-
Spring Val Lake	CA01077	L	Leavitt	1	Rock Creek	DFG	1979	11	0	75	600	Y	-
Taylor Lake	CA00533	L	Taylorsville	12	Tr Indian Creek	The Nature Conservancy	1929	14	0	380	490	Y	-
Three Lakes	CA00334	L	Rogers Camp	3	Feather River	PG&E	1928	33	606	513	500	N	-

Source: U.S. Army Corps of Engineers (USACE) National Inventory of Dams (NID) Database. Accessed 2012

[13] South Feather Water And Power Agency

5.7.4 Magnitude/Severity

Dam failure inundation zones have been prepared for a number of High Hazard and Significant Hazard dams in Plumas County. Dam failure Inundation zones are developed by using engineering hydrology modeling methods completed with various engineering technics. The results of the dam failure modeling often are displayed the form of inundation zones which are included in the dam emergency actions plan (EAP) held by dam owners, Cal EMA and DWR DsoD personnel. Modeled dam inundation zones represent the best estimate of where the water would flow if the dam completely failed with a full reservoir. Inundation pathways are often based upon a "sunny day event" however, some models may include dam failure results as a result of severe weather events with heavy precipitation. Weather event modeling provides the Probable Maximum Flood (PMF) in drainage areas, stressing the dam's maximum holding capacity. In Plumas County dam failure inundation zones cover 61,621 acres, or 3.6 percent, of Plumas County land area. Refer to Figure 5-64 for dam inundation locations.

5.7.5 Frequency/Probability of Future Occurrences

No quantitative information exists for a dam failure in Plumas County. When a dam is recognized to have a potential failure, the water level is reduced to allow for a reduction in water pressure and volume behind the dam. This reduction of water level is required by the DSOD and by safety protocols established by each dam owner (ABAG 2011).

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5.8 *Drought*

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. Drought severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity.

Drought originates from a deficiency of precipitation over an extended period, usually one or more seasons. Drought can result in a water shortage for some activity, group, or environmental sector. Drought is a complex natural hazard, which is reflected in the following four definitions commonly used to describe it:

- Agricultural – drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.
- Hydrological – drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Meteorological – drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Socioeconomic – drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be called a water management drought.

Although climate is a primary contributor to hydrological drought, other factors such as changes in land use (e.g., deforestation), land degradation and the construction of dams all affect the hydrological characteristics of the basin. Since regions are interconnected by hydrologic systems, the impact of meteorological drought may extend well beyond the borders of the precipitation-deficient area. Similarly, changes in land use upstream may alter hydrologic characteristics such as infiltration and runoff rates, resulting in more variable stream flow and a higher incidence of hydrologic drought downstream. Land use change is one of the ways human actions alter the frequency of water shortage even when no change in the frequency of meteorological drought has been observed.

5.8.1 Regulatory Environment

A number of regulatory requirements and documents address planning for drought in California and Plumas County specifically. These regulatory documents include the 2004 Feather River Watershed Management Strategy, 2005 Upper Feather River Watershed Integrated Regional Water Management Plan, 2011 Plumas County General Plan, and the 2010 California Drought Contingency Plan.

5.8.1.1 2004 Feather River Watershed Management Strategy

Plumas County encompasses most of the Upper Feather River watershed, which is the watershed for the State Water Project's primary storage facility at Lake Oroville. As part of the Monterey Settlement Agreement, the Department of Water Resources (DWR), Plumas County, and the State Water Project Contractors created the Plumas Watershed Forum to implement watershed management and restoration activities for the benefit of the State Water Project. One of the goals of the management plan is to improve groundwater retention and storage in major aquifers in order to stabilize groundwater levels for drought purposes.

5.8.1.2 2005 Upper Feather River Watershed Integrated Regional Water Management Plan

The Integrated Regional Water Management (IRWM) Plan is an implementation plan for the management of water resources throughout the Upper Feather River Watershed. The IRWM Plan Objective 8: Groundwater Recharge and Extraction Balance, identifies drought conditions and increased competition for surface water. Action 6.3: Water Supply Actions, initiates management actions for the watershed to build better understanding of existing water right conflicts between urban, agriculture, and recreational stakeholders by sub-watershed. The action plan recognizes sub-watershed water budgets, the protection of agricultural water rights and urban water rights, and the protection and monitoring of groundwater recharge areas as action areas for improving drought control and preparedness within the watershed.

5.8.1.3 2011 Plumas County GP

The 2011 Plumas County GP addresses drought in its Water Resources element, Goal 9.5 Public Water Supply. The Public Water Supply goal is to encourage public water systems and their sources to provide an adequate supply to meet long-term needs provided in a manner that maintains water resources for other water users while protecting the natural environment. As part of this goal, the General Plan identifies policies such as Policy 9.5.2: Cooperative Planning for Water Supply. This particular policy encourages the County to work with public water supply purveyors to disseminate and discuss information on the limits of available water supplies, how the supplies can be used efficiently, the possible effects of drought conditions, and acceptable levels of risk of shortage for various water users. The GP also encourages the County to assist in the preparation of master facilities plans, and urban water management plans where required by State law.

5.8.1.4 2010 California Drought Contingency Plan

The California Drought Contingency Plan was prepared in conjunction with the 2009 California Water Plan and will be updated every five years. The purpose of the plan is to minimize drought impacts by improving agency coordination, enhancing monitoring and early warning capabilities, water shortage impact assessments and preparedness, response and recovery programs. The California Water Plan presents strategic plan elements including a vision, mission, goals, guiding principles, and recommendations for current water conditions, challenges and activities. The plan includes future uncertainties and climate change impacts, scenarios for 2050, and a roadmap for improving data and analytical tools needed for integrated water management and sustainability.

5.8.2 Past Occurrences

The 2010 State Hazard Mitigation Plan (SHMP) states that from 1950 to 2009, there have been eight-drought State Emergency Proclamations in California. Through 2007, Cal EMA's administered costs due to drought total $2,686,858,480. Specifically for Plumas County, there have been five drought incidences since 1972, however none of the incidences were considered a state or federally declared drought disaster.

Additional information about previous occurrences of droughts in California (in general) can be obtained from the California Department of Water Resources.

5.8.3 Location/Geographic Extent

Drought can affect the entire Plumas County; however, unlike much of Central and Southern California regions, Plumas County rarely experiences long periods of extremely low precipitation due to its geographic location in the Sierra Nevada region. Instead, Plumas County's drought issues stem from poor retention of precipitation and depletion of deep groundwater systems as a result of continued extraction and reduced recharge during dry periods. Loss of water tables and depletion of shallow aquifers is a typical consequence of head cutting[14] throughout the watershed. Poor retention of precipitation is also a consequence when head cutting lowers water tables and changes the vegetation to more desert types.

Some areas of the watershed are experiencing dry year depletions of deep groundwater systems as a result of extraction. The Sierra Valley is an example of a high desert groundwater basin developed for agriculture that experiences periodic drought depletions that only recover during wet periods. Prior to the end of the 1970's most groundwater use in the valley was stock water from deep flowing artesian wells. However, significant groundwater declines occurred in the 1980's when many deep, large capacity irrigation wells were developed to grow alfalfa and other crops. Since then, the Sierra Valley Groundwater Management District has monitored pumping rates on all wells pumping 100gpm or more. The District has also established water budgets in the areas of significant agricultural pumping in order to manage drought depletions.

5.8.4 Magnitude/Severity

The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and estimate future expected conditions. The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning. The NIDIS maintains the U.S. Drought Portal (www.drought.gov) which is a web-based access point to several drought related resources. Resources include the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO).

[14] A head cut is an erosional feature of some intermittent and perennial streams where an abrupt vertical drop (or knickpoint) occurs in the stream bed. As erosion of the knickpoint and the streambed continues, the head cut will migrate upstream.

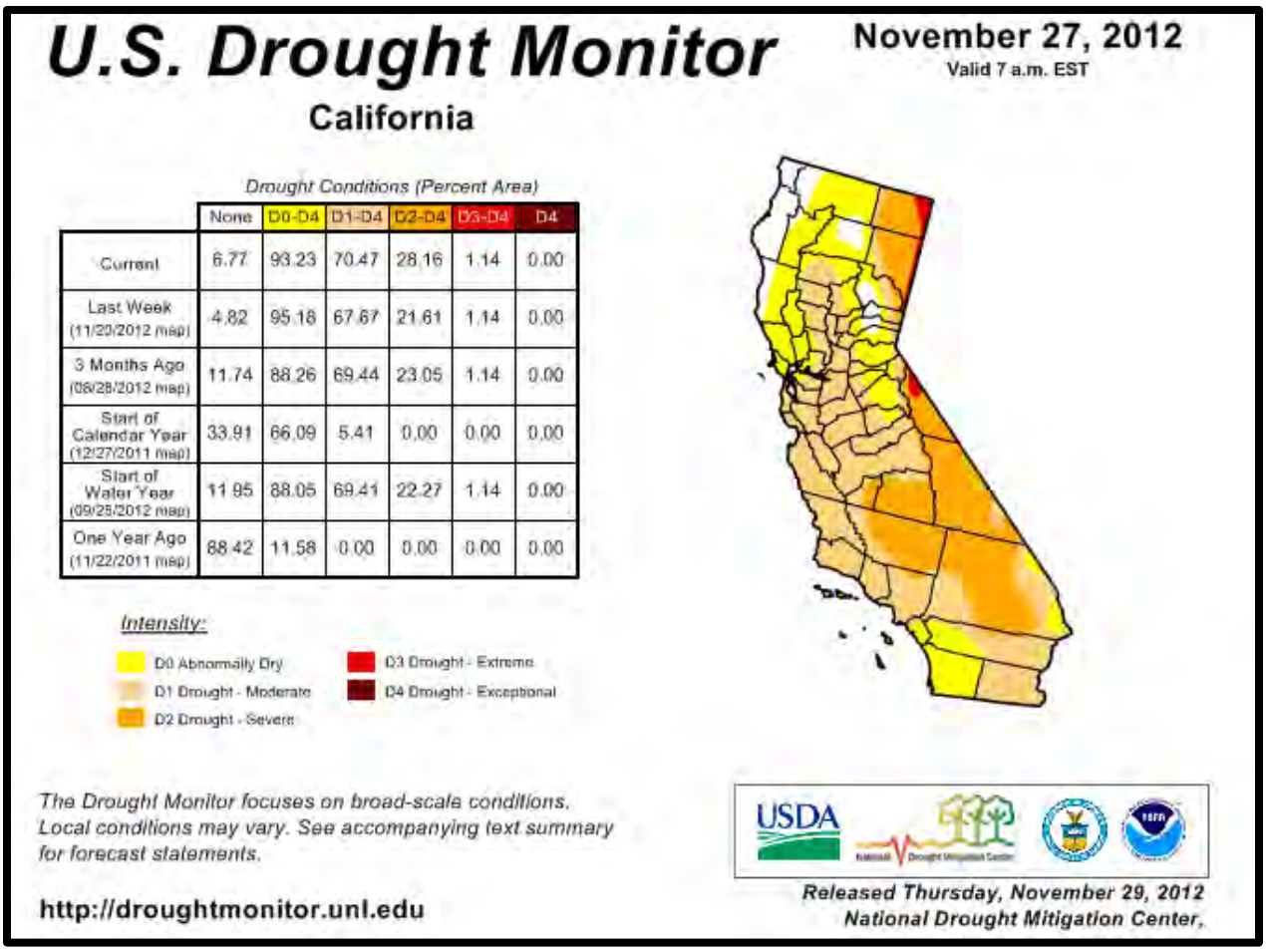

Figure 5-65: Drought Monitor Map for the State of California on November 27, 2012

The USDM provides a summary of drought conditions across the United States and Puerto Rico and is developed and maintained by the National Drought Mitigation Center (www.drought.unl.edu). USDM includes the U.S. Drought Monitor Map. This map is updated weekly by combining a variety of drought database and indicators, and local expert input into a single composite drought indicator. The map denotes four levels of drought intensity (ranging from D1 - D4) and one level of "abnormal dryness" (D0). In addition, the map depicts areas experiencing agricultural (A) or hydrological (H) drought impacts. These impact indicators help communicate whether short- or long-term precipitation deficits are occurring. An example Drought Monitor Map for the State of California on November 27, 2012 is illustrated in Figure 5-65.

The USSDO, shown in Figure 5-66, is a three-month projection of potential drought conditions developed by the National Weather Service's Climate Prediction Center at the following website: http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html.

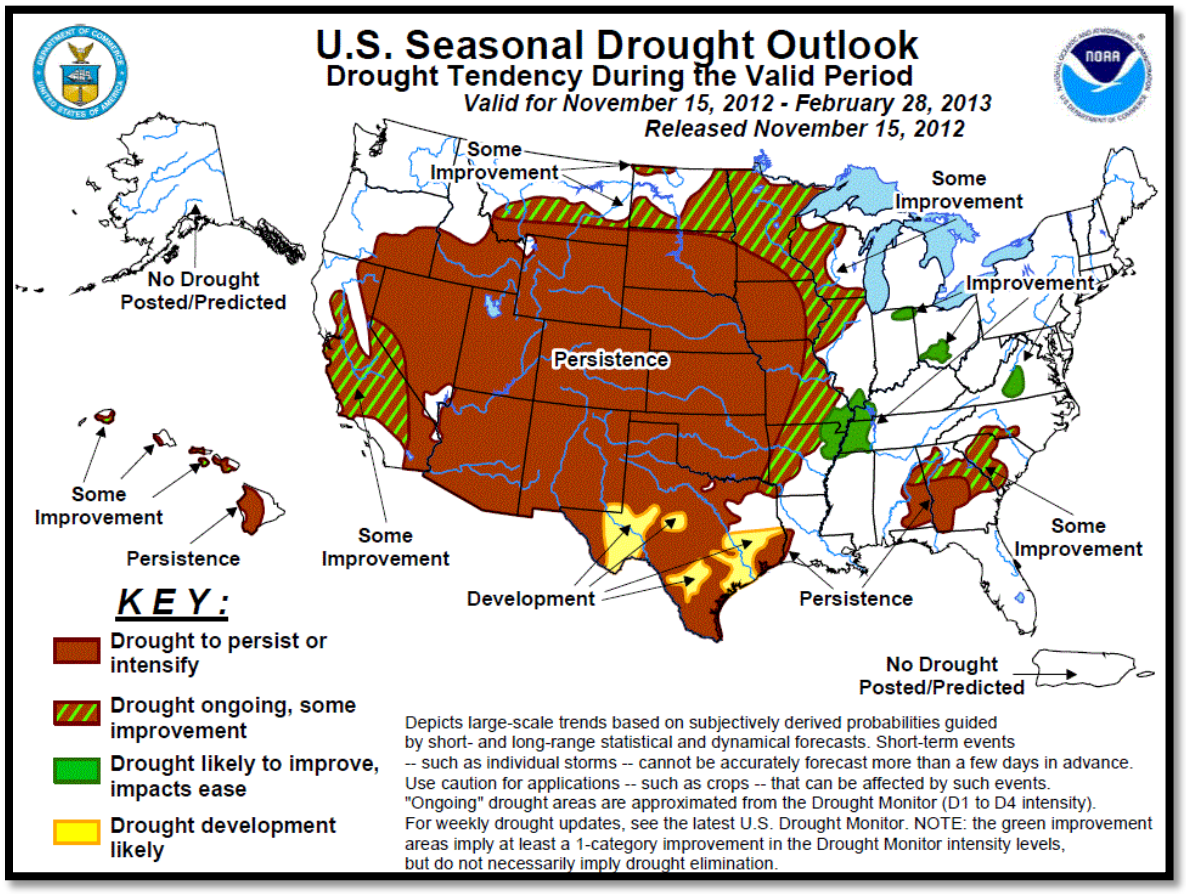

Figure 5-66: USSDO Drought Tendency Map (Valid November 15, 2012 to February 28, 2013)

A number of indices measure how much precipitation for a given period has deviated from historically established norms. The primary indicator for the USDM and USSDO for the western United States is the Palmer Drought Severity Index (PDSI). The PDSI is widely used by the USDA to determine when to grant emergency drought assistance to affected areas. PDSI is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the PDSI is not considered consistent enough to characterize the risk of drought on a nationwide basis (FEMA, 1997) nor is it well suited to the dry, mountainous areas in the western U.S.

For western States with mountainous terrain and complex regional microclimates, it is also useful to supplement the PDSI values with other indices such as Surface Water Supply Index and Standardized Precipitation Index (SPI). The Surface Water Supply Index takes snowpack and other unique conditions into account. The National Drought Mitigation Center (NDMC) uses the SPI to identify emerging drought months sooner than the PDSI. It is computed on various time scales to monitor moisture supply conditions. The SPI is the number of standard deviations that precipitation value would deviate from the long-term mean. As shown in Figure 5-67 the 72-month SPI through the end of October 2012 for Plumas County is moderately dry.

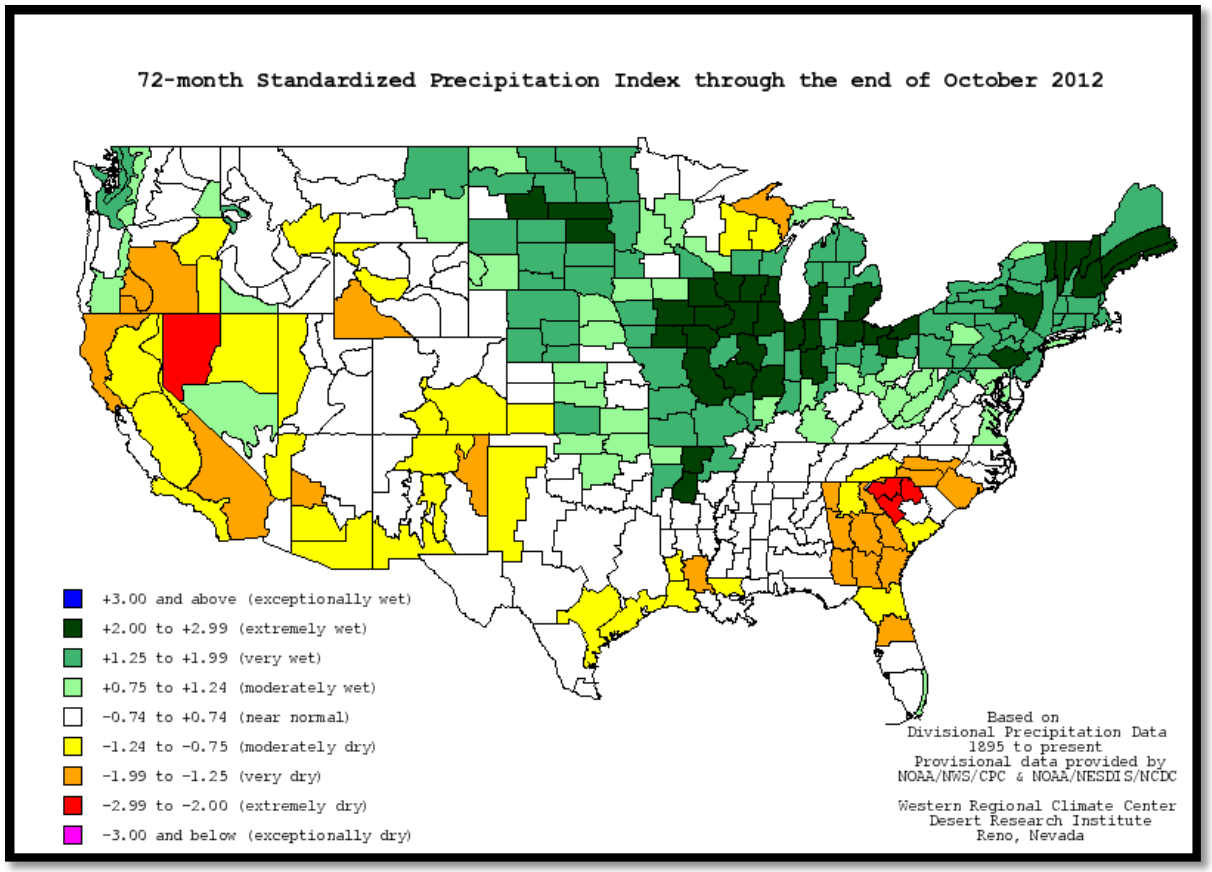

Figure 5-67: 72-Month SPI through the end of July 2011 for Plumas County

The Vegetation Drought Response Index, or VegDRI, is a bi-weekly depiction of vegetation stress across the contiguous United States. VegDRI is a fine resolution (1-km^2) index based on remote sensing data, and incorporates climate and biophysical data to determine the cause of vegetation stress. Development of the VegDRI map and associated products is a joint effort by the National Drought Mitigation Center (NDMC), the U.S. Geological Survey's (USGS) National Center for Earth Resources Observation and Science (EROS), and the High Plains Regional Climate Center (HPRCC). Figure 5-35 illustrates the VegDRI results for the San Francisco Bay Area for November 26, 2012.

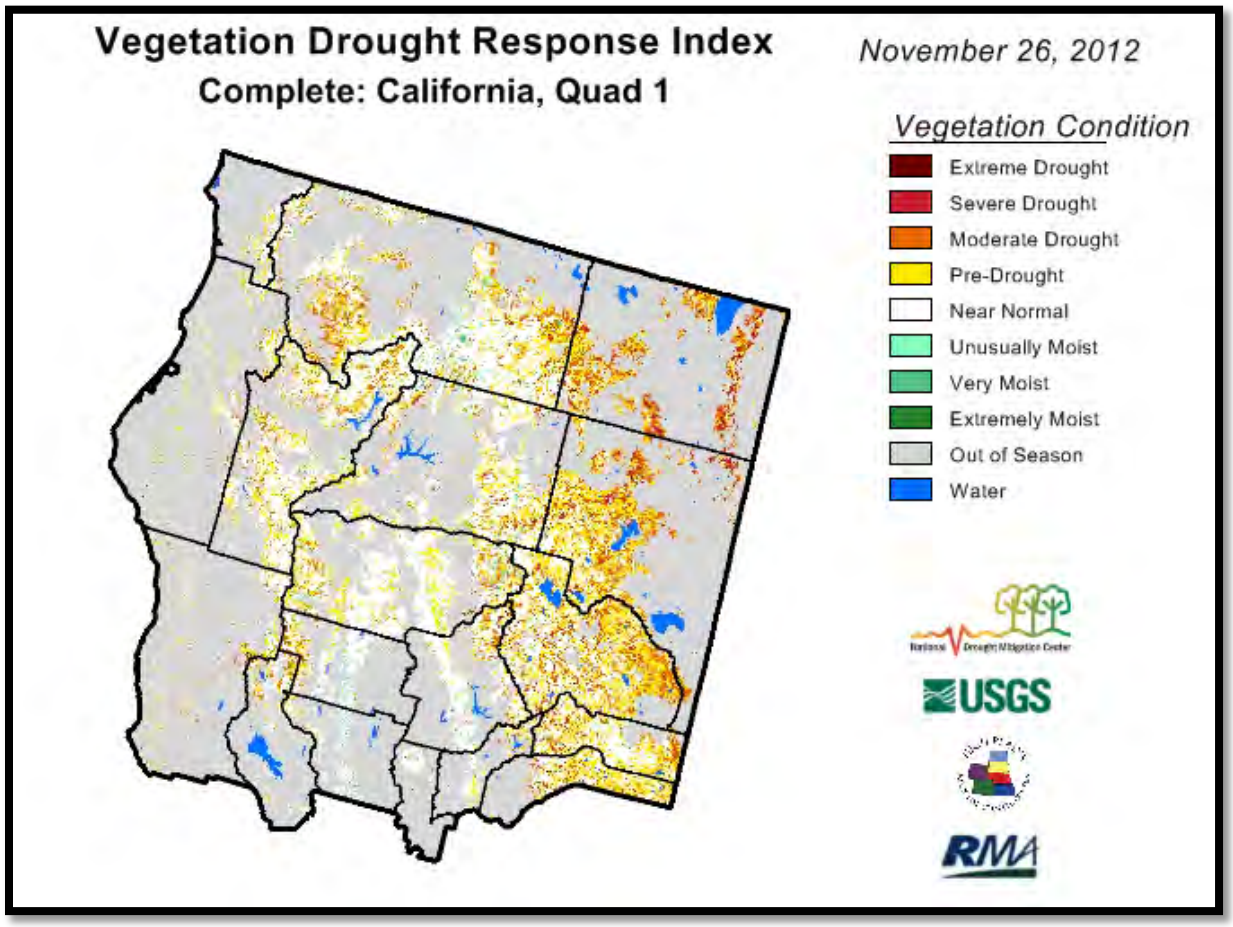

Figure 5-68: VegDRI results for California, Quad 1 for November 26, 2012

5.8.5 Frequency/Probability of Future Occurrences

Currently no data is available on the probability of drought that would be comparable to the USGS effort on earthquakes in the region, or how 100-year flood maps are created. According to the 2010 California State MHMP, 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.

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5.9 *Climate Change*

Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region or may occur across the whole Earth. Climate change may result from:

- Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
- Natural processes within the climate system (e.g., changes in ocean circulation); and
- Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs).

The effects of climate change are varied: warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change impacts a number of natural hazards including wildfires, floods, and drought.

Plumas County has its own set of expected hazards that are associated with climate change. Local weather station data (provide by the U.S. Forest Service) for years 1930-2000 show mean temperatures increasing, especially nighttime temperatures. There has also been a significant decrease in the number of months below freezing. Precipitation has been steady on average, although there has been an increase in precipitation on the west side of the Plumas National Forest and a decrease on the east side. In general, there has been more recorded high and low precipitation levels, demonstrating less predictability and more sporadic rainfall patterns in recent years.

5.9.1 Past Occurrences

Climate change has never been directly responsible for any declared disasters. Past flooding, wildfire and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual events. Unlike earthquakes and floods, that occur over a finite period, climate change is an on-going hazard, the effects of which are already being experienced. Other effects may not be apparent for decades or may be avoided altogether by mitigation actions taken today.

5.9.2 Location/Geographic Extent

Climate change is expected to affect the entire globe but will have varying effects on different geographical regions. It is expected that California coastal areas will be vulnerable to different hazards (e.g. sea level rise or more severe tropical storms) than inland areas, which will experience increased wildfire, drought, flooding from precipitation events, or other.

The Feather River watershed can be at risk due to winter temperature lows which are typically at or near freezing. Small warming trends (1-2 degrees F) will cause precipitation to shift from snow to rain which will decrease snow pack and exacerbate drought conditions in summer, creating the conditions for increased wildfires. The same observed trends could also increase flooding as more rainfall will contribute to larger runoff rates.

5.9.3 Magnitude/Severity

Refer to other natural disaster sections such as drought, severe weather, flood, and wildfire for the magnitude and severity of a particular event.

5.9.4 Frequency/Probability of Future Occurrences

According to the 2010 State Hazard Mitigation Plan (SHMP), climate change is one of the few natural hazards where the probability of occurrence is influenced by human action. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard with effects already experienced by some.

The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) projects possible changes in variability and the frequency/severity of future events based on climate scenarios. Scenarios, unlike projections, are not predictions or forecasts that indicate outcomes considered most likely, but are alternative images without ascribed likelihoods of how the future might unfold. Using four emissions scenarios that explore a range of alternative development pathways, the IPCC predicts a warming of about 0.2 degree Celsius per decade. Even if the concentrations of all GHGs and aerosols had been kept constant at year 2000 levels a future warming of about 0.1 degrees Celsius per decade would be expected.

Based on a 0.2 degree Celsius per decade increase scientists' project that snow cover area will contract, increases in thaw depth will occur in permafrost regions, sea ice will shrink, and hot extremes, heat waves and heavy precipitation events will become more frequent. It is also predicted that tropical storms will become more intense and sea level rise will continue. These impacts of climate change are expected to influence ecosystems, coastlines, food and agricultural productivity, fresh water resources, and overall human health. Specifically in North America, warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows, which exacerbate competition for over-allocated water resources.

5.10 *Vulnerability Assessment*

The information in this section provides an explicit representation of what a community stands to lose in a disaster. This is useful for county officials and other decision makers who will need to balance the costs of mitigation against the potential harm to citizens and damage to property. It provides comparable measurements of community natural hazard exposure[15] and assists in determining which hazards and/or what parts of Plumas County to focus on making resilient to disaster first. Based upon possible assets at risk, hazard mitigation resources can be directed where need be, in-part, by a vulnerability assessment and information found in hazard profiles presented in Section 5.3 through 5.9

The vulnerability assessment is developed by providing the hazard mitigation analysts with quantitative and qualitative information for each hazard. Through an exposure analysis, quantitative data is developed for each hazard. An exposure analysis provides quantities of people and assets at risk to particular hazards. Qualitative data has been developed and presented in this section for hazards without measurable data. Qualitative data provides information beyond quantities of people and assets at risk, but rather a description of how the hazard could affect a region like Plumas County.

***Note: The hazard exposure analysis has been developed with best available data and follows methodology described in the FEMA publication* Understanding Your Risks—Identifying Hazards and Estimating Losses.**

Note: There are other intangible losses that could result from a natural hazard event, such as losses of historic or cultural integrity or damage to the environment that are difficult to quantify. Other costs, including response and recovery costs, are often unrecoverable and are not addressed in this document.

5.10.1 Methodology

A vulnerability assessment was conducted for each of the priority hazards identified in Section 5.1.1. Geospatial data is essential in determining population and assets exposed to particular hazards. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people and assets. In Plumas County wildfire, flood, earthquake, landslides and dam failure inundation zones have known geographic extents and corresponding spatial information about each hazard. The spatial information can be used in an overlay analysis to examine particular exposure to people and assets. Spatial overlay analysis was conducted as part of this hazard mitigation update enabling mitigation planners to compare results across a broad range of hazards.

Several sources of data are necessary to conduct a vulnerability analysis. Figure 5-69 provides an exhibit of the data inputs and outputs used to create the vulnerability analysis results. U.S. Census data is the primary source in determining natural hazards exposure to the populations in Plumas County. The Census data has been used to determine the population at risk, which is generally referred to as

[15] Elements at risk; Risk inventory; Exposure encompasses all elements, processes, and subjects that might be affected by a hazardous event. Consequently, exposure is the presence of social, economic, environmental or cultural assets in areas that may be impacted by a hazard.

population exposure. Population exposure is provided for wildfire, flooding, earthquake, landslide and dam failure inundation hazards later in this section.

In addition to U.S. Census data, asset data was used to provide a snapshot of how county assets are affected by natural hazards. For purposes of this study, asset data includes parcels and critical infrastructure within the Plumas County. Critical infrastructure is described as assets that are essential for people and a community to function. Critical infrastructure includes such as utilities, county owned facilities, bridges, roadways, etc.. Critical facilities data were developed from a variety of sources including county owned and maintained data, state and federal government datasets, and private industry datasets. A large critical infrastructure spatial database was developed to translate critical facilities information into points and lines georeferenced[16] within Plumas County. Critical facility points and lines are overlaid with the spatial hazard layers to develop a list of "at risk" critical facilities. The county critical facilities that intersect with natural hazards are referred to as the critical facility exposure.

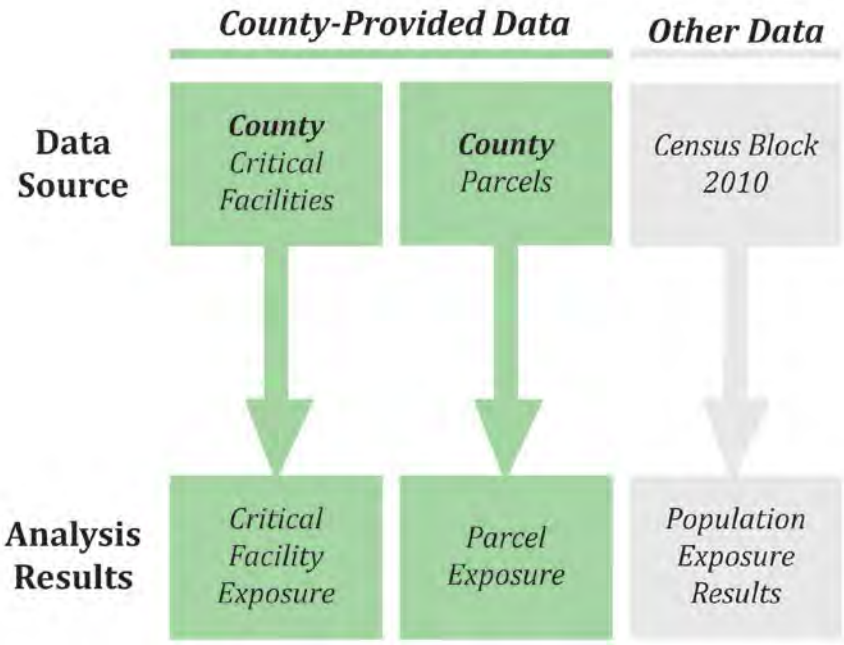


Figure 5-69: Data Source and Methodology

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analyses are discussed in more general terms in alphabetical order following the discussion on wildfire, flooding, geologic hazards, and dam failure hazards.

[16] To georeference something means to define its existence in physical space. That is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.

5.10.2 Population and Asset Exposure

In order to describe exposure results for each hazard, it is important to understand the "total" population and "total" assets at risk. The risk for each hazard described in this section will refer to the percent of total population or percent of total assets exposed to a particular hazard. This provides the possible significance or vulnerability to people and assets during a "worst case scenario" for each hazard with spatial extents. Section 5.10.2.1, Section 5.10.2.2 and Section 5.10.2.3 provide a description of the total population, critical facilities, and parcel exposure inputs.

5.10.2.1 Population Exposure

In order to develop hazard specific vulnerability assessments, population near natural hazard risks should be determined to understand the total "at risk" population. We can understand how geographically-defined hazards may affect the County by analyzing the extent of the hazard in relation to the location of population within the county. According to the 2010 U.S. Census, the total population for Plumas County is 20,009 – this is the total population exposure to hazards. Each natural hazard scenario affects the County population differently depending on the location of the hazard and the population density where it occurs. Vulnerability assessment sections presented later in this section summarize the population exposure for each natural hazard.

5.10.2.2 Critical Facilities Exposure

Critical facilities are of particular concern when conducting hazard mitigation planning. Critical facilities are defined as essential services, and if damaged, would result in severe consequences to the health, safety and welfare of the public. An inventory of critical facilities based on data from Plumas County Planning department and other publicly sourced information were used to develop a comprehensive inventory of facility points. See Figure 5-70 for a summary of critical facility points including communication buildings, emergency response buildings, healthcare, important private sector facilities (commercial and industrial), schools, transportation, utilities and County facilities.

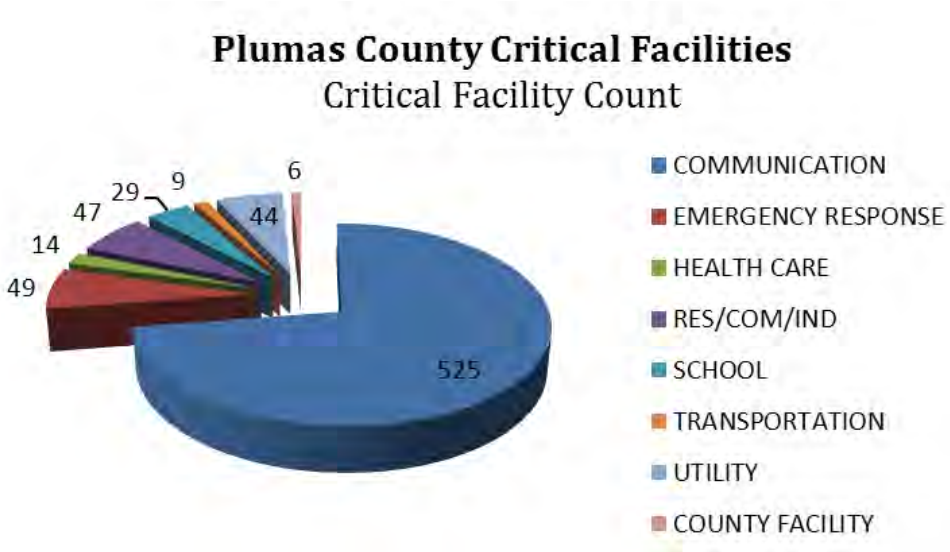


Figure 5-70: Plumas County Critical Facilities

A separate analysis was conducted for linear utilities and transportation routes, since these assets are represented in linear format rather than points. A current representation of the critical facilities and linear utilities are provided in Table 5-18 and Table 5-19. Some critical facility information has been omitted from documentation due to national security purposes. Plumas County Office of Emergency Service and the Plumas County Planning department manages and maintains a complete list of critical facilities.

Table 5-18: Critical Facility Inventory Summary Table

Facility Type	Count
COMMUNICATION	**525**
AM	1
ANTENNA STRUCTURE REGISTRATION	34
CELLULAR	6
FIXED MICROWAVE	174
FM	12
LAND MOBILE COMMERCIAL	7
LAND MOBILE PRIVATE	286
PAGING	3
TV NTSC	2
EMERGENCY RESPONSE	**49**
EOC	1
FIRE STATION	36
POLICE STATION	3
SHELTER	9
HEALTH CARE	**14**
CLINIC	1
HOME HEALTH AGENCY/HOSPICE	1
HOSPITAL	3
NURSING HOME	3
PHARMACY	5
PUBLIC HEALTH DEPARTMENT	1
RES/COM/IND	**41**
FINANCE	10
HISTORIC PLACE	18
PROPANE STATION	10
TIMBER PRODUCTS	3
SCHOOL	**29**
COLLEGE	1
DAY CARE CENTER	9
K-12	19

TRANSPORTATION	**9**
AIRPORT	4
HELIPORT	5
UTILITY	**44**
WASTEWATER TREATMENT PLANT	5
WATER TREATMENT PLANT	2
SUBSTATION	23
POWER PLANT	14
COUNTY FACILITY	**6**
PUBLIC WORKS YARD	6
Grand Total	**717**

Table 5-19: Linear Utility Inventory

Linear Utilities	Sum of Miles
Electric Transmission Line	**255**
NVENERGY_60KV	5
PG&E_115KV	31
PG&E_230KV	43
PG&E_34.5KV	1
PG&E_60KV	88
PLSR_60KV	88
Transportation	**5,276**
RAILROAD	185
ROAD	5,091
Grand Total	**5,532**

5.10.2.3 Improved Parcel Exposure

A standardized hazard overlay was conducted to develop hazard exposure results for improved county parcels. The Plumas County Assessor's data is pivotal to developing the total value of structures, personal property and fixtures exposed to each hazard – the value of parcels exposed to each hazard within the study area is referred to as parcel exposure. The spatial overlay method identifies parcels and the associated value of each to a particular hazard, which allows parcel exposure results to be compared for each hazard.[17] The structure value, fixture value, and personal property value for each parcel is summed and provided in Table 5-20. Table 5-20 represents the total parcel count and associated value in Plumas County.

Table 5-20: Parcels with Structural Value > than or = 10K

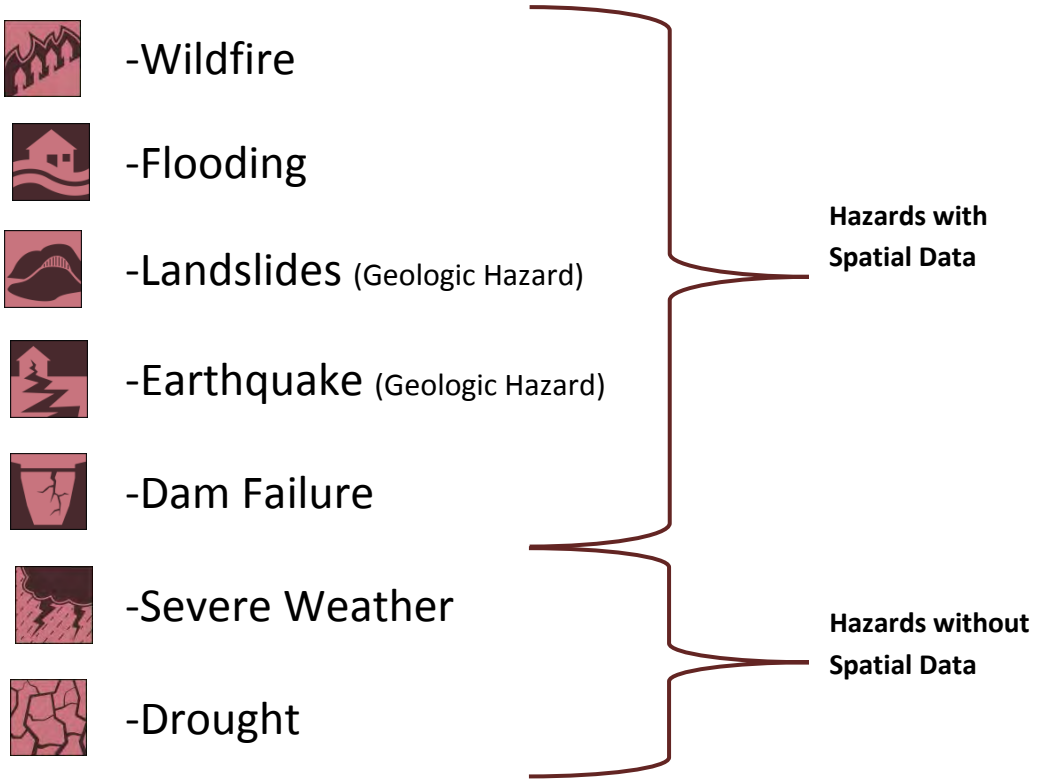
Parcel Count	Total Structure Value	Total Fixture Value	Total Personal Property Value
13,494	$ 1,895,437,450	$ 59,362,242	$ 16,833,898

Source: Plumas County Assessor's Role 2012

[17] County parcel data It is important to note that replacement cost is different than assessed market value for taxation purposes. 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 total loss and structures can be rebuilt.

5.10.3 Hazard Specific Vulnerability

FEMA Disaster Mitigation Act regulations require that Plumas County 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 priority hazards identified in earlier in Section 5. Estimated community vulnerability from each hazard is provided in each hazard-specific section that follows. Vulnerability can be quantified instances where there is a known hazard area, such as a mapped floodplain or high hazard landslide area. The Planning Committee 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 vulnerability analysis. The hazards evaluated as part the vulnerability assessment include:



Hazards with known geographical extents include wildfire, flooding, earthquake, landslides and dam failure. Hazards with spatial extents have discrete hazard risk areas; their risk varies and will affect people and assets differently. For hazards with spatial extents, "at risk" population and assets were inventoried by hazard area. To the extent possible, population and assets are quantified to define vulnerability in identified hazard areas. The hazard descriptions below include general hazard-related impacts, overall community impact, exposed population, assets and critical facilities at risk (i.e., types, numbers, and value of land and improvements). Together, this information conveys the vulnerability of particular populations and assets. In addition, it allows hazard mitigation planning to prioritize resources accordingly.

5.10.4 Assigning Risk Factors

The HMP Planning Committee assigned risk factors for each hazard profiled through a facilitated group exercise. During the group exercise, risk factor (RF) criteria worksheets were used to examine each identified hazard for potential risk. This methodology produces RF numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). Final RF values are obtained by assigning numerical criteria index values to five risk assessment categories. Risk assessment categories include *probability, impact, spatial extent, warning time* and *duration*.

To obtain RF for each hazard the Planning Committee assigned a numerical range (1-4) to each risk assessment category. Based upon unique concerns for the planning area a weighing factor can be agreed upon for each RF category. The RF weighting scheme is used to establish a higher degree of importance to selected risk assessment categories. To calculate the RF value for a given hazard the Planning Committee developed the RF weighting scheme below:

RF Value = [(Probability x .30) + (Impact x .30) +
(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

The sum of all five categories shown in the equation above equals the RF final risk factor values presented in Table 5-22. Table 5-21 provides a summary of the RF criteria the Planning Committee used to assign *criteria index values* during a group exercise. This RF approach uses hazard data, local knowledge and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. The final RF developed can be used to evaluate hazards and classify perceived hazard risk in Plumas County.

Table 5-21: Risk Factor Criteria

Risk Assessment Category	Degree of Risk	Level	Criteria Index	Weight Value
PROBABILITY **What is the likelihood of a hazard event occurring in a given year?**	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	**1**	**30%**
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY	**3**	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY	**4**	
IMPACT ***In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?***	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	**1**	**30%**

Risk Assessment Category	Degree of Risk	Level	Criteria Index	Weight Value
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	**2**	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	**3**	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	**4**	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	**1**	**20%**
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	**2**	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	**3**	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	**4**	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	**MORE THAN 24 HRS**	SELF DEFINED	**1**	**10%**
	12 TO 24 HRS	SELF DEFINED	**2**	
	6 TO 12 HRS	SELF DEFINED	**3**	
	LESS THAN 6 HRS	SELF DEFINED	**4**	
DURATION *How long does the hazard event usually last?*	**LESS THAN 6 HRS**	SELF DEFINED	**1**	**10%**
	LESS THAN 24 HRS	SELF DEFINED	**2**	
	LESS THAN 1 WEEK	SELF DEFINED	**3**	
	MORE THAN 1 WEEK	SELF DEFINED	**4**	

Table 5-22 displays RF index criteria and weighting determinations from the HMP Planning Committee. Final RF scores determine *High*, *Moderate* or *Low* risk designations based upon the conclusion index. It should be noted that although some hazards are classified as posing "Low Risk", their occurrence of varying or unprecedented magnitudes is still possible and will continue to be re-evaluated during future updates of this plan. Due to the inherent errors possible in any disaster risk assessment, the results of the risk assessment should only be used for planning purposes and in developing projects to mitigate potential losses.

5.10.5 Hazard Risk Factor

Table 5-22: Risk Factor Results Table

Rank	Natural Hazards	Probability	Wt.	Impact	Wt.	Spatial Extent	Wt.	Warning Time	Wt.	Duration	Wt.	RF Factor
1	Wildfire	4	1.2	3	0.9	4	0.8	3	0.3	4	0.4	**3.6**
2	Severe Weather	4	1.2	2	0.6	4	0.8	1	0.1	2	0.2	**2.9**
3	Flooding	3	0.9	3	0.9	2	0.4	1	0.1	4	0.4	**2.7**
4	Geologic Hazards	4	1.2	2	0.6	1	0.2	4	0.4	2	0.2	**2.6**
5	Drought	2	0.6	1	0.3	3	0.6	1	0.1	4	0.4	**2**
6	Climate Change	2	0.6	1	0.3	4	0.8	1	0.1	1	0.1	**1.9**
7	Dam Failure	1	0.3	2	0.6	1	0.2	2	0.2	1	0.1	**1.4**

Risk Factor Conclusion	
HIGH RISK (3.0 – 4.0)	Wildfire
MODERATE RISK (2.0 – 2.9)	Flooding, Severe Weather, Geologic Hazards, Drought
LOW RISK (0.1 – 1.9)	Climate Change, Dam Failure

The RF results assist planners to classify risk for each hazard regardless of hazard type. For purposes of this plan the following classifications are used:

Low Risk—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

Moderate Risk —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 Risk—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.

5.10.6 Wildfire

Risk to Plumas County citizens and property from wildfire is of significant concern. With the exception of a few low lying meadow valleys such as the Sierra, American, and Indian Valleys, wildfire danger is a major threat across the mountainous and fuel rich areas of Plumas County. High fuel loads in the mountains, 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, lightning, low relative humidity and significant winds can result in frequent and sometimes catastrophic fires. Any fire, once ignited, has the potential to quickly become large and out-of-control.

Table 5-23: Wildfire Vulnerability Analysis Summary

Wildfire Vulnerability Analysis		
Community Vulnerability Rating	**3.6**	**High Risk, Widespread potential impact.**

Exposure Type	Total Assets	Assets or Value at Risk	% of Total Asset	Assets in Very High Hazard Areas	Asset % in Very High Hazard Areas
Population	20,009	19,613	98%	11,473	57%
Critical Facilities	717	705	98%	502	70%
Parcels ≥ $10k	13,494	12,756	94%	7,584	56%
Miles of Roadway	5,091	5,019	99%	4,545	89%
Miles of Railroad	185	165	89%	140	76%
Miles of Linear Utilities	255	246	96%	200	81%

5.10.6.1 Population at Risk

Plumas County census block groups were used to estimate populations within the state produced Fire Hazard Severity Zones geospatial layer available from CAL FIRE. Wildfire risk is of greatest concern to populations residing in the moderate, high and very high wildfire hazard severity zones. More than 5,204 residents live within areas considered very high hazard areas and more than 11,473 residents are shown to live within a high hazard severity area. Figure 5-71 shows U.S. census population who live within a very high, high or moderate hazard severity zone.[18]

[18] High and very high Fire Hazard Severity Zones as defined by the California Department of Forestry and Fire Protection (CAL FIRE).

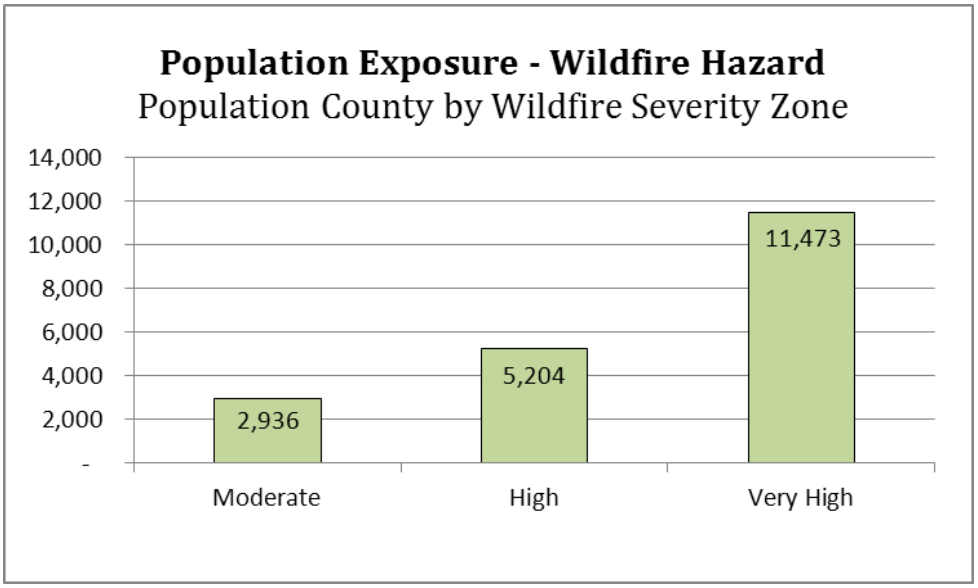


Figure 5-71: Population at risk from Wildfire Hazards

5.10.6.2 Improved Parcel at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases a parcel will be within multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the fire threat layer to determine the risk for each parcel. The fire threat zone in which the centroid was located was assigned to the entire parcel, and only improved parcels were analyzed. This analysis shows that 12,756 parcels (or 88%) are exposed to wildfire threat. See Table 5-24 for more information on parcel values exposed to wildfire.

Table 5-24: Parcel Value Exposed to wildfire

	Parcel Count	% of County Total	Structure Value	Fixture Value	Sum of Total Value	% of County Value
Fire	**13,494**	**100.00%**	**$1,895,437,450**	**$59,362,242**	**$1,971,633,590**	**100.00%**
Very High	7,584	56.20%	$1,002,896,411	$1,504,866	$1,009,413,234	51.20%
High	4,423	32.78%	$731,161,784	$28,131,802	$767,108,007	38.91%
Moderate	1,329	9.85%	$146,059,022	$16,233,619	$165,473,540	8.39%
Urban Unzoned	116	0.86%	$9,139,396	$13,248,195	$22,468,105	1.14%
Non-Wildland / Non-Urban	42	0.31%	$6,180,837	$243,760	$7,170,704	0.36%

5.10.6.3 Critical Facilities at Risk

Critical facilities data were overlaid with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Table 5-25 and Table 5-26 show the critical facilities in the high and very high wildfire hazard zones for unincorporated Plumas County.

Table 5-25: Critical Facility Exposure to Wildfire

Facility Type	Moderate	High	Very High	Total
COMMUNICATION	**32**	**99**	**382**	**513**
AM		1		1
ANTENNA STRUCTURE REGISTRATION	2	17	15	34
CELLULAR			6	6
FIXED MICROWAVE	11	18	142	171
FM		6	6	12
LAND MOBILE COMMERCIAL			7	7
LAND MOBILE PRIVATE	19	57	201	277
PAGING			3	3
TV NTSC			2	2
EMERGENCY RESPONSE	**6**	**13**	**29**	**48**
EOC			**1**	**1**
PLUMAS COUNTY OFFICE OF EMERGENCY SERVICES-EMERGENCY OPERATIONS CENTER			1	1
FIRE STATION	**6**	**9**	**21**	**36**
BECKWOURTH FPD, BECKWOURTH		1		1
BECKWOURTH FPD, GRIZZLY CREEK RD			1	1
BUCKS LAKE FPD, BUCKS LAKE			1	1
CHESTER FPD, CHESTER	1			1
CRESCENT MILLS FPD, CRESCENT MILLS			1	1
C-ROAD CSD, C-ROAD			1	1
EAST PLUMAS RURAL FPD, DELLEKER	1			1
EAST PLUMAS RURAL FPD, IRON HORSE			1	1
EAST PLUMAS RURAL FPD, LAKE DAVIS			1	1
GRAEAGLE FPD, GRAEAGLE		1		1
GRAEAGLE FPD, WHITEHAWK RANCH			1	1
GREENHORN CREEK FPD, GREENHORN RANCH			1	1
HAMILTON BRANCH FPD, HAMILTON BRANCH			1	1
INDIAN VALLEY FIRE, GREENVILLE			1	1
INDIAN VALLEY FIRE, TAYLORSVILLE			1	1
LA PORTE FPD, LA PORTE			1	1
LONG VALLEY CSD, CROMBERG			1	1
MEADOW VALLEY FPD, MEADOW VALLEY		1		1
PENINSULA FPD, PENINSULA		1		1
PLUMAS EUREKA FPD, PLUMAS EUREKA			1	1
PORTOLA FPD, PORTOLA	2			2
PRATTVILLE FIRE, PRATTVILLE			1	1
QUINCY FPD, AMERICAN VALLEY			1	1

Facility Type	Moderate	High	Very High	Total
QUINCY FPD, EAST QUINCY		1		1
QUINCY FPD, QUINCY		1		1
SIERRA VALLEY FPD, CHILCOOT	1			1
SIERRA VALLEY FPD, VINTON	1			1
USFS (PLUMAS NF) - BECKWOURTH RANGER DISTRICT, MOHAWK		1		1
USFS (PLUMAS NF) - BOULDER CREEK WORK CENTER, ANTELOPE LAKE			1	1
USFS (PLUMAS NF) - CHESTER, CHESTER			1	1
USFS (PLUMAS NF) - FRENCHMAN LAKE WORK CENTER, FRENCHMAN LAKE		1		1
USFS (PLUMAS NF) - GANSNER BAR, CARIBOU			1	1
USFS (PLUMAS NF) - GREENVILLE WORK CENTER, GREENVILLE			1	1
USFS (PLUMAS NF) - MT. HOUGH RANGER DISTRICT, QUINCY			1	1
WEST ALMANOR FPD, WEST ALMANOR		1		1
Law Enforcement			**3**	**3**
CALIFORNIA HIGHWAY PATROL - QUINCY AREA 165			1	1
NATIONAL PARK SERVICE - LASSEN NATIONAL FORREST - ALMANOR RANGER DISTRICT			1	1
PLUMAS COUNTY SHERIFFS DEPARTMENT			1	1
SHELTER		**4**	**4**	**8**
DISTRICT OFFICE ANNEX			1	1
GRAEAGLE COMMUNITY CHURCH		1		1
GREENVILLE SOUTHERN BAPTIST			1	1
GREENVILLE TOWN HALL			1	1
INDIAN VALLEY RESOURCE CENTER			1	1
PLUMAS-SIERRA COUNTY FAIR		1		1
PORTOLA MEMORIAL HALL		1		1
QUINCY MEMORIAL HALL		1		1
HEALTH CARE	**2**	**4**	**8**	**14**
CLINIC			**1**	**1**
GREENVILLE RANCHERIA TRIBAL HEALTH PROGRAM-GREENVILLE			1	1
HOME HEALTH AGENCY/HOSPICE		**1**		**1**
QUINCY HOME MEDICAL SERVICES - LAWRENCE - PARENT		1		1
HOSPITAL		**1**	**2**	**3**
EASTERN PLUMAS HOSPITAL - PORTOLA CAMPUS			1	1
PLUMAS DISTRICT HOSPITAL			1	1

Facility Type	Moderate	High	Very High	Total
SENECA HEALTHCARE DISTRICT HOSPITAL		1		1
NURSING HOME		**1**	**2**	**3**
COUNTRY VILLA QUINCY HEALTHCARE CENTER			1	1
HEAVENLY HOME		1		1
ASSISTED LIVING NURSING HOME			1	1
PHARMACY	**2**	**1**	**2**	**5**
KEHOE PHARMACY	1			1
LASSEN DRUG COMPANY	1			1
QUINCY DRUG STORE		1		1
RITE AID - 6093			1	1
VILLAGE DRUG COMPANY			1	1
PUBLIC HEALTH DEPARTMENT			**1**	**1**
PLUMAS COUNTY PUBLIC HEALTH AGENCY			1	1
COM /IND / HISTORIC	**3**	**14**	**27**	**44**
FINANCE	**2**	**3**	**5**	**10**
BANK OF AMERICA, NATIONAL ASSOCIATION, FEATHER RIVER BRANCH		1		1
BANK OF AMERICA, NATIONAL ASSOCIATION, QUINCY BRANCH		1		1
PLUMAS BANK			1	1
PLUMAS BANK, CHESTER BRANCH	1			1
PLUMAS BANK, GREENVILLE BRANCH			1	1
PLUMAS BANK, PLUMAS BANK			1	1
PLUMAS BANK, PORTOLA BRANCH		1		1
PLUMAS BANK, QUINCY ADMINISTRATIVE BRANCH			1	1
U.S. BANK NATIONAL ASSOCIATION, CHESTER BRANCH	1			1
U.S. BANK NATIONAL ASSOCIATION, QUINCY SAFEWAY BRANCH			1	1
HISTORIC PLACE		**2**	**14**	**16**
ABBEY BRIDGE GUARD STATION			1	1
ALMANOR POST OFFICE			1	1
ANTELOPE HOUSE			1	1
CAMP ROGERS POST OFFICE			1	1
CHESTER POST OFFICE		1		1
FANT GATHERING CORRAL			1	1
FLEMINGS SHEEP CAMP			1	1
JACKSON CREEK UNITED STATES FOREST SERVICE CABIN			1	1
LIGHTS CREEK GUARD STATION			1	1

Facility Type	Moderate	High	Very High	Total
OTIS RANCH			1	1
RHINEHART CABIN			1	1
RUFFA RANCH			1	1
SPRING GARDEN RANCH			1	1
SULPHUR SPRING HOUSE		1		1
THREEMILE GUARD STATION			1	1
WALKER MINE COMPRESSOR			1	1
PESTICIDE PRODUCER			**1**	**1**
PLUMAS-SIERRA COUNTIES DEPT. OF AGRICULTURE			1	1
PROPANE STATION	**1**	**5**	**3**	**9**
1633- PORTOLA - SUBURBAN		1		1
AMERIGAS		1		1
BI-STATE PROPANE			1	1
BI-STATE PROPANE - HERITAGE PROPANE		1		1
COAST GAS QUINCY STORE NUMBER 2675 - TITAN PROPANE - TITAN PROPANE			1	1
LAKE ALMANOR PROPANE STORE NUMBER 2481 - TITAN PROPANE - TITAN PROPANE	1			1
HIGH SIERRA PROPANE		1		1
COAST GAS - FERRELL PROPANE			1	1
SUBURBAN PROPANE		1		1
TIMBER PRODUCTS		**3**		**3**
COLLINS PINE CO		2		2
SIERRA PACIFIC INDUSTRIES QUINCY DIV.		1		1
SCHOOL	**6**	**10**	**13**	**29**
COLLEGE			**1**	**1**
FEATHER RIVER COMMUNITY COLLEGE DISTRICT			1	1
DAY CARE CENTER	**3**	**3**	**3**	**9**
CHESTER STATE PRESCHOOL	1			1
GRAEAGLE PRESCHOOL			1	1
INDIAN VALLEY STATE PRESCHOOL			1	1
MOUNTAIN METHODIST CHILDREN'S CENTER		1		1
MOUNTAIN MONTESSORI PRESCHOOL		1		1
PORTOLA HEAD START		1		1
PORTOLA KIDS, INC. PRESCHOOL	1			1
PORTOLA PRESCHOOL COOPERATIVE	1			1
QUINCY HEAD START			1	1
K-12	**3**	**7**	**9**	**19**
BECKWOURTH (JIM) HIGH (CONTINUATION)			1	1

Facility Type	Moderate	High	Very High	Total
C. ROY CARMICHAEL ELEMENTARY		1		1
CHESTER ELEMENTARY	1			1
CHESTER JUNIOR/SENIOR HIGH	1			1
GREENVILLE ELEMENTARY		1		1
GREENVILLE JUNIOR/SENIOR HIGH			1	1
HORIZON HIGH (CONTINUATION)		1		1
LAKE ALMANOR CHRISTIAN SCHOOL			1	1
PIONEER/QUINCY ELEMENTARY			1	1
PLUMAS CHARTER 146		1		1
PLUMAS COUNTY COMMUNITY	1			1
PLUMAS COUNTY OPPORTUNITY		1		1
PLUMAS COUNTY ROP		1		1
PORTOLA JUNIOR/SENIOR HIGH			1	1
PORTOLA OPPORTUNITY			1	1
QUINCY JUNIOR/SENIOR HIGH			1	1
SIERRA VALLEY CHRISTIAN SCHOOL		1		1
ST ANDREW'S ACADEMY			1	1
PLUMAS CHRISTIAN SCHOOL			1	1
TRANSPORTATION		**1**	**8**	**9**
AIRPORT		**1**	**3**	**4**
GANSNER FIELD (QUINCY)			1	1
NERVINO (BECKWOURTH)		1		1
ROGERS FIELD AIRPORT (CHESTER)			1	1
US FOREST SERVICE CHESTER AIR TANKER BASE			1	1
HELIPORT			**5**	**5**
INDIAN VALLEY HOSPITAL HELIPORT (GREENVILLE)			1	1
PLUMAS DISTRICT HOSPITAL HELIPORT (QUINCY)			1	1
RODGERS FLAT HELIPORT (BELDEN)			1	1
USFS CHESTER HELIPORT			1	1
USFS QUINCY HELITACK BASE			1	1
UTILITY	**3**	**9**	**30**	**42**
WASTEWATER TREATMENT PLANT		**1**	**4**	**5**
CHESTER WWTP			1	1
ES DISTRICT WWTP			1	1
PORTOLA WWTP		1		1
QUINCY WWTP			1	1
GRIZZLY LAKE CSD			1	1
WATER TREATMENT PLANT			**2**	**2**
JOHNSVILLE WTP			1	1

Facility Type	Moderate	High	Very High	Total
LAKE DAVIS WTP			1	1
SUBSTATION	**2**	**6**	**14**	**22**
MARBLE		1		1
GRAEAGLE			1	1
MOHAWK			1	1
CHILCOOT	1			1
PORTOLA		1		1
BECKWORTH		1		1
GRIZZLY			1	1
QUINCY			1	1
PLUMAS			1	1
EAST QUINCY	1			1
GANSNER		1		1
N.N.			1	1
BELDEN			1	1
GRAYS FLAT			1	1
SPANISH CREEK			1	1
CARIBOU 2			1	1
GREENVILLE			1	1
BIG MEADOWS			1	1
BUTT VALLEY			1	1
HAMILTON BRANCH			1	1
COLLINS PINE CO.		1		1
CHESTER		1		1
POWER PLANT	**1**	**2**	**10**	**13**
GRAEAGLE			1	1
PORTOLA		1		1
ROCK CREEK			1	1
GRIZZLY			1	1
BUCKS CREEK			1	1
BELDEN			1	1
FIVE BEARS			1	1
OAK FLAT			1	1
CARIBOU 1			1	1
CARIBOU 2			1	1
BUTT VALLEY			1	1
HAMILTON BRANCH	1			1
COLLINS PINE CO.		1		1
COUNTY FACILITY		**1**	**5**	**6**

Facility Type	Moderate	High	Very High	Total
PUBLIC WORKS YARD		**1**	**5**	**6**
LA PORTE PUBLIC WORKS YARD			1	1
GRAEAGLE PUBLIC WORKS YARD			1	1
BECKWOURTH PUBLIC WORKS YARD		1		1
QUINCY PUBLIC WORKS YARD			1	1
GREENVILLE PUBLIC WORKS YARD			1	1
CHESTER PUBLIC WORKS YARD			1	1
Total	**52**	**151**	**502**	**705**

Table 5-26: Linear Utilities and Transportation Routes with Wildfire Risk

Linear Utilities	Sum of Miles for Each Hazard Level			
Critical Facility Type	**Moderate**	**High**	**Very High**	**Grand Total**
TRANSMISSION LINE	**18**	**28**	**199**	**246**
NVENERGY_60KV	0	2	0	2
PG&E_115KV	2	0	28	31
PG&E_230KV	0	0	43	43
PG&E_34.5KV	0	1	0	1
PG&E_60KV	2	5	80	87
PLSR_60KV	14	20	48	82
TRANSPORTATION	**106**	**393**	**4,685**	**5,184**
RAILROAD	12	14	140	165
ROAD	94	380	4,545	5,019
GRAND TOTAL	**124**	**421**	**4,884**	**5,430**

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5.10.7 Flooding

Flooding is a significant problem in Plumas County as described in the flood hazard profile. Historically, Plumas County has been at risk to flooding primarily during the winter months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage or when there is a lack of flood control structures in place. Flooding has occurred on a continual basis throughout the County both within the 100-year floodplain and in other localized areas. GIS was used to determine the possible impacts of flooding within the County, and where the flood risk varies across the planning area. FEMA regulatory Digital Flood Insurance Rate Map (DIFRM) data were utilized to analyze the flood risk, and vulnerabilities were quantified using GIS analyses. The information in this section describes flood vulnerability methodologies for determining people and assets at risk to the 100- and 500-year flood events.

Table 5-27: Slope Failure Vulnerability Analysis Summary

Flood Vulnerability Analysis		
Community Risk Factor Rating	**2.7**	**Moderate Risk, Moderate potential impact.**

Exposure Type	Total Assets	Assets at Risk	% of Total Asset	Assets in 100-YR Flood Zone	% of Assets in 100-YR Flood Zone
Population	20,009	2,902	14.5%	1,286	6.4%
Critical Facilities	717	69	9.5%	43	6%
Parcels ≥ $10k	13,494	1,202	8.9%	543	4%
Miles of Roadway	5,091	83	1.6%	83	1.6%
Miles of Railroad	185	12	6.4%	12	5.9%
Miles of Linear Utilities	255	22	8.6%	22	8.6%

5.10.7.1 Population at Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2012 population data aggregated by census blocks, an estimate was made of the population within the 100- and 500-year floodplain. To account for census blocks that were partially within the floodplain, a weighted average was employed to calculate the proportion of the population within the floodplain. The results of the population overlay are shown in Figure 5-72. Approximately 1,286 people live within the 100-year floodplain and 1,616 people live within the 500-year floodplain.

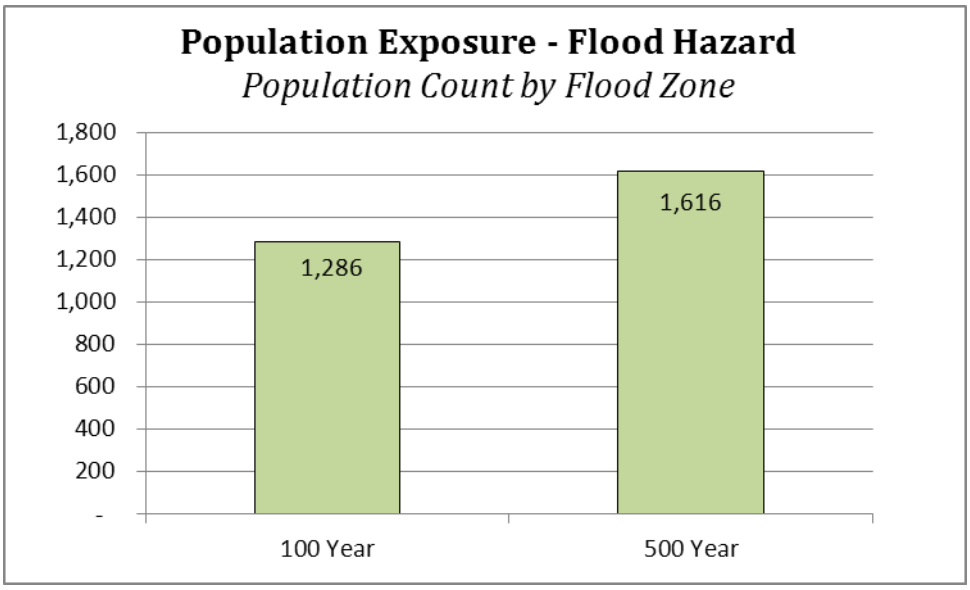

Figure 5-72: Population Exposed to Potential Flood Risk

5.10.7.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases a parcel will be within in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The parcel centroids were overlaid with the floodplain layer to determine the flood risk for each structure and assigned values base upon flood zone classification. Only improved parcels ≥ to $10,000 were analyzed. Through this analysis, 542 parcels were found to be within a 100 year flood zone, and 659 parcels were within a 500 year flood zone. Therefore, the total parcel exposure equals 1,202 parcels. See Table 5-28 for more information on parcel values exposed to flooding.

Table 5-28: Parcel Value Exposed to Flooding

	Parcel Count	% of County Total	Structure Value	Fixture Value	Sum of Total Value	% of County Value
Flood Hazard	**1,202**	**8.91%**	**$155,857,953**	**$29,325,229**	**$187,762,541**	**9.52%**
100-YR (Zone A)	442	3.28%	$69,014,269	$36,209	$69,420,579	3.52%
100-YR (Zone AE)	96	0.71%	$10,533,128	$80,930	$10,904,998	0.55%
100-YR (Zone AH)	5	0.04%	$569,425	$-	$569,425.00	0.03%
500-YR (0.2 PCT ANNUAL CHANCE FLOOD HAZARD)	659	4.88%	$75,741,131	$29,208,090	$106,867,539	5.42%

5.10.7.3 Critical Facilities at Risk

Critical facilities data were overlaid with flood hazard data to determine the type and number of facilities within the 100- and 500-year floodplain. Flooding poses numerous risks to critical facilities and infrastructure:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.
- Bridges washed out or blocked by floods or debris from floods also can cause isolation.
- Creek or river floodwaters can back up drainage systems causing localized flooding.
- Floodwaters can get into drinking water supplies causing contamination.
- Sewer systems can be backed up causing waste to spill into homes, neighborhoods, rivers and streams.
- Underground utilities can also be damaged.

Table 5-29 and Table 5-30 provide an inventory of these critical facilities in the floodplain for unincorporated Plumas County provide the locations of linear utilities relative to the floodplain in the unincorporated areas of the County. The impact to the community could be great if these critical facilities were damaged or destroyed during a flood event.

Table 5-29: Critical Facilities Exposed to Potential Flood Risk

Facility Type	100-YR A Zone	100-YR AE Zone	100-YR Zone-AH	500-YR (2% ANNUAL CHANCE FLOOD HAZARD)	Total
COMMUNICATION	**22**	**5**	**1**	**16**	**44**
ANTENNA STRUCTURE REGISTRATION				**3**	**3**
FIXED MICROWAVE	**6**	**2**		**2**	**10**
LAND MOBILE COMMERCIAL	**1**				**1**
LAND MOBILE PRIVATE	**15**	**3**	**1**	**11**	**30**
EMERGENCY RESPONSE	**3**	**1**		**1**	**5**
FIRE STATION	**3**			**1**	**4**
PLUMAS EUREKA FPD, PLUMAS EUREKA	1				1
QUINCY FPD, EAST QUINCY				1	1
SIERRA VALLEY FPD, CHILCOOT	1				1
USFS (PLUMAS NF) - BECKWOURTH RANGER DISTRICT, MOHAWK	1				1

Facility Type	100-YR A Zone	100-YR AE Zone	100-YR Zone-AH	500-YR (2% ANNUAL CHANCE FLOOD HAZARD)	Total
SHELTER		**1**			**1**
PORTOLA MEMORIAL HALL		1			1
COM /IND / HISTORIC	**2**	**1**		**3**	**6**
FINANCE				**2**	**2**
PLUMAS BANK				1	1
PLUMAS BANK, QUINCY ADMINISTRATIVE BRANCH				1	1
HISTORIC PLACE	**2**				**2**
ISLAND SCHOOL	1				1
SPRING GARDEN RANCH	1				1
PROPANE STATION		**1**			**1**
AMERIGAS		1			1
TIMBER PRODUCTS				**1**	**1**
SIERRA PACIFIC INDUSTRIES QUINCY DIV.				1	1
SCHOOL	**1**			**1**	**2**
K-12	**1**			**1**	**2**
PLUMAS COUNTY OPPORTUNITY				1	1
SIERRA VALLEY CHRISTIAN SCHOOL	1				1
TRANSPORTATION	**1**			**1**	**2**
AIRPORT	**1**			**1**	**2**
GANSNER FIELD (QUINCY)				1	1
NERVINO (BECKWOURTH)	1				1
UTILITY	**5**	**1**		**4**	**10**
WASTEWATER TREATMENT PLANT	**1**			**1**	**2**
PORTOLA WWTP	1				1
QUINCY WWTP				1	1
SUBSTATION	**2**	**1**		**2**	**5**
EAST QUINCY				1	1
GANSNER		1			1
SIERRA PACIFIC				1	1
GRAYS FLAT	1				1
BUTT VALLEY	1				1
POWER PLANT	**2**			**1**	**3**
SPI- QUINCY				1	1

Facility Type	100-YR A Zone	100-YR AE Zone	100-YR Zone-AH	500-YR (2% ANNUAL CHANCE FLOOD HAZARD)	Total
BUTT VALLEY	1				1
HAMILTON BRANCH	1				1
Total	**34**	**8**	**1**	**26**	**69**

Table 5-30: Miles of Linear Utilities Exposed to Potential Flood Risk

Linear Utilities	100-YR Zone AE	100-YR Zone A	500-YR (2% ANNUAL CHANCE FLOOD HAZARD)	Total
TRANSMISSION LINE	**3**	**17**	**2**	**22**
NVENERGY_60KV	0	5	0	5
PG&E_115KV	0	1	0	1
PG&E_60KV	2	3	2	7
PLSR_60KV	1	9	0	10
TRANSPORTATION	**8**	**73**	**15**	**96**
ROAD	7	63	14	83
RAILROAD	1	10	1	12
Grand Total	**10**	**90**	**17**	**118**

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5.10.8 Slope Failure (Geologic Hazard)

Plumas County has experienced a few isolated incidences of landslides and slope failure. These incidences include one avalanche, three rock falls, three rock slides, one landslide, and one instances of slope erosion. None of these incidences were declared a disaster; however all of them resulted in damage to infrastructure, and the environment. Most landslide hazards occur in areas of steeper slopes; however, landslides can also occur in areas of low relief especially when the area has been recently subject to wildfire or is prone to earthquakes.

The steepest slopes are found in the western portion of the county, which lies in the Sierra Nevada Range, suggesting a greater susceptibility to landslides at these locations. Human activities also contribute to landslide events such as altering the natural slope gradient, increasing soil water content, and removing vegetation cover. The best available predictor of where landsides may occur is the location of previous occurrences. In addition, landslides are most likely to occur during severe weather events. The ground must be saturated prior to the onset of a severe weather event for a significant landslide to occur. Transportation routes throughout Plumas County at the base or crest of cliffs should be considered vulnerable to landslide hazard.

Table 5-31: Slope Failure Vulnerability Analysis Summary

Slope Failure Vulnerability Analysis		
Community Risk Factor Rating	**2.6**	**Moderate Risk, Moderate potential impact.**

Exposure Type	Total Assets	Assets or Value at Risk	% of Total Asset	Assets in High Hazard Areas	% Very High Hazard Areas
Population	20,009	8,534	42.7%	1,894	8.5%
Critical Facilities	720	371	51%	158	21.9%
Parcels ≥ $10k	13,494	6,368	47.1%	1,154	8.5%
Miles of Roadway	5,091	3,618	72.0%	965	19.2%
Miles of Railroad	185	114	61.6%	45	24.3%
Miles of Linear Utilities	255	169	66.3%	76	29.8%

5.10.8.1 Population at Risk

Of greatest concern in the event of a landslide is the potential for loss of life. Using 2012 population data aggregated by census blocks, an estimate was made of the population within the low, moderate and high landslide susceptibility areas. The results of the population overlay are shown Figure 5-73.

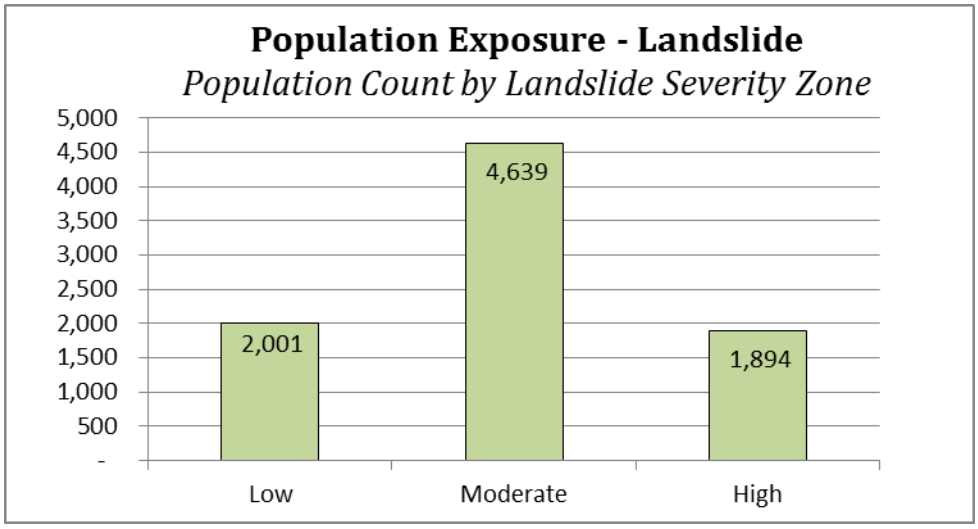

Figure 5-73: Population Exposure to Landslides Hazard

5.10.8.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The parcel centroids are overlaid with landslide susceptibility classes to determine at-risk parcels. Only improved parcels ≥ to $10,000 were analyzed. The results of the analysis show that ten percent of the county improved parcels (1,154 or 10.59%) to be located in a "high" landslide susceptibility areas. The remaining 5,214 parcels with land slide hazards are located in a low to moderate landslide susceptibility area. See Table 5-32 for more information on parcel values exposed to landslide risks.

Table 5-32: Parcel Value Exposed to Landslide Hazard

	Parcel Count	% of County Total	Structure Value	Fixture Value	Sum of Total Value	% of County Value
Landslide	**6,368**	**47.19%**	**$978,613,188**	**$1,449,107**	**$983,568,566**	**49.89%**
Low	2,519	18.67%	$413,830,294	$405,809	$415,219,742.00	21.06%
Moderate	2,695	19.97%	$356,969,168	$738,468	$359,486,558.00	18.23%
High	1,154	8.55%	$207,813,726	$304,830	$208,862,266.00	10.59%

5.10.8.3 Critical Facilities at Risk

Critical facilities data was spatially overlaid with landslide hazard data to determine the type and number of facilities within the low, moderate, and high landslide susceptibility areas. Landslide poses a small risk to critical facilities and infrastructure as compared to other hazards in Plumas County. However, if a landslide were to occur the potential damage could be severe. Some of the potential outcomes of a landslide include:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.
- Rock falls could potentially crush buildings, vehicles and infrastructure and present danger to people nearby
- Severe damage and sometimes destruction to homes and buildings.
- Disrupts water mains, sewers, power lines and other utility lines.
- Potential loss of life from the collapse of buildings and roads.

Table 5-33 provides an inventory of these critical facilities in the moderate landslide hazard area. In total, 148 known facilities may be in an area of high landslide susceptibility. Table 5-34 provides the linear utilities and transportation routes that are within high landslide susceptibility areas in the County. Roadways and Rail lines are very susceptible to landslides due to the location and abundance of roadways in extremely sloped areas. There are over 900 miles of roadway and 45 miles of rail lines in high landslide susceptibility areas.

Table 5-33: Critical Facilities with Landslide Risk

Count of Facilities by Threat Classification				
Facility Priorities	**Low**	**Moderate**	**High**	**Total**
COMMUNICATION	**85**	**89**	**148**	**322**
AM			**1**	**1**
ANTENNA STRUCTURE REGISTRATION	**6**	**4**	**2**	**12**
CELLULAR	**2**		**3**	**5**
FIXED MICROWAVE	**31**	**29**	**66**	**126**
FM	**1**	**5**	**1**	**7**
LAND MOBILE COMMERCIAL	**1**	**1**	**3**	**5**
LAND MOBILE PRIVATE	**44**	**48**	**71**	**163**
PAGING			**1**	**1**
TV NTSC		**2**		**2**
EMERGENCY RESPONSE	**3**	**5**	**1**	**9**
EOC		**1**		**1**
PLUMAS COUNTY OFFICE OF EMERGENCY SERVICES-EMERGENCY OPERATIONS CENTER		1		1
FIRE STATION	**3**	**4**	**1**	**8**
C-ROAD CSD, C-ROAD		1		1
GRAEAGLE FPD, WHITEHAWK RANCH		1		1
GREENHORN CREEK FPD, GREENHORN RANCH			1	1
PLUMAS EUREKA FPD, PLUMAS EUREKA		1		1
PRATTVILLE FIRE, PRATTVILLE	1			1
USFS (PLUMAS NF) - BOULDER CREEK WORK CENTER, ANTELOPE LAKE		1		1

USFS (PLUMAS NF) - FRENCHMAN LAKE WORK CENTER, FRENCHMAN LAKE	1			1
WEST ALMANOR FPD, WEST ALMANOR	1			1
HEALTH CARE		2		2
HOSPITAL		**1**		**1**
EASTERN PLUMAS HOSPITAL - PORTOLA CAMPUS		1		1
PUBLIC HEALTH DEPARTMENT		**1**		**1**
PLUMAS COUNTY PUBLIC HEALTH AGENCY		1		1
COM / IND / HISTORICAL	**4**	**7**	**4**	**15**
FINANCE		**2**		**2**
PLUMAS BANK		1		1
PLUMAS BANK, GREENVILLE BRANCH		1		1
GOLD MINING	**1**			**1**
UNKNOWN	1			1
PROPANE STATION		**1**		**1**
AMERIGAS		1		1
REFUSE FACILITY	**1**			**1**
GOPHER HILL LAND LEACHATE DISP	1			1
(blank)		**1**		**1**
LAKE DAVIS PIKE ERADICATION PROJECT, PORTOLA		1		1
HISTORICAL PLACE	**2**	**3**	**4**	**9**
CAMP ROGERS POST OFFICE (HISTORICAL)		1		1
FLEMINGS SHEEP CAMP (HISTORICAL)	1			1
JACKSON CREEK UNITED STATES FOREST SERVICE CABIN (HISTORICAL)			1	1
RUFFA RANCH (HISTORICAL)		1		1
SPRING GARDEN RANCH (HISTORICAL)	1			1
SULPHUR SPRING HOUSE (HISTORICAL)		1		1
THREEMILE GUARD STATION (HISTORICAL)			1	1
WALKER MINE COMPRESSOR (HISTORICAL)			1	1
SCHOOL	**2**	**6**	**1**	**9**
COLLEGE		**1**		**1**
FEATHER RIVER COMMUNITY COLLEGE DISTRICT		1		1
DAY CARE CENTER	**1**	**2**		**3**
PORTOLA HEAD START	1			1
PORTOLA KIDS, INC. PRESCHOOL		1		1
PORTOLA PRESCHOOL COOPERATIVE		1		1
K-12	**1**	**3**	**1**	**5**
BECKWOURTH (JIM) HIGH (CONTINUATION)		1		1
HORIZON HIGH (CONTINUATION)			1	1
LAKE ALMANOR CHRISTIAN SCHOOL	1			1

PIONEER/QUINCY ELEMENTARY		1		1
PORTOLA OPPORTUNITY		1		1
UTILITY	**3**	**6**	**4**	**13**
WATER TREATMENT PLANT			**1**	**1**
JOHNSVILLE WTP			1	1
SUBSTATION	**2**	**2**	**1**	**5**
MOHAWK		1		1
GRIZZLY	1			1
BELDEN		1		1
SPANISH CREEK	1			1
BUTT VALLEY			1	1
POWER PLANT	**1**	**4**	**2**	**7**
ROCK CREEK		1		1
GRIZZLY		1		1
BUCKS CREEK		1		1
BELDEN		1		1
CARIBOU 1	1			1
BUTT VALLEY			1	1
HAMILTON BRANCH			1	1
COUNTY FACILITY		**1**		**1**
PUBLIC WORKS YARD		**1**		**1**
GREENVILLE PUBLIC WORKS YARD		1		1
Grand Total	**97**	**116**	**158**	**371**

Table 5-34: Miles of Linear Utilities and Transportation Routes at Risk to Landslide

Linear Utilities	Low	Moderate	High	Total (Miles)
TRANSMISSION LINE	**30**	**62**	**76**	**169**
NVENERGY_60KV	3	8	17	27
PG&E_115KV	1	13	26	40
PG&E_60KV	13	26	19	59
PLSR_60KV	13	14	15	42
TRANSPORTATION	**1,435**	**1,287**	**1,009**	**3,732**
ROAD	1,415	1,239	965	3,618
RAILROAD	21	48	45	114

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5.10.9 Earthquake (Geologic Hazard)

Major Impacts from earthquakes are primarily the probable number of casualties and damage to infrastructure occurring from ground movement along a particular fault (USGS 2009). The degree of infrastructure damage depends on the magnitude, focal depth, distance from fault, duration of shaking, type of surface deposits, presence of high groundwater, topography, and the design, type, and quality of infrastructure construction.

While Plumas County is not located within an Alquist-Priolo Earthquake Fault Zone, several potentially active faults pass through the County, including the Almanor Fault, Butt Creek Fault Zone, and the Mohawk Valley Fault. Additionally, the Honey Lake and Fort Sage Faults are two active faults located east of the County. While these faults are within and near the County and could result in several seismic-related effects (i.e., groundshaking, etc.) to County residents and property, seismic hazard mapping indicates that the County has low seismic hazard potential. To analyze the risk to Plumas County, potential damage zones were created by combining USGS shake maps[19]. Results were used to develop exposure results for population, critical facilities and single family residential parcel values.

Table 5-35: Earthquake Vulnerability Analysis Summary

Earthquake Vulnerability Analysis		
Community Risk Factor Rating	**2.6**	**Moderate Risk, Moderate potential impact.**

Exposure Type	Total Assets	Assets or Value with Hazard Values	% of Total Asset	Assets in Heavy Damage Areas	% Very High Hazard Areas
Population	20,009	20,009	100%	N/A	0%
Critical Facilities	717	717	100%	5	.69%
Parcels ≥ $10k	13,494	13,494	100%	24	.17%
Miles of Roadway	5,091	5,019	100%	104	2.0%
Miles of Railroad	185	185	100%	0	0%
Miles of Linear Utilities	255	255	100%	0	0%

[19] Two USGS shake maps were used to develop the potential damage spatial layers. Peak Ground Velocity (PGV) for an earthquake having a 2% probability of occurring in 50 years with an Ls30 value of 360 m/s. Raster generated from points using IDW interpolation with a maximum input point of 4 and a maximum search radius of 15,000. Cell size is 2000' (much smaller than point spacing). Peak Spectral Acceleration (PSA) at 0.2 seconds for an earthquake having a 2% probability of occurring in 50 years with an Ls30 value of 360 m/s. Raster generated from points using IDW interpolation with a maximum input point of 4 and a maximum search radius of 15,000. Cell size is 2000' (much smaller than point spacing). Perceived Shaking and Potential Damage values are calculated from PGV based on documentation and table provided by California Integrated Seismic Network (CISN).

5.10.9.1.1 Population at Risk

According to the 2010 U.S. Census, Plumas County's total population is 20,007 residents. The County is one of California's most rural counties with 7.8 people per square mile without dense urban cores and large building masses vulnerable to earthquake hazards. Though rural residential construction is not particularly vulnerable to earthquakes, an earthquake could directly or indirectly expose the entire population of Plumas County to ground shaking. Depending on the time of day and year (the population differs significantly from summer to winter) and exact location of the modeled epicenter; an earthquake could be experienced differently. Figure 5-74 exhibits the population exposure totals in each modeled earthquake severity zone. Population location is based upon information taken during the 2010 U.S. Census.

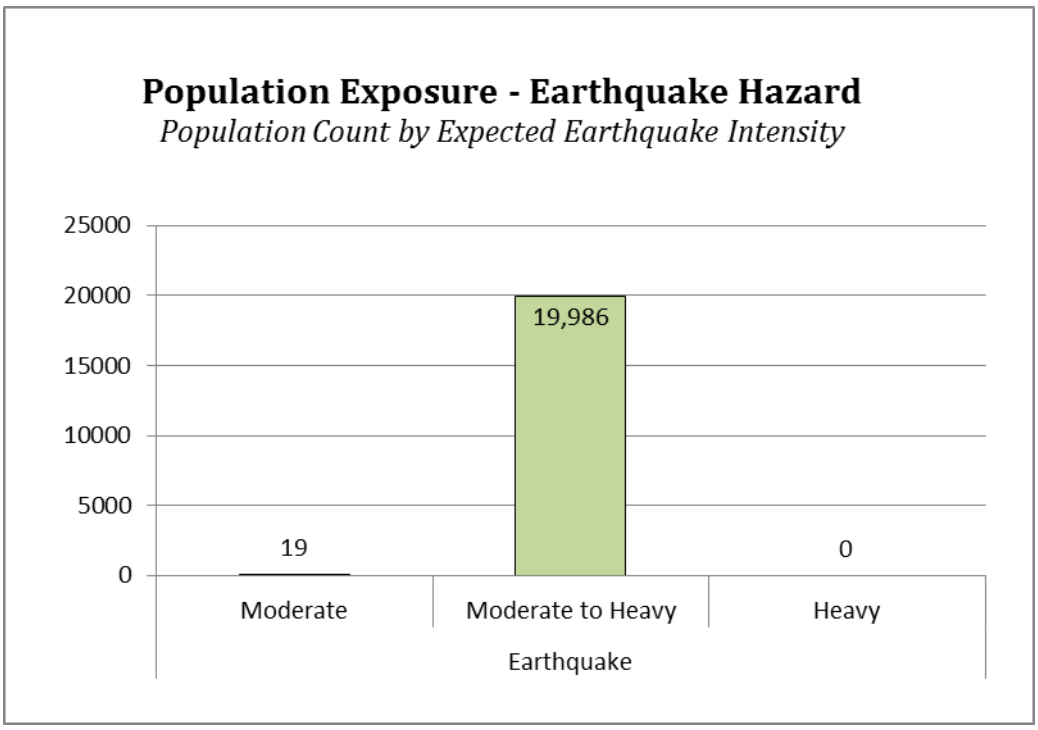

Figure 5-74: Population Exposure to Earthquake Hazard

5.10.9.1.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the shake severity zones to determine the at-risk structures. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed. See Table 5-28Table 5-36 for more information on parcel values exposed to earthquake hazards.

Table 5-36: Parcel Value Exposed to Earthquake Damage Potential

	Parcel Count	% of County Total	Structure Value	Fixture Value	Sum of Total Value	% of County Value
Earthquake Damage Potential	**13,494**	**100.00%**	**$1,895,437,450**	**$59,362,242**	**$1,971,633,590**	**100.00%**
Heavy	24	0.18%	$1,548,344	$ -	$1,548,344	0.08%
Moderate to Heavy	13,451	99.68%	$1,892,863,877	$59,355,360	$1,969,045,560	99.87%
Moderate	19	0.14%	$1,025,229	$6,882	$1,039,686	0.05%

5.10.9.1.3 Critical Facilities at Risk

Critical facilities data was spatially overlaid with earthquake hazard data to determine the type and number of facilities vulnerable to earthquake hazard classifications. Earthquakes pose numerous risks to critical facilities and infrastructure since the footprint of the earthquake hazard covers the entire county. However, most of the County's critical facilities have been built since the California Unified Building Code (UBC) was amended to include provisions for seismic safety. Seismic risks, or the harm or losses, that are likely to result from exposure to seismic hazards include:

- Casualties (fatalities and injuries).
- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damage to private property or public infrastructure.
- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.

Table 5-37 provides an inventory of critical facilities in each earthquake hazard category for Plumas County. The impact to the community could be great if these critical facilities were damaged or destroyed during a large earthquake event.

Table 5-37: Critical Facilities with Earthquake Damage Potential

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
COMMUNICATION	**25**	**494**	**5**	**524**
AM		**1**		**1**
ANTENNA STRUCTURE REGISTRATION		**34**		**34**
CELLULAR		**6**		**6**
FIXED MICROWAVE	**12**	**158**	**4**	**174**
FM		**12**		**12**
LAND MOBILE COMMERCIAL		**7**		**7**

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
LAND MOBILE PRIVATE	**13**	**271**	**1**	**285**
PAGING		**3**		**3**
TV NTSC		**2**		**2**
EMERGENCY RESPONSE		**49**		**49**
EOC		**1**		**1**
PLUMAS COUNTY OFFICE OF EMERGENCY SERVICES-EOC		1		1
FIRE STATION		**36**		**36**
BECKWOURTH FPD, BECKWOURTH		1		1
BECKWOURTH FPD, GRIZZLY CREEK RD		1		1
BUCKS LAKE FPD, BUCKS LAKE		1		1
CHESTER FPD, CHESTER		1		1
CRESCENT MILLS FPD, CRESCENT MILLS		1		1
C-ROAD CSD, C-ROAD		1		1
EAST PLUMAS RURAL FPD, DELLEKER		1		1
EAST PLUMAS RURAL FPD, IRON HORSE		1		1
EAST PLUMAS RURAL FPD, LAKE DAVIS		1		1
GRAEAGLE FPD, GRAEAGLE		1		1
GRAEAGLE FPD, WHITEHAWK RANCH		1		1
GREENHORN CREEK FPD, GREENHORN RANCH		1		1
HAMILTON BRANCH FPD, HAMILTON BRANCH		1		1
INDIAN VALLEY FIRE, GREENVILLE		1		1
INDIAN VALLEY FIRE, TAYLORSVILLE		1		1
LA PORTE FPD, LA PORTE		1		1
LONG VALLEY CSD, CROMBERG		1		1
MEADOW VALLEY FPD, MEADOW VALLEY		1		1
PENINSULA FPD, PENINSULA		1		1
PLUMAS EUREKA FPD, PLUMAS EUREKA		1		1
PORTOLA FPD, PORTOLA		2		2
PRATTVILLE FIRE, PRATTVILLE		1		1
QUINCY FPD, AMERICAN VALLEY		1		1
QUINCY FPD, EAST QUINCY		1		1
QUINCY FPD, QUINCY		1		1
SIERRA VALLEY FPD, CHILCOOT		1		1
SIERRA VALLEY FPD, VINTON		1		1
USFS (PLUMAS NF) - BECKWOURTH RANGER DISTRICT, MOHAWK		1		1
USFS (PLUMAS NF) - BOULDER CREEK WORK CENTER, ANTELOPE LAKE		1		1

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
USFS (PLUMAS NF) - CHESTER, CHESTER		1		1
USFS (PLUMAS NF) - FRENCHMAN LAKE WORK CENTER, FRENCHMAN LAKE		1		1
USFS (PLUMAS NF) - GANSNER BAR, CARIBOU		1		1
USFS (PLUMAS NF) - GREENVILLE WORK CENTER, GREENVILLE		1		1
USFS (PLUMAS NF) - MT. HOUGH RANGER DISTRICT, QUINCY		1		1
WEST ALMANOR FPD, WEST ALMANOR		1		1
POLICE STATION		**3**		**3**
CALIFORNIA HIGHWAY PATROL - QUINCY AREA 165		1		1
NATIONAL PARK SERVICE - LASSEN NATIONAL FORREST - ALMANOR RANGER DISTRICT		1		1
PLUMAS COUNTY SHERIFFS DEPARTMENT		1		1
SHELTER		**9**		**9**
CHESTER MEMORIAL HALL		1		1
DISTRICT OFFICE ANNEX		1		1
GRAEAGLE COMMUNITY CHURCH		1		1
GREENVILLE SOUTHERN BAPTIST		1		1
GREENVILLE TOWN HALL		1		1
INDIAN VALLEY RESOURCE CENTER		1		1
PLUMAS-SIERRA COUNTY FAIR		1		1
PORTOLA MEMORIAL HALL		1		1
QUINCY MEMORIAL HALL		1		1
HEALTH CARE		**14**		**14**
CLINIC		**1**		**1**
GREENVILLE RANCHERIA TRIBAL HEALTH PROGRAM-GREENVILLE		1		1
HOME HEALTH AGENCY/HOSPICE		**1**		**1**
QUINCY HOME MEDICAL SERVICES - LAWRENCE - PARENT		1		1
HOSPITAL		**3**		**3**
EASTERN PLUMAS HOSPITAL - PORTOLA CAMPUS		1		1
PLUMAS DISTRICT HOSPITAL		1		1
SENECA HEALTHCARE DISTRICT HOSPITAL		1		1
NURSING HOME		**3**		**3**
ASSISTED LIVING NURSING HOME		1		1
COUNTRY VILLA QUINCY HEALTHCARE		1		1

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
CENTER				
HEAVENLY HOME		1		1
PHARMACY		**5**		**5**
KEHOE PHARMACY		1		1
LASSEN DRUG COMPANY		1		1
QUINCY DRUG STORE		1		1
RITE AID - 6093		1		1
VILLAGE DRUG COMPANY		1		1
PUBLIC HEALTH DEPARTMENT		**1**		**1**
PLUMAS COUNTY PUBLIC HEALTH AGENCY		1		1
COMMERCIAL AND INDUSTRIAL	**1**	**46**		**47**
FINANCE		**10**		**10**
BANK OF AMERICA, NATIONAL ASSOCIATION, FEATHER RIVER BRANCH		1		1
BANK OF AMERICA, NATIONAL ASSOCIATION, QUINCY BRANCH		1		1
PLUMAS BANK		1		1
PLUMAS BANK, CHESTER BRANCH		1		1
PLUMAS BANK, GREENVILLE BRANCH		1		1
PLUMAS BANK, PLUMAS BANK		1		1
PLUMAS BANK, PORTOLA BRANCH		1		1
PLUMAS BANK, QUINCY ADMINISTRATIVE BRANCH		1		1
U.S. BANK NATIONAL ASSOCIATION, CHESTER BRANCH		1		1
U.S. BANK NATIONAL ASSOCIATION, QUINCY SAFEWAY BRANCH		1		1
HISTORIC PLACE	**1**	**17**		**18**
ABBEY BRIDGE GUARD STATION		1		1
ALMANOR POST OFFICE		1		1
ANTELOPE HOUSE		1		1
CAMP ROGERS POST OFFICE	1			1
CHESTER POST OFFICE		1		1
FANT GATHERING CORRAL		1		1
FLEMINGS SHEEP CAMP		1		1
ISLAND SCHOOL		1		1
JACKSON CREEK UNITED STATES FOREST SERVICE CABIN		1		1
LAST CHANCE VALLEY		1		1
LIGHTS CREEK GUARD STATION		1		1

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
OTIS RANCH		1		1
RHINEHART CABIN		1		1
RUFFA RANCH		1		1
SPRING GARDEN RANCH		1		1
SULPHUR SPRING HOUSE		1		1
THREEMILE GUARD STATION		1		1
WALKER MINE COMPRESSOR		1		1
PROPANE STATION		**10**		**10**
1633- PORTOLA - SUBURBAN		1		1
AMERIGAS		1		1
AMERIGAS CHESTER		1		1
BI-STATE PROPANE		1		1
BI-STATE PROPANE - HERITAGE PROPANE		1		1
COAST GAS - FERRELL PROPANE		1		1
COAST GAS QUINCY STORE NUMBER 2675 - TITAN PROPANE - TITAN PROPANE		1		1
HIGH SIERRA PROPANE		1		1
LAKE ALMANOR PROPANE STORE NUMBER 2481 - TITAN PROPANE - TITAN PROPANE		1		1
SUBURBAN PROPANE		1		1
TIMBER PRODUCTS		**3**		**3**
COLLINS PINE CO		2		2
SIERRA PACIFIC INDUSTRIES QUINCY DIV.		1		1
SCHOOL		**29**		**29**
COLLEGE		**1**		**1**
FEATHER RIVER COMMUNITY COLLEGE DISTRICT		1		1
DAY CARE CENTER		**9**		**9**
CHESTER STATE PRESCHOOL		1		1
GRAEAGLE PRESCHOOL		1		1
INDIAN VALLEY STATE PRESCHOOL		1		1
MOUNTAIN METHODIST CHILDREN'S CENTER		1		1
MOUNTAIN MONTESSORI PRESCHOOL		1		1
PORTOLA HEAD START		1		1
PORTOLA KIDS, INC. PRESCHOOL		1		1
PORTOLA PRESCHOOL COOPERATIVE		1		1
QUINCY HEAD START		1		1
K-12		**19**		**19**

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
BECKWOURTH (JIM) HIGH (CONTINUATION)		1		1
C. ROY CARMICHAEL ELEMENTARY		1		1
CHESTER ELEMENTARY		1		1
CHESTER JUNIOR/SENIOR HIGH		1		1
GREENVILLE ELEMENTARY		1		1
GREENVILLE JUNIOR/SENIOR HIGH		1		1
HORIZON HIGH (CONTINUATION)		1		1
LAKE ALMANOR CHRISTIAN SCHOOL		1		1
PIONEER/QUINCY ELEMENTARY		1		1
PLUMAS CHARTER 146		1		1
PLUMAS CHRISTIAN SCHOOL		1		1
PLUMAS COUNTY COMMUNITY		1		1
PLUMAS COUNTY OPPORTUNITY		1		1
PLUMAS COUNTY ROP		1		1
PORTOLA JUNIOR/SENIOR HIGH		1		1
PORTOLA OPPORTUNITY		1		1
QUINCY JUNIOR/SENIOR HIGH		1		1
SIERRA VALLEY CHRISTIAN SCHOOL		1		1
ST ANDREW'S ACADEMY		1		1
TRANSPORTATION		**9**		**9**
AIRPORT		**4**		**4**
GANSNER FIELD (QUINCY)		1		1
NERVINO (BECKWOURTH)		1		1
ROGERS FIELD AIRPORT (CHESTER)		1		1
US FOREST SERVICE CHESTER AIR TANKER BASE		1		1
HELIPORT		**5**		**5**
INDIAN VALLEY HOSPITAL HELIPORT (GREENVILLE)		1		1
PLUMAS DISTRICT HOSPITAL HELIPORT (QUINCY)		1		1
RODGERS FLAT HELIPORT (BELDEN)		1		1
USFS CHESTER HELIPORT		1		1
USFS QUINCY HELITACK BASE		1		1
UTILITY	**3**	**41**		**44**
WASTEWATER TREATMENT PLANT		**5**		**5**
CHESTER WWTP		1		1
ES DISTRICT WWTP		1		1
GRIZZLY LAKE CSD		1		1

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
PORTOLA WWTP		1		1
QUINCY WWTP		1		1
WATER TREATMENT PLANT		**2**		**2**
JOHNSVILLE WTP		1		1
LAKE DAVIS WTP		1		1
SUBSTATION	**1**	**22**		**23**
MARBLE		1		1
GRAEAGLE		1		1
MOHAWK		1		1
CHILCOOT		1		1
PORTOLA		1		1
BECKWORTH		1		1
GRIZZLY	1			1
QUINCY		1		1
PLUMAS		1		1
EAST QUINCY		1		1
GANSNER		1		1
SIERRA PACIFIC		1		1
N.N.		1		1
BELDEN		1		1
GRAYS FLAT		1		1
SPANISH CREEK		1		1
CARIBOU 2		1		1
GREENVILLE		1		1
BIG MEADOWS		1		1
BUTT VALLEY		1		1
HAMILTON BRANCH		1		1
COLLINS PINE CO.		1		1
CHESTER		1		1
POWER PLANT	**2**	**12**		**14**
GRAEAGLE		1		1
PORTOLA		1		1
ROCK CREEK	1			1
GRIZZLY	1			1
SPI- QUINCY		1		1
BUCKS CREEK		1		1
BELDEN		1		1
FIVE BEARS		1		1
OAK FLAT		1		1

Facility Type	Moderate	Moderate to Heavy	Heavy	Total
CARIBOU 1		1		1
CARIBOU 2		1		1
BUTT VALLEY		1		1
HAMILTON BRANCH		1		1
COLLINS PINE CO.		1		1
COUNTY FACILITY		**6**		**6**
PUBLIC WORKS YARD		**6**		**6**
BECKWOURTH PUBLIC WORKS YARD		1		1
CHESTER PUBLIC WORKS YARD		1		1
GRAEAGLE PUBLIC WORKS YARD		1		1
GREENVILLE PUBLIC WORKS YARD		1		1
LA PORTE PUBLIC WORKS YARD		1		1
QUINCY PUBLIC WORKS YARD		1		1
Grand Total	**29**	**688**	**5**	**722**

Earthquake events can significantly impact roads, overpasses, and bridges which often provide the only access to some neighborhoods. Since soft soil regions generally follow floodplain boundaries, bridges that cross water courses are considered vulnerable. Since most of the County's bridges provide access across water courses, most are at least somewhat vulnerable to earthquakes. Key factors in the degree of vulnerability are the bridge's age and type of construction which indicate the standards to which the bridge was built.

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Most of Plumas County is on well and septic tank service for water and waste water services respectively; however, major electrical transmission lines run through the county. Due to the amount of infrastructure and sensitivity of utility data linear utilities are difficult to analyze without further investigation of individual system components. Table 5-38 provides the best available linear utility data for transportation and electric utilities and it should be assumed that these systems are exposed to breakage and failure.

Table 5-38: Linear Utilities with Earthquake Damage Potential (Miles)

Row Labels	Moderate	Moderate to Heavy	Heavy	Total (Miles)
Transmission	36	219	0	255
NVENERGY_60KV	0	5	0	5
PG&E_115KV	11	21	0	31
PG&E_230KV	25	17	0	42
PG&E_34.5KV	0	1	0	1
PG&E_60KV	0	88	0	88
PLSR_60KV	0	87	0	87
Transportation	504	4,624	104	5,232
RAILROAD	13	172	0	185
ROAD	491	4,451	104	5,047
Grand Total	540	4,842	104	5,487

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5.10.10 Dam Failure

The primary danger associated with dam failure is the high velocity flooding downstream of the dam and limited warning times for evacuation. Vulnerability varies by community and depends on the particular dam profile and the nature and extent of the failure. Vulnerable population is present directly below downstream elements of the dam. This is especially true for those incapable of escaping the area within the allowable period. This population includes the elderly and young who may be unable to self-evacuate from the inundation area. The vulnerable population also includes those who would not have adequate warning from a television or radio emergency warning system. Dam inundation zones created by Cal EMA were used to develop exposure results for dam failure. Eleven Dam Inundation Zones have been used in the vulnerability analysis to capture at risk populations, parcel values, and critical facilities.

Table 5-39: Dam Failure Vulnerability Analysis Summary

Dam Failure Vulnerability Analysis		
Community Risk Factor Rating	**1.4**	**Low Risk, Minimal potential impact.**

Exposure Type	Total Assets	Assets or Value at Risk	% of Total Asset	Assets in Very High Hazard Areas	% Very High Hazard Areas
Population	20,009	1,396	7%	1,396	7%
Critical Facilities	717	82	11.4%	82	11.4%
Parcels ≥ $10k	13,494	1,064	7.8%	1,064	7.8%
Miles of Roadway	5,091	154	3%	154	3%
Miles of Railroad	185	76	41%	76	41%
Miles of Linear Utilities	255	43	16.7%	43	16.7%

5.10.10.1 Population at Risk

Populations located in a dam failure inundation zone can be exposed to the risk of a dam failure. The potential for loss of life is affected by the capacity and number of evacuation routes available to populations living in areas of potential inundation. The estimated population living in a dam inundation area is 1,396, or 7% of the population of Plumas County. It is difficult to estimate injury and loss of life for dam inundation zones due to the fluctuation of populations below dams. The Census population figures for each inundation zone were developed to provide a general sense of vulnerability. Figure 5-75 exhibits the population count within a dam inundation area.

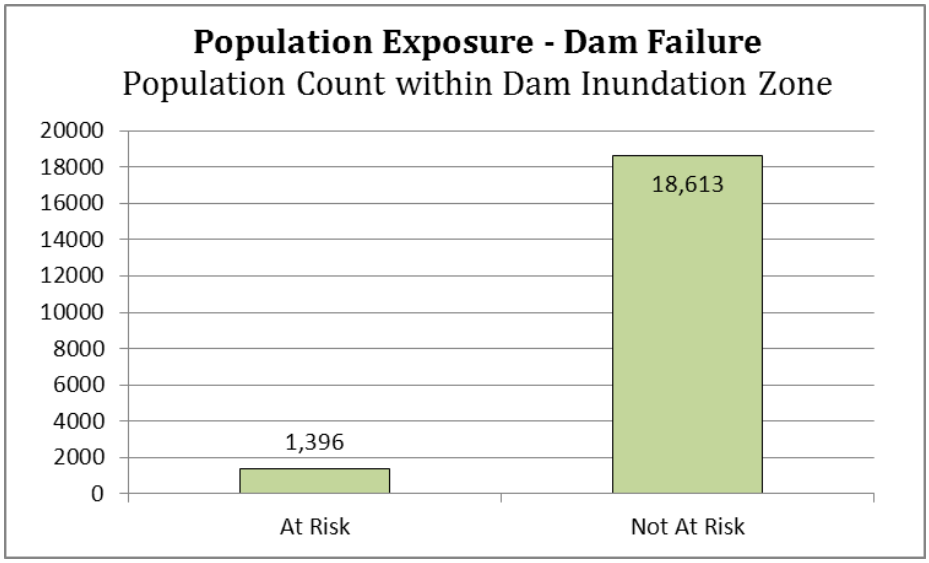


Figure 5-75: Population Exposure to Dam Failure

5.10.10.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the inundation zones to determine the at-risk structures. Only improved parcels were analyzed. Using this methodology, 1,151 (or 8%) of parcels was found to be within inundation zones. See Table 5-40 for more information on parcel values exposed to dam inundation hazards.

Table 5-40: Parcel Value Exposed to Earthquake Damage Potential

	Parcel Count	% of County Total	Structure Value	Fixture Value	Sum of Total Value	% of County Value
Dam Inundation Zone	1,064	7.88%	$133,511,400	$1,004,399	$136,958,212	6.95%

5.10.10.3 Critical Facilities at Risk

Critical Facilities at risk to dam inundation are on file with the County and for national security purposes can only be accessed through the Plumas County OES. As a general note, low-lying areas are vulnerable to dam inundation, especially transportation routes following valley floors. This includes all roads, railroads and bridges in the flow path of water. The most vulnerable critical facilities are those in poor condition that would have difficulty withstanding a large surge of water. Utilities, such as overhead power lines and communication lines, could also be vulnerable. Loss of these utilities could create additional compounding issues for emergency management officials attempting to conduct evacuation and response actions.

5.10.10.4 Dam Failure Community Impact

The most significant issue associated with dam failure involves the properties and populations in the inundation zones. Flooding as a result of a dam failure would significantly impact these areas. There is often limited warning time for dam failure. These events are frequently associated with other natural hazard events, such as earthquakes, landslides or severe weather, which limits their predictability and compounds the hazard. Important issues associated with dam failure hazards include the following:

- Federally regulated dams have an adequate level of oversight and sophistication in the development of emergency action plans for public notification in the unlikely event of failure; however, the protocol for notification of downstream citizens of imminent failure needs to be tied to local emergency response planning.
- Mapping for federally regulated dams is already required and available; however, mapping for non-federal-regulated dams that estimates inundation depths is needed to better assess the risk associated with dam failure from these facilities.
- Most dam failure mapping at federal levels requires determination of the probable maximum flood. While the probable maximum flood represents a worst-case scenario, it is generally the event with the lowest probability of occurrence. Even though they have a lower probability of occurrence, mapping of dam failure scenarios for non-federal-regulated dams that are not as extreme as the probable maximum flood can be valuable to emergency managers and community officials downstream of these facilities. This type of mapping can illustrate areas potentially impacted by more frequent events to support emergency response and preparedness actions.
- The concept of residual risk associated with structural flood control projects should be considered in the design of capital projects and the application of land use regulations.
- Addressing security concerns and the need to inform the public of the risk associated with dam failure is a challenge for public officials.

5.10.11 Summary of Spatial Hazards

In summary, hazards with spatial components can be analyzed with a side-by-side comparison. At-risk populations, critical infrastructure and improved parcels results for each hazard category are provided below. The side-by-side comparison allows officials to evaluate the impacts of potential hazards to determine what hazards to direct energy and financial resource for mitigation activities.

5.10.11.1 Population at Risk Summary

Figure 5-76 exhibits the amount of people living within wildfire, flood, landslide, earthquake and dam failure inundation zones. Though the earthquake hazard overlay has a large spatial footprint, only a small portion of the county contains heavy damage classifications, and therefore very little exposed population. In addition, the potential for casualties is somewhat low due to the date of building construction and type of structures within Plumas County.

Wildfire poses a risk for more than 11,000 people; this staggering statistic confirms the County's need and desire to prioritize the mitigation of wildfire hazards for Plumas County. For detailed vulnerability assessment information on affected populations, see the individual hazard specific sections presented previously in this section.

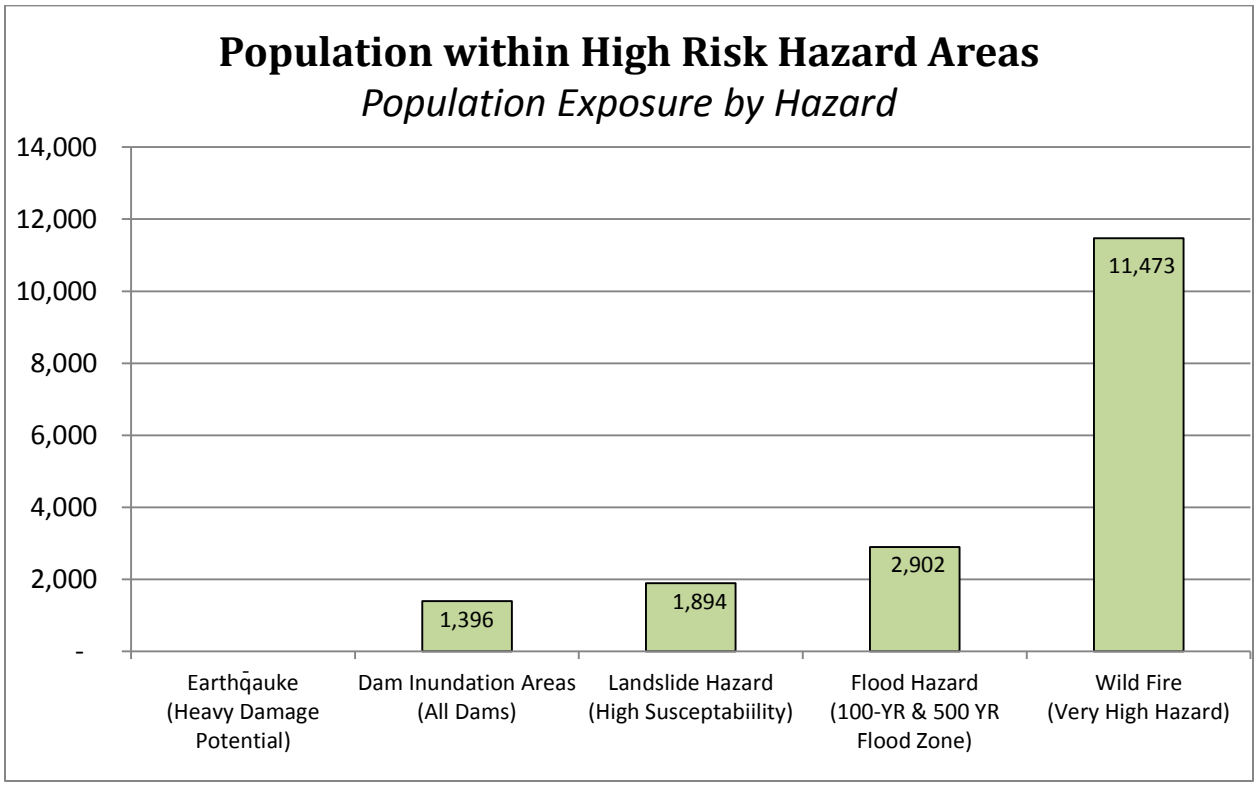


Figure 5-76: Population Exposure Summary

5.10.11.2 Parcel at Risk Summary

Table 5-41 and Figure 5-77 provide a summary of at-risk parcels by hazard. Wildfire's very high hazard classification creates approximately five times the amount exposed parcels compared to any other high hazard severity zone. For detailed vulnerability assessment information see the individual hazard specific sections presented previously in this section.

Table 5-41: Parcel Exposure Summary

Hazard	Parcel Count	Percent	Total Value	% of County Total
Earthquake (Heavy Shaking)	24	0.2%	$1,548,344	0.1%
Dam Failure (Inundation Zone Present)	1,064	7.9%	$136,958,212	6.9%
Flood (100-YR & 500-YR Flood Zones)	1,202	8.9%	$187,762,541	9.5%
Landslide (High Susceptibility)	1,154	8.6%	$208,862,266	10.6%
Fire (Very High)	7,584	56.2%	$1,009,413,234	51.2%

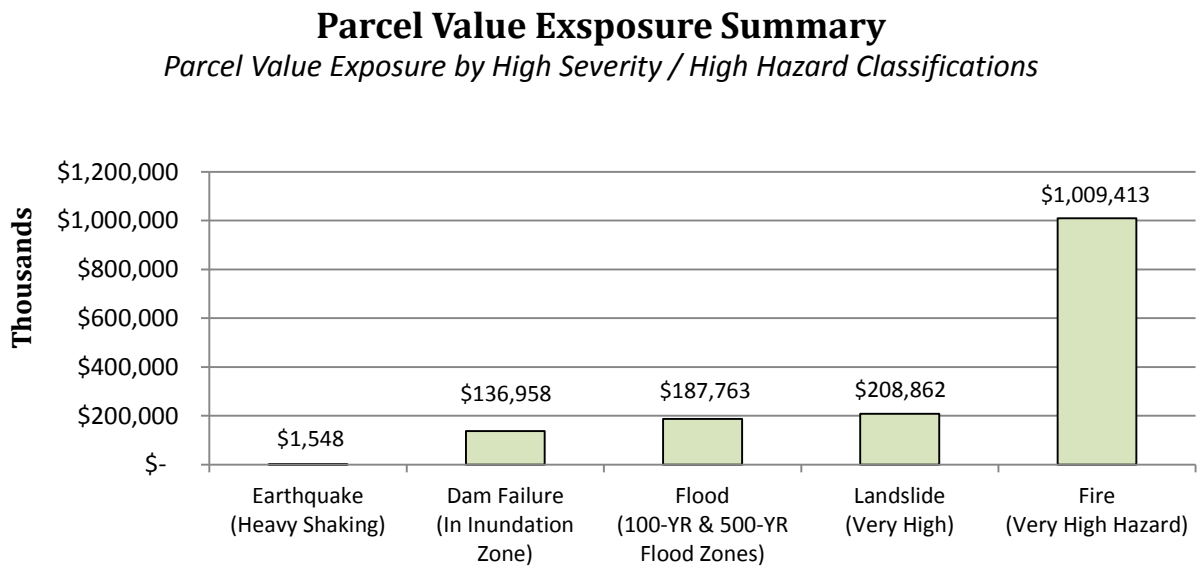


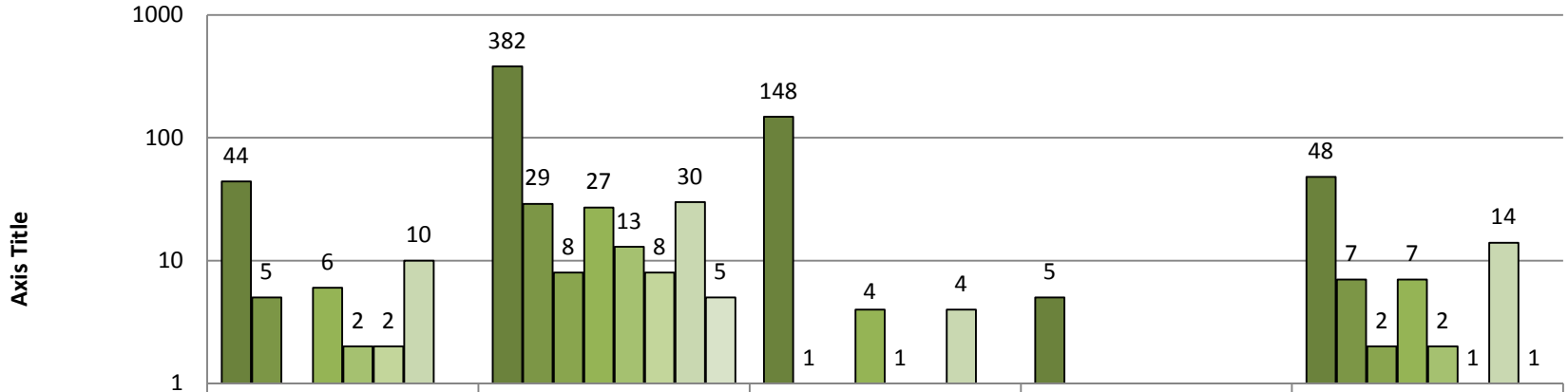
Figure 5-77: Parcel Exposure by High Severity / Hazard Classifications

5.10.11.3 Critical Infrastructure at Risk Summary

Critical infrastructure exposure by hazard comparison is provided in Figure 5-78 and Figure 5-79. Figure 5-78 provides a summary of at-risk critical infrastructure points for each hazard. Figure 5-78 provides a summary of at-risk electrical utilities and transportation routes by miles for each hazard. Critical infrastructure points include communication, emergency response, health care, schools, transportation point, utility points and county facilities. The County OES retains a complete record of all facilities in each hazard areas. For detailed vulnerabilities assessment information on critical infrastructure see the individual hazard specific sections presented previously in this section.

Critical Facilities in Hazard Hazard Areas

Count of Facilities by Hazard Class and Facility Type

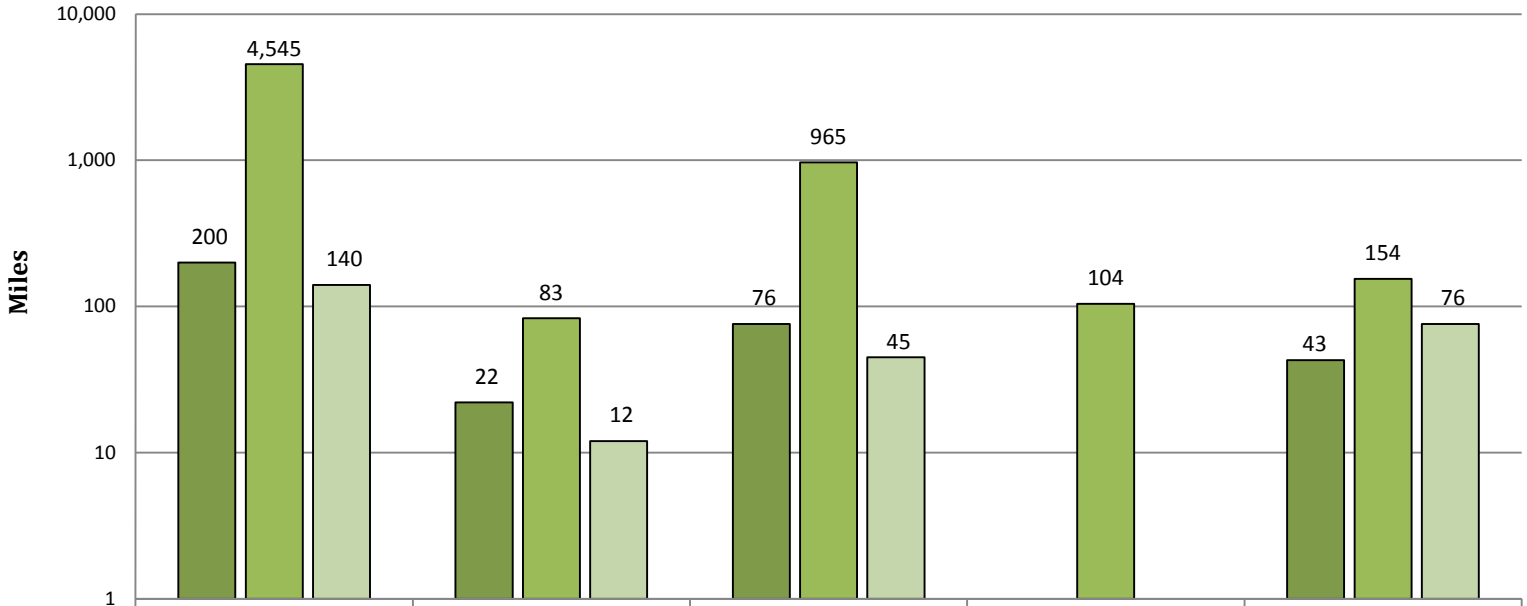


	Flood (100-YR & 500-YR)	Fire (Very High Hazard)	Landslide (High Susceptability)	Earthquake (Heavy Damage Potential)	Dam Failure (Within Dam Inundation Zone)
COMMUNICATION	44	382	148	5	48
EMERGENCY RESPONSE	5	29	1		7
HEALTH CARE	0	8	0		2
RES/COM/IND	6	27	4		7
SCHOOL	2	13	1		2
TRANSPORTATION	2	8	0		1
UTILITY	10	30	4		14
COUNTY FACILITY	0	5	0		1

Figure 5-78: Critical Facilities in High Hazard Area

Critical Facilities in High Hazard Areas

Length of Facilities (Miles) by Hazard Classification



	Fire (Very High Hazard)	Flood (100-YR & 500-YR)	Landslide (High Susceptability)	Earthquake (Heavy Damage Potential)	Dam Failure (Within Dam Inundation Zone)
Miles of Transmission	200	22	76	-	43
Miles of Roadway	4,545	83	965	104	154
Miles of Railroad	140	12	45	-	76

Figure 5-79: Critical Infrastructure Points Summary by Hazard

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5.10.12 Severe Weather

Severe weather in the Plumas County generally includes heavy rains or heavy snow and ice, often accompanied by strong winds, lightning or hail. Heavy rains or snow, coupled with low temperatures or other severe weather conditions, can result in increases in traffic accidents, disruptions in transportation, commerce, government, education, cause damage to buildings, communication towers, and electric power lines, and cause loss of life. Most commonly severe weather incidents can cause prolonged utility outages due to falling trees or other debris.

Severe weather can result in the closing of major and or secondary roads, particularly in rural locations, strand motorists, transportation accidents, loss of utility services, and loss of life. Environmental impacts of cold temperatures and heat include damage to shrubbery and trees and other vegetation. Personnel property such as cars, RVs and small equipment is extremely vulnerable to severe weather hazards especially hail and damage as a result of fallen trees and other storm debris.

Severe Weather Vulnerability Analysis		
Community Risk Factor Rating	**2.9**	**Moderate Risk, Moderate potential impact.**

The agricultural industry is especially vulnerable to severe weather, mostly extreme temperatures. Freezing temperatures can cause significant loss to crops, and excessive heat can cause high levels of mortality among livestock as well as damage to crops

According to historical hazard data, severe weather is an annual occurrence in Plumas County. Many of the historical severe weather events were state and federally declared disasters and have resulted in damages up to $407 Million. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain, snow and thunderstorms are the most frequent type of severe weather occurrences in the County. Wind and lightning often accompany these storms and have caused damage in the past. The secondary hazards caused by severe weather such as floods, fire, landslides and agricultural losses have had enormous impacts on the County. The risk and vulnerability associated with these secondary hazards are discussed in their respective sections.

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5.10.13 Drought and Climate Change

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand humans place on the water supply.

The impacts of drought can be categorized as economic, environmental or social. Many economic impacts occur in agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in crop and livestock production drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and diseases to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places human and wildlife populations, buildings, infrastructure and critical facilities, at higher levels of risk.

Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Reduced income for farmers has a ripple effect. Retailers and others who provide goods and services to farmers face reduced business. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls and loss of tax revenue for local, state and federal government. Less discretionary income affects the recreation and tourism industries. Prices for food, energy and other products increase as supplies are reduced. In some cases, local shortages of certain goods result in the need to import these goods from outside the stricken region. Reduced water supply impairs the navigability of rivers and results in increased transportation costs because products must be transported by rail or truck. Hydropower production may also be curtailed significantly.

Drought and Climate Change Vulnerability Analysis		
Community Risk Factor Rating	**2**	**Moderate Risk, Moderate potential impact.**

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

Social impacts mainly involve public safety, health, conflicts between water users, reduced quality of life and inequities in the distribution of impacts and disaster relief. A direct correlation to loss of human life due to drought is improbable for Plumas County.

The vulnerability assessment for drought is different from other natural hazards discussed in this HMP due to the lack of defined geographical boundaries. This section provides a summary of Plumas County's vulnerability as well as a description of the impacts resulting from a drought event.

No standardized methodology exists for estimating losses due to drought. Drought does not generally have a direct impact on critical and non-critical facilities and building stock. Instead, drought vulnerability is primarily measured by its potential impact to sectors of the County's economy and natural resources. In Plumas County some of the potential impacts to the economy include the following:

- Reduced agricultural and livestock production;
- Loss of timber from increased wildfires;
- Decreased municipal and industrial water supply;
- Loss of recreation/tourism; and
- Decreased wildlife and wildlife habitat.

For the purposes of this HMP Update potential dollar losses are determined based on historical data from disaster-related assistance funding from the USDA and the acreage and value of the crops currently grown in Plumas County. Since 1989, Plumas County has not received any indemnity payments for losses suffered due to drought[20]. This demonstrates Plumas County's historically low vulnerability to drought hazards.

According to the 2011 Plumas County Crop and Livestock Report the grand total of all agricultural products (excluding timber production) was approximately $24.7million in 2011. This represents a 23.6% increase over the 2010 value of $20 million. Livestock continues to be the primary commodity produced in Plumas County with an increase of almost 18% in the category overall. Field crops showed a very strong increase of 34%. Timber revenues also rose for the second consecutive year with a 14% increase. Table 5-42 summarizes the 2011 value of Plumas County's various agricultural crops.

Table 5-42: Plumas County's Crop Value (2011)

Crop	Acreage	2011 Total Value ($)
Alfalfa Hay	6,000	$3,834,000
Meadow Hay	3,000	$1,098,000
Grain Hay	1,000	$286,000
Irrigated Pasture	35,000	$2,800,000
Non-Irrigated Pasture	52,000	$1,248,000
Range Pasture	65,000	$325,000

[20] **Source: USDA Risk Management Agency, http://www.drought.unl.edu/Planning/Impacts/DroughtIndemnityData.asp**

Miscellaneous Crops*	-	$250,000
Total	**162,000**	**$1,209,100**

Note: Miscellaneous Crops include nursery, apiary, seed, fruit, potatoes, grain, etc.

Table 5-43 and Table 5-44 summarize the production value for livestock and timber for Plumas County in 2011.

Table 5-43: Production Value for Livestock (2011)

Livestock/Poultry	Number of Head	2010 Total Value ($)
Steers	8,250	$8,067,675
Heifers	6,750	$6,176,250
Slaughter	750	$536,192
Other	-	$125,000
Total	**15,750**	**$14,905,117**

Table 5-44: Production Value for Timber (2011)

Item	2011 Total Value ($)
Gross Timber Harvest	$11,510,226
Miscellaneous Timber Production	-
Total	**$11,510,226**

Direct costs such as increased pumping due to lowering of groundwater levels and costs to expand water infrastructure to compensate for reduced yields or to develop alternative water sources are a significant factor but very difficult to estimate due to a lack of documentation. Drought is also indirectly linked to wildfires which can have devastating impacts on timber and agricultural production; however, loss estimations are difficult to determine since drought is an indirect contributor. There are also intangible costs associated with lost tourism revenues and impacts to wildlife habitat and animals. Typically, these impacts are realized in the form of higher food and agricultural goods prices and increased utility costs.

Although historically Plumas County has not experienced long-term drought conditions the increased demands on the downstream water supply, climate change and land use change, such as deforestation and land degradation, continue to have unpredictable effects on drought in Plumas County. The potential risks and vulnerabilities associated with drought are further discussed in the Drought Hazard Profile section.

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Section 6. Mitigation Strategy

The intent of the mitigation strategy is to provide Plumas County the tools that will serve as guiding principles for future hazard mitigation policy and mitigation project administration. The development of the strategy included a thorough review of all natural hazards and identified far-reaching policies and projects intended to not only reduce the future impacts of hazards, but also to assist County administrators to achieve compatibility with existing planning mechanisms and the public alike. The development of the mitigation strategy ensures that all policies and projects link to established priorities and assign specific departments or individuals responsible for their implementation.

6.1 *Planning Process for Setting Hazard Mitigation Goals and Objectives*

The mitigation action strategy represents the key outcomes of the 2013 Plumas County HMP planning process. The hazard mitigation planning process conducted by the Planning Committee is a typical problem-solving methodology:

- Estimate the impacts the problem could cause (Vulnerability Assessment, See Section 5);
- Describe the problem (Hazard Identification);
- Assess what safeguards and resources exist that could potentially lessen those impacts (Capability Assessment); and
- Using this information, determine what, if anything, can be done, and select those actions that are appropriate for the community (Develop an Action Plan).

This process supports the goals, objectives and recommended actions in two ways. First, the risk assessment data identifies areas exposed to hazards, at-risk critical facilities, and future development at risk. Second, the Capability Assessment data identifies areas for integration of hazard mitigation into existing polices and plans.

Goals and objectives, discussed later in this section, help to describe what actions should occur, using increasingly narrow descriptors. Initially, long-term and general statements known as broad-based goals are developed. Goals can then be accomplished by meeting objectives, which are specific and achievable within a finite period. In most cases, there is a third level, called strategies or “actions”, which are detailed and specific methods to meet the objectives.

6.2 *Identifying the Problem*

As part of the mitigation actions identification process, the HMP Planning Committee and Hazard Focus Groups identified issues and/or weaknesses in the County’s existing/current hazard mitigation activities. From this exercise new mitigation actions address issues summarized by individual hazard in Table 6-1.

Table 6-1: Identified Issues/Weaknesses to be addressed by Mitigation Actions

Hazard ID	***Problem Statements***
Multi-Hazard	▪ Agency Coordination for mitigation planning ▪ Incorporation of mitigation planning into other County planning activities (general plan, natural resource management and preservation) ▪ Maintenance of technical skills, databases, and systems related to hazard mitigation planning
Flood	▪ Repetitive Loss Areas in Indian Valley ▪ Critical Infrastructure in American Valley (One School, and One Hospital as Risk) ▪ Residual Risk beyond Identified FEMA Floodplains ▪ Feather River Canyon wash-outs
Wildfire	▪ Inadequate street or house signage ▪ Narrow and often one-lane and/or dead-end roads ▪ Heavy fuel loads on vacant parcels, lands adjacent to communities and roadsides ▪ Multi-jurisdictional mitigation environment ▪ Nature and frequency of ignitions, both natural and man-made ▪ Evacuation or closures of transportation and or communities ▪ At Risk Critical Infrastructure ▪ Education and Implementation of Defensible Space for reducing structure vulnerability ▪ Wildfire hazard mitigation funding / Code Enforcement
Geo Hazards	▪ Unknown location of hazard ▪ Hazard is spread across entire county ▪ Compounded Hazard Risk ▪ Landslides can be activated by seismic activity ▪ Wildfire can cause higher risk of landslides or mudslides ▪ Transportation Infrastructure at Risk ▪ Highway 70 ▪ Rail Road ▪ Human development can exacerbate speed of erosion
Severe Weather	▪ Short periods of extreme events ▪ Long Periods of Winter Rains ▪ Secondary Hazards: Landslides, Storm Debris, Flash Flood, Lighting Strike, Snow Load ▪ Power Outages
Drought	▪ Poor retention of precipitation and depletion of deep groundwater systems as a result of continued extraction and reduced recharge during dry periods. ▪ Loss of water tables and depletion of shallow aquifers is a typical consequence of head cutting (not all drought related) throughout the watershed. ▪ Groundwater depletion high valley deserts such as Sierra Valley indicator of local drought.

Dam Failure	▪ Multiple Owners of Dams ▪ Dam Inundation Zones Information Distribution and Quality ▪ Emergency Action Plans responsibility of Cal EMA and DsoD ▪ County does not have jurisdictional authority for Dam Safety ▪ Communication of Hazard ▪ Warning Times for Sunny Day Event ▪ Maintenance on older dams
Climate Change	▪ Increased Precipitation in during winter rainy season ▪ Increased wildfire risk due to decreased snowpack ▪ Changes in variability and the frequency/severity of hazard events ▪ Other natural disaster such as drought, severe weather, flood, and wildfire occurrence intervals can change. ▪ Probability of occurrence is influenced by human action. ▪ Intergovernmental Panel on Climate Change (IPCC) predicts a warming of about 0.2 degree Celsius per decade

6.3 *Capabilities Assessment*

In preparing the mitigation actions, the Plumas County HMP Steering Committee members were asked to consider their overall capability to mitigate the identified hazards and associated problems. The mitigation strategy includes an assessment of Plumas County's planning and regulatory, administrative/technical, fiscal, and political capabilities to complete the identified mitigation actions.

6.3.1 Planning and Regulatory Mitigation Capabilities

Plumas County has several plans and programs in place that guide the County's mitigation of development in hazard-prone areas. The following table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. Table 6-2 provides a sample listing of possible planning and regulatory capabilities.

Table 6-2: Plumas County's Regulatory Mitigation Capabilities

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Multi-Hazard	***Emergency Operations Plan (EOP)***	PC OES	It addresses disasters, whether they are natural, technological or manmade. The Hazard Mitigation Plan addresses natural hazards only.
Multi-Hazard	***California Building Codes***	PC Building Department	Since 2006, Plumas County has adopted new building codes and regulations that protect new development and buildings from flooding, and Geo Hazards.
Multi-Hazard	***Zoning Regulations***	PC Planning Department	See Plumas County Building Regulations under Wildfire, Flood and Geo-Hazard

Multi-Hazard	***Subdivision Regulations***	PC Planning Department	See Plumas County Building Regulations under Wildfire, Flood and Geo-Hazard.
Multi-Hazard	***Comprehensive Land Use Plan (or General, Master or Growth Mgmt. Plan)***	PC Planning Department	Current General Plan Update under development.
Multi-Hazard	***Feather River Coordinated Resource Management Group***	Volunteer Staff	The Feather River Coordinated Resource Management Group works to protect, maintain, and enhance ecosystems and community stability in the Feather River Watershed through collaborative landowner participation.
Multi-Hazard	***Community Facility Development and Infrastructure Assistance***	PC Community Development Commission (PCCDC)	The Plumas County Community Development Commission assists low income residents meet their housing needs, build and improve infrastructure.
Multi-Hazard	***Statewide Historic Preservation Plan: Local Government Assistance***	Office of Historic Preservation	OHP's Local Government Unit (LGU) offers guidance and assistance to city and county governments in the following areas: ▪ Drafting or updating historic preservation plans and ordinances ▪ Developing historic context statements ▪ Planning for and conducting architectural, historical, and archeological surveys ▪ Developing criteria for local designation programs, historic districts, historic preservation overlay zones (HPOZs), and conservation districts ▪ Developing and implementing design guidelines using the Secretary of the Interior's Standards - Developing economic incentives for historic preservation - Training local historic preservation commissions and review boards - Meeting CEQA responsibilities with regard to historical resources
Wildfire	***Community Wildfire Protection Plan (CWPP), 2005***	PC Fire Safe Council	Update edits occurring, expect approval 2013.
Wildfire	***Fuel Reduction Map and Database***	PC Fire Safe Council	Updated Annually and Included as appendix to 2005 CWPP.

Wildfire	***Plumas County Hazardous Fuel Assessment and Strategy***	PC Fire Safe Council	Lifespan of not more than 10 years from the date of issue. Included as appendix to 2005 CWPP.
Wildfire	***Plumas County Health and Safety Code***	Plumas County Building Department	Section 14875 Section 14880 Section 14890 Section 4290 Section 4291
Wildfire	***Plumas County Building Regulations***	Plumas County Building Department	Section 8-14.01 Sec 8-14.03 Sec 8-14.03
Wildfire	***Local Community Codes***	Local Communities	Plumas Eureka Community Services District Greenhorn Community Services District Covenants, Conditions and Restrictions of West Almanor Community Club.
Wildfire / Flood	***USDA***	NRCS	Flood and Fire Recovery on Private Lands.
Flood	***Capital Improvement Plan***	Public Works	Flood Control Needs a budget to Clean / Maintain drainage throughout county.
Flood	***Prop. 50/84 Integrated Regional Water Management (IRWM)***	DWR	DWR has a number of IRWM grant program funding opportunities. Current IRWM grant programs include planning, implementation, and stormwater flood management. http://www.water.ca.gov/irwm/grants/index.cfm
Flood	***USDA***	NRCS	Improve floodplain function and reduce effects of flooding on private lands.
Flood	***Central Valley Flood Protection Plan***	DWR	State legislative requirements provide Plumas County local planning responsibilities for floodplain management (e.g., general plans, zoning ordinances, development agreements, tentative maps, and other actions).

Flood	***NFIP***	Plumas County Flood Control / Buildings Dept.	NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, Plumas County Officials are dedicated to protecting homes of more than 160 policies currently in force. ▪ 163 policies in force ▪ $37,987,500 insurance in force ▪ 34 paid losses ▪ $680,554 total paid losses ▪ 6 substantial damage claims since 1978
Flood	***DWR Prop 84***	DWR	Grant funding just came out from the Flood Operations Center.
Flood	***Central Valley Flood Protection Plan***	DWR	State legislative requirements provide Plumas County local planning responsibilities for floodplain management (e.g., general plans, zoning ordinances, development agreements, tentative maps, and other actions). 2007 flood risk management legislation apply Statewide, while other legislation is additive and provides provisions applicable to lands within the Sacramento-San Joaquin Valley (SSJV), Plumas County is within the SSJV. Government Codes of particular importance to hazard mitigation planning are: Government Code 65302 Government Code 8685.9
Flood	***Plumas Corporation, Feather River Coordinated Resource Management***	Plumas Corporation	Project Planning list has tons of projects related to stream restoration and watershed protection.
Flood	***USDA***	Natural Resources Conservation Service (NRCS)	Emergency Watershed Protection Program Environmental Quality Incentive Program
Geo-Hazard	***Plumas County General Plan Safety Element***	PC Planning Department	Develop sync with General Plan Safety Element. Following State legislation, it will be important to reference the PC Hazard Mitigation Plan in the General Plan Safety Element Section.
Geo-Hazard	***Statewide Seismic Regulations***	PC Building Department	

Flood / Drought	***Farmland Preservation***	Statewide Drought Mitigation Plan	
Dam Failure	***PG&E Exercise Development***		Multi-Agency tabletop / field exercise conducted in Feather River Canyon 2 Yrs. Ago.
Severe Weather	***Plumas County Building Codes***	PC Building Department PC Planning Department	Section 8-1.08 – Amendment of Section 1805 of the California Building Code: Frost Depth Required. Amendment of Section 1057 of the California Building Code: Ice Dam Protection

6.3.2 Administrative/Technical Capabilities

Plumas County has several departments and agencies that have both the administrative authority and technical capabilities related to hazard mitigation and loss prevention, as identified below:

- **Office of Emergency Services** develops, establishes, and maintains programs and procedures that provide for the protection of lives and property of Plumas County residents from the effects of natural disasters. The Office's responsibilities include:
  - Manage the Operational Area emergency management program and all EOC functions for Plumas County. Communicate with and provide information as the primary reporting agency to State OES during disasters and emergencies. Coordinate all state and Federal assistance needed by the county and the City of Portola.
  - Write, update and maintain the Plumas County Emergency Operations Plan, the Plumas County Hazard Mitigation Plan, the local Disaster Service Worker Program, the Emergency Response Training and Exercise Plan, and other plans as required to ensure overall county emergency preparedness. Manage and maintain the county's compliance with the Emergency Services Act Chapter 7 of Title 2 of the Government Code.
- **Plumas County Public Health** serves as the Medical Health Operational Area Coordinator and is responsible to plan, manage, coordinate and evaluate the essential medical components of emergency response. Duties include management of all personnel, equipment and resources needed to protect and preserve the public's health.
- **Plumas County Sheriff's Office** is dedicated to the safety and well-being of all persons within Plumas County. The Dispatch Center serves as the 24-hour local emergency notification and coordination center. In addition to law enforcement responsibilities, the Sheriff's office provides coroner and search and rescue operations.
- **Planning Department** includes General Planning Services, Zoning Administrator, Design Review, General Plan implementation, and Planning Commission administrators.
  - Current Planning Services staff ensure the timely and accurate processing of planning permit applications in the unincorporated County and ensure the accuracy and

consistency of information provided to interested persons related to Federal, State and County statutes, codes and policies related to uses of land in Plumas County. Long-Range Planning/General Plan Implementation Planning Services staff prepares and maintains comprehensive plans and policies that guide development and land use decisions to meet the goals and policies of the County and its citizenry consistent with the best principles of planning practice.

- The GIS Department is responsible for the development, access, and distribution of GIS data, technology, and mapping services to multiple departments, agencies, and users within Plumas County local government.

- **Building Department** performs building plan reviews, issues building, grading and other construction related permits, performs inspections of permitted construction, grading and building improvements for compliance with all applicable codes and regulations, and enforces mandated State and Federal Codes, as well as County adopted California Building Standards Codes.
- **Public Works** provides protection of the public investment in the county's existing road system and public safety by maintaining and improving overall roadway conditions. The Public Works Department maintains approximately 680 miles of roadways, including over 500 bridges and drainage structures and more than 5,000 road signs. The mission of the Public Works Department includes:
  - Maintaining, repairing, designing, and constructing county roads, bridges, and storm water drainage systems in accordance with local, state, and federal laws / standards and in a manner that maximizes public safety
  - Reviewing and approving land development projects as they relate to the county road and drainage systems
  - Pursuing and obtaining federal and state funds for the county roads, bridges, and storm drainage systems
  - Issuing Encroachment permits
  - Issuing Transportation permits
  - Maintaining assessment districts and county service area administrative tasks
  - Supporting the implementation of area Geographical Information System (GIS) mapping
- **Engineering** services include:
  - Administration of the Plumas County Floodplain Ordinance.
  - State and Local code compliance consultation to applicants and contractors on project development and mapping requirements.
  - The performs plan-checking functions pertaining to the following applications and maps: Records of Survey, Certificates of Corrections, Lot Line Adjustment Plans, Parcel Maps and Subdivisions, as well as reviews resultant parcel and parcel exchange deed descriptions related to Lot Line Adjustments.
  - Perform plan checking for code compliance of infrastructure improvements that are required per Conditions of Approval imposed by the Zoning Administrator on approved development applications.

- Perform plan checking for code compliance on behalf of Building Department concerning Fire Safe Driveway Designs and non-building-related Grading plans.
- They assure that engineering Conditions of Approval imposed by the Zoning Administrator on approved development applications are satisfied.
- They oversee construction of approved improvements for developments.
- They administrate security (guarantee and warranty) documents pertaining to approved developments with infrastructure improvements.
- They respond to inquiries and requests from professionals, the public and other agencies related to civil engineering and survey matters, including County policies, the Subdivision Map Act and State and County requirements and practices.
- They participate in the periodic meetings, which include the Development Review Committee and the Public Works/Engineering Review Committee.
- They provide large format copier/scanner services to project development representatives and to other County departments.
- Provides additional staff support services, on a requested basis, to the Department of Public Works and the Plumas County Transportation Commission.
- They participate in the Plumas County Safety Program.
- They participate in the Plumas County Office of Emergency Services Program.
- Manages and provides staff support services to the following dependent special districts:
    - Beckwourth County Service Area
    - Crescent Mills Lighting District
    - Grizzly Ranch Community Service District
    - Walker Ranch Community Service District
    - Quincy Lighting District

Table 6-3: Plumas County Administrative and Technical Mitigation Capabilities

Staff/Personnel Resources	Department / Agency	Comments
Planners (with land use / land development knowledge)	PC Planning Department	
Planners or engineers (with natural and/or human caused hazards knowledge) Public Works has capability.	PC Building Department PC Engineering Department PC Public Works Department	
Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors)	PC Building Department PC Engineering Department PC Public Works Department	

Staff/Personnel Resources	Department / Agency	Comments
Emergency Manager	PC OES	
Floodplain Manager (Planning Director / Public Works Director)	PC Planning Department PC Public Works Department	
Land surveyors	PC Engineering Department, PC Public Works Department, U.S. Forest Service	
Scientists or staff familiar with the hazards of the community	National Forest Service	Climatologist
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program	PC Planning Department PC Public Works Department	
Grant writers or fiscal staff to handle large/complex grants (David Keller)	PC Administration	PC Administrative Offices handle
Construction Equipment	PC Public Works Department	Public Works owns and maintains over 300 pieces of equipment / 55-60 Employees.
Public Works: ▪ Technical Assistance ▪ Personnel Assistance	PC Public Works Department	No Funding Outside Road Right of Way.
Utilities / Dam Safety Experts ▪ Dam Safety Personnel ▪ PG&E Arborist	Emergency Management / Risk Management	Dam Failure Exercise Expertise. PG&E arborist can remove hazard trees next to electrical lines free of charge.

Staff/Personnel Resources	Department / Agency	Comments
State Emergency Management Personnel ▪ State OES Access ▪ CCIC Access ▪ Mobile Emergency Personnel ▪ Medical Air Evacuation (Based in Auburn & Redding)	California Highway Patrol	CHP personnel can assist and maintain evacuation routes, radio communication, Aerial Support (Fixed Wing & Helicopter). CHP Maintains Mutual Aid Agreements with the State of Nevada during "State of Emergency".
Regional Medical Assistance Personnel ▪ Enloe Hospital / Chico ▪ Renown Hospital / Reno ▪ St. Mary's Hospital / Reno	Various Hospital Staff / Departments	Washoe County NV, EOP might be a good document to reference.
National Weather Service Weather Watchers	SKYWARN Weather Spotters	Spotter training classes is offered periodically at various locations in the area. The training is taught by National Weather Service forecasters and takes approximately 2 1/2 hours. The classes are generally offered on weeknights. We strongly encourage volunteers to attend these classes to become weather spotters. National Coordinator: Chris Maier, phone: 301-713-0090, email: chris.maier@noaa.gov http://www.nws.noaa.gov/training/wxspot.php

In addition to the departments/agencies described in Table 6-2, Table 6-3 below provides a list of local, state and federal agencies and programs that could provide financial assistance for hazard mitigation actions within Plumas County.

6.3.3 Fiscal Capabilities

This section identifies the financial tools or resources that the County could potentially use to help fund mitigation activities. These activities include County-specific capabilities, as well as state and federal

resources. It is also important to note that funding can also be sourced from participating agencies/organizations that collaborate with the County in the implementation of mitigation actions.

6.3.3.1 Local Fiscal Resources

A review of Plumas County's Annual Financial Report, Fiscal Year Ended June 30, 2011 resulted in the identification of a number of governmental funds, special revenue funds, and internal service funds that can be utilized for mitigation projects and activities.

- **Governmental Funds:**
  - *General Fund* is the County's primary operating fund, accounting for all financial resources of the general government.
  - *Special Revenue Fund* is used to account for services to County residents in the area of public protection, among other areas.
  - *Capital Projects Funds* are used to account for and report financial resources that are restricted, committed, or assigned to expenditure for capital outlays, including the acquisition or construction of capital facilities and other capital assets.

- **Other Funds:**
  - *Internal Service Funds*
  - *Enterprise Funds*
  - *Special District & Other Agencies*

In addition to the above funds, the County has the ability to incur debt through general obligation bonds, special tax bonds, and private activities, as well as withhold spending in hazard-prone areas. Table 6-4 provides a summary of financial resource capabilities.

Table 6-4: Fiscal Capabilities Table

Financial Resources	Department / Agency	Comments
Capital improvement programming	Public Works	Financial Resources Limited to Infrastructure Projects.
Community Development Block Grants (CDBG)	Plumas County CDC	
Special purpose taxes	Special Districts	
Gas / electric utility fees	Community Service Districts	Local Districts (Community Service District, Fire, School etc.)
Water / sewer fees	Community Service Districts	Local Districts (Community Service District, Fire, School etc.)

Stormwater Utility fees	Community Service Districts	Local Districts (Community Service District, Fire, School etc.)
General obligation, revenue, and/or special tax bonds		Local Districts (Fire, School etc.)
DWR Position 84 Bond Funding		The Plumas County Community Development Commission assists low income residents meet their housing needs, build and improve infrastructure.
Weatherization Services	PC Community Development Commission	Eligible households (owners and renters) can receive energy efficiency improvements installed at no cost, such as weather-stripping, insulation, storm windows, water heater blankets, compact fluorescent light bulbs, and other energy-related. Home repairs.

6.3.3.2 State and Federal Fiscal Resources

The following table provides a list of potential funding programs and resources provided by state and federal agencies/programs the County can use for hazard mitigation activities. Please note that the information provided below is not exhaustive.

Table 6-5: Potential Funding Programs/Grants from State and Federal Agencies

Agency	Potential Programs/Grants
Department of Homeland Security (DHS)– Federal Emergency Management Agency (FEMA)	Homeland Security Grant Program, Emergency Management Performance Grants Program, Transit Security Grant Program, Assistance to Fire Fighter Grants, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program, Flood Mitigation Assistance Program, Severe Repetitive Loss Program.
US Department of Housing and Urban Development	Community Development Block Grants
US Department of the Interior	Coast Impact Assistance Program, US Geological Survey Research and Data Collection
US Department of Health and Human Services/California Department of Health Services	Grants for Public Health Emergency Preparedness
California Emergency Management Agency (Cal EMA)	Regional Catastrophic Preparedness Grant Program, Interoperable Emergency Communications Center Grant Program,

	Proposition 1B Grant, Citizens Corps Program, Metropolitan Medical Response System Program, Earthquake and Tsunami Grants Program.
California Department of Housing and Community Development	Disaster Recovering Initiative
California Department of Forestry and Fire Protection	Western States WUI Fire Assistance Grant

6.3.4 Political Capability

Political capability in this instance is measured by the degree to which local political leadership (including appointed boards) is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum State or Federal requirements (e.g., building codes, floodplain management, etc.). The HMP Planning Committee evaluated the county's political capability as "moderately willing" to change policy or programs. Thus the HMP Planning Committee did not see political capability as a barrier to reducing hazard vulnerabilities.

6.3.5 Self-Assessment Summary

The Plumas County HMP Planning Committee conducted a short *Capabilities Assessment Self-Survey* in order to understand the degree of capability for categories reviewed previously in this section. Using Table 6-6 as an outline, the Planning Committee agreed "as a group" upon the degree of capability: limited, moderate, or high for each capability area. The survey conclusion results are based upon information provided previously in this Section and working knowledge of County operations.

Table 6-6: Capabilities Assessment Self-Survey Conclusion

	Degree of Capability		
Capability Area	***Limited***	***Moderate***	***High***
Planning and Regulatory Capability		x	
Administrative and Technical Capability			x
Fiscal Capability	x		
Community Political Capability		x	

6.4 *Mitigation Goals, Objectives and Actions*

Through a series of Planning Committee meetings, goals, objectives and strategies or "actions" for the county were developed and finalized. The goals, objectives and strategies form the basis for the development of a Mitigation Action Plan and specific mitigation projects to be considered for the County. The process consisted of 1) setting goals and objectives, 2) considering mitigation alternatives, 3) identifying strategies or "actions", and 4) developing a prioritized action plan resulting in a mitigation strategy. Supporting documentation for this section is provided in Appendix D. Further information on each step is provided below.

6.4.1 Goals and Objectives

The Planning Committee discussed goals and objectives for this plan at distinct points in the planning process. In February 2013 (Planning Committee Meeting #3), the Planning Committee discussed the results of the risk assessment and to begin developing the mitigation strategy by discussing the 2006 mitigation goals and objectives. The HMP Planning Committee opted to develop an entirely new set of goals and objects based upon the risk assessment results, and the identified problems as a result of new community analysis. The HMP Planning Committee decided to redevelop goals and objectives to address each hazard identified in Section 5. More details of this particular meeting are provided in Appendix B.

In March 2013 (Planning Committee Meeting #4), goals and objects were refined. Thereafter hazard focus group meetings were conducted during the months of April and May 2013 to develop mitigation strategy under each objective below. The following goals and objectives have been developed as part the 2013 planning effort:

ALL HAZARD GOAL: Maximize the use of mitigation actions to prevent losses from natural hazards identified in the 2013 HMP.

- ***ALL HAZARD OBJECTIVE 1: Increase the County's capability to provide mitigation opportunities and assistance to Plumas County communities.***
- ***ALL HAZARD OBJECTIVE 2: Continuously improve hazard assessments.***
- ***ALL HAZARD OBJECTIVE 3: Protect Natural and Cultural Resources through hazard mitigation.***
- ***ALL HAZARD OBJECTIVE 3: Support mitigation planning in all County Operations.***

GOAL 1: Minimize the losses of life and property due to Wildfire in Plumas County

- ***OBJECTIVE 1.1: Enhance community awareness of effective mitigation measures and wildfire impacts through education.***
- ***OBJECTIVE 1.2: Enhance the county's capability to notify and prepare the community during wildfire season.***
- ***OBJECTIVE 1.3: Continue reducing fuel hazards conditions within the wildland-urban interface.***

- ***OBJECTIVE 1.4: Continue implementation actions of the community wildfire protection plan (CWPP), and continue to seek establishment of fire wise communities.***
- ***OBJECTIVE 1.5: Enhance the county wildfire hazard code enforcement capabilities within wildland-urban interface.***
- ***OBJECTIVE 1.6: Continue land use planning efforts to ensure increased fire safety in new developments.***

GOAL 2: Minimize the losses of life and property due to Severe Weather in Plumas County

- ***OBJECTIVE 2.1: Increase community capabilities to mitigate the impact of winter weather hazards.***
- ***OBJECTIVE 2.2: Increase community capabilities to mitigate summer weather hazards.***
- ***OBJECTIVE 2.3: Implement actions to enhance reliability of power supply during and after***

GOAL 3: Minimize the losses of life and property due to Flooding in Plumas County

- ***OBJECTIVE 3.1: Mitigate flooding of structures and infrastructure.***
- ***OBJECTIVE 3.2: Increase public awareness of flood mitigation.***
- ***OBJECTIVE 3.3: Improve the effectiveness of flood insurance programs.***

GOAL 4: Minimize the losses of life and property due to Geologic Hazards in Plumas County

- ***OBJECTIVE 4.1: Provide for earthquake resistance in new construction.***
- ***OBJECTIVE 4.2: Mitigate potential damage to life and property from landslides and rock falls.***
- ***OBJECTIVE 4.3: Educate the public in earthquake mitigation and readiness.***

GOAL 5: Minimize the effects of Drought and Climate Change in Plumas County

- ***OBJECTIVE 5.1: Educate the citizens of Plumas County on methods to reduce the effects of Drought and Climate Change***
- ***OBJECTIVE 5.2: Protect water resources within Plumas County watersheds from drought conditions.***

GOAL 6: Minimize the losses of life and property due to Dam Failure in Plumas County

- ***OBJECTIVE 6.1: Reduce the Risk of Dam Failure***
- ***OBJECTIVE 6.2: Increase capability for continuity of government.***
- ***OBJECTIVE 6.3: Enhance warning capabilities.***

6.4.2 Identification of Mitigation Actions

To begin the process to identify mitigation actions under the 2013 HMP update, the Plumas County HMP Planning Committee reviewed mitigation actions from the 2006 MHMP in May of 2013. Due to new priorities and risk assessment results, the HMP Planning Committee removed, edited and developed new mitigation actions. Most importantly, the HMP Planning Committee developed new mitigation actions to acknowledge risk assessment results from the 2013 Vulnerability Assessment process outlined in Section 4 and Section 5.

Note: Mitigation actions have been developed for each goal. These strategies or actions state a more specific outcome that Plumas County expects to accomplish over the next five years. The strategies will outline the specific steps necessary to achieve the end state of hazard mitigation. Most of these actions are dynamic and can change based upon resources and barriers to implementation.

6.4.2.1 Considering Mitigation Alternatives

During meetings that occurred between February and March 2013, members of Planning Committee were presented with the risk assessment findings. Discussions held during the meeting resulted in the formation of Hazard Focus Groups. The range of alternatives identified and prioritized by each hazard focus group. The results from the Wildfire, Flood and Geo-Hazard focus groups provided a full range of potential mitigation strategies and actions to address each identified hazard. In formulating Plumas County's mitigation strategy, a wide range of activities were considered and narrowed to match mitigation activities recognized by the hazard mitigation industry. This includes mitigation activity criteria recommended by the Emergency Management Accreditation Program (EMAP)[21], which includes the following:

1) The use of applicable building construction standards;
2) Hazard avoidance through appropriate land-use practices;
3) Relocation, retrofitting, or removal of structures at risk;
4) Removal or elimination of the hazard;
5) Reduction or limitation of the amount or size of the hazard;
6) Segregation of the hazard from that which is to be protected;
7) Modification of the basic characteristics of the hazard;
8) Control of the rate of release of the hazard;
9) Provision of protective systems or equipment for both cyber or physical risks; and
10) Establishment of hazard warning and communication procedures

[21] The Emergency Management Accreditation Program (EMAP), an independent non-profit organization, is a standard-based voluntary assessment & peer review accreditation process for government programs responsible for coordinating prevention, mitigation, preparedness, response, and recovery activities for natural & human-caused disasters. Accreditation is based on compliance with collaboratively developed national standards, the Emergency Management Standard by EMAP.

The mitigation actions that met criteria for inclusion were classified under one of FEMA's six broad categories of mitigation techniques:

- Prevention (PRV): Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:
    - Planning and zoning;
    - Building codes;
    - Open space preservation;
    - Floodplain regulations;
    - Stormwater management regulations;
    - Drainage system maintenance;
    - Capital improvements programming; and
    - Shoreline / riverine / fault zone setbacks.
- Property Protection (PP): Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:
    - Acquisition;
    - Relocation;
    - Building elevation;
    - Critical facilities protection;
    - Retrofitting (e.g., wind proofing, flood proofing, seismic design techniques, etc.);
    - Safe rooms, shutters, shatter-resistant glass; and
    - Insurance.
- Public Education and Awareness (PE&A): Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:
    - Outreach projects;
    - Speaker series/demonstration events;
    - Hazard map information;
    - Real estate disclosure;
    - Library materials;
    - School children educational programs; and
    - Hazard expositions.
- Natural Resource Protection (NRP): Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection;
- Watershed management;
- Riparian buffers;
- Forest/vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.);
- Erosion and sediment control;
- Wetland preservation and restoration;
- Habitat preservation; and
- Slope stabilization.

- Emergency Services (ES): Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:
  - Warning systems;
  - Construction of evacuation routes;
  - Sandbag staging for flood protection; and
  - Installing temporary shutters for wind protection.
- Structural Projects (SP): Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:
  - Reservoirs;
  - Dams / levees / dikes / floodwalls / seawalls;
  - Diversions / detention / retention;
  - Channel modification; and
  - Storm sewers.

6.4.3 Formulating Mitigation Strategy

In formulating a mitigation strategy, wide ranges of activities were narrowed by criteria stated above. Through a series of hazard focus group meetings, conference calls, and e-mail exchanges from May through June 2013, the Planning Committee participated in the development and review of the local mitigation strategy.

Over 30 possible mitigation actions were identified by the Planning Committee to reduce the effects of hazards and focus on new and existing buildings and infrastructure. Table 6-7 provides an abbreviated table of mitigation actions considered to help achieve the community goals and objectives of reducing risk to Plumas County and the effects of natural hazards. A complete listing with mitigation details are provided in Appendix D. The table in Appendix D includes the agency(s) and/or department(s) best suited to complete or track the action, existing or potential funding sources, timeframe, and FEMA-recognized mitigation category. The cost/budget for each mitigation action, when available, is provided.

Table 6-7: Mitigation Action Abbreviated List (Full Mitigation Action List is found in Appendix D.)

No.	Hazard	Type	Specific Mitigation Strategy or Action
AH-1	All Hazard	PRV	Continue to enforce and enhance the California Building Codes and Plumas County regulations that reduce natural hazard risk.
AH-2	All Hazard	PE&A	Assist Citizens and Business to participate in hazard mitigation activities.
WF-1	Wildfire	NRP	Assess Plumas District Hospital property for possible fuel load reduction projects.
WF-2	Wildfire	PRV	Evaluate Cultural Resources for Wildfire risk.
WF-3	Wildfire	PRV	Develop and maintain a position for "County Fire Marshall"
WF-4	Wildfire	PRV	Continue to expand Fire Protection Districts.
WF-5	Wildfire	SP	Fund roof replacement projects for homeowners.
WF-6	Wildfire	PRV	Create defensible Space assistance (PRC 4291) for Seniors, Disabled and Low Income Citizens.
WF-7	Wildfire	PRV	Create homeowner incentives for fire safe house signing - to meet CA Fire Safe Standards (PRC 4290) criteria.
WF-8	Wildfire	ES	Construct alternate community escape routes for high-risk communities.
WF-9	Wildfire	NRP	Continue community based Hazardous Fuel Reduction (HFR) projects to modify fire behavior.
WF-10	Wildfire	PP	Develop Countywide implementation plan for PRC 4291 administration and enforcement.
WF-11	Wildfire	PP	Expand and upgrade Quincy Airport to reduce flood risk.
SW-1	Severe Weather	PRV	Develop rebate program to incentivize the installation of snow protectors on propane regulators.
SW-2	Severe Weather	PE&A	Create reverse 911 system capability for functional needs populations in remote locations.
SW-3	Severe Weather	SP	Mitigate severe weather impacts to vulnerable populations through home repairs and distribution of critical supplies.
FL-1	Flood	SP	Work with property owners in repetitive flood loss (RL) areas to identify the best alternative to flood proofing RL properties.
FL-2	Flood	PRV	Develop and Maintain Storm Drainage Inventory Maps and database.
FL-3	Flood	PRV	Continue countywide drainage system maintenance and clearing program.
FL-4	Flood	PRV	Continue right-of-way and drainage easement permitting.

No.	Hazard	Type	Specific Mitigation Strategy or Action
FL-5	Flood	SP	Develop flood protection measures study for Plumas District Hospital.
FL-6	Flood	SP	Develop flood protection measures study for Plumas School District Office Structure (1908).
FL-7	Flood	SP	Work with Sierra Valley Christian School to evaluate flood risk.
FL-8	Flood	SP	Develop flood control enhancements for Henchels Drainage Area (Boyle's Creek).
FL-9	Flood	PRV	Clear debris and vegetation from area behind Les Schwab.
FL-10	Flood	PP	Evaluate Indian Valley for flooding issues in a localized setting.
LS-1	Landslide	PRV	Implement bank stabilization projects based upon criteria developed during HMP Risk Assessment for Landslide.
LS-2	Landslide	PRV	Implement landslide / rockslide railway risk reduction working group to share information and data.
DRT-1	Drought & Climate Change	ES	Continue and enhance drought-monitoring programs through the County Agricultural Commissioner's Office.
DF-1	Dam Failure	ES	Develop reverse 911 System for Residents and Businesses in Dam Inundation Zones.
DF-3	Dam Failure	ES	Evaluate hazardous material sites, shelters, day care centers, and other functional needs facilities for Dam Hazards.
DF-2	Dam Failure	ES	Develop better dam inundation mapping for all High Hazard dams within Plumas County,

Many of the mitigation actions in Table 6-7 support ongoing county projects or activities such as WF-4, the effort to continue to expand Fire Protection Districts and structural fire protection throughout the county. Other actions support ongoing activities by allied agencies such as WF-9, the project to continue community-based hazardous fuels reduction projects by the Fire Safe Council to modify fire behavior. Still other actions identify opportunities to partner with outside agencies or communities on larger projects to reduce risk such as FL-5, the project to develop a flood protection study for Plumas District Hospital or FL-1, and the project to work with property owners in repetitive flood loss areas to flood-proof their homes.

Taken together, these projects help demonstrate the county's commitment to hazard mitigation and help establish the baseline for possible future action. Some actions developed by the Planning Committee are intended to be completed when funding becomes available. These particular projects should be considered an opportunity for future project funding should any become available.

Additionally, the mitigation actions will be part of an annual review, described in the next section, where projects can and will change to reflect current conditions.

6.4.4 Prioritization of Mitigation Actions

A common failure of mitigation plans is that they are never implemented. A prioritized action plan lays the groundwork for implementation by describing how mitigation actions are prioritized, implemented, and administered. Implementing the identified mitigation actions can be overwhelming for any community, especially with limited staffing and fiscal resources. To ensure that the Plumas County HMP reflects a reality of what Plumas County can do with its available resources over the next update cycle, the mitigation actions are prioritized by various means. The Planning Committee utilized goals and objectives, public input and the STAPLE/E method to provide several layers of prioritization which help balance county resources and public priorities within a five year planning window. The prioritization process is discussed below.

6.4.4.1.1 Goal and Objective Prioritization

Through a series of Planning Committee meetings, the Goals and Objectives were prioritized based upon risk assessment outcomes. The higher the risk factor score, the greater the priority placed on corresponding goals and objectives. The goals and objectives form the basis for the development of a Mitigation Action Strategy as well as to form a prioritized list of objectives and actions to be considered for the community. Table 6-8 provides a prioritized list of mitigation action goals and objectives.

Table 6-8: Risk Factor Goal Objective Matrix

Rank / Goal	Hazard	RF Factor	Mitigation Action Objectives
1	Wildfire	3.6	▪ OBJECTIVE 1.1: Enhance community awareness of effective mitigation measures and wildfire impacts through education. ▪ OBJECTIVE 1.2: Enhance the county's capability to notify and prepare the community during wildfire season. ▪ OBJECTIVE 1.3: Continue reducing fuel hazards conditions within the wildland-urban interface. ▪ OBJECTIVE 1.4: Continue implementation actions of the community wildfire protection plan (CWPP), and continue to seek establishment of fire wise communities.
2	Severe Weather	2.9	▪ OBJECTIVE 2.1: Increase community capabilities to mitigate the impact of winter weather hazards. ▪ OBJECTIVE 2.2: Increase community capabilities to mitigate summer weather hazards. ▪ OBJECTIVE 2.3: Implement actions to enhance reliability of power supply during and after severe weather events
3	Flooding	2.7	▪ OBJECTIVE 3.1: Mitigate flooding of structures and infrastructure. ▪ OBJECTIVE 3.2: Increase public awareness of flood mitigation. ▪ OBJECTIVE 3.3: Improve the effectiveness of flood insurance programs.
4	Geologic Hazards	2.6	▪ OBJECTIVE 4.1: Provide for earthquake resistance in new construction. ▪ OBJECTIVE 4.2: Mitigate potential damage to life and property from landslides and rock falls. ▪ OBJECTIVE 4.3: Educate the public in earthquake mitigation and readiness.

Rank / Goal	Hazard	RF Factor	Mitigation Action Objectives
5	Drought and Climate Change	2 1.9	▪ OBJECTIVE 5.1: Educate the citizens of Plumas County on methods to reduce the effects of Drought and Climate Change ▪ OBJECTIVE 5.2: Protect water resources within Plumas County watersheds from drought conditions.
6	Dam Failure	1.4	▪ OBJECTIVE 6.1: Reduce the Risk of Dam Failure ▪ OBJECTIVE 6.2: Increase capability for continuity of government. ▪ OBJECTIVE 6.3: Enhance warning capabilities.

Risk Factor Conclusion	
HIGH RISK (3.0 – 4.0)	Wildfire
MODERATE RISK (2.0 – 2.9)	Flooding, Severe Weather, Geologic Hazards, Drought
LOW RISK (0.1 – 1.9)	Climate Change, Dam Failure

6.4.4.1.2 Public Input

By involving the public when developing mitigation actions, it ensures fair representation of all sectors in the community and increases the ability to match personal property protection mitigation with public needs. Public surveys were used to determine priorities of mitigation categories, types and specific elements that would aid county administrators to determine mitigation action criteria for public mitigation assistance. Questions and results of the full survey are provided in Appendix D. Results from the public survey assisted in prioritizing mitigation actions in conjunction with risk factors mentioned previously. Specifically, the results of Survey Question 10 and Survey Question 11 assisted to prioritize mitigation actions. A number FEMA accepted community-wide activities could reduce risk from hazards. In general, these activities fall into one of the following six broad categories as mentioned earlier in this section. Figure 6-1 provides a summary of the community's considerations for FEMA's mitigation types, and provides a prioritization method for county officials to consider.

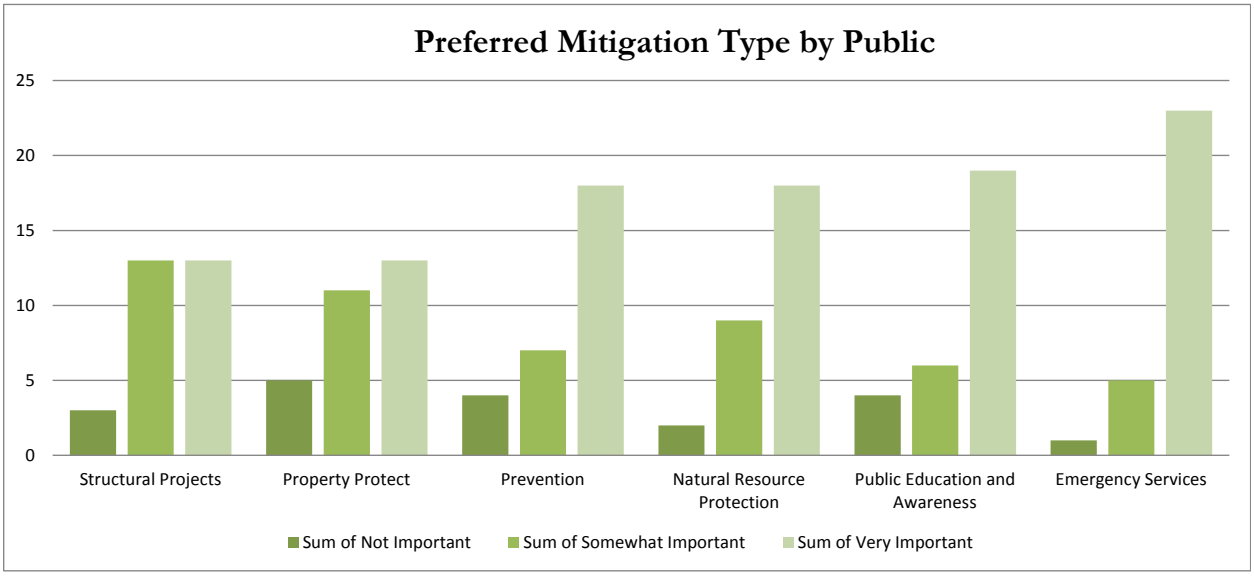

Figure 6-1: Question 10 Survey Results

In addition to the Survey Question 10, Survey Question 11 helped to understand public opinion on types of projects the County should be implementing in order to reduce damage and disruption from hazard events. Figure 6-2 provides a summary of public opinion on preferred mitigation types. Mitigations types can include the retrofitting essential facilities and infrastructure, providing public information, developing new capital projects such as floodwalls and gates, restoration of the natural environment, or strengthen existing codes and regulations. The results from Survey Question 11 further refined prioritization of mitigation actions.

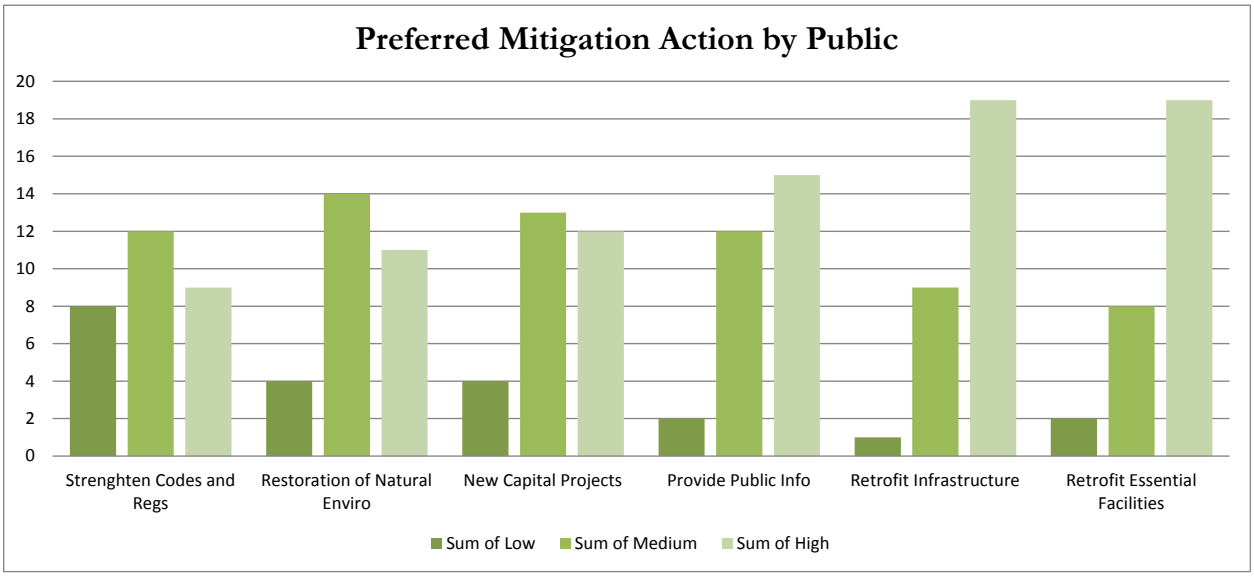

Figure 6-2: Question 11 Survey Results

6.4.4.1.3 STAPLEE Criteria

In addition to prioritized goals and public input, mitigation Actions were ranked and prioritized with the STAPLE/E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) Criteria. This methodology requires that social, technical, administrative, political, legal, economic, and environmental issues be addressed while reviewing potential mitigation strategies and actions for the County to undertake. This process was used to ensure that the most equitable and feasible actions would be undertaken based on the County's capabilities. Table 6-9 below provides information regarding the review and prioritization criteria for mitigation actions. STAPLE/E scoring and prioritization for each mitigation actions are in Appendix D.

Table 6-9: STAPLE/E Review and Selection Criteria for Alternatives

STAPLE/E Review and Selection Criteria for Alternatives
Social
Is the proposed action socially acceptable to the community(s)?
Does the mitigation action affect large segments of the population?
Technical
Will the proposed action be technically feasible?
Will it create a long term solution?

STAPLE/E Review and Selection Criteria for Alternatives
Does it solve a problem or only a symptom (i.e. Long Term Solution)?
Administrative
Is there sufficient funding, staff, and technical support available?
Can the community(s) implement the action under existing business process?
Is there someone to coordinate and lead the effort for operations and maintenance?
Political
Is the action politically acceptable?
Is there a local champion to coordinate the project?
Is there public support both to implement and to maintain the project?
Legal
Is the community(s) authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
Are there legal side effects or will the activity be challenged?
Economic
Do the benefits exceed the costs?
How will this action affect the fiscal capability of the community(s)?
Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
Environmental
How will the action affect the environment (Land / Water)?
Will the action need environmental regulatory approvals?
Will it meet local and state regulatory requirements and community environmental goals?

6.4.4.1.4 Mitigation Costs

In addition to the prioritization mentioned above, the anticipated level of cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural measures, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. Although detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For those measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions. Cost when available can be found in Appendix D.

6.4.5 Mitigation Strategy 2013-2018

Based upon the prioritization process above, and with insight to the realities of the County's capabilities, the Planning Committee chose five mitigation actions, identified in Table 6-10, to develop more detailed implementation strategies. See Section 7 for Implementation Strategies.

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Table 6-10: 2013-2018 Prioritized Mitigation Strategy

No.	Hazard	Type	Specific Mitigation Strategy	Description	Responsible Parties	Funding Source	Time Line	Resources / Cost	Goals Addressed	STAPLEE SCORE
AH-2	All Hazard	PE&A	Assist Citizens and Business to participate in hazard mitigation activities.	Expand information & education to residents via Plumas County OES, fire departments, and Plumas County Fire Safe Council and other partner agencies. Identified agencies should continue to provide and expand informational and educational programs for residents, property owners, and communities. Projects can include: 1) Targeted Mailers from County to high-risk addresses. 2) PSA in Internet and Newspaper (Adjust per public survey). 3) Social Media Development (Need staff time). 4) Provide speakers to civil groups regarding hazard related activities. 5) Preparation and Distribution of Personnel Safety Kits (Updated from 2006 HMP to include current needs.)	PC OES	General Fund / EMPG	1-5 Yrs.	Fire Safe Council personnel.	ALL HAZARD GOAL	15
WF-8	Wildfire	ES	Construct alternate community escape routes for high-risk communities.	In the Wildland Urban Interface. Communities, industrial landowners, along with local, state, and federal agencies should work collaboratively to identify and pursue funding to improve access for evacuations. Access communities for evacuations in and out of the community in the wildland urban interface (WUI) - A number of existing “at risk” communities in Plumas County presently only have “one way” in and out of their community. Evacuation planning - many of the County’s communities have evacuation plans and identified evacuation assembly areas. Efforts by the County should continue to work towards providing plans to those communities without one. Based upon final evacuation planning efforts provide alternatives to constructing and or re-purposing existing routes to mitigate wildfire risk to communities.	PC SO, PC Public Works, Plumas County Fire Safe Council	PDM Grant	1-5 Yrs.	UNKNOWN	GOAL 1	11
FL-10	Flood	PP	Evaluate Indian Valley for flooding issues in a localized setting.	This area has a history of repetitive flooding and a detailed flood study should be developed to explore concepts to reduce flood risk. As part of this effort, evaluate Flood Proofing Alternatives for Mt. Hough Estates and Cresent Mills repetitive flood loss areas. County NFIP programs losses: NFIP Community Overview: FEMA has reported five (5) SL properties and one (1) RL property in Mt. Hough Estates. The SL properties account for $120,479 in claims and the RL property accounts for $43,457 in claims.	Engineering, Planning Department (GIS), and PC OES	UNKOWN	1-5 Yrs.	$150,000	GOAL 3	17
LS-1	Landslide	PRV	Implement bank stabilization projects based upon criteria developed during HMP Risk Assessment for Landslide.	Over 964 Miles of Roadway have been identified with "High" Landslide Risk.	Public Works, Engineering, Planning Department (GIS)	UNKOWN	1-5 Yrs.	GIS personnel and equipment. Road crew verification of results.	GOAL 4	15
DRT-1	Drought & Climate Change	NRP	Continue and enhance drought-monitoring programs through the County Agricultural Commissioner’s Office.	Continue programs that have the Agricultural Commissioner determine drought conditions that cause severe effects on agricultural producers, as well as notifying local OES and Board of Supervisors of emergencies, preparing the County Agricultural Commissioner Disaster Reports and seeking implementation of USDA Emergency Loan Program.	Agricultural Commissioner, Emergency Services, Services Board of Supervisors	N/A	Ongoing	Ag. Commissioner Position Training.	GOAL 5	13

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Section 7. Plan Implementation and Maintenance

As this document is a living document, it is important that it becomes a tool in the County's arsenal to ensure minimal damage in the event of natural disaster event. This section discusses plan adoption and implementation, as well as the processes for monitoring, evaluating, and updating the HMP, to ensure that the HMP remains relevant and continues to address the changing environment in the County. In addition, this section describes the incorporation of the HMP into existing Plumas County planning mechanisms, as well as how the County will continue to engage the public.

7.1 *Plan Adoption*

To comply with DMA 2000, the Plumas County BOS will officially adopt the 2013 Plumas County HMP within one year of FEMA approval. The adoption of the updated HMP recognizes the County's commitment to reducing the impacts of natural hazards on the unincorporated areas of Plumas County. A copy of the 2013 HMP resolution is included in Appendix A.

7.2 *Implementation*

The planning team will work with county officials and personnel to begin implementation of the newly adopted hazard mitigation actions into the general operations of Plumas County government and partner organizations. For the 2013 update, Implementation Strategies have been developed to guide mitigation action completion. Implementation Strategies can be used as a baseline for implementation, Hazard Mitigation Assistance (HMA) project applications, and other potential grant funding opportunities. Overtime, Implementation Strategies will become more detailed and the Plumas County mitigation planners will work to provide more detail for the priority mitigation actions. In conjunction with progress reports outlined in Section 7.4.2, implementation strategy worksheets provided in Appendix E will be extremely useful to maintain update as a plan of record tool. Each implementation strategy worksheet in Appendix E provides individual steps and resources need to complete tasks. The following provides several options to consider when developing implementation strategies in the future:

- **Use processes that already exist;** initial strategy is to take advantage of tools and procedures that were identified in the capability assessment in Section 6. By using planning mechanisms already in use and familiar to the Plumas County departments and organizations, it will give the planning implementation phase a strong initial boost, especially if mitigation strategy calls for expanding existing programs, or creating new programs or processes at a later date. Section 7.5 provides more information on existing planning mechanisms.
- **Updated work plans, policies,** or procedures; include hazard mitigation concepts and activities can help integrate the Plumas County HMP into daily operations. These changes can include how major development projects and subdivision reviews are addressed in hazard prone areas or ensure that hazard mitigation concerns are considered in the approval of major capital improvement projects.
- **Job descriptions;** working with department or agency heads to revise job descriptions of government staff to include mitigation-related duties could further institutionalize hazard

mitigation. This change would not necessarily result in great financial expenditures or programmatic changes.

7.3 *Future Participation*

The Plumas County HMP Steering Committee, established for this update, will become a permanent advisory body to administer and coordinate the implementation and maintenance of the HMP. The Plumas County Office of Emergency Services Manager will lead the HMP plan development and updates and all associated HMP maintenance requirements. On an annual basis, the HMP Steering Committee will report to the Board of Supervisors and the public on the status of plan implementation and mitigation opportunities in the County. Other duties include reviewing and promoting mitigation opportunities, informing and soliciting input from the public and addressing stakeholder concerns about hazard mitigation assistance.

7.4 *Monitoring, Evaluating, and Updating the HMP*

This section describes the schedule and process for monitoring, evaluating, and updating the HMP.

7.4.1 Schedule

Monitoring the progress of the mitigation actions will be on-going throughout the five-year period between the adoption of this HMP and the next update. The HMP Planning Committee will meet on an annual basis to monitor the status of the implementation of mitigation actions.

As mentioned, one of the duties of the HMP Planning Committee is to report to the Board of Supervisors on the status of plan implementation. This annual review will take place each year on or near the anniversary of the adoption of the plan. A month prior to this annual review, the HMP Planning Committee will meet to prepare the evaluation of the HMP.

The HMP will be updated every five years, as required by DMA 2000. The update process will begin at least one year prior to the expiration of the 2013 HMP. However, should a significant disaster occur within the County, the HMP Planning Committee will reconvene within 30 days of the disaster to review and update the HMP as appropriate. The Plumas County Board of Supervisors will adopt written updates to the HMP.

7.4.2 Process

The HMP Planning Committee will coordinate with responsible agencies/organizations identified for each mitigation action. These responsible agencies/organizations will monitor and evaluate the progress made on the implementation of mitigation actions and report to the Planning Committee on an annual basis. Working with the HMP Planning Committee, these responsible agencies/organizations will assess the effectiveness of the mitigation actions and modify the mitigation actions as appropriate. A HMP Mitigation Action Progress Report worksheet, provided in Appendix E, has been developed as part of this HMP to assist mitigation project managers in reporting on the status and assessing the effectiveness of the mitigation actions.

Information culled from the quarterly meeting to monitor mitigation actions can be used for the annual evaluation of the HMP. The following questions will be considered as criteria for evaluating the effectiveness the HMP:

- Has the nature or magnitude of hazards affecting the County changed?
- Are there new hazards that have the potential to impact the County?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the HMP?
- Should additional local resources be committed to address identified hazards?

An Annual HMP Review Questionnaire worksheet, also provided in Appendix E, has been developed as part of this HMP to provide guidance to the HMP Planning Committee on what should be included in the evaluation. Future updates to the HMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise during monitoring and evaluating the HMP, which require changes to the risk assessment, mitigation strategy and other components of the HMP, will be incorporated into the next update of the Plumas County HMP in 2018. The questions identified above would remain valid during the preparation of the 2018 updated.

7.5 *Incorporation into Existing Planning Mechanisms*

Another important implementation mechanism is to incorporate the recommendation and underlying principles of the HMP into other community plans and mechanizing, such as comprehensive planning, capital improvement budgeting, economic goals and incentives, and regional plans. Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of government and development. Thus, the integration of a variety of County administrative departments on the HMP Planning Committee provides an opportunity for constant and pervasive efforts to network, identify, and highlight mitigation activities and opportunities at all levels of government, through the monitoring of agendas, attendance at meetings, and distribution of memos. This collaborative effort is also important in the monitoring of funding opportunities that can be leveraged to implement the mitigation actions. Specific documents that the HMP mitigation planners will actively incorporate information from include:

- **Plumas County Building / Development Codes and Ordinances:** The 2013 Plumas County HMP will provide information to enable the County to make decisions on appropriate building/development codes and ordinances. Appropriate building codes and ordinances can increase the County's resilience against natural disasters.
- **Plumas County EOP**: The 2013 Plumas County HMP will provide information on risk and vulnerability that will be extremely important to consider and incorporate into the County's EOP. Probability and vulnerability can direct emergency management and response efforts.
- **Plumas County GP**: The 2013 Plumas County HMP will provide information that can be incorporated into the Land Use and Public Safety Elements during the next GP update. Specific

risk and vulnerability information from the HMP can help to identify areas where development should not take place.

- **Plumas County Community Wildfire Protection Plan (CWPP):** The 2013 Plumas County HMP highlights wildfire areas of concerns in Plumas County. Suitable mitigation actions contained in the HMP can be included in the CWPP.

7.6 *Continued Public Involvement*

During the five year update cycle (2013-2018), the plan administrators will involve the public during the monitoring, evaluating and updating process of the HMP through various public workshops and meetings. Information on upcoming public events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and on the County website (http://www.countyofplumas.com/index.aspx?NID=2214). An electronic copy of the current HMP document will be accessible through the Plumas County website, with a hard copy available for review at the Plumas County Office of Emergency Services. The HMP administrators will incorporate all relevant comments during the next update of the HMP.

During the development of this HMP, there was a "fair" amount of public involvement despite the efforts to engage the public. In June 2013, the HMP Planning Committee members discussed ideas to improve public involvement during the HMP maintenance and update process. The HMP Planning Committee will, as much as practicable, incorporate the following feedback and ideas into its public outreach strategy to ensure continued public involvement in the HMP planning process:

- Collaborate with Plumas County Disaster Council efforts
- Collaborate with Plumas County Fire Safe Council
- Collaborate with public service clubs, i.e., Lions, Rotary, Moose, etc. and other NGOs
- Collaborate with County places of worship
- Create story ideas for media outlets, such as newspapers, local radio, and TV
- Send emails and postcards/mailers to County residents about hazard mitigation
- Post meeting announcements at coffee houses, libraries, shopping malls and centers, etc.
- Educate and collaborate with homeowners associations and Board of Realtors
- Piggy back on other existing local community meetings
- Distribute information through K-12 schools
- Continue to use County websites and the Hazard Mitigation Webpage

Section 8. Works Cited

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Appendix A.
County Adoption Resolution.

County Resolution to Be Inserted Here….

Appendix B.
Planning Process Documentation

B.1 Steering and Planning Committee Meetings

Plumas County Office of Emergency Services

270 County Hospital Road #127
Quincy, California 95971
Phone: (530) 283-6332
Fax: (530) 283-6241

Agenda

Plumas County Multi-Hazard Mitigation Plan (MHMP) Update
MHMP Planning Committee Kick-Off Meeting
Wednesday, September 19, 2012, 1:00pm - 3:00pm
Plumas County Library Conference Room

- **Welcome and Introductions**
- **Project Overview**
- **MHP Update Process and Components**
  - **Planning Process**
  - **Plan Components**
- **Overview of Existing MHMP**
- **Project Timeline**
- **Question and Answer Session**

Break

- **Planning Area Population / Land Use / Economics**
- **Resources**
- **Public Outreach Strategy**
- **Workshop Process**
- **Workshop Format**
- **Workshop Advertisement**
- **Next Steps**
- **Wrap Up**

PLUMAS COUNTY HMP

Plumas County Hazard Mitigation Plan (PCHMP) Update

Planning Committee Meeting #1

September 19th, 2012

	Name	Title	Jurisdiction/ Organization	Mailing Address	Email	Telephone
1	LORI PINI	Health Education Specialist	Public Health/ OES	270 County Hospital Rd, Ste 206 Quincy CA 95971	lpini@countyofplumas.com	530-283-6988
2	Jerry Sipe	OES Director/ Environmental Health Director	OES / Environmental Health	270 County Hospital Rd, Ste 127 Quincy CA 95971	jerrysipe@countyofplumas.com	530-283-6367
3	TinaVenable	Director of Nursing	Public Health	270 County Hosp ste 111 Quincy	tinavenable@countyofplumas.com	283-6346
4	ShaneVargas	Pre-Fire Planning & Engineering	CAL FIRE	P.O. Box F Quincy, CA. 95971	Shane.Vargas@Fire.ca.gov	530-283-9322
5	LOUISE STEENKAMP	ASST. DIR, PUBLIC HEALTH	COUNTY	270 COUNTY HOSP RD. QUINCY	louisesteenkamp@countyofplumas.com	530.283.6453
6	Dan Martynn	District Conservationist	USDA NRCS		dan.martynn@ca.usda.gov	283-7511

	Name	Title	Jurisdiction/ Organization	Mailing Address	Email	Telephone
7	JOE BLACKWELL	DEPUTY DIRECTOR	PLUMAS CO. PUBLIC WORKS	1834 E MAIN QUINCY 95971	JOEBLACKWELL@ COUNTYOFPLUMAS.COM	283-6491
8	Terry Swofford	Board of Supervisors	Plumas County	48 W SPRUCE AVE Portola CA 96122	Terrell Swofford@ SBC Global.net	832-4043
9	JIM PEREZ	Plumas RH	PlumasCo		Jim Perez@countyof Plumas.com	283-6355
10	Keith Mahan	Plumas Ag Comm.	Plumas Co	208 FAIRGROUND RD. QUINCY 95971	KEITHMAHAN@ COUNTYOFPLUMAS.COM	283-6365
11	Terry Hurley	Plumas Co. FSC Coord	PC FSC	P.O. Box 673 Portola, 96122	terry.hurley@ sbcglobal.net	832-4705
12	DAVID KELLER	E.D.	Plumas CBC		dwk@plumascdc.org	283-2464
13	JOHN CUNNINGHAM	P.C. BLD G				283-2886

	Name	Title	Jurisdiction/ Organization	Mailing Address	Email	Telephone
14	MIKE GRAY	DEP. ADMIN SERVICES	PLUMAS CO	520 E MAIN ST QUINCY	mgrant@plso.net	283 6375
15	Sue McCourt	Plumas Co. Fire Prev Specialis	OES - Plumas Co	PO Box 3022I Crombeg CA 96103	suemccourt1@gmail.com	530 8361977
16	BRUCE CARPENTER	LT. COMMANDER CHP QUINCY	CHP Quincy	86 W main Quincy	bcarpenter@chp.ca.gov	283-1100
17	Rebecca Herrin	Plumas Co. Planning	Plumas Co.	555 Main St. Quincy CA 95971	beckyherrin@countyofplumas.com	283-6213
18	Jerilyn Anderson	Emergency Svcs Coordinator	Cal EMA	915 8th St, Ste 117 Marysville CA 95901	jerilyn.anderson@calema.ca.gov	(530)-749-7808
19	PETE DUNCAN	DEPUTY FOREST FIRE CHIEF - PLUMAS NF	PLUMAS NF	PO 11500 Quincy CA 95971	Pduncan01@fs.fed.us	530 283-8100
20	ETHAN MOBLEY	PROJECT MANAGER	MICHAEL BAKER JR. INC.	ONE KAISER PLAZA, SUITE 1150, OAKLAND, CA 94612	emobley@mbakercorp.com	510-879-0920

Name	Title	Jurisdiction/ Organization	Mailing Address	Email	Telephone
NATE [illegible] MIRIN	HAZUS SPECIALIST	MICHAEL BAKER JR. INC.	ONE KAISER PLAZA, SUITE 1150 OAKLAND, CA 94612	nmirin@mbakercorp.com	510-879-0946

Multi-Hazard Mitigation Plan (MHMP) 2012 Update

Plumas County, CA

MHMP Planning Committee Kick-off Meeting
September 19, 2011

Agenda

1:00pm – 1:55pm *Part I*

- Welcome and Introductions
- Project Overview
- MHP Update Process and Components
  - Planning Process
  - Plan Components
- Overview of Existing MHMP
- Project Timeline
- Question and Answer Session

5 Min Break

2:00pm – 3:00pm *Part II*

- Planning Area Population / Land Use / Economics
- Resources
- Public Outreach Strategy
- Workshop Process
- Workshop Format
- Workshop Advertisement
- Next Steps
- Wrap Up

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Part I

- Welcome and Introductions
- Project Overview
- MHP Process and Components
  - Planning Process
  - Plan Components
- Overview of Existing MHMP
- Project Timeline
- Question and Answer Session

3

Welcome and Introductions

Plumas County Department of Health and Office Emergency Services

County Project Manager	Jerry Sipe, OES Director
County Outreach	Lori Pini, Public Health
MHMP Planning Committee	Joint Plumas County Staff

Michael Baker Jr., Inc.

Project Manager	Ethan Mobley, AICP
Hazard Mitigation Planner	Aaron Pfannenstiel, AICP
Hazard Mitigation Planner	Wynne Kwan, AICP
Hazard Mitigation Planner	Drew Whitehair, CFM
Public Outreach Specialist	Jack Eldridge
GIS /Hazus Specialist	Nate Mirin, GISP
Senior Technical Advisor	Carver Struve, CFM

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Project Overview

- **What is Hazard Mitigation?**

  Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property resulting from natural hazards.

- **What is a Mitigation Plan?**

  The plan is an official statement of Plumas County's hazards, vulnerability analysis, and mitigation strategy. The result of a collaborative multi-agency and county citizen planning process. As a living document, it guides implementation activities to achieve the greatest reduction of vulnerability, which results in saved lives, reduced injuries, reduced property damages, and protection for the environment.

- **Why have a Mitigation Plan?**

  To ensure public consensus through a planning process on mitigation actions that best suit the community. Allows communities to focus efforts and limited resources on the most highly desirable mitigation projects. Plumas County also must have a State and federally approved plan to apply for and receive mitigation grants. These grants can augment local mitigation activities already done and planned activities too. Ultimately, these actions reduce vulnerability and communities are able to recover more quickly from disasters.

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Project Overview
Primary Objectives

- Create a MHMP Planning Committee which can provide input and facilitate implementation of mitigation actions.
- Provide the public opportunities throughout the plan development and drafting process to provide input, taking special care to make the plan and outcome relevant to the impacted community.
- Assess current hazards, vulnerabilities, and capabilities that exist within the County.
- Update the risk assessment using the most recent disaster data and information.
- Assess status of existing mitigation actions and identify new ones, as appropriate.
- Update hazard mitigation goals, objectives and actions as they relate to reducing loss of life and property from natural hazards.
- Generate and deliver a well-documented multi-hazard mitigation plan for FEMA approval prior to formal County adoption.
- Obtain State and Federal approval of the updated plan.

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Project Overview
Background

- Disaster Mitigation Act (DMA) 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments as a condition of mitigation grant assistance.
- Plumas County developed the 2006 Hazard Mitigation Plan (HMP).
- FEMA requires an update every 5 years.
- Plumas County receives Disaster Recovery Initiative (DRI) grant funding, which was made available after Statewide fires in 2008.
- DRI grant funding in Plumas County was awarded / allocated for Public Improvements and Planning.
- Under the DRI planning element, the 2012 MHMP Update is to address hazard mitigation planning in unincorporated areas of Plumas County. The updated plan will address new concerns, and rework goals, objectives and mitigation actions.

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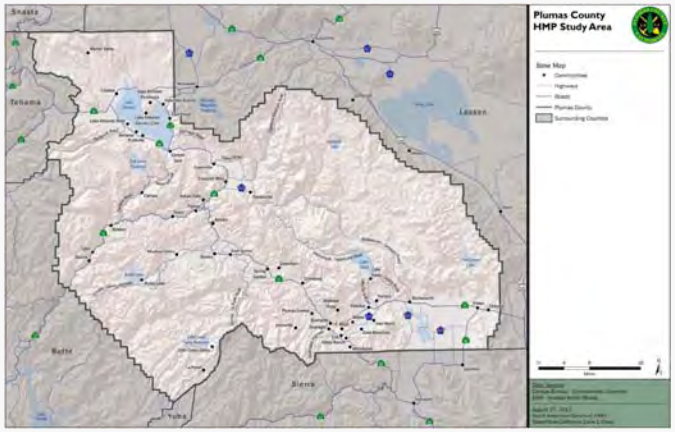
Project Overview
Planning Area



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MHP Process and Components
Planning Process

The planning process is predefined by federal regulations. The requirements and procedures for State, Tribal and Local Mitigation Plans are found in the Code of Federal Regulations (CFR) at:

Title 44, Chapter 1, Part 201 (44 CFR Part 201)

DMA (44 CFR 201.6)	Common Name
(1) Organize Resources	
201.6(c)(1)	Organize to prepare the plan
201.6(b)(1)	Involve the public
201.6(b)(2) and (3)	Coordinate with other agencies
(2) Assess Risks	
201.6(c)(2)(i)	Assess the hazard
201.6(c)(2)(ii) and (iii)	Assess the problem
(3) Develop the Mitigation Plan	
201.6(c)(3)(i)	Set goals
201.6(c)(3)(ii)	Review possible activities (actions)
201.6(c)(3)(iii)	Draft an action plan
(4) Plan Maintenance	
201.6(c)(5)	Adopt the plan
201.6(c)(4)	Implement, evaluate, and revise

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MHP Process and Components
Planning Process

Organize Resources
- Build Planning Team
- Develop Public Outreach Strategy
- Review/Incorporate Existing Plans, Studies, Reports, and other technical data/ information

Assess Risks
- Identify/Profile Hazards
- Assess Vulnerabilities

Workshop w/ Public Open Houses

Develop Mitigation Plan
- Identify Goals
- Develop Capabilities Assesssment
- Review past/current mitigation measures
- Identify new mitigation measures

Draft Plan
- Background Information
- Plan Maintenance
- Document Authority and References

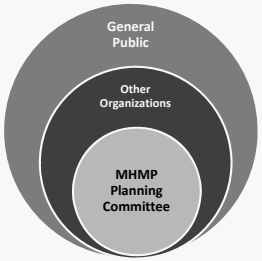
Public Review

Plan Review/Revision
- Review Final Draft with Plumas County Planning Committee and Public

Plan Adoption/Submittal
- Prepare Crosswalk for Submittal to FEMA Region IX and Cal EMA

MHP Process and Components
Planning Process: Step 1 Organize Resources

- **Build Planning Team**
  - Backbone of the planning process
  - Provides direction for the development of the MHMP Update
  - Consists of key decision-makers in specific government functions
  - Public face of the MHMP Update Planning Process
  - Provides input throughout the planning process
- **Review/Incorporate Existing Plans, Studies, Reports, Technical Data and Other Information**
  - 2006 Plumas County HMP
  - GIS Data
  - Fire Hazard Plans
  - Flood Plains
  - Climatic Data
  - Stream Gauge Data



We need your help!!!!

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MHP Process and Components
Planning Process: Step 1 Organize Resources

- **Planning Committee Participation**
  - Attend/actively participate in a series of structured coordination meetings
  - Assist in the collection of valuable local information and other requested data
  - Make decisions on plan process and content
  - Identify mitigation actions for the MHMP
  - Review/provide comments on plan drafts
  - Coordinate/participate in public input process

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MHMP Update
Planning Process: Step 1 Organize Resources

- **Develop Public Outreach Strategy**
  - HMP Update Website
  - Social Networking Tools
  - Local Media
  - Community Based Services and Retail Establishments
  - Workshops and Public Open Houses
  - HMP Planning Committee Support

Plumas County Local Hazard Mitigation Plan Update Project Website:
http://www.countyofplumas.com/index.aspx?NID=2214

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MHP Process and Components
Planning Process: Step 2 Assess Risk

- **Identify/Profile Hazards**
  - Description
  - Location/Extent (Magnitude/Severity)
  - Probability of Future Occurrences
  - Previous Occurrences
- **Verify Hazard Extents**

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MHP Process and Components
Planning Process: Step 2 Assess Risk

- **Declared Events in Plumas County**
- **Covers 1950 to Present**

Data Sources:

FEMA:

Plumas County Disaster History

CAL EMA:

Emergency & Disaster Proclamations and Executive Orders

Federal Declarations and State Proclamations

Disaster Name	Disaster Type	Disaster Cause	Disaster#	Year	Deaths	Injuries	Cost of Damage*
Mid-Year Fires	Fire	Fire	EM-3287	2008			N/A
Winter Storms	Flood	Storms	DR-1628	2005- 06			$ 128,964,501
August Fires	Fire	Fire	EM-3140	1999			$ 1,154,573
January Floods	Flood	Storms	DR-1155	1997	8		$ 194,352,509
Torrential Winds and Rain	Flood	Storms	GP96-01	1996			N/A
Severe Winter Storms	Flood	Storms	DR-1044	1995	11		$ 221,948,347
Late Winter Storms	Flood	Storms	DR-979	1992	20	10	$ 226,018,111
Wildland Fires	Fire	Fire	GP	1987	3	76	$ 18,000,000
Storms	Flood	Storms	DR-758	1986	13	67	$ 407,538,904
April Storms	Flood	Storms	80-01 -80-25	1980			N/A
Northern California Flooding	Flood	Flood	DR-283	1970			$ 27,657,478
Storms	Flood	Storms	DR-253	1969			N/A
Late Winter Storms	Flood	Storms	DR-183	1964			$ 213,149,000
Floods and Rains	Flood	Storms	N/A	1963			N/A
Widespread Fires	Fire	Fire	N/A	1960			$ 3,075,000

***Note:** Emergency & Disaster Proclamations cost of damage is for total event. Event may be spread over multiple jurisdictions.*

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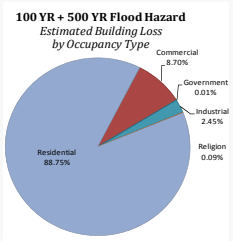
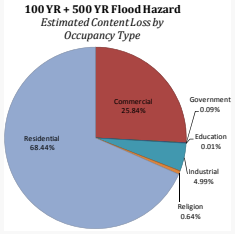
MHMP Update
Planning Process: Step 2 Assess Risk

- **County-specific Hazard Data Development**
- **Develop Population Profiles / Data**
- **Develop Critical Infrastructure Inventory / Summarize Vulnerable Assets**
- **Estimate Losses**
  - Level 2 Hazus Analysis for Flood, Dam Failure and EQ
  - GIS layering technique for other hazards
- **Assess Vulnerabilities**
- **Develop Risk Factor for Profiled Hazards**





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MHP Process and Components

Planning Process: Step 3 Develop Mitigation Plan

- **Review Past Goals and Objectives**
- ***Develop Capabilities Assessment***
  - *Emergency Management*
  - *Participation in the NFIP*
  - *Planning and Regulatory Capability*
  - *Administrative and Technical Capability*
  - *Fiscal Capability*
  - *Political Capability*
- **Review Past / Current Mitigation Actions**
- **Identify New Mitigation Actions**
- **Evaluate / Prioritize Mitigation Actions**
- **Identify Implementation Strategy for Mitigation Actions.**

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MHP Process and Components

Planning Process: Step 4 Plan Development

- **Intro**
- **Community Profile**
  - Geography/Environment
  - Community Facts
  - Population and Demographics
  - Land Use/Development Trends
- **What's New**
- **Planning Process**
- **Risk Assessment**
- **Mitigation Strategy**
- **Plan Maintenance**

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MHP Process and Components

Planning Process: Step 5 Review and Revision

- **Admin Draft Plan Development**
- **Planning Committee Review**
- **Public Review**
- **Adjust as necessary**
- **Prepare for submittal**

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MHP Process and Components

Planning Process: Step 6 Plan Submittal and Adoptions

- **Submit to Cal EMA with Crosswalk**
- **Cal EMA submits on behalf of Plumas County**
- **The County must adopt the Multi-Hazard Mitigation Plan within 1 year of receiving FEMA approval**
- **The plan is to be updated 5 years after adoption**
- **Engage in Plan Maintenance and Update Activities**

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MHP Process and Components
Planning Process: Plan Maintenance

- **Plan Maintenance**
  - Monitoring, evaluating and updating the plan is important for the next update.
  - Incorporation into other planning mechanisms
  - Continued public involvement
  - A five-year process

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Existing HMP Overview
Background

- **2006 Plumas County HMP**
  - Five Sections with Annexes
  - Records Historical Disasters
  - Hazard and Risk Assessment
  - Mitigation Activities and Priorities
  - Plan Maintenance and Updating Process
- **MHMP Update is an opportunity to develop a plan that is more specific to the County resources and capabilities, and thus more useful**
- **Required for FEMA approval:**
  - Document the review and analysis of the previous plan
  - Describe revisions as part of the update process
  - Provide justifications for revisions (or lack of revisions)

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Existing HMP Overview
Components

Section One:
- Introduction
- Background
- Purpose
- Scope
- Authority
- Participants
- Planning Process

Section Two:
- Goals and Objectives

Section Three:
- Mitigation Action Plans
- Category
- Jurisdictional Mitigation Plans
- STAPLEE

Section Four:
- Implementation
- Process
- Funding Sources

Section Five:
- Evaluation & Updating
- Monitoring & Reporting Plan Amendments
- Continued Public Involvement

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Existing HMP Overview
Hazards and Participants

- **Possible Hazards Identified in 2006 PCHMP:**
  1. Flooding
  2. Winter Storms
  3. Wildfire
  4. Drought
  5. Hazardous Materials
  6. Dam Failure
  7. Earthquake
  8. Terrorism

- **2006 MHP Planning Participants:**

COUNTY DEPARTMENTS
- County Administrative Officer - Julia Coleman
- Office of Emergency Services – Andy Anderson, Director
- Public Works- Tom Hunter, Director Planning & Building - John McMorrow, Director
- Sheriff - Terry Bergstrand
- County Clerk - Kathleen Williams
- Social Services - Elliott Smart, Director
- Health Department - Rita Scardaci, Director

INDUSTRY
- Sierra Pacific Industries
- American Valley Aviation
- Collins Pine Lumber
- U. S. Forest Service
- Feather Publishing Company
- K.P.C.O Radio

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Existing HMP Overview
Section Two: Goals and Objectives

- **Goal 1. The County will strive to minimize the threat from a hazard event in order to protect the health, safety and welfare of the county's residents and visitors.**
- **Goal 2. The County Government will strive to have the capability to initiate and sustain emergency response operations during and after a hazard event.**
- **Goal 3. The availability and functioning of the community's infrastructure will not be significantly disrupted by a hazard event.**
- **Goal 4. The County will strive to educate the members of the communities to understand the hazards threatening local areas and the techniques to minimize vulnerability to those hazards.**
- **Goal 5. The continuity of local government administration and services will not be significantly disrupted by a hazard event.**

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MHMP Update
Section Two: Goals and Objectives

- **Goal 6. Local government will have the capability to develop, implement and maintain effective hazard loss reduction programs.**
- **Goal 7. The County will strive to minimize the vulnerability of homes, institutions and places of business and employment to hazard events.**
- **Goal 8. The policies and regulations of local government will support effective hazard mitigation programming throughout the County.**
- **Goal 9. The County will strive to reduce the impact of a hazard event on the economic stability of the County.**
- **Goal 10. All sectors of the communities will work together to create a disaster resistant region.**
- **Goal 11. The County will strive to reduce the impact of a hazard event on the natural and cultural resources of the County in order to protect the quality of life.**

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Existing HMP Overview
Section Three: Mitigation Actions

- **25 Mitigation Actions from 2006**
- **Implementation Reporting on these are essential**
- **Mitigation Actions are already part of County Business Processes / Procedures**
- **Documentation of success important!**
- **Mitigation Actions are divided into seven categories, of which five are used:**
  - **"PA"** - Preventive Activities,
  - **"PP"** - Property Protection Activities,
  - "NB"- Natural and Beneficial Functions/Resource Preservation Activities,
  - **"ES"** - Emergency Services Activities
  - **"SP"** - Structural Projects Activities
  - **"PI"** - Public Information Activities
  - "GIS"- Geographic Information Systems Activities

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Existing HMP Overview
Section Three: Mitigation Actions

Type	Activity	Responsible	Funding Sour	Time Line	Goals Address	Priority Level	Applicable Haza
PA1	County has adopted and enforces: The California Building Code The Uniform Code for Abatement of Dangerous Buildings The California Electrical Code The State Housing Law The California Mechanical Code The California Plumbing Code The California Fire Code	Planning and Building Services	General Fund, Fees,	Ongoing	1, 7,8,9,11	1	All Hazard
PA2	Continue to provide coordination of County's storm water management regulations	Engineering	General Fund, Fees,	Ongoing	1,3,5,7,8, 9, 11	1	All Hazard
PA3	Continue enforcement of general plan, regulations, subdivision, and land development regulations	Planning and Building Services	General Fund, Fees,	Ongoing	1,3,4,6,7,8,9,10,11	1	All Hazard
PA4	Continue providing information to citizens regarding non-structural mitigation measures	Emergency Preparedness	General Fund, Grant Funding	Ongoing	4,7,9,11	2	All Hazard
PP5	Promote the us of voluntary standards for single-family residences to exceed minimal building code requirements for wind and seismic design	Planning and Building Services	General Fund, Grant Funding	Pending	1,4,7,8,9,11	2	Earthquake, Winter Storm
PP6	Promote standards for existing homes to be retrofitted to standards that exceed minimal codes	Planning and Building Services	General Fund	Pending	1,4,7,8,9,11	2	All Hazard
PP7	Demolishing structures posing a threat to public safety, considering location within the special flood hazard area as a prioritization factor	Planning and Building Services	Grant Funding	Pending	1,7,8,9,11	3	All Hazard
PP8	Seek funding for retrofitting, demolishing or relocating repetitively flooded structures if suitable candidates can be identified	Planning and Building Services	Grant Funding	Pending	1,7,8,9,11	1	Flood
PA9	Develop and Maintain Storm Drainage Inventory Maps and database	GIS & Engineering	General Fund, Stormwater Fee Funding	Pending	1,3,6,7,8,9,11	2	Flood, Winter Storms
ES10	Continue Terrorist Response Training	Emergency Preparedness	Grant Funding	Ongoing	1,2,3,4,5,6,7,8,9,11	1	Terrorism
ES11	Continue Coordination Emergency Operations Center activities in the event of a hazard event	Emergency Preparedness	General Fund	Ongoing	2,4,5,9	1	All Hazard
PA12	Continue responding to hazard emergencies	EMS, Fire Departments, Sheriff, Haz Mat Coordinator	General Fund	Ongoing	2,4,7,9	1	All Hazard
ES13	Evaluate existing County owned facilities for hazard resistance and retrofit facilities if needed where feasible.	Facilities Services, Engineering, and Public Works	General Fund, Grant Funding, Bond Funding	Pending	1,2,3,4,5,6,7,8,9,11	1	All Hazard
ES14	Sponsor training programs for medical providers on topics of interest, such as decontamination procedures, etc..	Emergency Preparedness, EMS	General Fund, Grant Funding	Pending	2,7	2	All Hazard

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Existing HMP Overview
Section Three: Mitigation Actions

ES 15	Continue coordinating the Anti-Terrorism Task Force of specially train sheriff, fire, and EMS personnel to respond to terrorist acts.	Emergency Preparedness	Grant Funding	Ongoing	2,3,5,6,7,8,9,11	1	Terrorism
ES16	Continue to promote interest in the Community Emergency Response Training (CERT) program	Emergency Preparedness	Grant Funding	Ongoing	2,3,5,6,7,8,9,11	1	All Hazard
PA17	Continue the drainage system maintenance and clearing program	Public Works	General Fund	Ongoing	1,3,7,8,9,11	1	Flood Winter Storms
PA18	Continue right-of-way and drainage easement permitting considering emergency vehicle access and flood zone related issues in permitting decisions	Public Works	General Fund	Ongoing	1,3,7,8,9,11	1	Flood Winter Storms
SP19	Implement an elevation reference mark inspection program	Engineering	General Fund, Grant Funding	Pending	1,3,7,8,9,11	1	Flood Winter Storms
PA20	Continue the road repair construction program, considering needs during evacuation and soil liquefaction potential in prioritization decisions	Public Works	General Fund, Grand Funding	Ongoing	1,2,3,7,8,9,11	1	All Hazard
PA21	Continue providing hazard related literature/information to citizens	Emergency Preparedness	General Fund	Ongoing	3,4,7,9,10,11	2	All Hazard
PI22	Continue providing speakers to civic groups regarding hazard related activities	Emergency Preparedness	General Fund	Ongoing	3,4,7,9,10,11	1	All Hazard
PI23	Conduct Outreach initiatives to the small business community to encourage businesses to prepare fir hazard events	Emergency Preparedness	General Fund	Ongoing	3,4,7,9,10,11	2	All Hazard
PI24	Continue programs aimed towards providing resources to local schools to enhance their ability to educate students regarding hazard events and hazard events preparation	Emergency Preparedness	Grant Funding	Ongoing	3,4,7,9,10,11	1	All Hazard
PP25	Continue programs of having Agricultural Commissioner determine drought conditions causing severe effects on agricultural Producers and notifying local OES and Board of Supervisors of emergency and preparing County Agricultural Commissioner Disaster Report and seeking implementation of USDA Emergency Loan Program	Agricultural Commissioner, Emergency Services, Services Board of Supervisors	General Fund	Ongoing	1,2,4,6,8,9	2	Drought

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Existing MHMP Overview
Proposed Changes to Plan Components

2006 PCHMP Plan Component	Expected Changes to Incorporate into the 2012 HMP Update
Introduction	• Create separate Community Profile Chapter and update demographic and other County data
Planning Process	• Describe changes to the planning process and participants • Describe public outreach activities since adoption of the 2006 Plumas County HMP • Describe Current Outreach Process
Historical Disasters	• Update with disasters that occurred since adoption of the 2006 Plumas County HMP • Update with disasters that were not declared but resulted in substantial losses/damage
Hazard and Risk Assessment	• Review 2006 identified hazards and determine if still relevant • Update Hazard Profile and Risk Assessment with new/current data • Describe/analyze future development trends and potential impacts from hazards
Mitigation Activities and Priorities	• Review 2006 identified goal and determine if still relevant • Develop capabilities assessment • Determine status of/review 2006 identified mitigation actions and determine if still relevant
Plan Maintenance and Updating Process	• Describe any plan maintenance/update activities in the past 5 years • Describe changes to plan maintenance/update process resulting from review of the last 5 years

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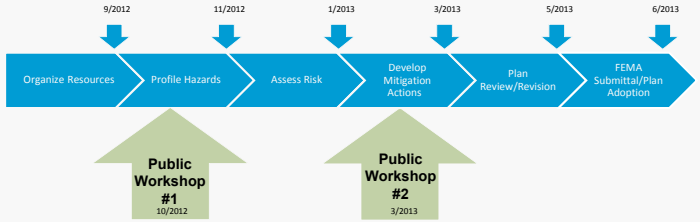
Project Timeline



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Questions?

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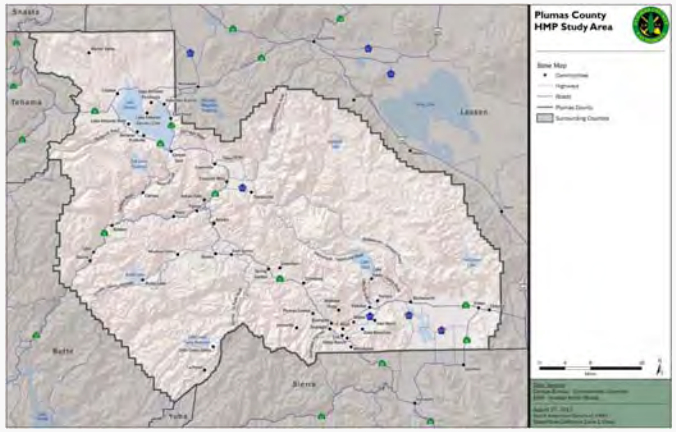
Session Break

Part II

- Planning Area Population / Land Use / Economics
- Resources
- Public Outreach Strategy
- Workshop Process
- Workshop Format
- Workshop Advertisement
- Next Steps
- Wrap Up

Planning Area Population / Land Use / Economics

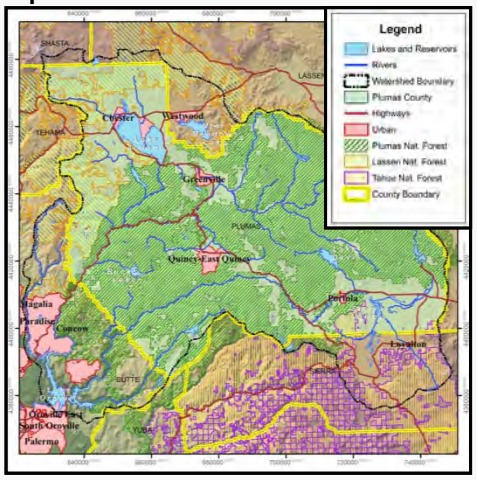
Planning Area



Planning Area Population / Land Use / Economics

Land Use

- **Planning Area**
  - Four Urban Areas
  - 65% Nat. Forest
    - Plumas Nat. Forest
    - Lassen Nat. Forest
    - Tahoe Nat. Forest
    - Lassen Volcanic National Park
  - 29% Private Property
  - 99% Feather River Watershed



Planning Area Population / Land Use / Economics
Population

- **Population**
- **~ 20,000 people spread over large geographic area (2,613.48 square miles) Population Centers:**
  - City of Portola (~2,104)
  - Quincy / East Quincy (~4,217)
  - Chester (~2,144)
  - Greenville (~1,129)
- (89.0%) White
- (3.6%) Two or more races
- (3.0%) Hispanic / Latino / Other Races
- (2.7%) Native American
- (1.0%) African American
- (0.7%) Asian
- (0.1%) Pacific Islander

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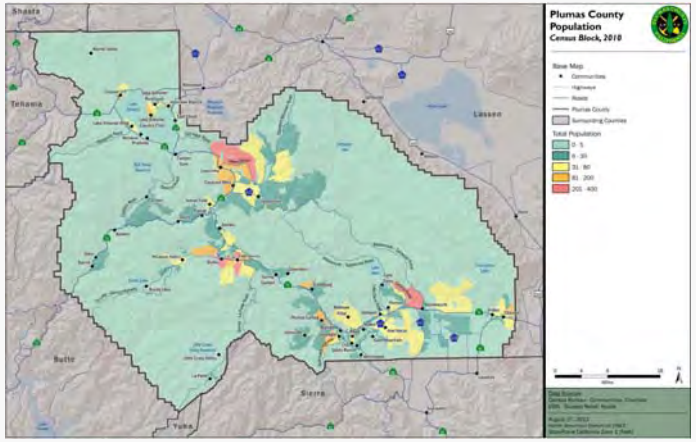
Planning Area Population / Land Use / Economics
Population



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Planning Area Population / Land Use / Employment
Employment

- **Employment Centers**
  - Union Pacific Railroad
  - Sierra Pacific Industries
  - Forest Service
  - Fish and Game
  - 3 – Local Hospitals
    - Quincy - Plumas District Hospital
    - Chester - Seneca District Hospital
    - Portola - Eastern Plumas District Hospital
- **Transportation Routes**
  - State Route 36
  - State Route 49
  - State Route 70
  - State Route 89
  - State Route 147

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MHMP Update Planning Process
Planning Area, resources are out there!

- FEMA Technical Guidance
- Cal EMA Technical Assistance
- Plumas County Fire Safety Council (PC FSC)
- Plumas County Disaster Council
- City of Portola HMP Effort
- Plumas County Hazard Fuel Assessment and Strategy
- Natural Resources - Crop Reports
- Plumas County General Plan Documentation
- Feather River Coordinated Resource Management (Plumas Corporation)
- Baker Staff
- Plumas County Citizens
- Data, Data, Data…..

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MHMP Update Planning Process
Outreach Strategy

- **Understand the resources available to develop a hazard mitigation plan in Plumas County.**
- **Collaborate with stakeholders to evaluate natural hazards and work together to create plans with community participation.**
- **Develop meaningful hazard data that is easy to use and communicates risk to community stakeholders.**
- **Collaborate to establish a public outreach strategy at an appropriate scale.**
- **Effective public outreach strategies provide opportunities for the public to engage in planning process, ensuring a Hazard Mitigation Plan has a successful community approach to mitigation.**
- **Documenting outreach process at every step!**

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MHMP Update Planning Process
Workshop Process

- **Provides us an opportunity to work as a team**
- **Provides transparency in the planning process**
- **Includes a series of data collection exercises to assemble necessary and required information.**
- **Provides documentation of the planning process to be included in the MHMP Update**
- **Well orchestrated work week with, open and closed blocks of time and activities**
- **Minimizes disruption and impacts to business process and resources by divide and conquer.**

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MHMP Update Planning Process
Workshop Tasks

- **Review existing projects, plans and programs.**
- **Acquire critical infrastructure and county owned building and assets.**
- **Acquire additional hazards information from local data sources.**
- **Update / Create hazard maps and profile narratives.**
- **Augment existing information with community interview and targeted field verification.**
- **"Who" and "what" is susceptible to specific hazards within Plumas County.**

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MHMP Update Planning Process
Workshop Format

- **One Week (5 Day Hazard Profiling Workshop)**
  - **Day 1 – Planning Committee In-Brief** 1:00–2:30 PM
  - **Day 2 – Quincy Area Workshop** 8:00 AM–7:00 PM
  - **Day 3 – Chester Area Workshop** 8:00 AM–7:00 PM
  - **Day 4 – Portola Area Workshop** 8:00 AM–7:00 PM
  - **Day 5 – Planning Committee Out-Brief** 10:00–12:00
- **Day 2,3,4 (Individual Data Gathering Workshops)**
  - 8:00 – 7:00 PM
    - 8:00 – 2:00 PM Closed Working Sessions
    - 3:00 – 7:00 PM Public Open House
  - Two Teams
    - Critical Infrastructure Team
    - Hazard Profile Team
  - Each team works concurrently to develop and gather material and spread resources throughout county.

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MHMP Update Planning Process
Workshop Format

- **Day 1: Monday Oct 15th**
  - 8:00 – 12 PM - Travel and Logistics
  - 1:00 – 2:30 PM – Planning Committee In-Brief
  - 2:30 – 5:00 PM – Logistics and Quincy Area Prep
- **Day 2: Quincy Data Gathering Workshop**
  - Critical Infrastructure Team: 8:00 – 2:00 PM – Critical Infrastructure Capture with local Quincy stakeholders
  - Hazard Team: 8:00 – 2:00 PM – Quincy Hazard Profiling with stakeholders (schedule TBD)
  - 3:00 – 7:00 PM – Public Open House
    - Explain Hazard Mitigation Planning process and concepts (Open House Engagement)
    - Capture Perceived Hazard Risk from Public
      - Survey
      - In person Interviews

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MHMP Update Planning Process
Workshop Format

- **Day 3: Chester Data Gathering Workshop**
  - Critical Infrastructure Team: 8:00 – 2:00 PM – Critical Infrastructure Capture with local Quincy stakeholders
  - Hazard Profile Team: 8:00 – 2:00 PM – Chester Hazard Profiling with stakeholders (schedule TBD)
  - 3:00 – 7:00 PM – Public Open House
    - Explain Hazard Mitigation Planning process and concepts (Open House Engagement)
    - Capture Perceived Hazard Risk from Public
      - Survey
      - In person Interviews

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MHMP Update Planning Process
Workshop Process

- **Day 4: Portola Data Gathering Workshop**
  - Critical Infrastructure Team: 8:00 – 2:00 PM – Portola Critical Infrastructure Capture
  - Hazard Profile Team: 8:00 – 2:00 PM – Portola Hazard Profiling with stakeholders (schedule TBD)
  - 3:00 – 7:00 PM – Public Open House
    - Capture Perceived Hazard Risk from Public
      - Survey
      - In person Interviews
    - Participants of interviews

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MHMP Update Planning Process
Workshop Process

- **Day 5: Out-Brief**
  - Back to Quincy
  - Assemble Out-brief Material
  - Out-Brief Planning Committee 10:00–12:00
  - Webinar??
  - Conference Call

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MHMP Update Planning Process
Planning Committee Support

- **Local Area Representatives**
  - Quincy – ???
  - Chester – ???
  - Portola – ???
  - Greenville – ???
- **Workshop Location Logistics**
  - Meeting Space / Vet Memorial Hall?
  - Field Guides
  - Outreach / Media

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MHMP Update Planning Process
Workshop Advertisement

- **Newspaper**
  - Required Component
  - www.plumasnews.com
  - Others?
- **Mailings?**
- **Piggybacking on other Efforts**
  - Hazard Mitigation Flysheet
- **Web and Social Media**
  - Project Website
  - County Facebook Page
  - County Landing Page

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Next Steps

- **Logistics Planning**
- **Advertisement of Workshops**
- **Planning Committee meeting logistics and tempo.**
- **BOS Coordination / Planning Commission Coordination**
- **Initial hazard profile mapping**
- **Initial development of critical facilities**

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Questions?

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Thank You for Your Participation

Check out the Project website:
http://www.countyofplumas.com/index.aspx?NID=2214

Contact: JerrySipe@countyofplumas.com

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Plumas County Office of Emergency Services
270 County Hospital Road, Suite 127, Quincy, California 95971
530-283-6367 ~ 530-283-6241 Fax
Jerry Sipe, Director

Agenda
Hazard Mitigation Planning Meeting
February 8, 2013 10am - Noon
Plumas County Public Health - 2nd floor large conference room.

Agenda Items:
Conduct a cursory review of the natural hazard material developed for the 2013 Hazard Mitigation Plan.

Based on the updated hazard information, complete a hazard matrix to establish priority and focus during the 2013 Hazard Mitigation update cycle.

Establish, refine and edit the Goals and Objectives of 2006 Hazard Mitigation Plan based upon 2013 current and updated information.

Multi-Hazard Mitigation Plan (MHMP) 2013 Update

Plumas County, CA

MHMP Planning Committee Meeting #2
February 8, 2013

Agenda

10:00 am – 11:00 am

Part I

- **Welcome and Introductions**
- **Brief Project Overview**
- **Overview of Existing Hazards**
- **Question and Answer Session**

5 Min Break

11:00 am – 12:00 pm

Part II

- **Complete a hazard Risk Factor Matrix**
- **Establish priority and focus resources**
- **Establish, refine and edit the Goals and Objectives**
- **Next Steps and Wrap Up**

Part I

- **Welcome and Introductions**
- **Brief Project Overview**
- **Overview of Existing Hazard**
- **Question and Answer Session**

Welcome and Introductions

Plumas County Department of Health and Office Emergency Services

County Project Manager	Jerry Sipe, OES Director
County Outreach	Lori Pini, Public Health
MHMP Planning Committee	Joint Plumas County Staff

Michael Baker Jr., Inc.

Project Manager	Ethan Mobley, AICP
Hazard Mitigation Senior Planner	Jason Farrell, CFM
Hazard Mitigation Planner	Desirea Hoffman
Hazard Mitigation QA/QC	Wynne Kwan, AICP
Public Outreach Specialist	Jack Eldridge
GIS /Hazus Specialist	Nate Mirin, GISP
Senior Technical Advisor	Carver Struve, CFM

Project Overview

- **What is Hazard Mitigation?**

  Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property resulting from natural hazards.

- **What is a Mitigation Plan?**

  The plan is an official statement of Plumas County's hazards, vulnerability analysis, and mitigation strategy. The result of a collaborative multi-agency and county citizen planning process. As a living document, it guides implementation activities to achieve the greatest reduction of vulnerability, which results in saved lives, reduced injuries, reduced property damages, and protection for the environment.

- **Why have a Mitigation Plan?**

  To ensure public consensus through a planning process on mitigation actions that best suit the community. Allows communities to focus efforts and limited resources on the most highly desirable mitigation projects. Plumas County also must have a State and federally approved plan to apply for and receive mitigation grants. These grants can augment local mitigation activities already done and planned activities too. Ultimately, these actions reduce vulnerability and communities are able to recover more quickly from disasters.

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Project Overview
Background

- Disaster Mitigation Act (DMA) 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments as a condition of mitigation grant assistance.
- Plumas County developed the 2006 Hazard Mitigation Plan (HMP).
- FEMA requires an update every 5 years.
- Plumas County receives Disaster Recovery Initiative (DRI) grant funding, which was made available after Statewide fires in 2008.
- DRI grant funding in Plumas County was awarded / allocated for Public Improvements and Planning.
- Under the DRI planning element, the 2012 MHMP Update is to address hazard mitigation planning in unincorporated areas of Plumas County. The updated plan will address new concerns, and rework goals, objectives and mitigation actions.

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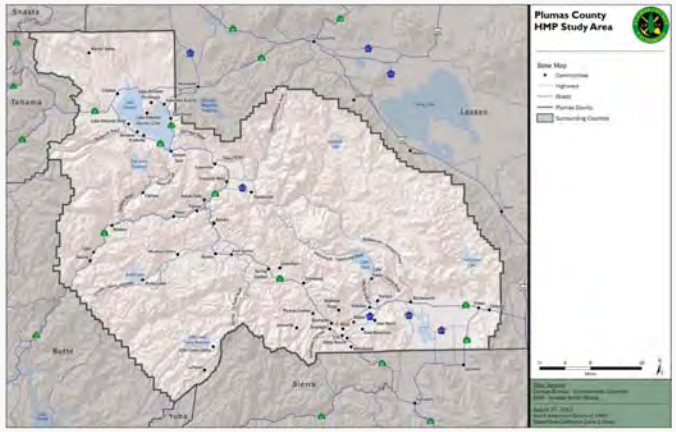
Project Overview
Planning Area



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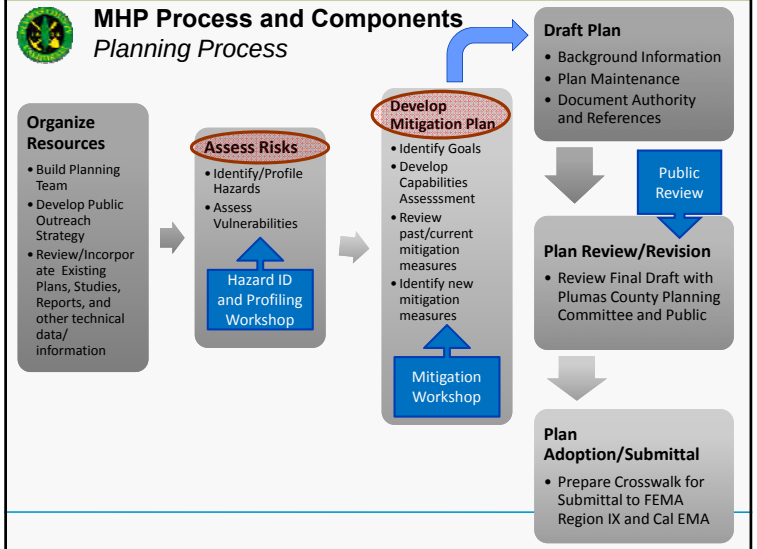
MHP Process and Components
Planning Process



Existing HMP Overview
Hazards and Participants

- **Possible Hazards Identified in 2006 PCHMP:**
  1. Flooding
  2. Winter Storms
  3. Wildfire
  4. Drought
  5. ~~Hazardous Materials~~
  6. Dam Failure
  7. Earthquake
  8. ~~Terrorism~~

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MHP Process and Components
Step 2: Identify / Profile the Hazard 2013

- -Wildfire
- -Flooding
- -Geologic Hazards
- -Severe Weather
- -Drought
- -Dam Failure
- -Climate Change

Identify/Profile Hazards:

Description
Regulatory Environment
Previous Occurrences
Location/ Geographic Extent
Magnitude/Severity
Probability of Future Occurrences

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MHMP Update
Step 2: Assess Risk

- ✓ **County-specific Hazard Data Development**
- ✓ **Develop Population Profiles / Data**
- ✓ **Develop Critical Infrastructure Inventory / Summarize Vulnerable Assets**
- ❑ **Develop Risk Factor for Profiled Hazards**
- ❑ **Estimate Losses**
  - Possible Hazus Loss Estimation
  - GIS layering technique for other hazards
- ❑ **Assess Vulnerabilities**

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MHP Process and Components
Identify / Profile the Hazard

- **Declared Events in Plumas County**
- **Covers 1950 to Present**

Data Sources:

FEMA:

Plumas County Disaster History

CAL EMA:

Emergency & Disaster Proclamations and Executive Orders

Federal Declarations and State Proclamations

Disaster Name	Disaster Type	Disaster Cause	Disaster#	Year	Deaths	Injuries	Cost of Damage*
Mid-Year Fires	Fire	Fire	EM-3287	2008			N/A
Winter Storms	Flood	Storms	DR-1628	2005- 06			$ 128,964,501
August Fires	Fire	Fire	EM-3140	1999			$ 1,154,573
January Floods	Flood	Storms	DR-1155	1997	8		$ 194,352,509
Torrential Winds and Rain	Flood	Storms	GP96-01	1996			N/A
Severe Winter Storms	Flood	Storms	DR-1044	1995	11		$ 221,948,347
Late Winter Storms	Flood	Storms	DR-979	1992	20	10	$ 226,018,111
Wildland Fires	Fire	Fire	GP	1987	3	76	$ 18,000,000
Storms	Flood	Storms	DR-758	1986	13	67	$ 407,538,904
April Storms	Flood	Storms	80-01 -80-25	1980			N/A
Northern California Flooding	Flood	Flood	DR-283	1970			$ 27,657,478
Storms	Flood	Storms	DR-253	1969			N/A
Late Winter Storms	Flood	Storms	DR-183	1964			$ 213,149,000
Floods and Rains	Flood	Storms	N/A	1963			N/A
Widespread Fires	Fire	Fire	N/A	1960			$ 3,075,000

***Note:** Emergency & Disaster Proclamations cost of damage is for total event. Event may be spread over multiple jurisdictions.*

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Flood Hazards

- ☑ *Description*
- ☑ *Regulatory Environment*
- ☑ *Previous Occurrences*
- ☑ *Location/Extent*
- ☑ *Magnitude/Severity*
- ☑ *Probability of Future Occurrences*

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Flood Hazards
Description

- Riverine and Valley Floor Flooding
- 99% Feather River Watershed
- Starts with very little velocity and slope in upper watershed, flooding issues compound lower elevation valleys.
- Primary Areas Discussed in Flood hazard Profile
  - Sierra Valley
  - Chester
  - Indian Valley
  - American Valley
  - North Fork Feather River

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Flood Hazards
Previous Occurrences

- Major Disaster Declarations at the Federal level have occurred 9 times in Plumas County
- State Emergency Disaster Proclamations for flood damage as result of severe storms and heavy rains have been declared 10 times from 1950 to present.
- A total of 11 flood events have received a Federal or State disaster declaration.
- Events of Significant Impact: 1986 and 1997

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Flood Hazards
Previous Occurrences

Figure 5-6: 1893 flooding in Quincy taken from the old Courthouse roof looking north.

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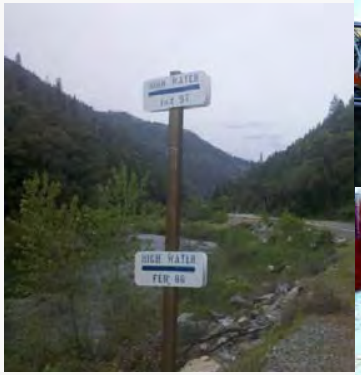
Flood Hazards
Previous Occurrences



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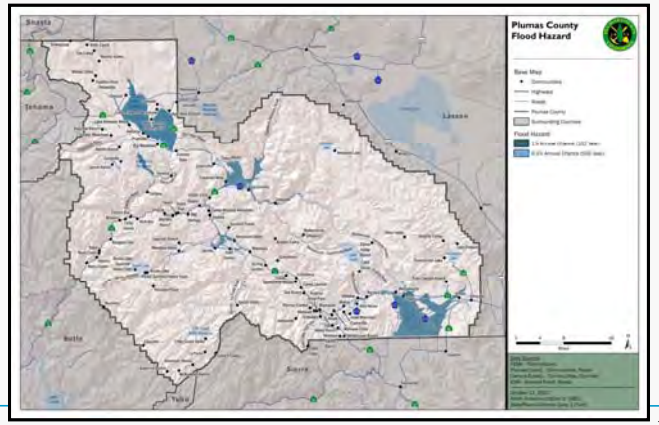
Flood Hazards
Location and Geographic Extent



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Flood Hazards
The Problem

- Valley Flooding
  - Repetitive Loss Areas in Indian Valley
  - Critical Infrastructure in American Valley (One School, and One Hospital as Risk)
  - Residual Risk beyond Identified FEMA Floodplains.
- Stream channelization and bank erosion
- Drainage Maintenance
- Critical Infrastructure Crossings

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Flood Hazards
Sierra Valley
Chester / Lake Almanor
Indian Valley
American Valley
Feather River Canyon

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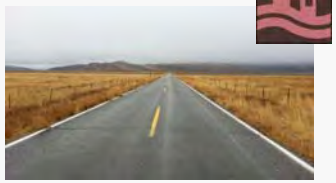
Flood Hazards
Sierra Valley

- The Sierra Valley is a large intermountain valley on the eastern edge of Plumas County.
- 120,000 acres and is primarily located in Plumas County, but also extends southward into Sierra County.
- Average elevation of 4,850 feet and serves as the headwaters for the Middle Fork Feather River.
- The Sierra Valley has minimal topographic relief and flooding is generally shallow and low velocity.
- During large storms, such as those in 1986 and 1997, the entire valley will fill with several feet of water



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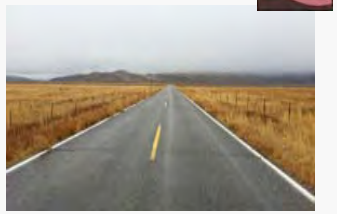
Flood Hazards
Sierra Valley

- Dyson Lane
  - Sheet flow issues across road,
  - shallow flooding, flooded with whole valley in 1992,
  - 1/10 mile low spot across valley drainage area
  - Serves local population and as a bypass.



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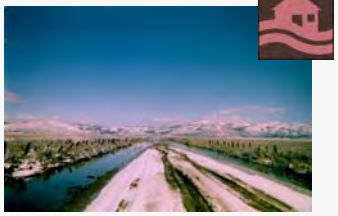
Flood Hazards
Sierra Valley

- Marble Hot Springs Road –
  - floods every year due to rain and irrigation,
  - closed in winter due to snow,
  - 0.7 mile section has repeated flooding,
  - historic bridge needs upgrade. Designated evacuation route.
  - Culverts have been damaged and clogged



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Flood Hazards
Sierra Valley

- Rocky Point Road (Old Highway 70)
  - Experiences shoulder and bank erosion and repeated flooding
  - Will flood nearly up to road centerline during major events
  - One or two homes have been damaged

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Flood Hazards
Sierra Valley

- Harriet Lane
  - Sheet flow across roadway consistent issue
  - repeated flooding around Island Ranch area.
  - Road has sub-layer integrity issues,
  - Contains clay road base,
  - Road requires constant repair.
  - Major corridor for Hay transportation to Loyalton

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Flood Hazards
Chester / Lake Almanor

- Lake Almanor is a higher elevation alpine lake located at 4,505 feet in the northwestern portion of Plumas County.
- Chester is the largest community of several that surround the lake and is located at the inlet of the North Fork Feather River. The outflow of the North Fork Feather River is controlled by Canyon Dam at the southern edge of the lake.
- Flooding issues in this region are minimal due to the construction of the Chester Flood Control Channel. The diversion channel allows river water to enter once it reaches a certain height and directs it around Chester into Lake Almanor.
- The bypass also has a secondary set-back levee system outside of the channel for extreme flooding events.

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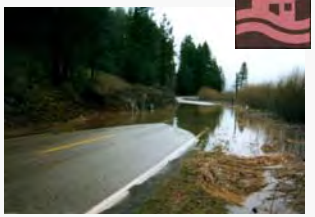
Flood Hazards
Indian Valley

- Indian Valley is a medium sized valley located in the north-central portion of Plumas County at an average elevation of 3,500 feet. It contains several developed communities and is also utilized for farming. Indian Valley is the meeting place of four creeks: Wolf Creek, Cooks Creek, Lights Creek, and Indian Creek. Indian Creek is the dominant stream reach as the other three creeks confluence with it, and then exits the valley past Arlington Bridge.
- Indian Valley exhibits a number of flooding issues due to its flat topography and hydrography. Much of the water that flows through the Upper Feather River watershed makes its way through Indian Valley on its journey into the Feather River Canyon.
- Infrastructure Washout Hazard
- Residential structure flooded repeatedly



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Flood Hazards
Indian Valley

- Hough Creek.
  - Sedimentation Issues
  - Floodwaters and gravel deposits made there way into homes south of Arlington Rd.
  - Improvements made after localized flooding occurred during 1986 and 1997
  - Made improvements to banks, wing walls at box culvert.
  - Removed sedimentation on upper and lower reaches of Hough Creek
  - Maintenance will need to be on-going to prevent similar flood occurrences.

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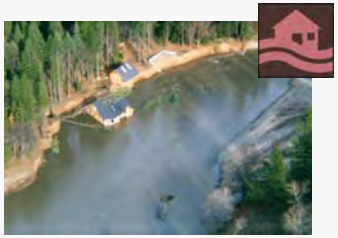
Flood Hazards
Indian Valley

- Indian Creek.
  - Drains entire Gennesse Valley
  - Choke points near tributary confluences.
  - Historic flooding issues, however, natural stream meandering common occurrence in slity deposits on valley floor.
  - Watch where you build your home! Creeks are a nice sounding but can cause homes to float away.
  - FEMA floodplain mapping has not been conducted in the area. The 100 YR- Zone was probably near the property.



29

Flood Hazards
Indian Valley

- Valley Floor Infrastructure.
  - Series roads and bridges on the Indian Valley floor have seen flood hazards .
  - Arlington Bridge and Hough Bridge provide access to Diamond Mountain Road and Taylorsville.
  - Stampfli Lane in low lying portion of Indian Valley. Two bridges on Stampfli have similar flow through capacity issues.
    - Nelson Bridge, stream meandering
    - Hough Bridge, channelized stream
  - Arlington Bridge is the last bridge crossing before valley outlet. Floodwaters back up at this location and flood valley floor.

30

Flood Hazards
American Valley

- American Valley is located in the geographic center of Plumas County and sits at an average elevation of 3,500 feet.
- Greenhorn Creek confluences with Spanish Creek upstream of Quincy. A majority of the flooding issues are caused by localized drainage as opposed to valley-flooding events.
- The water in Spanish Creek that passes through American Valley confluences with Indian Creek flowing out of Indian Valley into the Feather River Canyon.

31

Flood Hazards
American Valley

- Henchels (change Name)
  - Grate at edge of property needs to be more accessible and much safer.
  - Experiences repeated flooding
  - Floods school and adjacent buildings
  - Floodwaters continue across downtown area and affect other structures

32

Flood Hazards
American Valley

- Gansner Creek
  - Stream bank overtopping floods hospital
  - Drainage culverts may not be sized large enough to handle higher flows
  - Plumas District hospital complex at risk to flooding.

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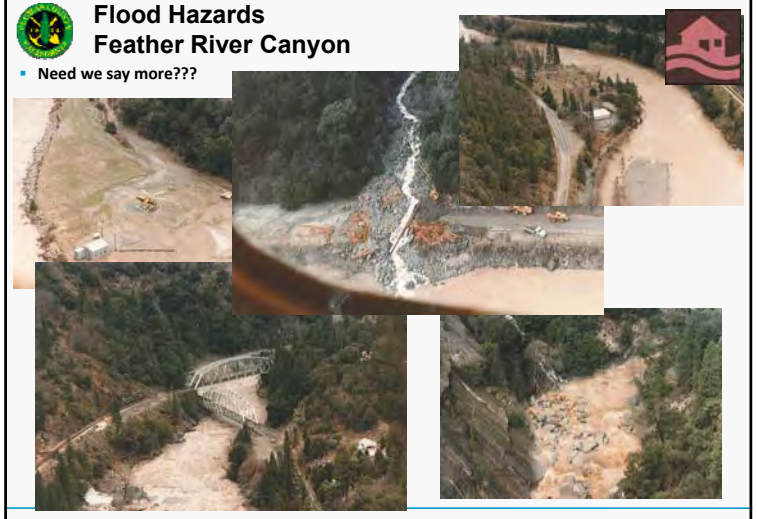
Flood Hazards
American Valley

- Les Schawb
  - Drainage ditch behind old Les Schawb has vegetation overgrowth.
  - Problem with transition from creek to underground piping.
  - The ditch should be cleared of debris and the grate on the pipe needs to be modified to allow better/safer access.
  - Flooding has occurred multiple times in shopping center.
  - Pipe was relined in 2000

34

Flood Hazards
Feather River Canyon

- Need we say more???



35

Wildfire Hazard

- ☑ *Description*
- ☑ *Regulatory Environment*
- ☑ *Previous Occurrences*
- ☑ *Location/Extent*
- ☑ *Magnitude/Severity*
- ☐ *Probability of Future Occurrences*

36

Fire Hazards
Description

- Wildland fires affect grass, forest, and brushlands, as well as any structures located within them.
- Where there is human access to wildland areas, such as large extents of forest land, the risk of fire increases due to a greater chance for human carelessness and historical forest management practices.
- With exception to a few low lying meadow valleys such as the Sierra, American, and Indian Valleys, wildfire danger is a predominate feature across the mountainous and fuel rich areas of Plumas County.

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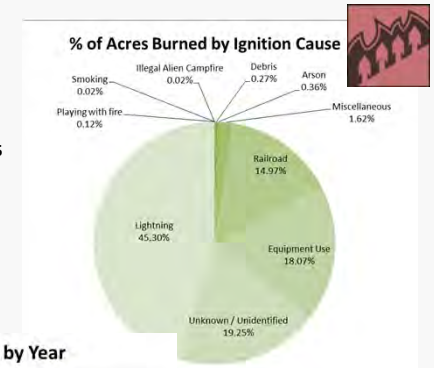
Wildfire Hazards
Previous Occurrences

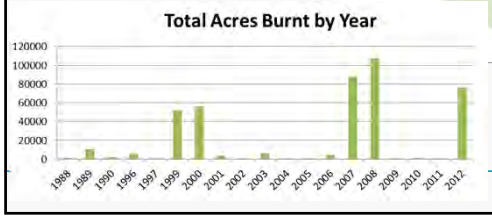
- In Plumas County there are approximately 170 ignitions per year, with over half being caused by lightning.
- Since 1900, 340 significant wildland fire events, 11 had a perimeter greater than 10,000 acres
- The majority of fires, 87%, occur from May through September.
- Major Disaster Declarations at the Federal level have occurred 4 times in Plumas County.
- Events of Significant Impact: Chips, Moonlite, Storrie…..and many more.

38

Wildfire
Previous Occurrences

- 2008 worst year on record over a 25 year period. 14 fires totaling more than 100,000 acres
- Largest causes of acres burned is Lighting, Unidentified Cause, Equipment Use, and Railroad Related.





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Fire Hazards
Regulatory Environment

- Federal and State and Local Response Authority
  - USFS
  - Cal Fire
  - Local Responsibility Area
- Plumas County Codes
  - Parts 5 and 6 of the Health and Safety Code address abatement of hazardous weeds and rubbish for the prevention of fires.
  - Part 2 of the Public Resources Code addresses the protection of forest, range and forage lands.
  - (State adopted) Section 4290; implements fire safety standards related to defensible space
  - (State adopted) Section 4291; outlines the requirements for maintaining adjacent landscapes near structures

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Fire Hazards
Regulatory Environment

- Sec 8-14.01 – 8-14.03 Plumas County, California, Code of Ordinances; Title 8 – Building Regulations
  - Disposal of flammable vegetation and fuels
  - Driveways and egress
  - Signage
- Local Community Codes.
  - Plumas Eureka Community Services District
  - Greenhorn Community Services District
  - Covenants, Conditions and Restrictions of West Almanor Community Club

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Wildfire Hazards
The Problem

- Regulatory Environment for LRAs
- Local Enforcement / Mitigation Activities
- Access / Egress to Communities
- LE 100 Certified Enforcement Officers
- Funding
  - Mostly all Volunteer Fire Departments
  - Code Enforcement Staff
- Coordinating Hazard Mitigation Activities with other efforts, PCFSC, USF, Cal Fire and PG&E.
- Railroad and Equipment Use in high hazard areas?

42

Geological Hazard

- ☑ *Description*
- ☑ *Regulatory Environment*
- ☑ *Previous Occurrences*
- ☑ *Location/Extent*
- ☑ *Magnitude/Severity*
- ☐ *Probability of Future Occurrences*

43

Geologic Hazards
Description

- Earthquake- refers to the vibration of the Earth's surface caused by movement along a fault, by a volcanic eruption, or even by manmade explosions. The vibration can be violent and cause widespread damage and injury, or may be barely felt.
- Most destructive earthquakes are caused by movements along faults.
- Slope Failure - A landslide is the movement of soil, rock, or other earth materials, downhill in response to gravity. Landslides include rock falls and topples, debris flows and avalanches, earthflows, mudflows, creep, and lateral spread of rock or soil.
- Slope failure can be activated by seismic activity and or precipitation

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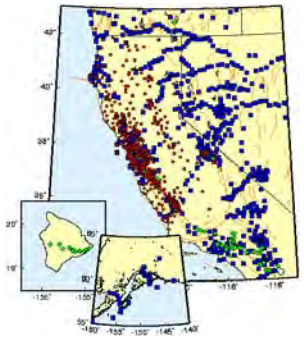
Geological Hazards

Previous Occurrences

- 10 Earthquakes > Magnitude 5 in last 140 Years.
- 2 Active Faults within or near Plumas County
  - Fort Sage Fault (Near Honey Lake)
  - Indian Valley Fault

Year	Magnitude	Closest Community	Distance from Community (Miles)
1875	5.8	Antelope Lake	4.0
1885	5.7	Antelope Lake	16.1
1888	5.9	Gold Lake	2.2
1889	5.9	Clear Creek Junction	24.0
1948	6	Chilcoot	17.4
1950	5.5	Drakesbad	3.5
1950	5.6	Last Chance	11.4
1959	5.6	Vinton	5.9
1979	5.2	Last Chance	7.4
2001	5.2	Two Rivers	1.2



Red circles are seismic sites; blue squares are GPS sites (both continuous and campaign)

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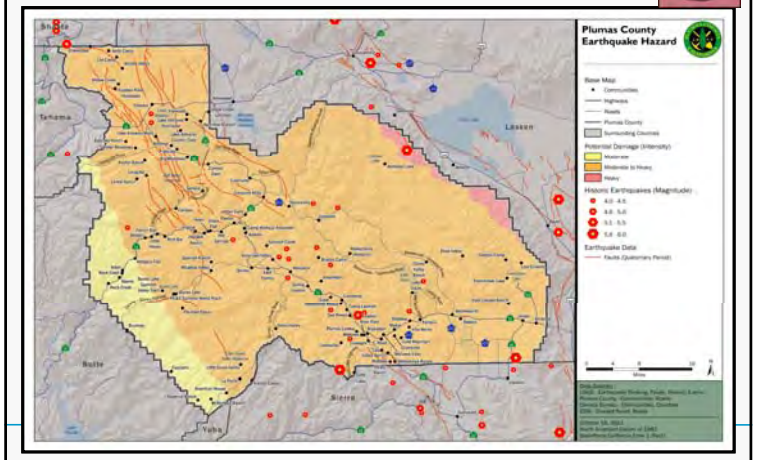
Geological Hazards

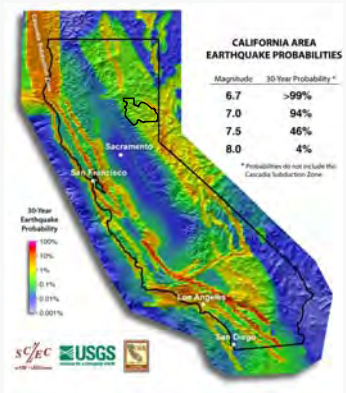
Location and Geographic Extent



Geological Hazards

Probability of Future Occurrences

- According to the new forecast, California has a 99.7% chance of having a magnitude 6.7 or larger earthquake during the next 30 years. The likelihood of an even more powerful quake of magnitude 7.5 or greater in the next 30 years is 46%. Such a quake is more likely to occur in the southern half of the state (37% chance in 30 years) than in the northern half (15% chance in 30 years).
- Most of Plumas county has a .1 % -1% chance of having a earthquake greater than 6.7 Magnitude over the next 30 Years.



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Geological Hazards

Previous Occurrences

Landslide and Rock Falls

Year	Type	Damage	Injury or Death	Area
2006	Rockslide	State Route 70	No	1.5 miles west of Pulga
2007	Rock Fall	Rail Cars and Environment	No	MP 251 on State Highway 70, between Tobin and Rock Creek
2007	Rock Fall	Rail Cars and Environment	No	Storrie Resort on the Feather River
2009	Rock Slide	State Route 70	Yes	Rich Bar
2010	Landslide	USFS Road (Scales Road)	No	Scales Road
2010	Rockslide	State Route 70	No	Between Greenville Way and Elephant Butte Tunnel
2012	Avalanche	N/A	No	Sloat
2013	Rock Fall	BNSF Locomotive damage	No	Between Rich Bar and Twain on the Feather River
Present	Slope Erosion	To Co Hwy A14	No	Johnsville

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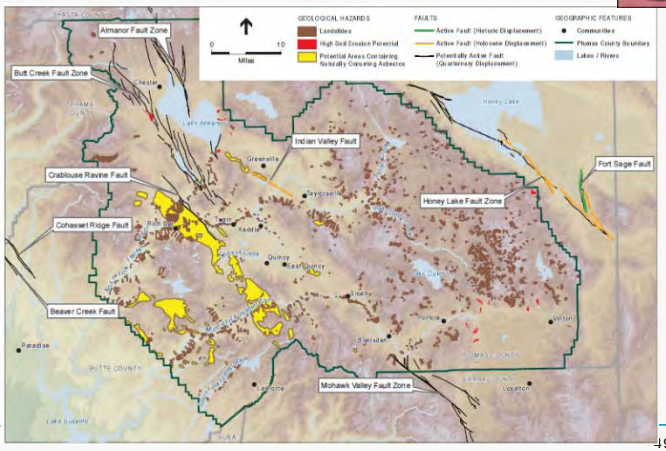
Geological Hazards

Location and Geographic Extent



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Geological Hazards

The Problem

- Unknown location of hazard
- Hazard is spread across entire county
- Compounded Hazard Risk
  - Lanslides can be activated by seismic activity
  - Wildfire can cause higher risk of landslides, mudslides and or debris flows.
- Transportation Infrastructure at Risk
  - Highway 70
  - Rail Road
- Human development can exacerbate speed of erosion

50

Severe Weather

- ☑ *Description*
- ☑ *Regulatory Environment*
- ☑ *Previous Occurrences*
- ☑ *Location/Extent*
- ☑ *Magnitude/Severity*
- ☑ *Probability of Future Occurrences*

51

Severe Weather Hazard

Description

- Severe weather can be defined as any destructive weather event that has the potential to damage property or cause loss of life.
- Severe summer weather usually occurs as localized storms that bring heavy rain, lightning, strong winds, and microbursts.
- A severe winter storm in Plumas County would typically result in heavy snowfall or hail.
- Divided into two subsections:
  - Summer
  - Winter

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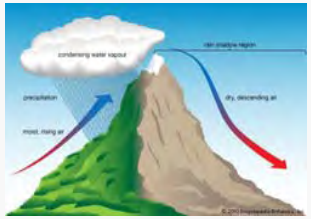
Severe Weather Hazard

Previous Occurrences

- **Since 1964, nine federally or state declared severe weather events have occurred in Plumas County**
- **According to FEMA Declarations and Cal EMA Emergency and Disaster Proclamations (November 1964 to present), these events include: severe winter and summer storms causing.. flooding, landslides, and heavy rain.**
- **Important to understand perception and orographic lift to understand severe storms and weather patterns in Sierras and Plumas County.**
- **According to National Climatic Data Center (NCDC) i.e. Weather Watchers in Plumas County has six documented extreme individual events recorded since 2006. Extreme Hail, wind etc…**



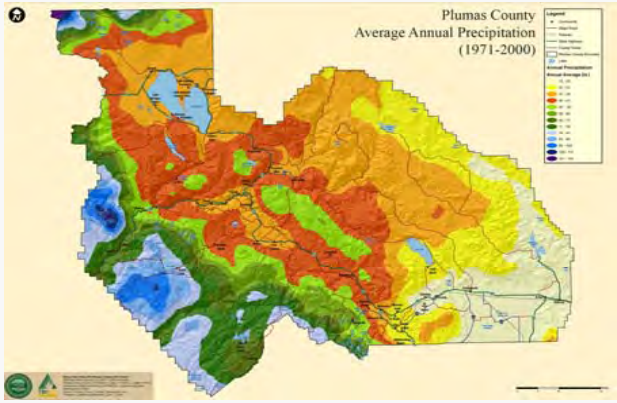
Severe Storms

Documented Occurrences

Past Disasters in Plumas County							
Disaster Number	Declaration Date	Disaster Type	Incident Type	Explanation	Deaths	Injuries	Cost*
Federal and State Declarations							
183	12/24/1964	DR	Severe Storm(s)	HEAVY RAINS & FLOODING			$213,149,000
253	1/26/1969	DR	Severe Storm(s)	SEVERE STORMS & FLOODING			Unknown
283	2/16/1970	DR	Severe Storm(s)	SEVERE STORMS & FLOODING			
758	2/21/1986	DR	Severe Storm(s)	SEVERE STORMS & FLOODING	13	67	$407,538,904
979	2/3/1993	DR	Severe Storm(s)	SEVERE WINTER STORM, MUD & LAND SLIDES, & FLOODING	20	10	$226,018,111
1044	1/10/1995	DR	Severe Storm(s)	SEVERE WINTER STORMS, FLOODING, LANDSLIDES, MUD FLOWS	11		$221,948,347
1046	3/12/1995	DR	Severe Storm(s)	SEVERE WINTER STORMS, FLOODING LANDSLIDES, MUD FLOW			Unknown
1155	1/4/1997	DR	Severe Storm(s)	SEVERE STORMS, FLOODING, MUD AND LANDSLIDES	8		$194,352,509
1628	2/3/2006	DR	Severe Storm(s)	SEVERE STORMS, FLOODING, MUDSLIDES, AND LANDSLIDES			$128,964,501

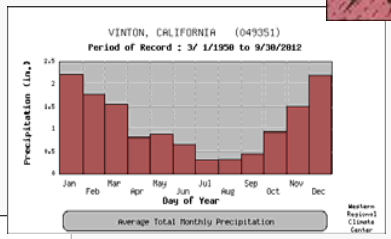
Severe Weather Hazard

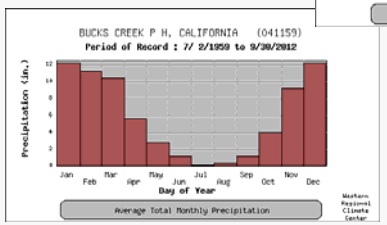
Location and Extent



Severe Weather Hazard

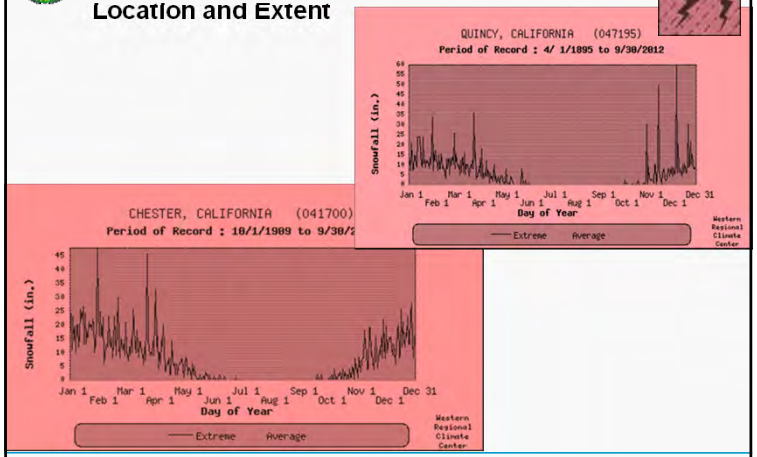
Location and Extent





Severe Weather Hazard

Location and Extent



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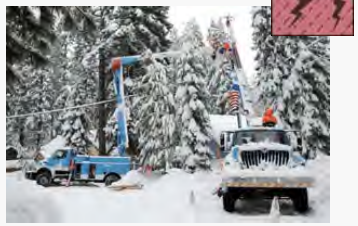
Severe Weather Hazards

The Problem

- Very little mitigation against large weather patterns that will overwhelm resources and infrastructure within hours.
- Short periods of extreme events.
- Long Periods of Winter Rains / Snow
- Secondary Hazards:
  - Landslides
  - Debris
  - Flash Flood
  - Lighting Strikes
  - Snow Load
- Power Outages



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Dam Failure

- ✓ *Description*
- ✓ *Regulatory Environment*
- ✓ *Previous Occurrences*
- ✓ *Location/Extent*
- ✓ *Magnitude/Severity*
- ✓ *Probability of Future Occurrences*

59

Dam Failure Hazards

Description

- A dam failure is usually the result of neglect, poor design, and/or structural damage caused by a major event such as an earthquake. When a dam failure occurs, an enormous quantity of water is suddenly released, destroying infrastructure and flooding the area downstream of the dam.
- State of California (Cal EMA) passed a law requiring dam owners to develop maps depicting areas that might be inundated due to dam failure.
- Cal EMA approves the dam inundation maps and distributes them to local governmental agencies, who in turn adopt emergency procedures for the evacuation and control of areas in the event of a dam failure.
- This law requires that each map be produced only once, without any requirements for updating.

60

Dam Failure Hazards
Hazard Definition

- The USACE maintains the National Inventory of Dams (NID), Dams included in the NID are either greater than 25 feet high, hold more than 50 acre-feet of water, or are considered a significant hazard if they were to fail. Dams are classified based on the severity or magnitude of the potential devastation and losses of human life, economic, and environmental resources. Dam hazard classifications are defined as follows:
- High Hazard - loss of one human life is likely if a dam failure should occur.
- Significant Hazard - possible loss of human life and likely significant property or environmental destruction if a dam failure should occur.
- Low Hazard - no probable loss of human life and low economic, and/or environmental losses if a dam failure should occur.

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Dam Failure Hazard
Previous Occurrences

- Dam failure has never occurred in Plumas County.
- There have been 4 dam failures in surrounding counties, and 11 dam failures in California.
- Dam failure occurred in Placer County on the Lower Hell Hole Dam on December 22, 1964
- The 30,000 acre foot flood from the dam failure destroyed two suspension bridges and one steel girder State Highway bridge.
- Lava Cap Mine tailings dam failed near Nevada City, California in the winter of 1997. The failure was caused by a rotted log in the dam which released 10,000 cubic yards of arsenic-tainted tailings into Little Clipper Creek and Lost Lake.

This photo shows the water emerging from the toe of the downstream rock fill shell at 3 PM on December 22, 1964. Some rock has been eroded.

By 7 AM on December 23rd, the flow had increased as the reservoir rose behind the dam, and a considerable portion of the downstream slope had been eroded away.

At 9:30 AM on December 23rd, a gully had been eroded across the crest of the dam, and the reservoir began to spill over the top of the fill. When this happened the velocity of flow and the rate of erosion increased rapidly, and soon a major portion of the embankment was washed away and the reservoir was emptied.

At 3:30 PM on December 23rd, there was a gaping hole in the dam, and very little water in the reservoir.

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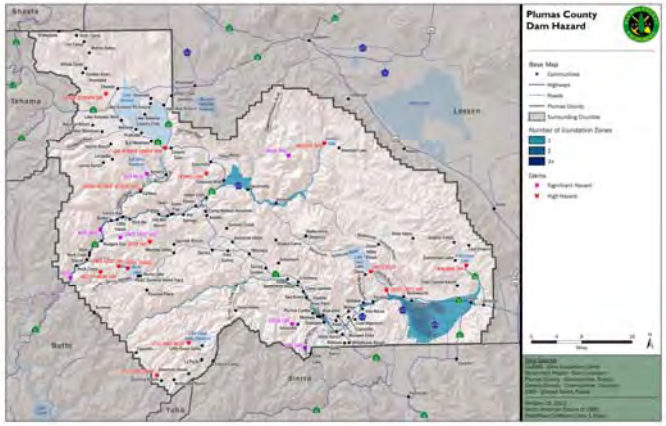
Dam Failure Hazard
Location and Geographic Extent



Dam Failure Hazard
Location and Extent

- 50 Dams in Plumas County
- 13 High Hazard Dams
- 10 Significant Hazard

Owner	Count of High Hazard Dams
Reclamation Board Sacramento – San Joaquin	1
(blank)	1
Soper Wheeler Co	1
Oroville-Wyandotte Irrigation District	1
State Department of Water Resources	1
Private landowner(s)	2
California Department of Water Resources	2
PG&E	4
Grand Total	**13**

High Hazard Dam Ownership
California Department of Water Resources
Antelope
Frenchman
Oroville-Wyandotte Irrigation District
Little Grass Valley
PG&E
Bucks Storage
Canyon
Grizzly Forebay
Lower Bucks Lake
Private landowner(s)
Bidwell Lake
Grizzly Creek
Reclamation Board Sacramento – San Joaquin
Chester Diversion
Soper Wheeler Co
Silver Lake
State Department of Water Resources
Grizzly Valley
Unknown Owner
Caribou Afterbay (Belden)

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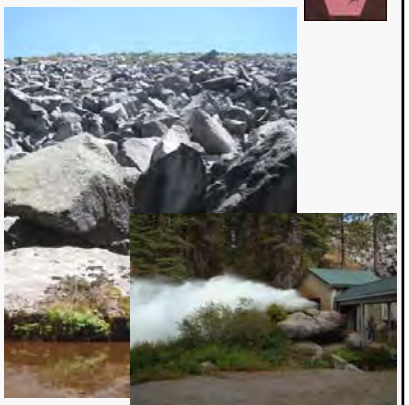
Dam Failure Hazard

The Problem

- Multiple Owners of Dams
- Dam Inundation Zones Information Distribution and Quality
- Emergency Action Plans responsibility of Cal EMA and DsoD
- County does not have jurisdictional authority for Dam Safety
- Communication of Hazard
- Warning Times for Sunny Day Event
- Maintenance on older dams



Bucks Storage

65

Drought

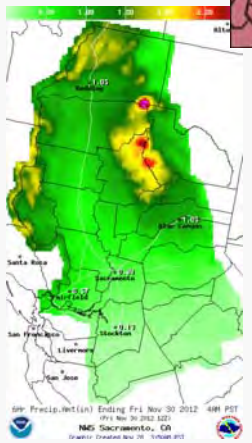
- ***Description***
- ***Regulatory Environment***
- ***Previous Occurrences***
- ***Location/Extent***
- ***Magnitude/Severity***
- ***Probability of Future Occurrences***

66

Drought Hazard

Description

- Drought is a complex natural hazard, which is reflected in the following four definitions commonly used to describe it:
- Agricultural – drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.
- Hydrological – drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Meteorological –expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Socioeconomic – occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall.



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Drought Hazard

Previous Occurrences

- The 2010 State Hazard Mitigation Plan (SHMP) states that from 1950 to 2009, there have been 8 drought State Emergency Proclamations in California.
- Through 2007, Cal EMA's administered costs due to drought total $2,686,858,480.
- Specifically for Plumas County, there have been five drought incidences since 1972, however none of the incidences were considered a state or federally declared drought disaster.
- County rarely experiences long periods of extremely low precipitation due to its geographic location in the Sierra Nevada region.

Photo by: Shannon Morrow

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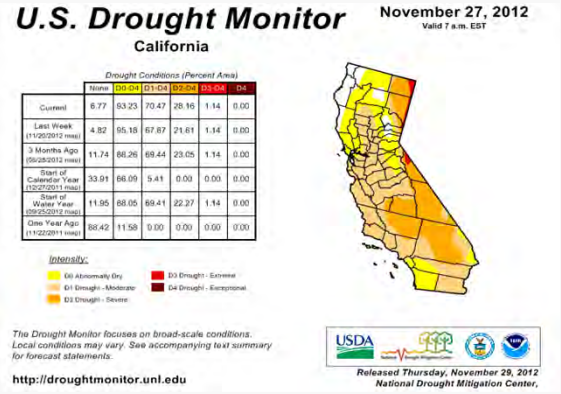
Drought Hazard
Previous Occurrences

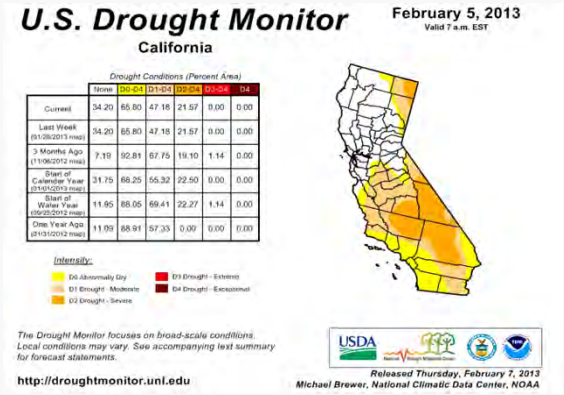
- Several resources available to evaluate drought status and estimate future expected conditions
  - National Integrated Drought Information System (NIDIS)
  - NIDIS maintains the U.S. Drought Portal (www.drought.gov)
  - Resources include the U.S. Drought Monitor (USDM)
  - U.S. Seasonal Drought Outlook (USSDO)

Photo By: Tim Gavin

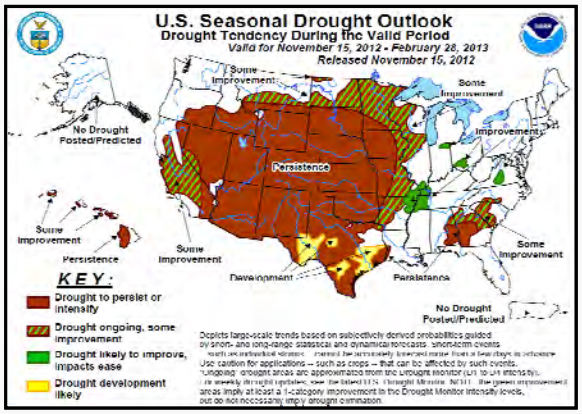
Drought Hazard
Location and Geographic Extent



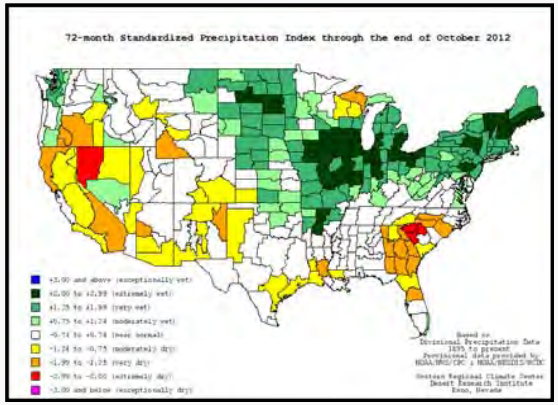
Drought Hazard
Location and Geographic Extent



Drought Hazard
Location and Geographic Extent



Drought Hazard
Location and Geographic Extent



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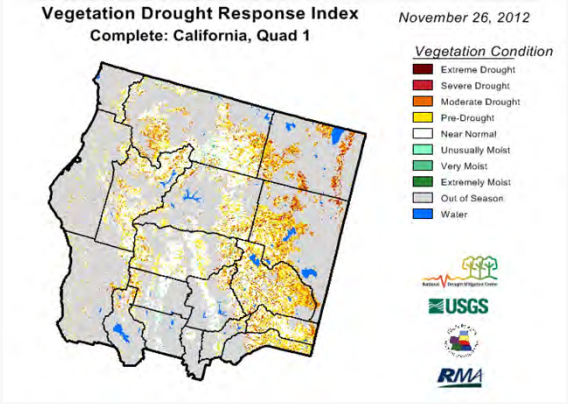
Drought Hazard
Location and Geographic Extent



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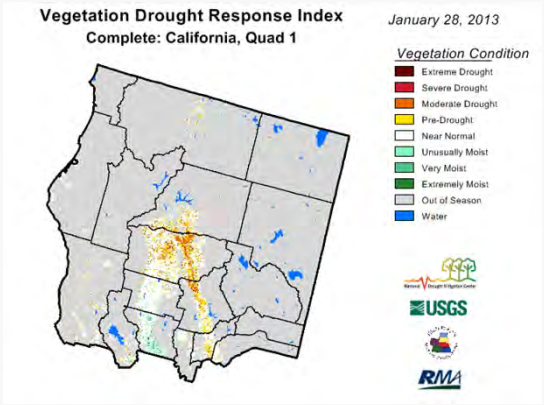
Drought Hazard
Location and Geographic Extent



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Drought Hazard
The Problem

- **Poor retention of precipitation and depletion of deep groundwater systems as a result of continued extraction and reduced recharge during dry periods.**
- **Loss of water tables and depletion of shallow aquifers is a typical consequence of head cutting (not all drought related) throughout the watershed.**
- **Groundwater depletion high valley deserts such as Sierra Valley indicator of local drought.**
- **Agricultural Loss?**

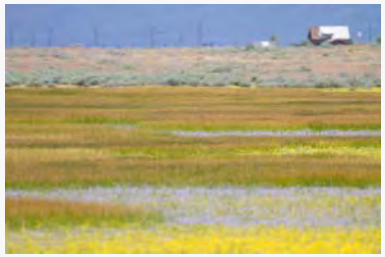

Photo By: Marcel Holyoak

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Climate Change

- ***Description***
- ***Regulatory Environment***
- ***Previous Occurrences***
- ***Location/Extent***
- ***Magnitude/Severity***
- ***Probability of Future Occurrences***

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Climate Change Hazard
Description

- Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region or may occur across the whole Earth. Climate change may result from:
  - Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
  - Natural processes within the climate system (e.g., changes in ocean circulation); and
  - Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs).

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Climate Change Hazard
Previous Occurrences

- Climate change has never been directly responsible for any declared disasters.
- Past flooding, wildfire, and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual events.
- Unlike earthquakes and floods that occur over a finite time period climate change is an on-going hazard, the effects of which are already being experienced.
- Other effects may not be apparent for decades or may be avoided altogether by mitigation actions taken today.

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Climate Change Hazard
Location and Geographic Extent

- It is expected that California coastal areas will be vulnerable to different hazards (e.g. sea level rise or more severe tropical storms) than inland areas, which will experience increased wildfire, drought, flooding from precipitation events, or other.
- The Feather River watershed can be at risk due to winter temperature lows which are typically at or near freezing. Small warming trends (1-2 degrees F) can cause precipitation to shift from snow to rain which will decrease snow pack and exacerbate drought conditions in summer, creating the conditions for increased wildfires.
- These observed trends could also increase flooding as more rainfall will contribute to larger runoff rates.

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Climate Change Hazard
The Problem

- **Increased Precipitation in during winter rainy season.**
- **Increased wildfire risk due to decreased snowpack**
- **Changes in variability and the frequency/severity of hazard events.**
- **Other natural disaster such as drought, severe weather, flood, and wildfire occurrence intervals can change.**
- **Probability of occurrence is influenced by human action?**
- **Intergovernmental Panel on Climate Change (IPCC) predicts a warming of about 0.2 degree Celsius per decade**

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The Problem

Hazard	Weaknesses Identified/Needing to be Addressed
Multi-Hazard	▪ Agency Coordination for mitigation planning ▪ Incorporation of mitigation planning into other County planning activities (general plan, natural resource management/preservation) ▪ Maintenance of technical skills, databases, and systems related to hazard mitigation planning
Flood	▪ Repetitive Loss Areas in Indian Valley ▪ Critical Infrastructure in American Valley (One School, and One Hospital as Risk) ▪ Residual Risk beyond Identified FEMA Floodplains ▪ Feather River Canyon wash-outs. (Cal Trans Problem)
Wildfire	▪ Code Enforcement ▪ Maintenance of and access to High Hazard Areas ▪ Property maintenance ▪ Funding
Geo Hazards	▪ Unknown location of hazard ▪ Hazard is spread across entire county ▪ Compounded Hazard Risk ▪ Landslides can be activated by seismic activity ▪ Wildfire can cause higher risk of landslides or mudslides ▪ Transportation Infrastructure at Risk ▪ Highway 70 ▪ Rail Road ▪ Human development can exacerbate speed of erosion

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The Problem

Hazard	Weaknesses Identified/Needing to be Addressed
Severe Weather	▪ Short periods of extreme events. ▪ Long Periods of Winter Rains ▪ Secondary Hazards: Landslides, Storm Debris, Flash Flood, Lighting Strike, Snow Load ▪ Power Outages
Drought	▪ Poor retention of precipitation and depletion of deep groundwater systems as a result of continued extraction and reduced recharge during dry periods. ▪ Loss of water tables and depletion of shallow aquifers is a typical consequence of head cutting (not all drought related) throughout the watershed. ▪ Groundwater depletion high valley deserts such as Sierra Valley indicator of local drought.
Dam Failure	▪ Multiple Owners of Dams ▪ Dam Inundation Zones Information Distribution and Quality ▪ Emergency Action Plans responsibility of Cal EMA and DsoD ▪ County does not have jurisdictional authority for Dam Safety ▪ Communication of Hazard ▪ Warning Times for Sunny Day Event ▪ Maintenance on older dams
Climate Change	▪ Increased Precipitation in during winter rainy season. ▪ Increased wildfire risk due to decreased snowpack ▪ Changes in variability and the frequency/severity of hazard events. ▪ Other natural disaster such as drought, severe weather, flood, and wildfire occurrence intervals can change. ▪ Probability of occurrence is influenced by human action. ▪ Intergovernmental Panel on Climate Change (IPCC) predicts a warming of about 0.2 degree Celsius per decade

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Questions?

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Session Break

Part II

- Hazard Risk Factor Matrix
- Establish priority and focus resources
- Establish, refine and edit the Goals and Objectives
- Next Steps and Wrap Up

Existing HMP Overview

Section Two: Goals and Objectives

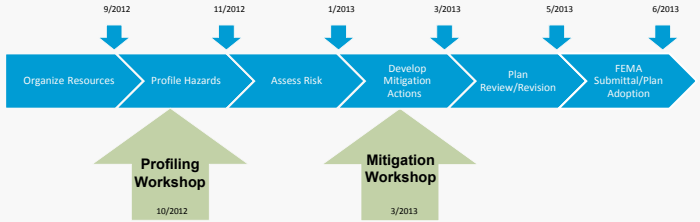
- Goal 1. The County will strive to minimize the threat from a hazard event in order to protect the health, safety and welfare of the county's residents and visitors.
- Goal 2. The County Government will strive to have the capability to initiate and sustain emergency response operations during and after a hazard event.
- Goal 3. The availability and functioning of the community's infrastructure will not be significantly disrupted by a hazard event.
- Goal 4. The County will strive to educate the members of the communities to understand the hazards threatening local areas and the techniques to minimize vulnerability to those hazards.
- Goal 5. The continuity of local government administration and services will not be significantly disrupted by a hazard event.

MHMP Update

Section Two: Goals and Objectives

- Goal 6. Local government will have the capability to develop, implement and maintain effective hazard loss reduction programs.
- Goal 7. The County will strive to minimize the vulnerability of homes, institutions and places of business and employment to hazard events.
- Goal 8. The policies and regulations of local government will support effective hazard mitigation programming throughout the County.
- Goal 9. The County will strive to reduce the impact of a hazard event on the economic stability of the County.
- Goal 10. All sectors of the communities will work together to create a disaster resistant region.
- Goal 11. The County will strive to reduce the impact of a hazard event on the natural and cultural resources of the County in order to protect the quality of life.

Project Timeline



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Thank You for Your Participation

Check out the Project website:
http://www.countyofplumas.com/index.aspx?NID=2214

Contact: JerrySipe@countyofplumas.com

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Plumas County Office of Emergency Services
270 County Hospital Road, Suite 127, Quincy, California 95971
530-283-6367 ~ 530-283-6241 Fax

Jerry Sipe, Director

Multi Hazard Mitigation Planning Meeting
Agenda
March 7, 2013
10:00am – Noon
Plumas County Public Health Agency
2nd Floor Conference Room

Part I: 30 Min

- Hazard Recap / Focus Group Updates
- Goals and Objectives Review
- Goals and Objectives Edit session

Break 5 Min

Part II – Capabilities Assessment: 90 Min

- Planning and Regulatory Capability
- Administrative and Technical Capability
- Fiscal Capability
- Community Political Capability
- Grant Funding Review

Meeting: MHMP

Date: 3-7-2013

	First Name	Last Name	Organization	Mailing Address	City	Telephone #	Fax #	E-Mail Address
1	BRODIE	MITCHELL	CHP	86 W MAIN ST	Quincy	283-1100	283-5164	BROMITCHELL@CHP.CA.GOV
2	JOE	BLACKWELL	PUBLIC WORKS	1834 E. MAIN	QUINCY	283-6481	283-6323	JOEBLACKWELL@COUNTYOFPLUMAS.COM
3	JERRY	BLINN	PUBLIC WORKS	1834 E. MAIN	Quincy	283-6495	283-6323	jerryblinn@countyofplumas.com
4	Warren	Grandall	MVFD / PU 28 Weather Spotter	PO Box 273	95956 Meadow Valley	283-0476	—	wgrandall@gmail.com
5	Sue	McCourt	OES	PO Bx 30221	Cromberg	836 1977		suemccourt1@gmail.com
6	PETE	DUNCAN	PLUMAS NF	P.O. Bx 11500	Quincy	283-7831		Pduncan01@fs.fed.US.
7	Jerry	Hurley	PC FSC	Bx 673	Portola	249-4926		jerry.hurley@sbcglobal.net
8	Dan	Martynn	USDA-NRCS	POB 3562	Quincy	283-7511		dan.martynn@ca.usda.gov
9	DAVID	KELLER	PLUMAS CDC	P.O. Box 319	Quincy	283-2466	283-2478	dwk@plumasedc.org.
10	JIM	THEATON	CHP	86 W. MAIN ST.	QUINCY	283-6000	283-5164	JTHEATON@CHP.CA.GOV
11	LORI	PINI	Health/OES	270 Co Hospital Ste 200	Quincy	283-6988	283-6425	lpini@countyofplumas.com
12	Ethan	Mobley	Baker					
13								
14								
15								

Capability Assessment Survey

Jurisdiction/Organization: ***Plumas County Operational Area*** ***Name and Title:*** ***Plumas County Hazard Mitigation Planning Committee***

1. Planning and Regulatory Capability: Please indicate whether the following planning or regulatory tools and programs are currently in place or under development for your jurisdiction by placing an "X" in the appropriate box, followed by the date of adoption/update. Then, for each particular item in place, identify the department or agency responsible for its implementation and indicate its estimated or anticipated effect on hazard loss reduction (Supports, Neutral or Hinders) with the appropriate symbol and also indicate if there has been a change in the ability of the tool/program to result in loss reduction. Finally, please provide additional comments or explanations in the space provided.

Hazard	***Plan / Program / Regulation***	***Responsible Agency***	***Comments:***
Multi-Hazard	***Hazard Mitigation Plan***	PC OES	Implementation and updates over a 5 Year Period.
Multi-Hazard	***Emergency Operations Plan (EOP)***	PC OES	To address disasters, whether they are natural, technological or manmade. The Hazard Mitigation Plan addresses natural hazards only.
Multi-Hazard	***Evacuation Plan***	PC OES	PC might have an evacuation plan with the following elements: ▪ Transportation ▪ Housing / Shelters ▪ Large and Small animal Evacuation Washoe County NV, has a good evacuation plan.
Multi-Hazard	***California Building Codes***	PC Building Department	Since 2006, Plumas County has adopted new building codes and regulations that protect new development and buildings from flooding, and Geo Hazards.

Multi-Hazard	***Zoning Regulations***	PC Planning Department	*See **Plumas County Building Regulations** under Wildfire, Flood and Geo-Hazard.*
Multi-Hazard	***Subdivision Regulations***	PC Planning Department	*See **Plumas County Building Regulations** under Wildfire, Flood and Geo-Hazard.*
Multi-Hazard	***Comprehensive Land Use Plan (or General, Master or Growth Mgmt. Plan)***	PC Planning Department	Current General Plan Update under development.
Multi-Hazard	***Feather River Coordinated Resource Management Group***	Volunteer Staff	The Feather River Coordinated Resource Management Group works to protect, maintain, and enhance ecosystems and community stability in the Feather River Watershed through collaborative landowner participation.
Multi-Hazard	***Capital Improvement Plan***	Public Works	Flood Control Needs a budget to Clean / Maintain drainage throughout county.
Multi-Hazard	***Community Facility Development and Infrastructure Assistance***	PC Community Development Commission (PCCDC)	The Plumas County Community Development Commission assists low income residents meet their housing needs, build and improve infrastructure.

Multi-Hazard	***Statewide Historic Preservation Plan: Local Government Assistance***	***Office of Historic Preservation***	OHP's Local Government Unit (LGU) offers guidance and assistance to city and county governments in the following areas: ▪ Drafting or updating historic preservation plans and ordinances ▪ Developing historic context statements ▪ Planning for and conducting architectural, historical, and archeological surveys ▪ Developing criteria for local designation programs, historic districts, historic preservation overlay zones (HPOZs), and conservation districts ▪ Developing and implementing design guidelines using the Secretary of the Interior's Standards ▪ Developing economic incentives for historic preservation ▪ Training local historic preservation commissions and review boards
Wildfire	***Community Wildfire Protection Plan (CWPP), 2005***	PC Fire Safe Council	Update edits occurring, expect approval 2013.
Wildfire	***Fuel Reduction Map and Database***	PC Fire Safe Council	Updated Annually. Included as appendix to 2005 CWPP.
Wildfire	***Plumas County Hazardous Fuel Assessment and Strategy***	PC Fire Safe Council	Lifespan of not more than 10 years from the date of issue. Included as appendix to 2005 CWPP.

Wildfire	***Plumas County Health and Safety Code***	Plumas County Building Department	Section 14875 Section 14880 Section 14890 Section 4290 Section 4291
Wildfire	***Plumas County Building Regulations***	Plumas County Building Department	Section 8-14.01 Sec 8-14.03 Sec 8-14.03
Wildfire	***Local Community Codes***	Local Communities	Plumas Eureka Community Services District Greenhorn Community Services District Covenants, Conditions and Restrictions of West Almanor Community Club
Wildfire / Flood	***USDA***	NRCS	Flood and Fire Recovery on Private Lands
Flood	***Prop. 50/84 Integrated Regional Water Management (IRWM)***	DWR	DWR has a number of IRWM grant program funding opportunities. Current IRWM grant programs include: planning, implementation, and stormwater flood management. http://www.water.ca.gov/irwm/grants/index.cfm
Flood	***USDA***	NRCS	Improve floodplain function and reduce effects of flooding on private lands
Flood	***Central Valley Flood Protection Plan***	DWR	State legislative requirements provide Plumas County local planning responsibilities for floodplain management (e.g., general plans, zoning ordinances, development agreements, tentative maps, and other actions).

Flood	***NFIP***	Plumas County Flood Control / Buildings Dept.	NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, Plumas County Officials are dedicated to protecting homes of more than 160 policies currently in force. ▪ 163 policies in force ▪ $37,987,500 insurance in force ▪ 34 paid losses ▪ $680,554 total paid losses ▪ 6 substantial damage claims since 1978
Flood	***DWR Prop 84***	DWR	Grant funding just came out from the Flood Operations Center.
Flood	***Central Valley Flood Protection Plan***	DWR	State legislative requirements provide Plumas County local planning responsibilities for floodplain management (e.g., general plans, zoning ordinances, development agreements, tentative maps, and other actions). 2007 flood risk management legislation apply Statewide, while other legislation is additive and provides provisions applicable to lands within the Sacramento-San Joaquin Valley (SSJV), Plumas County is within the SSJV. Government Codes of particular importance to hazard mitigation planning are: Government Code 65302 Government Code 8685.9
Flood	***Plumas Corporation, Feather River Coordinated Resource Management***	Plumas Corporation	Project Planning list has tons of projects related to stream restoration and watershed protection.

Flood	***USDA***	Natural Resources Conservation Service (NRCS)	Emergency Watershed Protection Program Environmental Quality Incentive Program
Geo-Hazard	***Plumas County General Plan Safety Element***	PC Planning Department	Develop sync with General Plan Safety Element. Following State legislation it will be important to reference the PC Hazard Mitigation Plan in the General Plan Safety Element Section.
Geo-Hazard	***Statewide Seismic Regulations***	PC Building Department	??
Flood / Drought	***Farmland Preservation***	Statewide Drought Mitigation Plan	???
Dam Failure	***PG&E Exercise Development***		Multi-Agency table top / field exercise conducted in Feather River Canyon 2 Yrs Ago.
Severe Weather	***Plumas County Building Codes***	PC Building Department PC Planning Department	Section 8-1.08 – Amendment of Section 1805 of the California Building Code: Frost Depth Required. Amendment of Section 1057 of the California Building Code: Ice Dam Protection

2. Administrative and Technical Capability: Please indicate whether your jurisdiction maintains the following staff members within its current personnel resources by placing an "X" in the appropriate box. Then, if YES, please identify the department or agency they work under and provide any other comments you may have in the space provided or with attachments.

Staff/Personnel Resources	***Yes***	***No***	***Department / Agency***	***Comments***
Planners (with land use / land development knowledge)	x		PC Planning Department	
Planners or engineers (with natural and/or human caused hazards knowledge) Public Works has capability.	x		PC Building Department PC Engineering Department PC Public Works Department	
Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors)	x		PC Building Department PC Engineering Department PC Public Works Department	
Emergency Manager	x		PC OES	
Floodplain Manager (Planning Director / Public Works Director)	x		PC Planning Department PC Public Works Department	
Land surveyors	x		PC Engineering Department PC Public Works Department	
Scientists or staff familiar with the hazards of the community	x		National Forest Service	Climatologist
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program	x		PC Planning Department PC Public Works Department	
Grant writers or fiscal staff to handle large/complex grants (David Keller)	x		PC Administration	PC Administrative Offices handle
Construction Equipment	X		PC Public Works Department	Public Works owns and maintains over 300 pieces of equipment / 55-60 Employees.

Public Works: ▪ *Technical Assistance* ▪ *Personnel Assistance*	X		PC Public Works Department	No Funding Outside Road Right of Way.
Utilities / Dam Safety Experts ▪ *Dam Safety Personnel* ▪ *PG&E Arborist*	x		Emergency Management / Risk Management	Dam Failure Exercise Expertise. PG&E arborist can remove hazard trees next to electrical lines free of charge.
State Emergency Management Personnel ▪ *State OES Access* ▪ *CCIC Access* ▪ *Mobile Emergency Personnel* ▪ *Medical Air Evacuation (Based in Auburn & Redding)*	x		California Highway Patrol	CHP personnel can assist and maintain evacuation routes, radio communication, Aerial Support (Fixed Wing & Helicopter). CHP Maintains Mutual Aid Agreements with the State of Nevada during "State of Emergency".
Regional Medical Assistance Personnel ▪ *Plumas District Hospital* ▪ *Renown Hospital / Reno?* ▪ *St. Mary's Hospital / Reno?*	x		Various Hospital Staff / Departments	Washoe County NV, EOP might be a good document to reference.

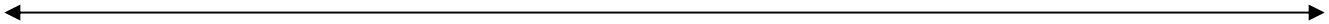
National Weather Service Weather Watchers	X		SKYWARN Weather Spotters	Spotter training classes are offered periodically at various locations in the area. The training is taught by National Weather Service forecasters and takes approximately 2 1/2 hours. The classes are generally offered on week-nights. We strongly encourage volunteers to attend these classes to become weather spotters. National Coordinator: Chris Maier, phone: 301-713-0090, email: chris.maier@noaa.gov http://www.nws.noaa.gov/training/wxspot.php

3. Fiscal Capability: Please indicate whether your jurisdiction has access to or is eligible to use the following local financial resources ***for hazard mitigation purposes*** (including as match funds for State of Federal mitigation grant funds). Then, identify the primary department or agency responsible for its administration or allocation and provide any other comments you may have in the space provided or with attachments.

Financial Resources	*Yes*	*No*	*Department / Agency*	*Comments*
Capital improvement programming		x	Public Works	Financial Resources Limited to Infrastructure Projects.
Community Development Block Grants (CDBG)	x		Plumas County CDC	
Special purpose taxes	x			
Gas / electric utility fees	x			Local Districts (Community Service District, Fire, School etc.)
Water / sewer fees	x			Local Districts (Community Service District , Fire, School etc..)
Stormwater utility fees	x			Local Districts (Community Service District , Fire, School etc..)
Development impact fees	???			
General obligation, revenue, and/or special tax bonds	x			Local Districts (Fire, School etc.)
Partnering arrangements or intergovernmental agreements	x			

DWR Position 84 Bond Funding	X			The Plumas County Community Development Commission assists low income residents meet their housing needs, build and improve infrastructure,
Weatherization Services	x		PC Community Development Commission	Eligible households (owners and renters) can receive energy efficiency improvements installed at no cost, such as weather-stripping, insulation, storm windows, water heater blankets, compact fluorescent light bulbs, and other energy-related. home repairs.

4. Community Political Capability: Political capability in this instance is being measured by the degree to which local political leadership (including appointed boards) is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum State or Federal requirements (e.g., building codes, floodplain management, etc.). Rate the jurisdiction's political capability to enact policies and programs that reduce hazard vulnerabilities on a scale from 0 to 5. Generally, a higher the score corresponds to a higher degree of community political capability.



5-Very Willing ***3-Moderately Willing*** ***0-Unwilling to Adopt Policies/Programs*** ***Score: 2.5***

5. Self-Assessment of Capability: Please provide an approximate measure of your jurisdiction's capability to effectively implement hazard mitigation strategies to reduce hazard vulnerabilities. Using the following table, please place an "**X**" in the box marking the most appropriate degree of capability (Limited, Moderate or High) based upon best available information and the responses provided in Sections 1-5 of this survey.

Area	***Degree of Capability***		
	Limited	***Moderate***	***High***
Planning and Regulatory Capability		X	
Administrative and Technical Capability			X
Fiscal Capability	X		
Community Political Capability		X	

Plumas County Office of Emergency Services
270 County Hospital Road, Suite 127, Quincy, California 95971
530-283-6367 ~ 530-283-6241 Fax
Jerry Sipe, Director

Agenda
Hazard Mitigation Planning Meeting
April 4, 2013 – 10:00am - Noon
Plumas County Public Health - 2nd floor large conference room.

Agenda Items:

1. 2006 Hazard Mitigation Action Review

2. 2013 Hazard Mitigation Action Strategy Development

B.2 October Hazard Profile and Risk Assessment Workshop

2012 Plumas County HMP

October Hazard Identification and Profiling Workshop

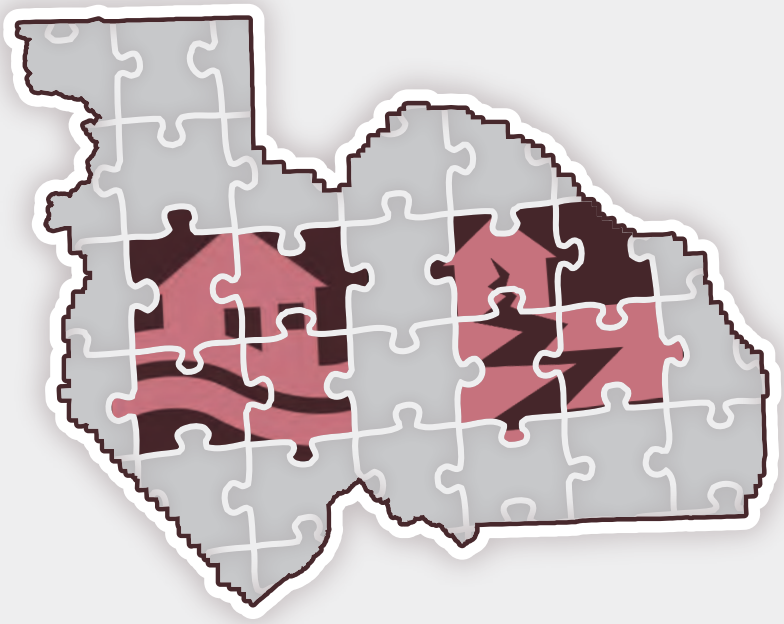
Plumas County Workshop #1 Schedule

	Monday 10/22		Tuesday Greenville 10/23		Wednesday Quincy 10/24		Thursday Chester 10/25		Friday 10/26	
08:00	In-Brief at Beckwourth Public Works Yard		In-Brief at Greenville Public Works Yard		In-Brief at Quincy Public Works Yard		In-Brief at Chester Public Works Yard		In-Brief at LaPorte Public Works Yard	
09:00	Flood Hazard Profiling w/ CPW Sup.	Critical Infrastructure Capture w/ CPW Crew	Flood Hazard Profiling w/ CPW Sup.	Critical Infrastructure Capture w/ CPW Crew	Flood Hazard Profiling w/ CPW Sup.	Critical Infrastructure Capture w/ CPW Crew	Flood Hazard Profiling w/ CPW Sup.	Critical Infrastructure Capture w/ CPW Crew	Flood Hazard Profiling w/ CPW Sup.	Critical Infrastructure Capture w/ CPW Crew
10:00	Fire Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Fire Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Fire Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Fire Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Fire Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew
11:00	Severe Weather Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Severe Weather Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Severe Weather Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Severe Weather Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew	Severe Weather Hazard Profiling w/ CPW Sup	Critical Infrastructure Capture w/ CPW Crew
12:00	Lunch		Lunch		Lunch		Lunch		Lunch	
13:00	Graeagle Hazard Profiling and Fieldwork w/ Public Works		Local Area Stakeholder Hazard Profiling	Critical Infrastructure Health Care or Functional Needs Population	OES and Public Health	Critical Infrastructure Health Care or Functional Needs Population	Local Area Stakeholder Hazard Profiling	Critical Infrastructure Health Care or Functional Needs Population	Follow Up Data Collection	
14:00			Local Area Stakeholder Hazard Profiling	Critical Infrastructure Health Care or Functional Needs Population	OES and Public Health	Critical Infrastructure Health Care or Functional Needs Population	Local Area Stakeholder Hazard Profiling	Critical Infrastructure Health Care or Functional Needs Population		
14:30	Team Logistics		Setup		Setup		Setup			
15:00	Portola Area / Memorial Hall		Greenville Town Hall		Quincy Veterans Hall		Chester / Lake Almanor Recreation Building			
16:00										
17:00										
16:00										
18:00										
19:00										

PLUMAS COUNTY HMP
Hazard Mitigation Plan

Hazard Mitigation
PUBLIC OPEN HOUSE SERIES

- *Tell your fire, flood or natural hazard story.*
- *Come to a Plumas County hazard mitigation open house.*



Open House Locations & Times

OPEN HOUSE 1

Monday 10/22 **3:00-7:00PM**

Portola Veterans Hall
449 West Sierra Street
Portola, CA 96122

OPEN HOUSE 2

Tuesday 10/23 **3:00-7:00PM**

Greenville Town Hall
120 Bidwell
Greenville, CA 95947

OPEN HOUSE 3

Wednesday 10/24 **3:00-7:00PM**

Quincy Veterans Hall
274 Lawrence Street
Quincy, CA 95971

OPEN HOUSE 4

Thursday 10/25 **3:00-7:00PM**

New-Almanor Recreation Building
450 Meadowbrook Loop
Chester, CA 96020

Your story is an important piece of history.
Be part of the future!

PROJECT WEBSITE
www.plumascounty.us/index.aspx?nid=2214

CONTACT
JerrySipe@countyofplumas.com

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information			
Location Name: Harriet - Beckwourth			
Address:			
Lat / Long: N 39 degrees 44.675 ‘ W 120 degrees 18.338 ‘ Elevation: 4872			
Description (include estimated length and or size) and Function:			
Road falls apart when the roadway is overtopped with flood waters. Island Ranch sits on a small rise, and is above the waters that rise. The roadway is at roughly the same elevation as the fields that surround it, so there is nowhere for the water to go once it rises. Picture: 23			
Capacity or Population Served:			
In the summer, roughly 20 trucks per day carry loads of haystacks to Sierraville, and points beyond. There is another route, but the truck drivers take this route because it is 0.7 miles shorter.			
Estimated Value:			
Replacement Value:			
Function Use Value:			
Estimated Displacement Cost $ Dollar Per Day:			
Hazard Information			
Hazard Threat Information:			
i.e. distance or location from asset….			
Frequency of Hazard Occurrence: Annually – spring runoff/lots of rain			
	Event 1: 1992	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate	x- roadway had to be rebuilt		
30-49% - Severe			
50% + - Substantial			
Description of Damaging Event:			
1992 – Flood waters filled valley with water. The repairs would entail elevating material and culverts to be built into the roadway.			

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Williams Creek on N Valley Road
Address:
Lat / Long: N 40 deg 8.962 min W 120 deg 56.306 min Elevation: 3614
Description (include estimated length and or size) and Function:
This is a bridge, over culverts that drain water from private land (upstream). The water passes through the culverts, and eventually heads down to Wolf Creek. This bridge has been overtopped before, as a result from the blockages in the culverts. The public works crew has had to use logging equipment/poles to remove blockages during high water times. Pictures: 44-46
Capacity or Population Served:
The roadway serves a large population in Taylorsville and Diamond Valley. This particular roadway rends to receive less snow and ice than alternative routes.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
The water that comes down from the upstream private property carries all kinds of debris and gravel, resulting in clogged culverts. These clogged culverts force the water to back up, and may result in the road over-topping.
Frequency of Hazard Occurrence: Infrequently. Not on a regular basis.

	Event 1: 1986	Event 2: 1996	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate		x	
30-49% - Severe	x		
50% + - Substantial			

Description of Damaging Event:
The county public works department views the addition of an extra culvert and the creation of concrete diversion walls as a possible solution to the problem. They would like to deal with the sides of the creek/channel, but there are environmental concerns and regulations which likely prohibit this.

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Stanfly Lane
Address:
Lat / Long: N 40 deg 6.39 min W 120 deg 53.643 min Elevation: 3505
Description (include estimated length and or size) and Function:
Stanfly Lane gets ponding water across the road. Pictures: 50-67
Capacity or Population Served:
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
This hazard results from the surrounding agricultural fields being saturated and not being able to take on any more water. Once the fields are full of water, and the levee system fills, and the water backfloods into the Arlington. Once the water begins to backflood, the residents in Indian Valley are going to be flooded.
Frequency of Hazard Occurrence: This hazard occurs annually. Spring runoff/extreme rainfall

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:
The bridge crossing the culverts and associated runoff paths has not been overtopped by rising waters. However, the road leading up to and away from the bridge can be underwater and impassable.

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information			
Location Name: Nelson Street Bridge			
Address:			
Lat / Long:			
Description (include estimated length and or size) and Function:			
The Nelson Street Bridge crosses Indian Creek.			
Capacity or Population Served:			
Estimated Value:			
Replacement Value:			
Function Use Value:			
Estimated Displacement Cost $ Dollar Per Day:			
Hazard Information			
Hazard Threat Information:			
Just a few hundred yards upstream from the bridge is a large area undercut by streambank erosion. The creek had been straightened by the ACE in the past, but appears to be returning to its original course, and as a result, is cutting into the levees/banks created by the ACE.			
Frequency of Hazard Occurrence:			
	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			
Description of Damaging Event:			

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Mount Huff Estates
Address:
Lat / Long: N 40 deg 7.195 min W 120 deg 54.262 min Elevation: 3476
Description (include estimated length and or size) and Function:
This housing development has low-lying homes that routinely flood. This development was started in the late 60's, early 70's. Pictures: 65, 66, 68-72
Capacity or Population Served:
There are homes which a low-lying and flood on a frequent basis. It is unknown if any homeowners have undertaken any mitigation efforts (raising electrical service, utilities, appliances). Houses appeared to be built slab-on-grade.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
Flooding threatens multiple homes in the Mount Huff subdivision. Residents are aware of when the floodwaters are coming, by the presence of water in the agricultural fields which neighbor the subdivision.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:
Check address of: 15880 Old Wagon Road against SRL property list provided for the planning process.

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Mill Creek
Address:
Lat / Long: N 39.926132 W -120.90613 Elevation: 3555.8
Description (include estimated length and or size) and Function:
Mill creek runs behind and alongside private property. However, it does pass along side the Quincy public works yard as well. There is a small drain in place on private property at the end of a drive that has to be checked, and unclogged periodically. However, during heavy rains, and large scale events, the water will bypass this drain, and flow down the gravel road down towards 70. Pictures: 147-150
Capacity or Population Served:
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
Large storm events, and 1% annual events pose a threat to this system.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: "Les Schwab" storm drain grate
Address:
Lat / Long: N 39.935436 W -120.93404 Elevation: 1050.8 Meters
Description (include estimated length and or size) and Function:
There is a storm grate located behind the Les Schwab tire company building. The grate can get covered and clogged with debris. Once it is clogged, the public works dept clears it out, and then opens the grate to allow all water and material to enter the drainage system. Pictures: 101-108
Capacity or Population Served:
This grate helps clear water into a nearby culvert, around the mall, and across the street. Currently the pipe turns a couple of times before entering the large earthen culvert.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
Once the water begins to back up, there is a house located at 95 E Jackson that gets some water in it. This backup has occurred 3-4 times in the recent past. 1986, 1993, 1997 are the quickly recalled dates. The water goes under the les schwab garage in the drainage pipe, and has caused some issues in the building, and under the parking lot.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:
Large water events are what lead to this hazard. Large storms, and runoff do not seem to trigger this hazard. The road crew believes that straightening the pipe system and enlarging it may allow for more water to get through, and prevent the debris from clogging it. These large events have resulted in around 2 feet of water in some of the businesses in the mall (now Plumas Café, Champions Pizza, etc.). There is a small medical treatment center in the general vicinity that has gotten some water in the past. They have crawl spaces to accommodate plumbing and other utilities for their therapy pools.

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Hough Creek - Greenville
Address:
Lat / Long:
Description (include estimated length and or size) and Function:
Hough Creek has been graded and rip-rap sheets have been added to the south side in order to prevent further erosion of the section of the creek.
Capacity or Population Served:
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
i.e. distance or location from asset….
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Gansner Creek
Address:
Lat / Long: N 39.939476 W -120.96152
Description (include estimated length and or size) and Function:
Gansner Creek comes down off the hillside, and enters a small culvert on the street opposite the hospital. This pipe is designed to take the water under the street, and next to the hospital. However, as with the other storm grates in Quincy, once this one clogs, the water overtops the road, and will effect the hospital. The hospital will sandbag the ambulance entrance, the ER entrance, and the X-ray doors. The creek continues out past the hospital and passes between two houses. Pictures: 125-139
Capacity or Population Served:
The hazard impacts the hospital, a critical facility.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
Flooding/water hazard. Indications are that the winter of 86, 92-93 and 96-97 saw flooding to the hospital and the road being overtopped.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information			
Location Name: Gennessee Woods			
Address:			
Lat / Long:			
Description (include estimated length and or size) and Function:			
Gennessee Woods are a fire hazard.			
Capacity or Population Served:			
Estimated Value:			
Replacement Value:			
Function Use Value:			
Estimated Displacement Cost $ Dollar Per Day:			
Hazard Information			
Hazard Threat Information:			
There are multiple homes set back from the road and surrounded by tree growth.			
Frequency of Hazard Occurrence:			
	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			
Description of Damaging Event:			

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Gansner Creek
Address:
Lat / Long: N 39.939476 W -120.96152 Elevation: 3431.8
Description (include estimated length and or size) and Function:
Gansner Creek comes down off the hillside, and enters a small culvert on the street opposite the hospital. This pipe is designed to take the water under the street, and next to the hospital. However, as with the other storm grates in Quincy, once this one clogs, the water overtops the road, and will effect the hospital. The hospital will sandbag the ambulance entrance, the ER entrance, and the X-ray doors. The creek continues out past the hospital and passes between two houses. Pictures: 125-139
Capacity or Population Served:
The hazard impacts the hospital, a critical facility.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
Flooding/water hazard. Indications are that the winter of 86, 92-93 and 96-97 saw flooding to the hospital and the road being overtopped.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Clear Creek
Address:
Lat / Long: N 39.924515 W -121.0848 Elevation: 3944.2
Description (include estimated length and or size) and Function:
Clear Creek comes out past a home, and enters a series of culverts. Once these culverts become blocked, the water begins swirling around a bowl at the base of Meadow Valley Road. This road serves as a back way to Oroville and sees roughly 1000 vehicles a day. This road serves one of the larger satellite communities to Quincy. This blockage and potential erosion issue could be very dangerous to the road, which is directly above culverts. Pictures: 141-146
Capacity or Population Served:
Population served is Meadow Valley and the roughly 1000 vehicles per day that travel the road.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
The grates/culverts backing up elevates water levels directly into the base of Meadow Valley Road, and could pose an erosion issue. This creek and drainage system is stressed several times a year.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Arlington Bridge
Address:
Lat / Long: N 40 deg 5.061 min W 120 deg 55.022 min Elevation: 3503
Description (include estimated length and or size) and Function:
Bridge is Arlington Road over the Arlington Creek. The bridge can become clogged with material and prevent flow-through. The road crew would like to add culverts on either side, to assist in drainage issues. There is a rocky outcropping which restricts flow out of the valley. If it were to be demolished/removed, it would greatly increase outflow. Pictures: 74-77
Capacity or Population Served:
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information:
The Arlington Bridge is a large span, over a small flow area. This small outlet for the water forces water to back up to the edges of the levees and spill out into the surrounding ag fields.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information			
Location Name: Smith Creek - Graegle			
Address:			
Lat / Long: N 39 deg 46.626 min W 120 deg 37.975 min. elevation: 3595			
Description (include estimated length and or size) and Function:			
There is a Y split upstream of the roadway, and culverts. The culverts get plugged over time, and help cause overtopping of the roadway. This overtopping happens every 2 years or so. Pictures: 33-35			
Capacity or Population Served:			
In the summer, roughly 20 trucks per day carry loads of haystacks to Sierraville, and points beyond. There is another route, but the truck drivers take this route because it is 0.7 miles shorter.			
Estimated Value:			
Replacement Value:			
Function Use Value:			
Estimated Displacement Cost $ Dollar Per Day:			
Hazard Information			
Hazard Threat Information: Snowmelt – severe weather and flooding			
In the winter there are roughly 150-200 vehicles per hour that travel the road. That number triples in the summer. (A recent road study was completed. More accurate vehicle counts may be available)			
Frequency of Hazard Occurrence: Every other year			
	Event 1: 2003?	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe	The guardrails were removed from the roadway, and had to be replaced		
50% + - Substantial			
Description of Damaging Event: There were large events in 1986 and the winter of 1996-97.			

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Plumas Eureka State Park - Graegle
Address:
Lat / Long: N 39 deg 45.518 min W 120 deg 41.516 min Elevation: 5136
Description (include estimated length and or size) and Function:
There is a roadway that connects Graeagle to Johnsville. It is the only paved road that connects the two. This roadway has been moved back in order to avoid an erosion issue that has developed. The suspected culprit is runoff and ground water saturation. Pictures: 36-43
Capacity or Population Served:
The population of Johnsville is served by this roadway. The only other way out of Johnsville is a dirt road which is essentially impassable in the winter.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information: Snowmelt/Groundwater Saturation
Water coming down off the pass has eroded the roadway. There may have been some recent engineering studies completed on this situation that should be accessed and assessed. (Steve Dervin) The road is a County right-of-way, and has been moved to accommodate the new hazard.
Frequency of Hazard Occurrence:

	Event 1:	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

2012 Plumas County HMP

Critical Facility Hazard Evaluation

Critical Asset Information
Location Name: Marble Hot Springs Road - Beckwourth
Address:
Lat / Long: N 39 deg 45.358 W 120 deg 21.149 Elevation: 4887
Description (include estimated length and or size) and Function:
This is a road which routinely overtops. There are two stretches of roadway that are in need of repair. The length is roughly .7 miles. Track: 10/22/12 – 9:58:48 1.27 miles Pictures: 13-22
Capacity or Population Served:
Ranchers, Bird Watchers, Evac Route from the area. This road is also a by pass for construction traffic to use.
Estimated Value:
Replacement Value:
Function Use Value:
Estimated Displacement Cost $ Dollar Per Day:
Hazard Information
Hazard Threat Information: Snowmelt – spring runoff and flooding
Frequency of Hazard Occurrence: Annual Flooding

	Event 1: 1992	Event 2:	Event 3:
Severity of Events:			
0-9% - Minimal			
10-29% - Moderate			
30-49% - Severe			
50% + - Substantial			

Description of Damaging Event:

The road overtops annually. This is usually the result of a spring runoff or severe weather. In addition, there has been overtopping resulting from irrigation taking place on the agricultural land surrounding the area.

B.3 Website Snapshots

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Mulit-Hazard Mitigation Plan

Welcome to the Plumas County Multi-Hazard Mitigation Plan (MHMP) webpage!

This webpage serves as an information source and document repository for Plumas County's Multi-Hazard Mitigation Plan. Plumas County's Hazard Mitigation Plan must be updated every five years to ensure the plan remains current with natural hazard events and maintains eligibility for State and Federal Hazard Mitigation Grant funding. This webpage will remain permanently active to document past, current and future hazard mitigation planning efforts for the public and county officials alike.

Please explore the left hand navigation bar for more information on Hazard Mitigation Planning!

As always, the Plumas County Multi-Hazard Mitigation (MHMP) Project Team is seeking the public's help and input during MHMP Update processes. If you have disaster related stories and/or photographs that you would like to share, or you have comments or other

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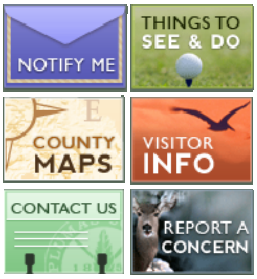

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Planning Committee Meetings

Planning Committee meeting #1 - September 19, 2012

- Agenda
- Presentation
- October Workshop Schedule (Draft)

Planning Committee Meeting #2 - February 8, 2013

- Agenda
- Presentation #1
- Presentation #2
- Risk Factor Worksheet
- Risk Factor Outcomes

Planning Committee Meeting #3 - March 7, 2013

- Agenda
- Capabilities Assessment Outcomes

Planning Committee Meeting #4 - April 4, 2013 (CANCELLED to be conducted via Hazard Focus Groups)

- Agenda
- *Draft* 2006 - Mitigation Actions
- FEMA 2013 - Mitigation Ideas

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Step 1: Organizing Resources

This step involves the formation of the MHMP Update Project Team, which includes the formation of a MHMP Planning Committees, and Hazard Focus Groups. The MHMP Planning Team consists of local emergency managers, health officials, fire department staff, planning staff, as well as other stakeholders in the community. In addition to citizens of Plumas County, the following agencies are involved in this MHMP Update process (in alphabetic order):

- CAL FIRE
- California Emergency Management Agency
- California Highway Patrol; Quincy
- Plumas County Agricultural Commissioner
- Plumas County Board of Supervisors
- Plumas County Building Department
- Plumas County Community Development Department
- Plumas County Environmental Health Department
- Plumas County Fire Safe Council
- Plumas County GIS Department
- Plumas County Office of Emergency Services
- Plumas County Planning Department
- Plumas County Public Works
- Plumas County Sherriff's Office
- Plumas National Forest
- Sierra Institute
- USDA NRCS

Planning Committee

In addition to stakeholder input, a MHMP Planning Committee is used to guide the process and ensure the mitigation plan meets the goals of the County and the State and Federal Hazard Mitigation Plan requirements. The Planning Committee:

- Attends/actively participates in a series of structured coordination meetings
- Assists in the collection of valuable local information and other requested data
- Makes decisions on plan process and content
- Identifies mitigation actions for the MHMP
- Reviews/provides comments on plan drafts
- Coordinates/participates in public input process

Feel free to explore Planning Team Meeting Content below!

Planning Committee Meetings

County Consultant Support:

The county solicited support from Michael Baker, Jr., Inc. (Baker) to facilitate the MHMP Update planning process and the development of the MHMP Update document. The MHMP Update Project Team, as shown in table below, consists of a variety of professionals from Baker.

Ethan Mobley,	AICP, Project Manager
Carver Struve,	Senior Technical Advisor
Jason Farrell	Senior Planner
Jack Eldridge	National Flood Insurance Program (NFIP)/ Outreach Specialist
Nathaniel Mirin	Hazus Specialist
Brian Greer	Geographic Information Systems (GIS) Specialist
Aaron Pfannenstiel, AICP	QA/QC

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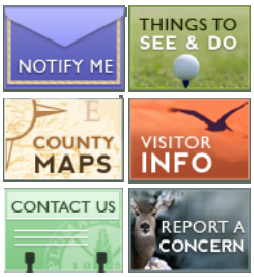
Step 1: Organize Resources
Step 2: Assess Risk
Step 3: Develop a Mitigation Plan



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Step 2: Assessing Risk

In accordance with FEMA requirements, this step of the Hazard Mitigation Plan (HMP) planning process identifies the natural hazar Plumas County and assesses the vulnerability from the identified hazards. Results from this phase in the planning process will form for the subsequent mitigation actions for reducing risk and potential losses in Plumas County.

Hazard Identification

The countywide risk assessment begins with the identification of hazards which could potentially affect the County. During the plan we re-establish information about prevalent natural hazards and prepare a preliminary list of hazards based upon the County's 200 stakeholder input, and other documentation. The preliminary hazard list of for 2012 HMP Update includes:

- Flooding
- Severe Storms (Winter and Summer)
- Wildfire
- Drought
- Dam Failure
- Earth Movements (Earthquakes and Landslides)
- Climate Change

As indicated in table below, large regional incidents have affected Plumas County. Most recently, severe fires were declared the Co 2012 summer season, causing extensive damage. During the 2012 fire season Chips fire was first reported in Plumas National For 2012, burning about 20 miles (32 kilometers) west of Quincy, California. By September 5, it had charred more than 75,000 acres (3 kilometers). In addition to the Chips fire, the historic disaster declarations in table below provide a baseline for consideration in the h prioritization process.

Federal Declarations, State and Local Proclamations

Disaster Name	Disaster Type	Disaster Cause	Disaster#	Year	Deaths*	Injuries*	Cost of Damage*
Chips Fire	Fire	Fire	Proclamation of Local Emergency (Board of Supervisors	2012			TBD
Mid-Year Fires	Fire	Fire	EM-3287	2008			N/A
Winter Storms	Flood	Storms	DR-1628	2005-2006			$128,964,501
August Fires	Fire	Fire	EM-3140	1999			$1,154,573
January Floods	Flood	Storms	DR-1155	1997	8		$194,352,509
Torrential Winds and Rain	Flood	Storms	GP96-01	1996			N/A
Severe Winter Storms	Flood	Storms	DR-1044	1995	11		$221,948,347
Late Winder Storms	Flood	Storms	DR-979	1992	20	10	$226,018,111
Wildland Fires	Fire	Fire	GP	1987	3	76	$18,000,000
Storms	Flood	Storms	DR-758	1986	13	67	$407,538,904
April Storms	Flood	Storms	80-01-80-25	1980			N/A
Northern California Flooding	Flood	Flood	DR-283	1970			$27,657,478
Storms	Flood	Storms	DR-253	1969			N/A
Late Winter Storms	Flood	Storms	DR-183	1964			$213,149,000
Floods and Rains	Flood	Storms	N/A	1963			N/A
Widespread Fires	Fire	Fire	N/A	1960			$3,075,000

Planning Team worked with the county and other jurisdictions to re-establish profiles for the 2012 Hazard Mitigation Plan. Hazard p a standardized method to explain each hazard in terms of:

- Definition
- Regulations / Policies
- Location/Extent
- Magnitude/Severity
- Probability of Future Occurrences

During the hazard profiling process we review and assessed existing plans, studies, other technical reports, and create hazard map

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valid. The HMP Planning Team will update the hazard profiles to reflect any new hazard events since 2006 and provide information in a FEMA preferred / required hazard profile format.

Draft Hazard Profiles Coming Soon!!

October Hazard Profiling and Identification Workshop

In order to properly document naturally occurring hazards within Plumas County, the HMP Planning Team worked over a one week period (Oct 22nd – Oct 26th) to re-established existing hazard profiles with "boots-on-the-ground" validation efforts. The October workshop:

- Provided us an opportunity to work as a team
- Provided transparency in the planning process
- Included a series of data collection exercises to assemble necessary and required information.
- Provided documentation of the planning process to be included in the MHMP Update
- Minimized disruption and impacts to business process and resources.
- Opened the planning process for the public

In order to appropriately capture the hazards and critical infrastructure throughout 2,600 Square Miles of area within Plumas County, the HMP Planning Team worked with county agencies and the public. The week period or "workshop" consisted of field work and a series of public open houses to provide information about local hazards within the County.

During the October Workshop the HMP Planning Team worked with agencies in the field to identify hazards, critical infrastructure and successful mitigation actions by "ground truthing" areas prone to natural disasters. During this period the HMP Planning Team worked with each Public Works District to capture historic damage to roads and other community infrastructure and assets.

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Thank you Beckworth, Greenville, Quincy, Chester and Portola Roads Department!!!!!

Thank you Public!
During the October Workshops, we "opened the house" to the public showcasing the hazard profiling process and the data we collected during four distinct open houses in Portola, Greenville, Quincy, and Lake Almanor. The Open House provided opportunities for the public and county agencies to interact with county and other project staff, as well as provide there story about the hazard. As part of this process we asked interested citizens to provide information and pictures of local hazards. We collected tons of historic natural hazard event photos, thanks to the Quincy History Museum, Public Works and the Public!!!

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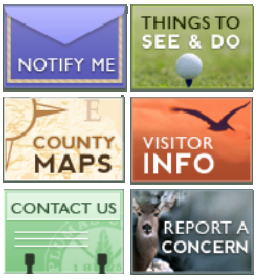

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About the project

About the Project

What is the Purpose?

The purpose of the current FY2012 -13 planning process is to update Plumas County's existing multi-hazard mitigation plan (MHMP) done in 2007. The MHMP will be updated by using the most current information and data, conducting a thorough vulnerability analysis, and revising community priorities and subsequent mitigation actions.

Objectives:

Provide the public opportunities throughout the plan development and drafting process to provide input, taking special care to make the plan and outcome relevant to the impacted community.

Update the risk assessment using the most recent disaster data and information.

Update hazard mitigation goals, objectives and actions as they relate to reducing loss of life and property from natural and human-made hazards.

Obtain state and federal approval of the updated plan.

What is a Multi-Hazard Mitigation Plan?

The plan is an official statement of Plumas County's hazards, vulnerability analysis, and mitigation strategy. The result of a collaborative multi-agency and county citizen planning process. As a living document, it guides implementation activities to achieve the greatest reduction of vulnerability, which results in saved lives, reduced injuries, reduced property damages, and protection for the environment.

Why have a Multi-Hazard Mitigation Plan?

To ensure public consensus through a planning process on mitigation actions that best suit the community. Allows communities to focus efforts and limited resources on the most highly desirable mitigation projects. Plumas County also must have a State and federally approved plan to apply for and receive mitigation grants. These grants can augment local mitigation activities already done and planned activities too. Ultimately, these actions reduce vulnerability and communities are able to recover more quickly from disasters.

How is the Multi-Hazard Mitigation Plan Update Process Completed?

State, Indian Tribal, and local officials develop and adopt mitigation plans to meet the requirements of the Stafford Act. The Multi-Hazard Mitigation Planning Guidance provides the official guidance on these requirements and procedures for approval of hazard mitigation plans. The core steps in the graphic below show the process to complete a mitigation plan.

+myConnections: Engage your community - connect to news, events and information you care about. View more information... Sign In

When can I get involved?

The Plumas County update process follows the core hazard mitigation steps identified by FEMA above. Plumas County has created a step-by-step planning process below which identifies detail county actions from start to finish. Please see the steps below for more information on o pportunities to g et involved. More to come from the county planners….stayed tuned!

B.4 Public Notices and Press Releases

Residents can share their hazard stories

The Plumas County Hazard Mitigation Plan project is hosting a series of public open houses. Residents are invited to attend and tell their fire, flood or natural hazard stories. Accompanying photos are encouraged.

"Your story is an important piece of history," say organizers.

All open houses are held 3 – 7 p.m. For more information, email JerrySipe@countyofplumas.com . To visit the project website, go to plumascounty.us. Scroll over Departments, then Departments G – Z. Then scroll over Office of Emergency Services and click on Multi-Hazard Mitigation Plan.

Monday, Oct. 22
Portola Veterans Hall
449 W. Sierra St.
Portola, CA 96122

Tuesday, Oct. 23
Greenville Town Hall
120 Bidwell
Greenville, CA 95947

Wednesday, Oct. 24
Quincy Veterans Hall
274 Lawrence St.
Quincy, CA 95971

Thursday, Oct. 25
Almanor Recreation Center
450 Meadowbrook Loop
Chester, CA 96020

Read all about it on our Website!

plumasnews.com

HMP
Hazard Mitigation Plan

PUBLIC OPEN HOUSE SERIES

- *Tell your fire, flood or natural hazard story.*
- *Bring your photos.*
- *Come to a Plumas County hazard mitigation open house.*

Locations & Times

OPEN HOUSE 1

Monday 10/22 3:00-7:00PM

Portola Veterans Hall
449 West Sierra Street
Portola, CA 96122

OPEN HOUSE 2

Tuesday 10/23 3:00-7:00PM

Greenville Town Hall
120 Bidwell
Greenville, CA 95947

OPEN HOUSE 3

Wednesday 10/24 3:00-7:00PM

Quincy Veterans Hall
274 Lawrence Street
Quincy, CA 95971

OPEN HOUSE 4

Thursday 10/25 3:00-7:00PM

Almanor Recreation Center
450 Meadowbrook Loop
Chester, CA 96020

Your story is an important piece of history.

PROJECT WEBSITE:
www.plumascounty.us/index.aspx?nid=2214

CONTACT:
JerrySipe@countyofplumas.com

PLUMAS COUNTY HMP

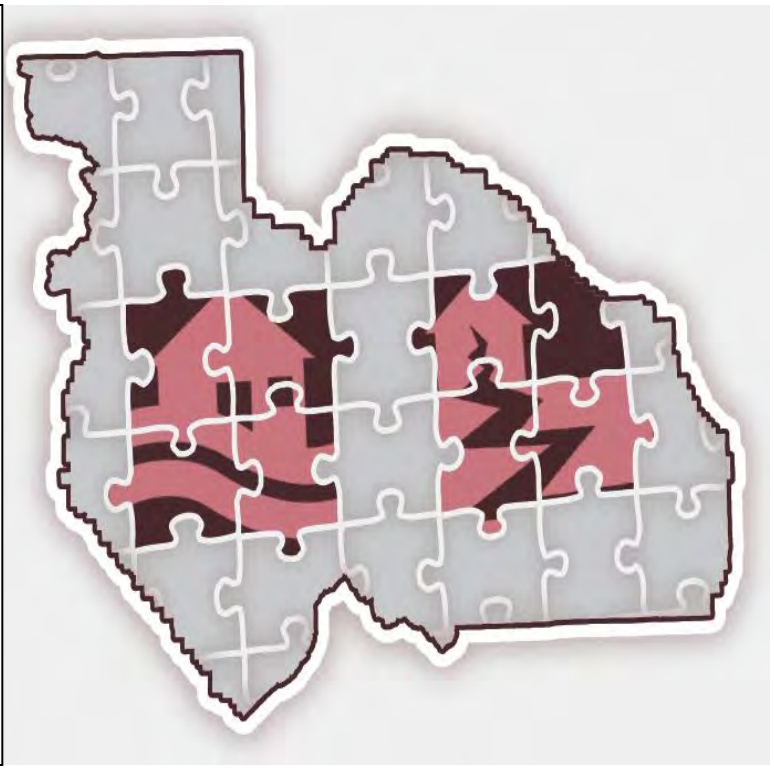
Hazard Mitigation Plan
PUBLIC OPEN HOUSE

Your presence is requested~
Please join us for the final review of Plumas County's Hazard Mitigation Plan.

<u>Your input is highly desired.</u>

The Open House will include:

- **Draft Plan review**
- **Your input on edits**
- **Strategies for Hazard Mitigation**
- **Prevention**
- **Property Protection**
- **Education**
- **Protecting Natural Resources**
- **Emergency Services**
- **Structural Projects**



OPEN HOUSE ~ JUNE 3rd, 2013 ~ 1:00 PM – 5:00 PM

Mohawk Community Resource Center
Highway 70 & 89 at the Barn ~ Graeagle, California

OPEN HOUSE ~ JUNE 4th, 2013 ~ 3:00 PM – 7:00 PM

Greenville Town Hall ~ 120 Bidwell Street ~ Greenville, California

PROJECT WEBSITE:
http://www.plumascounty.us/index.aspx?nid=2214

Contact: jerrysipe@countyofplumas.com

Appendix C.
Risk Assessment Documentation

C.1 DWR National Flood Insurance Program California Quick Guide.

C.2 DWR General Safety Plan Element Review Crosswalk

C.1 DWR Quick Guide

2007

THE NATIONAL FLOOD INSURANCE PROGRAM IN CALIFORNIA

Quick Guide

California Department of Water Resources
Floodplain Management Branch

www.fpm.water.ca.gov

Table of Contents

Table of Contents (continued)

Prepared by:

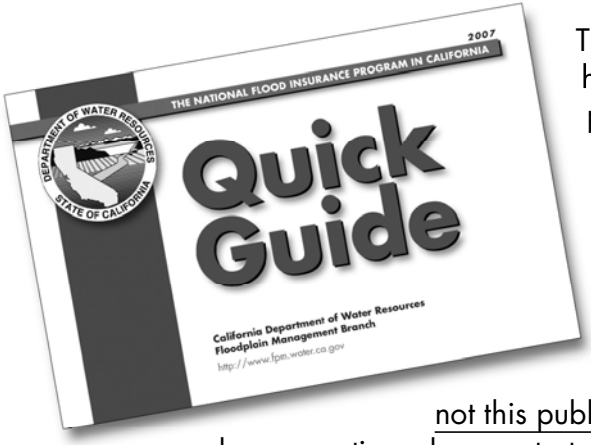
RCQUINN CONSULTING, INC.

www.rcquinnconsulting.com

In association with:

ASFPM — Association of State Floodplain Managers

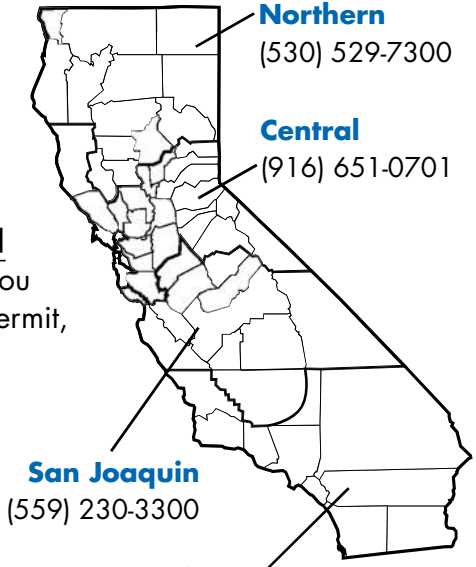
About This Guide



This **Quick Guide** will help you understand more about why and how communities in the State of California manage floodplains to protect people and property.

Flood-prone communities adopt ordinances that detail the rules and requirements for floodplain development. In case of conflict, that ordinance and not this publication, must be followed. If you have questions, be sure to talk with your local planning, permit, engineering, or floodplain management officials.

The California Department of Water Resources (DWR), Floodplain Management Branch, coordinates the National Flood Insurance Program in California (www.fpm.water.ca.gov). Call the Department at (916) 653-5791 and ask for the Floodplain Management Branch, or contact a DWR district office and ask for an NFIP program manager regarding questions or comments.



Introduction

The California Department of Water Resources, Floodplain Management Branch, is pleased to provide this **Quick Guide** to help our citizens understand what floodplain management is and why floodplain development is regulated.

Counties and local communities regulate the floodplain to:

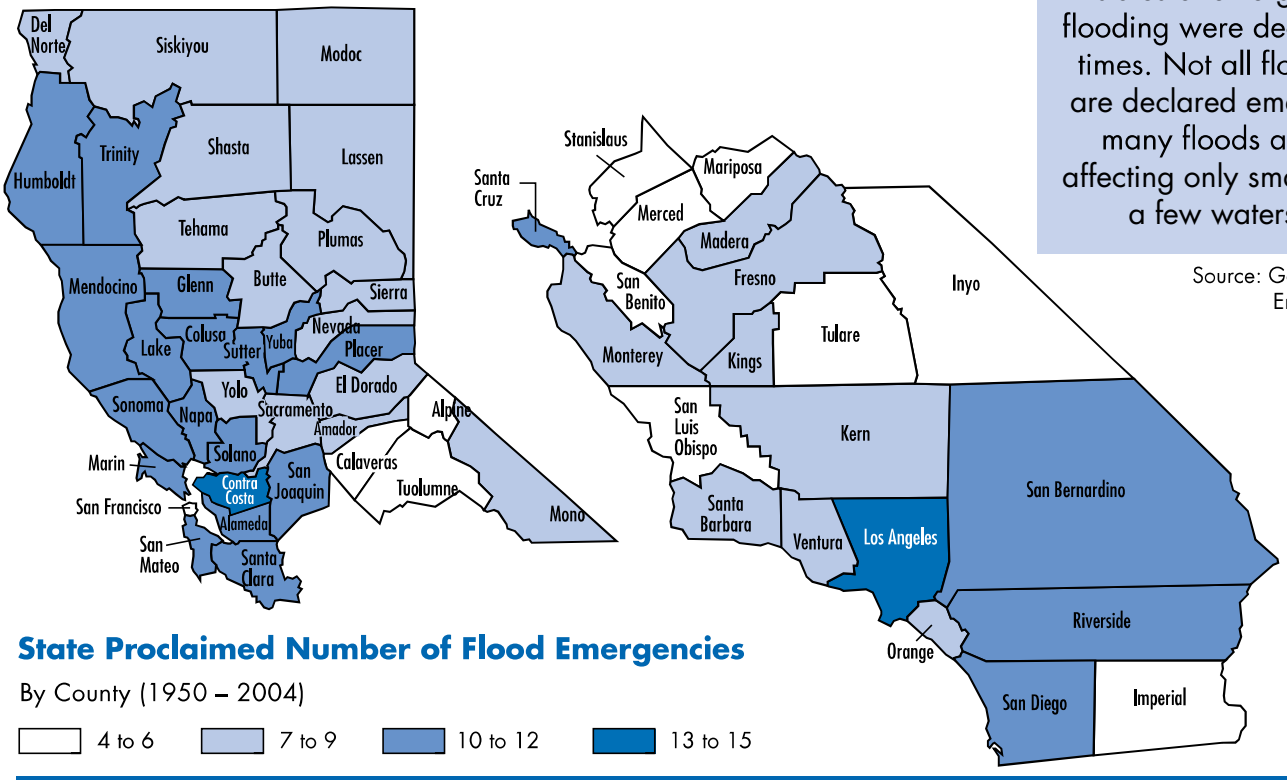
- **Protect** people and property
- **Ensure** that Federal flood insurance and disaster assistance are available
- **Save** tax dollars
- **Reduce** liability and law suits
- **Reduce** future flood losses

Floods have been, and continue to be, a destructive natural hazard in terms of economic loss to the citizens of California. Since 1978, Federal flood insurance policy holders in California have received over $474.2 million in claim payments. Even though that represents many insurance payments, most of the State's flood-prone property owners do not have flood insurance.

California Flood Emergencies

Between 1950 and 2004, states of emergency for flooding were declared 483 times. Not all flood events are declared emergencies– many floods are local, affecting only small areas or a few watersheds.

Source: Governor's Office of Emergency Services



State Proclaimed Number of Flood Emergencies

By County (1950 – 2004)

4 to 6 | 7 to 9 | 10 to 12 | 13 to 15

Why Do We Regulate the Floodplain?

- **To protect people and property.** Floodplain management is about building smart. It makes good sense. If we know part of our land will flood from time to time, we should make reasonable decisions to help protect our families, homes, and businesses.

- **To make sure that Federal flood insurance and disaster assistance are available.** If your home or business is in the floodplain, and Federal flood insurance isn't available, then you can't get some types of Federal financial assistance. Home mortgages will be hard to find and you won't be able to get some types of State and Federal loans and grants.

- **To save tax dollars.** Every flood disaster affects your community's budget. If we build smarter, we'll have fewer problems the next time the water rises. Remember, Federal disaster assistance isn't available for all floods. And even when the President declares a disaster, most of the time your community still has to pay a portion of the costs of evacuation, temporary housing, repair, and clean-up.

- **To avoid liability and law suits.** If we know an area is mapped as a floodplain and likely to flood, if we know people could be in danger, and if we know that buildings could be damaged, it makes sense to take reasonable protective steps when we develop and build.

- **To reduce future flood losses in California.** Development that complies with the minimum floodplain management requirements is better protected against major flood-related damage.

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to protect lives and property and to reduce the financial burden of providing disaster assistance. The NFIP is administered by the Federal Emergency Management Agency (FEMA). Nationwide, over 20,000 communities participate in the NFIP— nearly all of California's flood-prone communities participate.

The NFIP is based on a mutual agreement between the Federal Government and communities. Communities that participate agree to regulate floodplain development according to certain criteria and standards. The partnership involves:

- **Flood hazard maps.** FEMA prepares maps that are used by communities, insurance agents, and others.
- **Flood insurance.** Property owners in participating communities are eligible to purchase Federal flood insurance for buildings and contents.
- **Regulations.** Communities must adopt and enforce minimum floodplain management regulations so that development, including buildings, is undertaken in ways that reduce exposure to flooding (see page 67).

To learn more about the NFIP, including your potential flood risk and the approximate cost of a flood insurance policy, go to FEMA's FloodSmart website www.floodsmart.gov/

Community Responsibilities

To participate in the National Flood Insurance Program, your community agrees to:

- **Adopt and enforce** a flood damage prevention ordinance.
- **Require** permits for all types of development in the floodplain (see page 25).
- **Assure** that building sites are reasonably safe from flooding.
- **Establish** Base Flood Elevations (BFE) where not determined by FEMA.
- **Require** new or substantially improved homes and manufactured homes to be elevated above the BFE.
- **Require** non-residential buildings to be elevated or floodproofed.
- **Determine** if damaged buildings are *substantially* damaged.
- **Conduct** field inspections and cite violations.
- **Require** surveyed elevation information to document compliance (see pages 34, 35, and 36).
- **Carefully consider** requests for variances.
- **Resolve** non-compliance and violations.
- **Advise and work** with FEMA and the State when updates to flood maps are needed.

National Flood Insurance Program

Flood Insurance: Property Owner's Best Protection

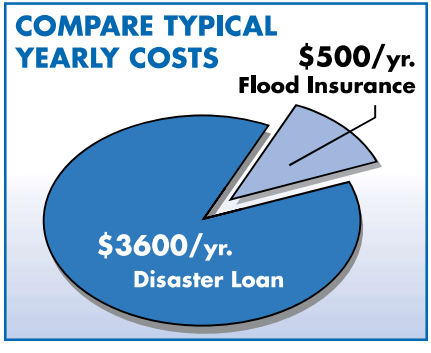
Who needs flood insurance? Federal flood insurance is required for all buildings in mapped Special Flood Hazard Areas (SFHAs) shown on FEMA's maps if they are financed by federally-backed loans or mortgages. All homeowners, business owners and renters in communities that participate in the NFIP may purchase Federal flood insurance on any building, even if outside of the mapped flood zone. If your home is in the mapped SFHA, you are five times more likely to be damaged by flood than by a major fire.

Not in a mapped floodplain? Unfortunately, it's often after a flood that many people discover that their home or business property insurance does NOT cover flood damage. Approximately 25% of all flood damage occurs in low risk zones, commonly described as being "outside the mapped flood zone."

Protected by a levee or dam? Even if you live in an area protected by levees or other flood control structures, there is a residual risk that those structures will be overtopped or fail. If your community's levee provides "100-year" flood protection, there is still a chance that a bigger flood will cause flooding.

What about disaster grants and loans? Federal disaster grants do not cover most losses and repayment of a disaster loan can cost many times more than the price of a flood insurance policy.

Want to know more? Learn more at www.floodsmart.gov.
To purchase a policy, call your insurance agent. To get the name of an agent in your community, call the NFIP's toll free number (888) 356-6329.



The NFIP's Community Rating System (CRS)

The NFIP's CRS gives "extra credit" to communities in the form of reduced flood insurance premiums. Communities must apply to the CRS and commit to implement and certify activities that contribute to reduced flood risk. Examples of actions your community can take to reduce the cost of your insurance premiums include:

- Preserve open space in the floodplain
- Enforce higher standards for safer development
- Undertake engineering studies and prepare flood maps
- Obtain grants to buy out or elevate houses or to floodproof businesses
- Maintain drainage systems
- Monitor flood conditions and issue warnings
- Inform people about flood hazards, flood insurance, and how to reduce flood damage

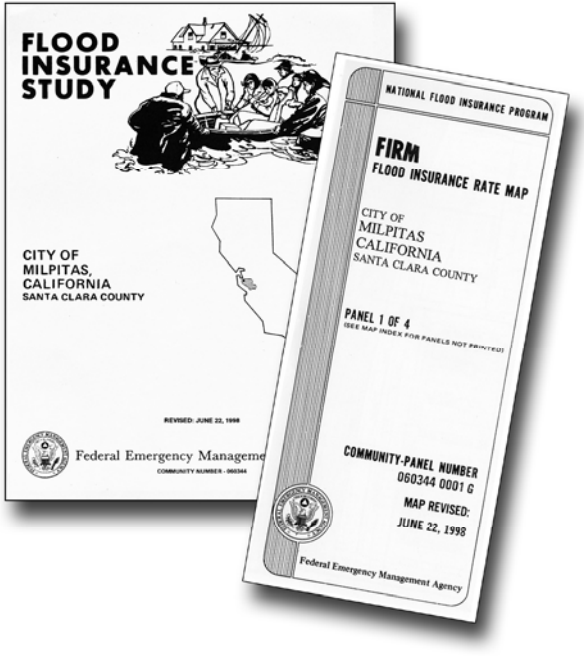
Community officials can request assistance from CRS specialists to help with the application process and prerequisites. Check the online CRS Resources Center (see page 67).

In 2006, Roseville, CA, became the nation's first community to be awarded the highest possible CRS rating. Property owners in Roseville's mapped Special Flood Hazard Area enjoy a 45% discount (10% in non-SFHA areas). Many other California communities participate in the CRS, with discounts from 5% to 25%.

CITY OF ROSEVILLE CALIFORNIA

Looking for FEMA Flood Map Information?

Enter the FEMA Flood Map Service Center at http://msc.fema.gov. Digital scans of flood maps can be downloaded or hardcopy maps can be ordered. Reach the Service Center by calling (800) 358-9616.

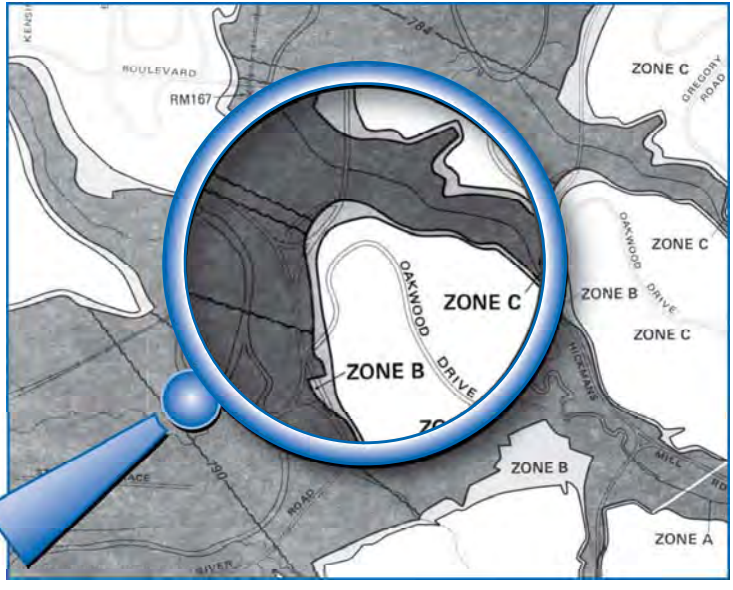


- FEMA prepares Flood Insurance Studies and Flood Insurance Rate Maps (FIRMs) for communities in California.
- Most FIRMs show Special Flood Hazard Areas (SFHAs, also called the "100-year floodplain") and floodways. Some FIRMs show floodplains delineated using approximation analyses (see page 17).
- Not all waterways have designated floodplains – but all waterways will flood, even though a floodplain study may not have been prepared.
- DWR and the State Reclamation Board also have flood map programs (see page 66).

Need a fast answer?

Visit your community's planning, engineering, or permit office where flood maps are available for viewing by the public.

FIRMette: FEMA Flood Maps Online

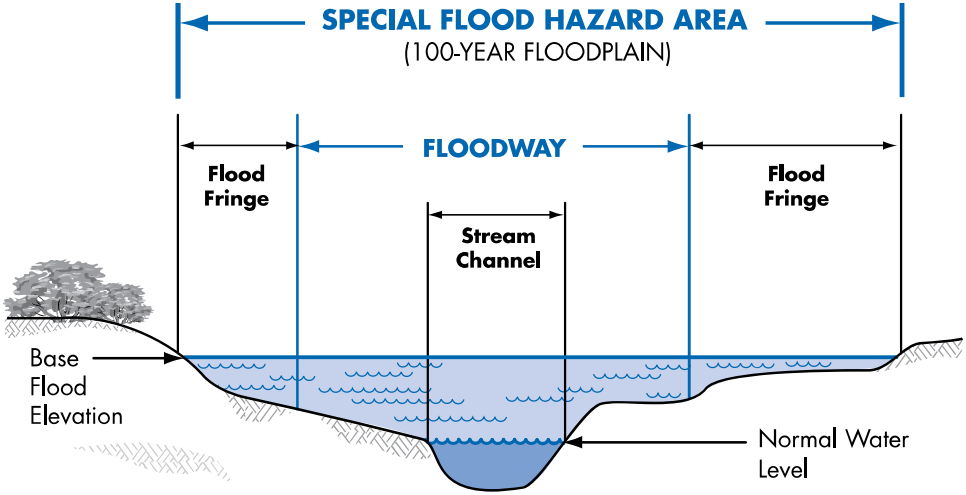


You can order paper maps or digital maps on CD-ROM.

You can find and print a portion of a FIRM by using online tools at http://msc.fema.gov

- Use "Product Search by Address" on the right OR click on "Product Catalog" at the top of the page, select "FEMA Issued Flood Maps", select the state, county and community, then click on "Find FEMA Issued Flood Maps"
- Click the "View" button to display the map panel and use "Zoom" to enlarge the map.
- Use the pan and zoom tools to find the specific area of interest – a miniature map on the left side of the screen shows a red box around the area you are viewing.
- Click the "Make a FIRMette" button and drag the pink translucent box over the area you wish to print.
- Select paper size and Adobe Acrobat (pdf) or Image File (tif).
- Your FIRMette will be displayed and you can print the map or save the file to your hard drive.

Understanding the Riverine Floodplain



For floodplains with Base Flood Elevations, the Flood Profile in the Flood Insurance Study shows water surface elevations for different frequency floods (see page 16).

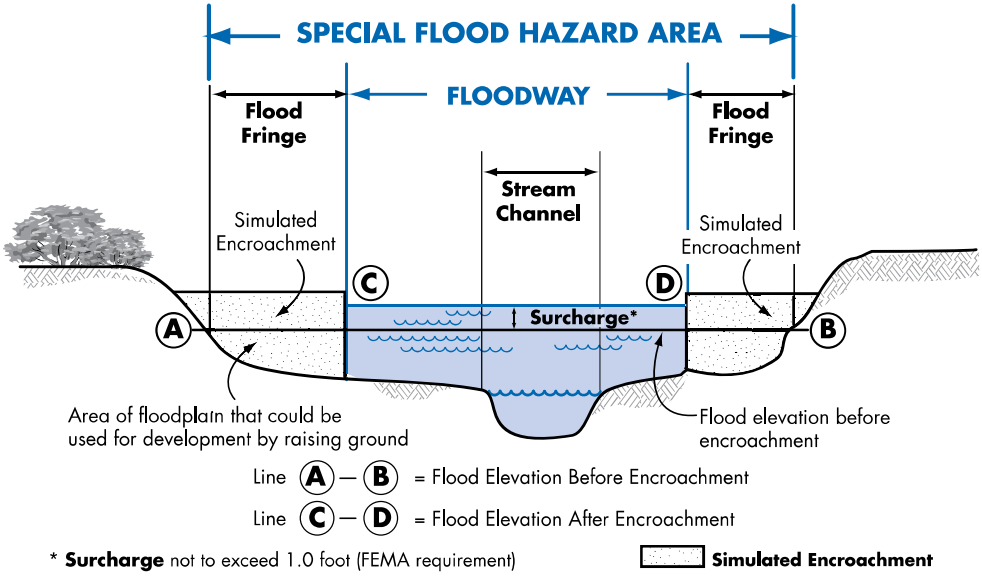
Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (100-year) and/or flood-related erosion hazards. SHFAs are shown on new format FIRMs as Zones A, AE, AH, AO, AR, and A99. Other format FIRMs may have numbered A Zones (A1-A30).

See page 12 to learn about the floodway, the area of the floodplain where floodwaters usually flow faster and deeper.

See page 7 to learn about flood insurance requirements in SFHAs.

Understanding the FEMA Floodway



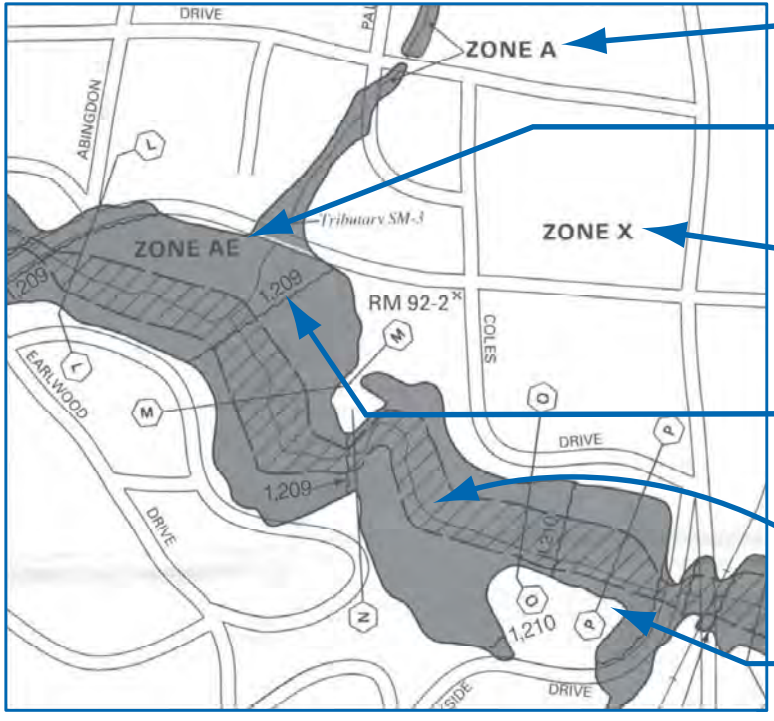
Terms and Definitions

The **Floodway** is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to pass the base flood discharge without increasing flood depths.

Computer models of the floodplain are used to simulate "encroachment" or fill in the flood fringe in order to predict where and how much the base flood elevation would increase if the floodplain is allowed to be filled.

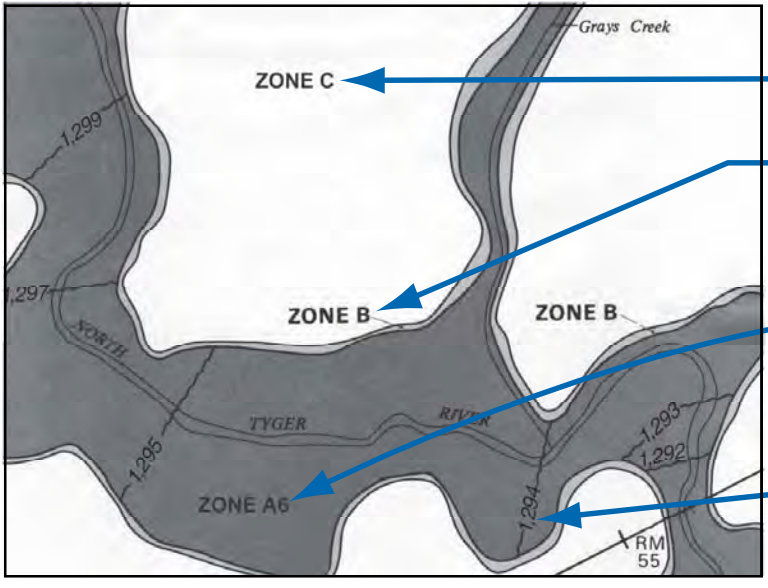
For any proposed floodway development, before a state or local floodplain permit can be issued, the applicant must provide evidence that "no rise" will occur (see page 38).
You will need an experienced registered professional engineer to make sure your proposed project won't increase flooding on other properties.

FEMA Flood Insurance Rate Map (Riverine)



1. **Zone A** (unnumbered) is the 1%-annual-chance flood hazard area without BFEs.
2. **Zone AE** is the 100-year (1%-annual-chance) floodplain with BFEs (formerly called Zones A1- A30).
3. **Zone X** (shaded or unshaded) is other areas considered moderate or low risk (formerly Zone B or C).
4. **Base Flood Elevation (BFE)** is the water surface elevation of the base flood (rounded to whole feet).
5. The **Floodway** is the cross-hatched area.
6. **Cross Section** location (see page 16).

Old Format Flood Insurance Rate Map

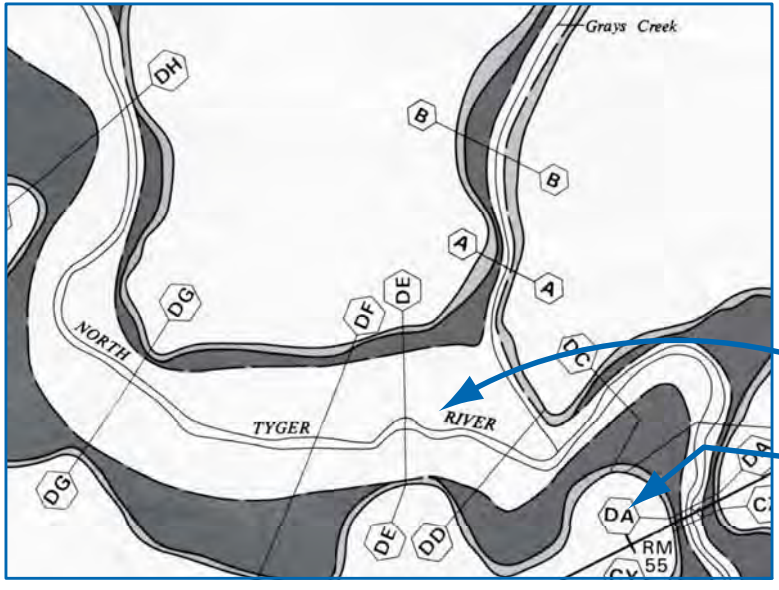


FLOOD HAZARD ZONES

1. **Zone C** (or Zone X) is all areas considered to be low risk.
2. **Zone B** (or shaded Zone X) is subject to flooding by the 500-year flood (0.2% annual chance), and other moderate risk areas.
3. **Zone A, Zones A1-A30** or **Zone AE** are subject to flooding by the base or 100-year flood (1%-annual-chance), and are considered high risk areas.
4. **Base Flood Elevation (BFE).** Water surface elevation of the base flood at specific locations.

FEMA prepares Flood Insurance Rate Maps (FIRMs) to show areas that are at high risk of flooding. These "old format" FIRMs, and companion Flood Boundary and Floodway Maps (next page), are being revised and digitized as part of FEMA's map modernization initiative (see page 22).

Old Format Flood Boundary and Floodway Map



Important

Information

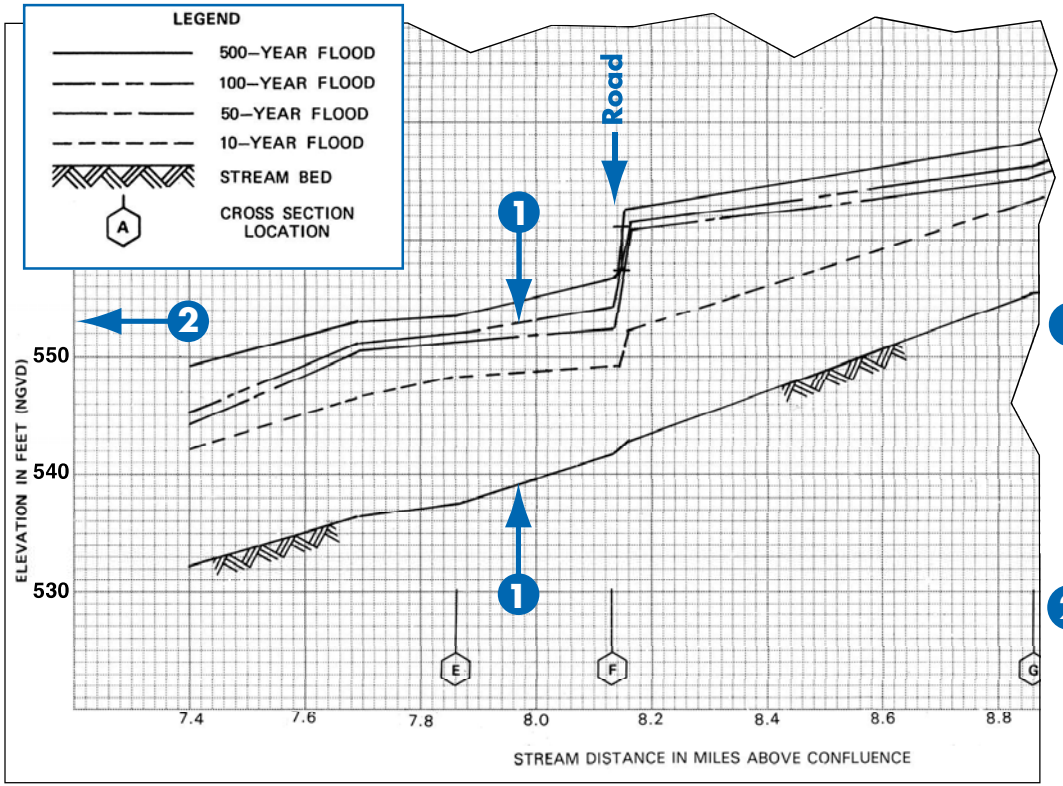
Floodway maps do not show flood zones or BFEs. Check the companion FIRM for that information. Page 14 shows the FIRM that matches the map clip to the left.

1. **The Floodway** is the white area around the waterway centerline.

2. **Cross Section** location, where ground surveys determined the shape of the land and how constrictions such as bridges and culverts affect the flow of floodwater.

FEMA prepared Floodway maps as companions to many "old format" FIRMs. You should check to see if your project will be in the Floodway because additional engineering may be required (see page 38).

Use the Riverine Flood Profile to Determine BFEs



Flood profiles from Flood Insurance Study reports can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for floods other than the 1%-annual-chance flood (100-year).

1. On the effective flood map, locate your site by measuring the distance, along the center-line of the stream channel, from a known point such as a road or cross section, for example, E or F.

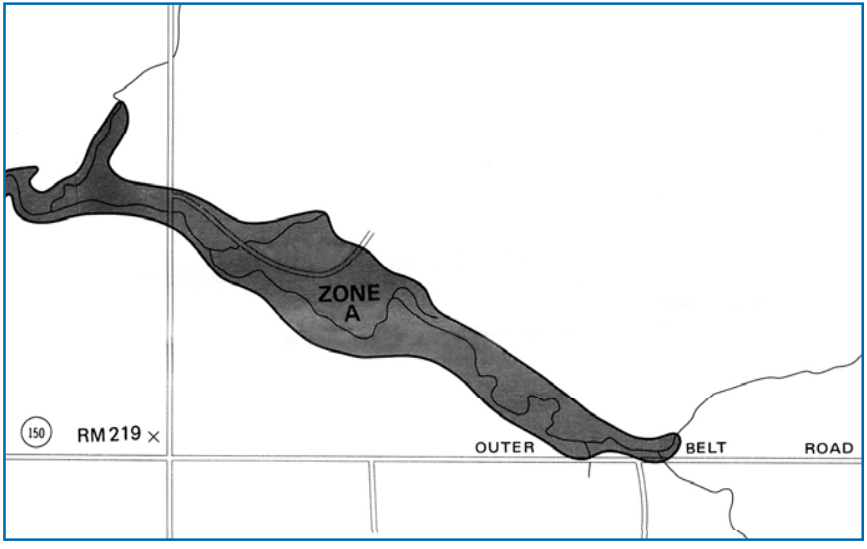
2. Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the elevation.

Approximate Flood Zones and Unnumbered A Zones

If you need help determining the BFE in an unnumbered A Zone, check with your community's planning, engineering, or permit office, or the DWR Floodplain Management Branch (see page 1).

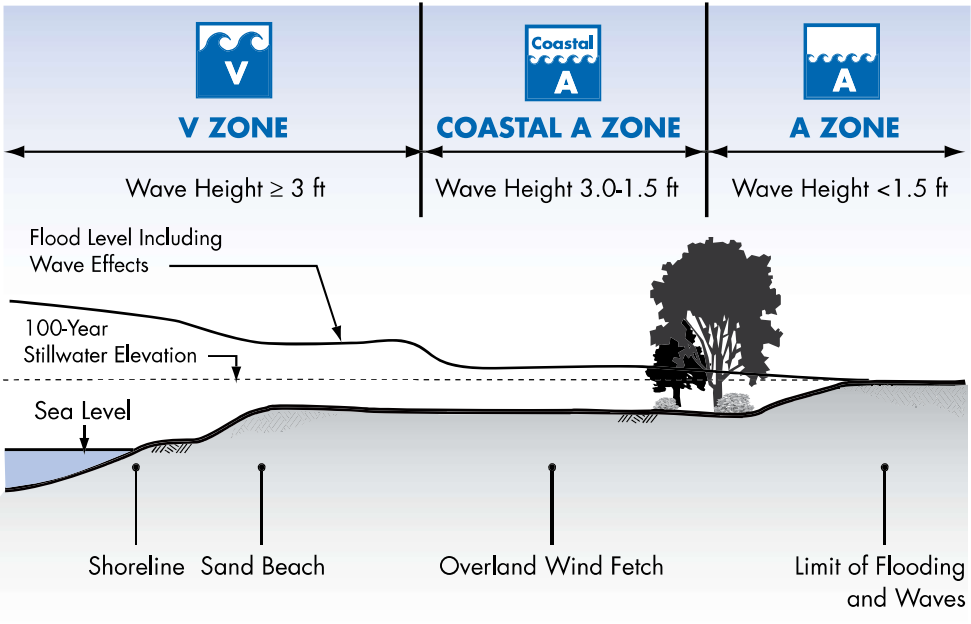
Check www.fpm.water.ca.gov– click "On-line Training", then click on "Development in Approximate A Zones".

The FEMA publication *Managing Floodplain Development in Approximate Zone A Areas* (FEMA 265) is useful for engineers and community officials.



Even if the estimated BFE indicates flooding might be only a foot or two deep, it is recommended that the lowest floor be at least 2 feet above the highest adjacent grade. Not only does this improve flood protection, but lower flood insurance premiums may apply.

Understanding the Coastal Floodplain



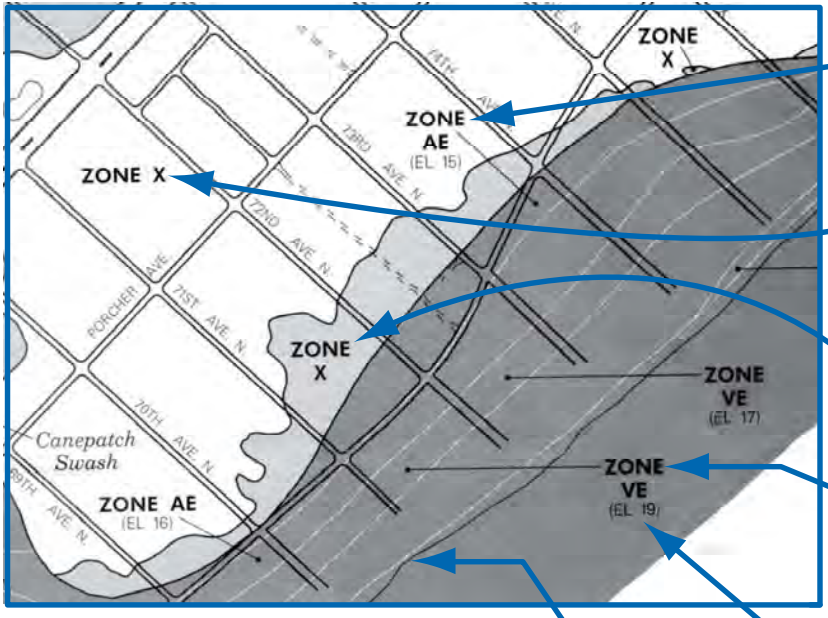
Coastal graphics from *Coastal Construction Manual* (FEMA 55-CD).

Terms and Definitions

The **Coastal High Hazard Area (V Zone)** is the Special Flood Hazard Area that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action. The area is designated on the FIRM as Zone VE (or Zones V1– V30).

The term **Coastal A Zone** means the portion of the SFHA landward of the V Zone or landward of a shoreline that does not have a mapped V Zone. The principle sources of flooding are associated with astronomical tides, storm surges, seiches or tsunamis. Coastal A Zones may be subject to wave effects, velocity flows, erosion, scour, or combinations of these forces and may be treated as V Zones.

FEMA Flood Insurance Rate Map (Coastal)



COASTAL FLOOD HAZARD ZONES

Zone A and **Zone AE** are subject to flooding by the base or 100-year flood (1%-annual-chance), and waves less than 3 feet (formerly called Zones A1-A30).

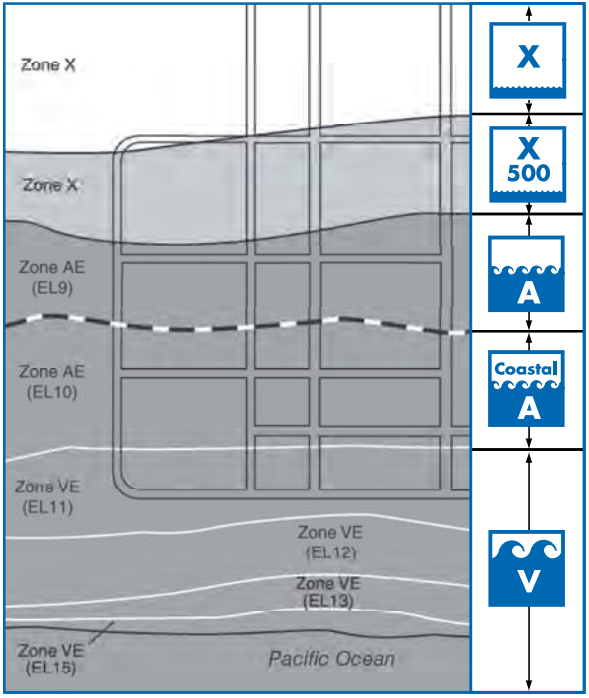
Unshaded Zone X is the area of minimal flood risk outside the 500-year floodplain, formerly called Zone C.

Shaded Zone X is subject to flooding by the 500-year flood (0.2% annual chance), formerly called Zone B.

Zone V and **Zone VE** are where waves are expected to be 3 feet or more.

Base Flood Elevation (BFE) is the estimated water surface elevation (in feet above datum).

The Coastal A Zone (CAZ)



For illustrative purposes only. Flood Insurance Rate Maps do not show the Coastal A Zone Boundary depicted in this example (heavy dashed line).

- Post-flood evaluations and laboratory tests confirm that breaking waves as small as 1.5 feet high cause damage to walls and foundations.
- The CAZ is not shown on FIRMs, but stillwater depths between 2 and 4 feet can support CAZ waves.
- V Zone construction methods are recommended in CAZs, including pile, post and column foundations and breakaway walls around enclosures.
- Where possible, exceed minimum V Zone construction requirements (for example, elevate above BFE).

Terms and Definitions

The **Coastal A Zone** (CAZ) is the area landward of a V Zone, or landward of an open coast without a mapped V Zone, where the principal source of flooding will be astronomical tides, storm surges, seiches or tsunamis, not riverine flooding. During base flood conditions, the potential for breaking wave heights between 1.5 feet and 3.0 feet will exist.

Alluvial Fan Flooding Requires Special Attention

Alluvial fan flood hazard areas are shown on FIRMs as AO Zones with a "depth number" and anticipated velocity. Special attention is required if buildings are proposed in these areas:

- Lowest floors must be elevated at least as high as the depth number above the highest adjacent grade (plus freeboard, if required).
- Buildings may be elevated on a fill pad or a raised foundation – fills and foundations must be designed by a qualified registered professional engineer to resist the anticipated flood depths, erosion, and velocities.
- Drainage and grading must prevent directing water, sediment and debris flows onto adjacent properties.

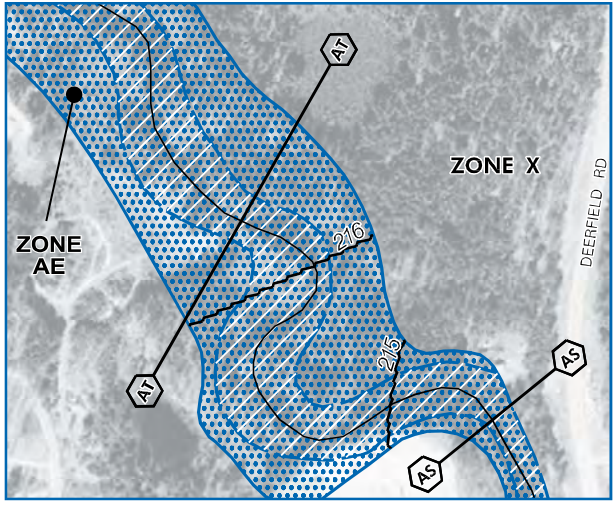
Some of California's mountains have alluvial fans at their base. Alluvial fans are a landform created where floodwaters rushing off the steep mountains spread out and deposit sand, cobble, and rocks.

Flood Map Modernization

DWR, FEMA, the U.S. Army Corps of Engineers, and California communities are cooperating to modernize the flood maps.

All new and revised flood maps will be designed to view digitally on a computer within a Geographic Information System (GIS) or as paper maps. Flood maps will be composites of base data, topographic data, and flood layers which can be overlain with parcel information or other data to more easily determine if a house or other property is or will be located in a Special Flood Hazard Area or Floodway.

DWR's new Awareness Floodplain Maps are prepared using approximate assessment procedures. The maps show potential flood risk areas (without flood depths) which have not been mapped by FEMA. To check for awareness floodplain maps in your area, click on "Mapping Program" at www.fpm.water.ca.gov/.



This map uses aerial photography (topographic layer not shown)

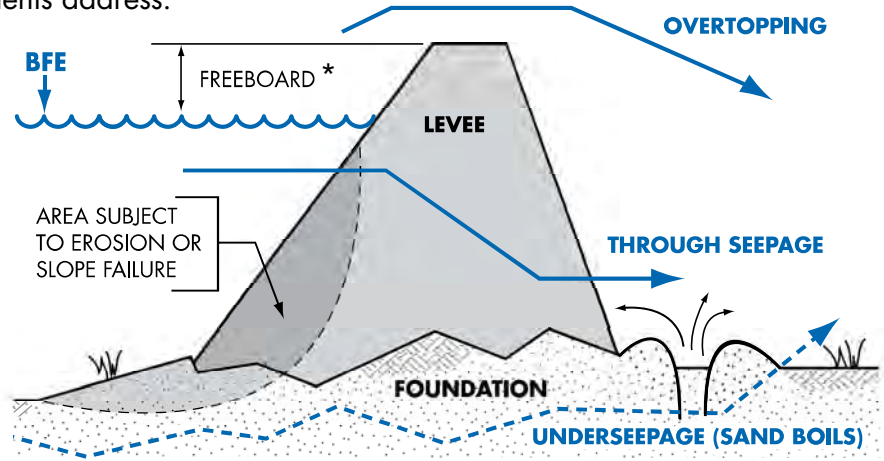
Learn more about FEMA's flood map modernization initiatives at http://www.fema.gov/plan/prevent/fhm.

Levee Certification for FEMA Flood Maps

Many levees are designed to protect land against flooding from the Base Flood. In order for FEMA to show those areas as outside of the Special Flood Hazard Area, communities and levee owners must certify that levees meet certain design criteria. Certification will present significant challenges during the map revision process.

Communities that have levees should determine whether certification will be required as soon as possible. Pursuant to FEMA's Procedural Memoranda 34 and 43, and as outlined in Federal regulations at 44 CFR Section 65.10, the documentation requirements address:

- Freeboard
- Closures
- Embankment protection for erosion
- Embankment and foundation stability
- Settlement
- Interior drainage and seepage
- Operation and maintenance plans
- Other site specific criteria



* Freeboard is the distance between the BFE and the top of the levee; for FEMA accreditation freeboard is usually 3 feet

Flood Map Revisions Issued by FEMA

1. **Letter of Map Amendment (LOMA)** is an official amendment to an effective FIRM that may be issued when a property owner provides additional technical information from a Land Surveyor or Civil Engineer, such as ground elevation relative to the BFE, SFHA, and the building. Lenders may waive the flood insurance requirement if the LOMA documents indicate that a building is on natural ground above the BFE.
2. **Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, special flood hazard areas and floodway boundary delineations, BFEs, and/or other map features. Lenders may waive the insurance requirement if the approved map revision shows buildings to be outside of the SFHA.
3. **Letter of Map Revision Based on Fill (LOMR-F)** is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land has been elevated by fill above the BFE, and therefore is no longer in the SFHA. Lenders may waive the insurance requirement if the LOMR-F shows that a building on fill is above the BFE.
4. **Physical Map Revision (LOMR PMR)** may be issued for major floodplain changes that require engineering analyses, such as bridges, culverts, channel changes, flood control measures, and large fills that change the BFE or floodway. Physical map revisions are also issued when a new study updates or improves the FIRM.
5. **Electronic Letter of Map Amendment (eLOMA)** is a web-based application for licensed Land Surveyors or Civil Engineers to submit simple LOMAs to FEMA.

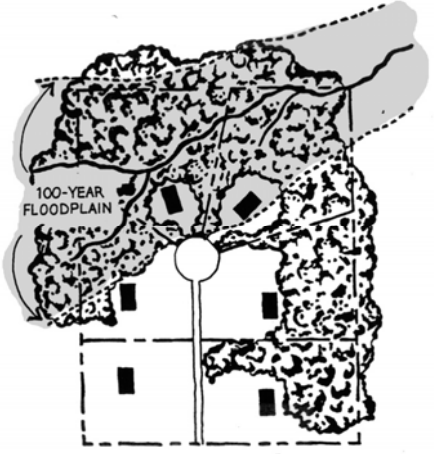
Check online at www.fema.gov/plan/prevent/fhm/ for more information about map revisions for different user groups, including homeowners, surveyors, engineers, and insurance professionals.

Activities Requiring Local Floodplain Permits

- Construction of new buildings
- Additions to existing buildings
- Substantial improvements of existing buildings
- Renovation of existing building interiors
- Repair of substantially damaged buildings
- Placement of manufactured (mobile) homes
- Subdivision of land
- Construction or placement of temporary buildings and accessory structures
- Construction of agricultural buildings
- Construction of roads, bridges, and culverts
- Placement of fill, grading, excavation, mining, and dredging
- Alteration of stream channels

You need local floodplain permits for **ALL** of these activities.
The State Reclamation Board also issues permits for Central Valley levee encroachments and development within its "designated floodways" (see page 66).

Safer Uses of the Floodplain

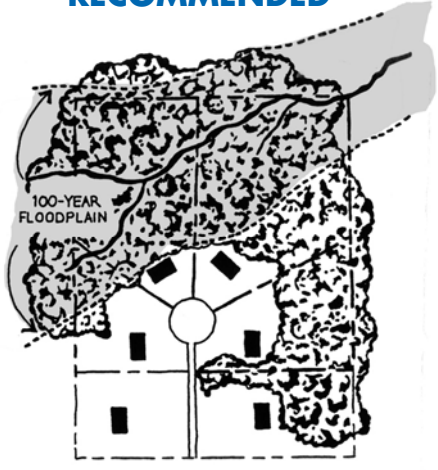


All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

All land subdivided into lots, some lots partially in the floodplain, setbacks modified to keep homesites on high ground.

RECOMMENDED

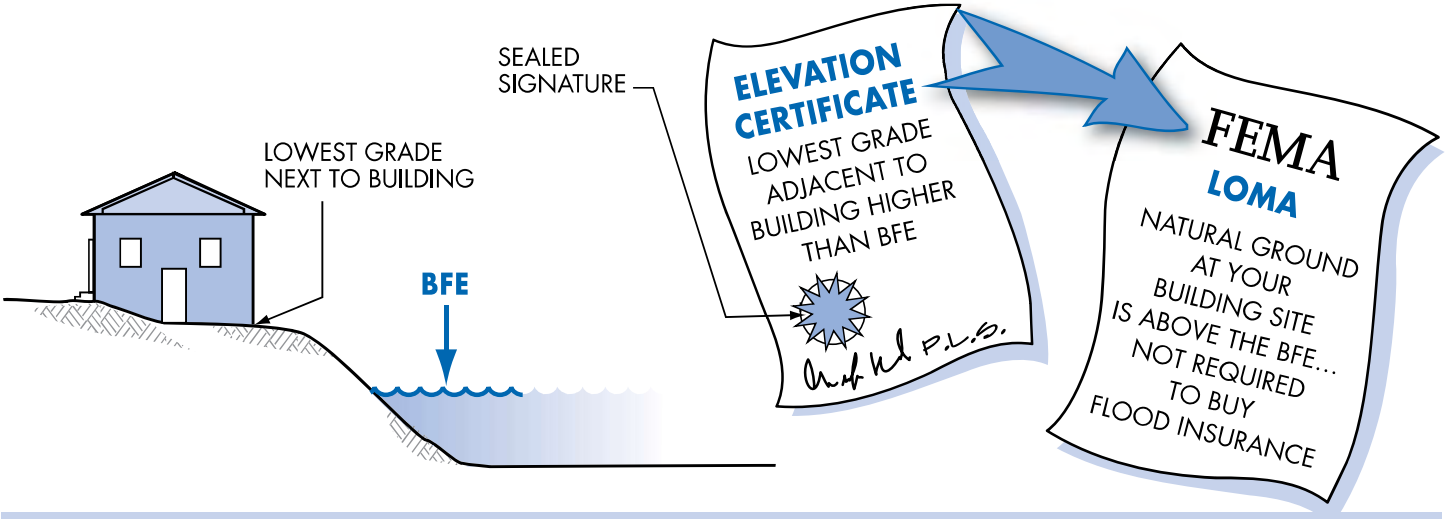


Floodplain land put into public/ common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

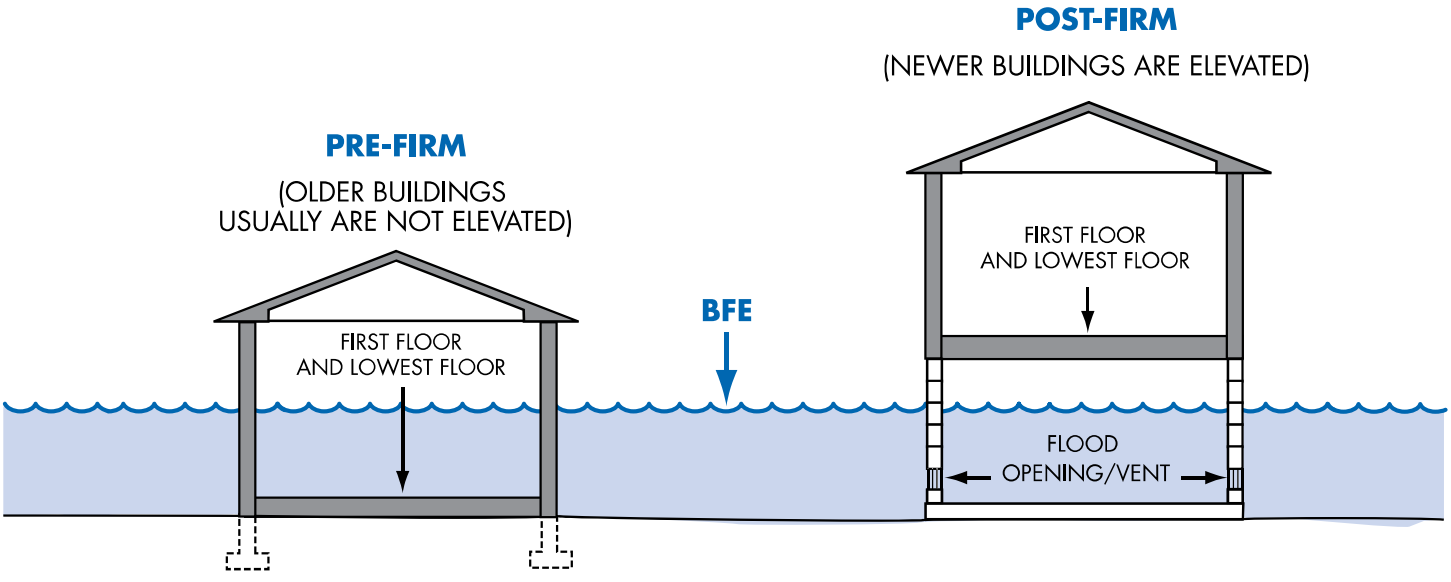
Let the floodplain do its job – if possible, keep it as natural open space. Other compatible uses: recreational areas, playgrounds, reforestation, parking, gardens, pasture, and created wetlands.

Is Your Building Site Higher than the BFE?



If your land is shown on the map as "in" the SFHA, but your building site is higher than the Base Flood Elevation (BFE)... get a Land Surveyor or Civil Engineer to complete a FEMA Elevation Certificate (EC). Submit a request for a Letter of Map Amendment to FEMA along with the EC to verify that your structure is above the BFE (see page 24). If FEMA approves your request, it will remove the mandatory Federal requirement to purchase flood insurance. Keep the certificate with your deed, it will help future buyers.

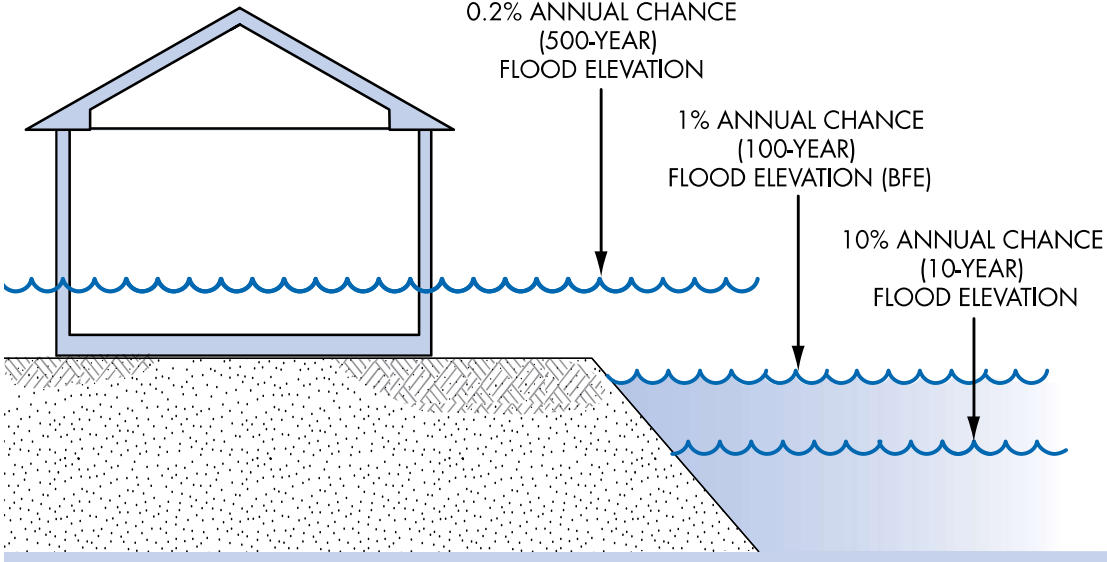
What is Meant by Pre-FIRM and Post-FIRM Structures?



A building is **Pre-FIRM** if it was built **before** the date of your community's first FIRM. If built **after** that date, a building is **Post-FIRM**.

Improvements or repairs to Pre-FIRM buildings may require permits (see pages 53 through 58).

Nature Doesn't Read Flood Maps

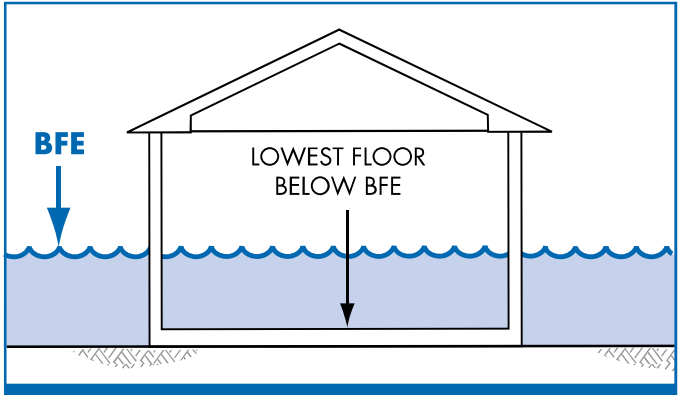


Important Information

Many people don't understand just how risky the floodplain can be. There is a greater than 26% chance that a non-elevated home in the SFHA will be damaged during a 30-year mortgage period. The chance that a major fire will occur during the same period is less than 5%!

CAUTION! Nature doesn't read the flood map! Major storms and flash floods can cause flooding that rises higher than the Base Flood Elevation (BFE). Consider safety – protect your home or business by building higher. See page 33 to see how this will save you money on flood insurance.

Think Carefully Before You Seek A Floodplain Variance



POST-FIRM BUILDING, NOT ELEVATED

INSURANCE $5,000+ PER YEAR

Very specific conditions related to the property (not the owner) must be satisfied to justify a variance:

- Good and sufficient cause
- Unique site conditions
- Non-economic hardship
- If in the floodway, no increase in flood level

A variance that allows construction below the BFE does not waive your lender's flood insurance requirement. Flood insurance will be very expensive – perhaps more than $5,000 per year (see page 33)!

Think carefully before seeking a variance to build below the Base Flood Elevation.
Not only will your property be more likely to suffer damage, but insurance will be very costly.

If your community has a pattern of issuing variances, sanctions could be imposed – costing you even more!

Some Key Floodplain Permit Review Steps

The Permit Reviewer has to Check Many Things. Some of the Key Questions are:

- Is the site near a watercourse?
- Is the site in the mapped FEMA or State Reclamation Board floodplain or floodway?
- Have other State and Federal permits been obtained?
- Is the site reasonably safe from flooding?
- Does the site plan show topography, Base Flood Elevation, and building location?
- Is substantial improvement of an older building proposed?
- Is an addition proposed?
- Will new buildings and utilities be elevated properly?
- Will manufactured homes be properly elevated and anchored?
- Do the plans show an appropriate and safe foundation?
- Will the owner/builder have to submit an as-built Elevation Certificate?

Carefully Complete the Permit Application

Part of a sample Floodplain Permit Application
(may vary by community)

Owner's Name: DAVID & SALLY JONES

Site Address, Tax #, Parcel #: 781 REED STREET, 400-33A-002

A. Description of Work

1. Proposed Development Description:
- ☑ New Construction
- ☐ Alteration or Repair
- ☑ Filling
- ☐ Grading
- ☐ Dredging
- ☐ Manufactured/Modular
- ☐ Logging
- ☐ Other

2. Size and Location of Development
SINGLE FAMILY (2,000 CY FILL);
FLOOD FRINGE OF DRY RIVER

3. Type of Construction
- ☑ New Residential
- ☐ New Non-Residential
- ☐ Addition
- ☐ Improvement
- ☑ Renovation
- ☐ Accessory structure
- ☐ Temporary

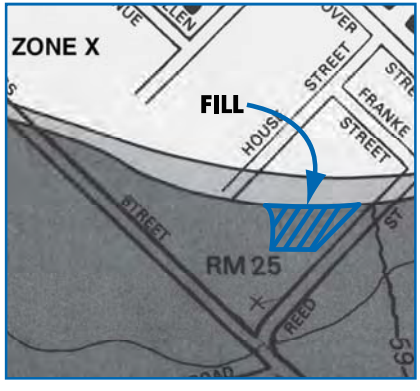
Community, Map, and Elevation Data:
1. Community No: 060243
2. Panel No: 125C
3. Zone AE
4. Base Flood Elevation 59.2
5. Required Lowest Floor Elevation (including basement) 60.2
6. If floodproofed, required floodproofing elevation N/A
7. Elevation to which all attendant utilities, including all heating, duct work, and electrical equipment will be installed or floodproofed: 60.2

Applicant's Signature: David M. Jones

Good information will lead to better construction and less exposure to future flood damage.

Important Information

You must get all permits **before** you do work in a floodplain.



Freeboard: Build Higher, Reduce Damage, Save on Insurance

DWR recommends that the lowest floor of all new buildings and substantially improved buildings be elevated at least two feet above the BFE. Remember, upstream development as well as uncertainty may result in higher future flood levels. Building higher protects your home and belongings, reduces damage, and lowers the cost of NFIP flood insurance.

The approximate annual costs for NFIP flood insurance on a post-FIRM home in an AE Zone with $250,000 coverage on the structure and $100,000 coverage on contents, are:

+3 ft and higher $485
+2 ft to +3 ft $550
+1 ft to +2 ft $725
BFE to +1 ft $1,230
BFE to –1 ft $5,385
–1 ft and lower.....Expensive! (submit to FEMA for rates)

Nearly one-third of all NFIP claims are paid on buildings outside of the SFHA (in shaded Zone X and unshaded Zone X areas). In these areas, less expensive "Preferred Risk" policies are available.

Important Information

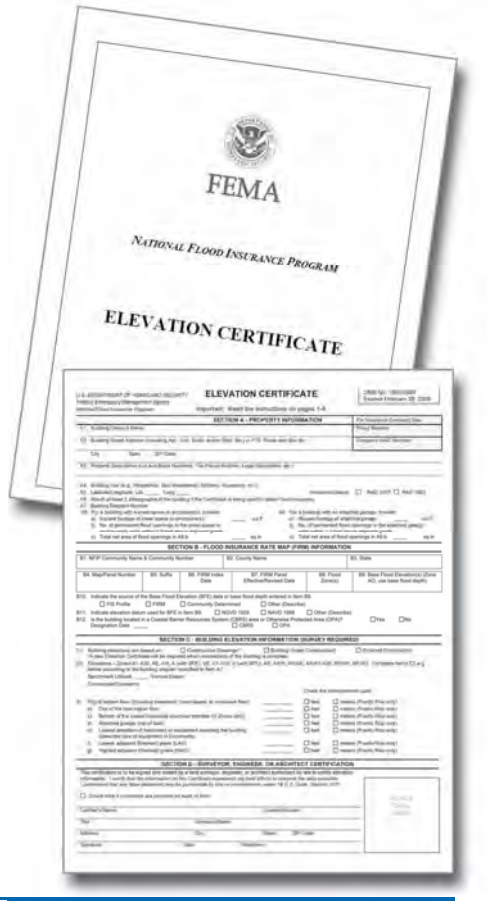
NOTE: Flood insurance rates and various fees change from time to time. Rather than specific costs for insurance, these figures give a feel for how much difference just a foot or two can make.

Remember! When building a new home, be sure the builder checks the floor elevation as part of the foundation inspection. An error of just 6 to 12 inches could more than double what you have to pay for NFIP flood insurance.

The community may be able to grant a variance, but the owner will probably still be required to buy insurance. Imagine trying to sell a house if the bank requires insurance that costs about $5,000 a year!

What is the Elevation Certificate and How is it Used?

- The Elevation Certificate (EC) is a FEMA form. Go to www.fema.gov/ and search for "Elevation Certificate."
- The EC must be completed and sealed by a Land Surveyor or Civil Engineer.
- A community official may complete the EC for sites in Approximate A Zones and AO Zones.
- It can be used to show that the grades of building sites are above the Base Flood Elevation (see page 27).
- It is used to verify that buildings are elevated properly (see page 36).
- Insurance agents use the EC to write and rate flood insurance policies.



By itself, the EC cannot be used to waive the requirement to obtain flood insurance. See page 24 to learn about FEMA's Letter of Map Amendment.

Completing the Elevation Certificate

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

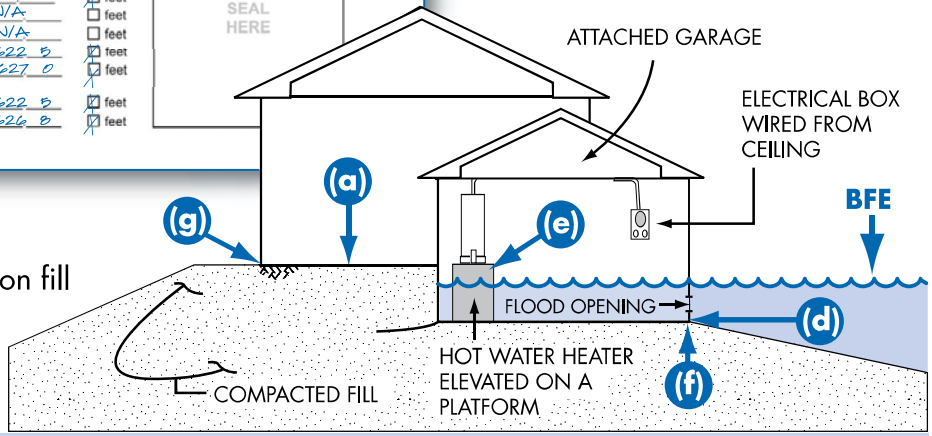
C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-g below according to the building diagram specified in Item A7.
Benchmark Utilized PM55 Vertical Datum NGVD 1929
Conversion/Comments

a)	Top of bottom floor (including basement, crawl space, or enclosure floor)	627.0	☒ feet
b)	Top of the next higher floor	N/A	☐ feet
c)	Bottom of the lowest horizontal structural member (V Zones only)	N/A	☐ feet
d)	Attached garage (top of slab)	622.5	☒ feet
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments)	627.0	☒ feet
f)	Lowest adjacent (finished) grade (LAG)	622.5	☒ feet
g)	Highest adjacent (finished) grade (HAG)	626.8	☒ feet

PLACE SEAL HERE

ELEVATION CERTIFICATE
(partial)



In this example, the BFE is 625.0 feet.

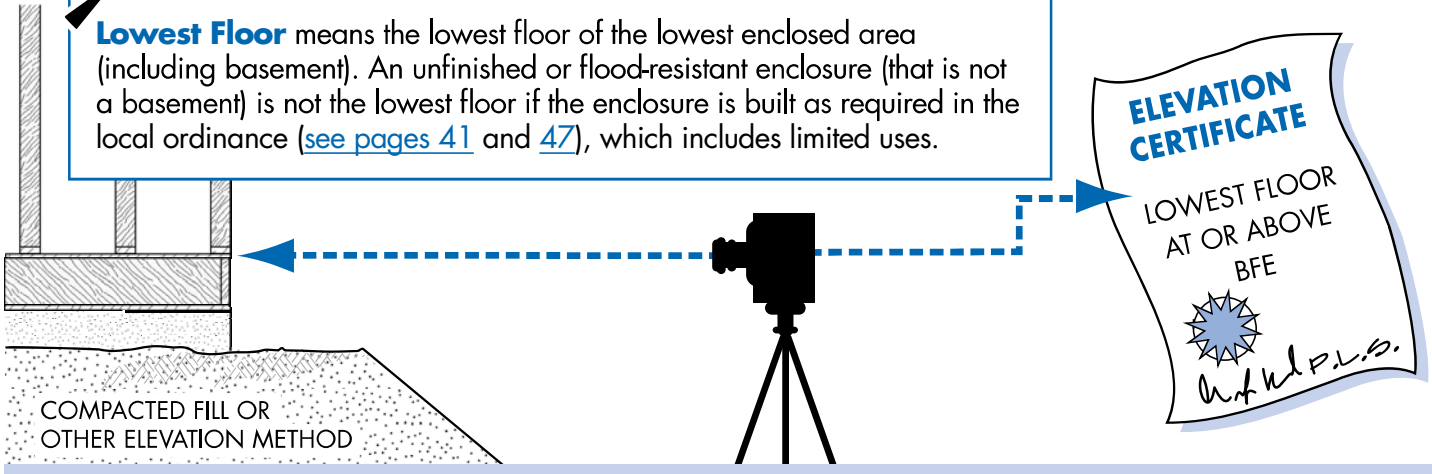
The slab-on-grade house was elevated on fill 2 feet above the BFE, and the vented garage is 2.5 feet below the BFE.

You will get a blank Elevation Certificate form when you get your permit. You **must** have a Land Surveyor or Civil Engineer fill it out and seal it. The Elevation Certificate includes diagrams for eight building types. Several points must be surveyed.

Paperwork is Important – for You and Your Community

Terms and Definitions

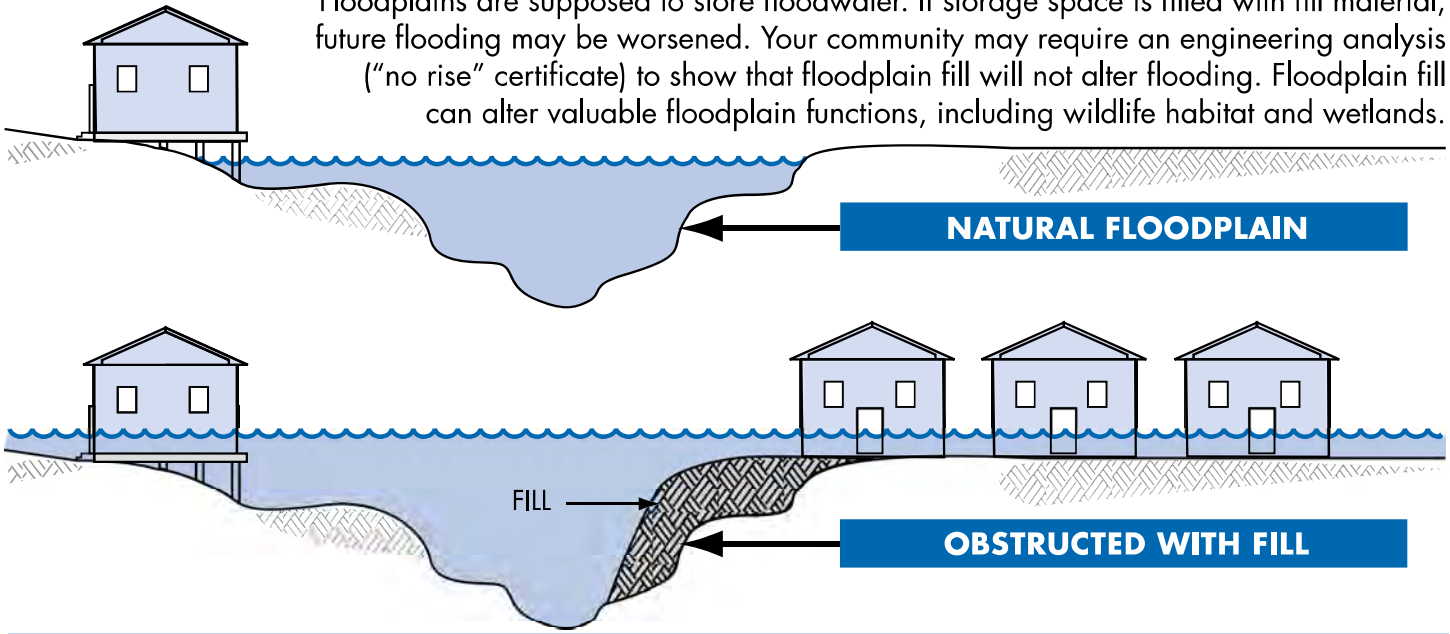
Lowest Floor means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure (that is not a basement) is not the lowest floor if the enclosure is built as required in the local ordinance (see pages 41 and 47), which includes limited uses.



If you get a permit to build in the floodplain, you will be given given a FEMA Elevation Certificate or a similar form issued by the community. As soon as your lowest floor is set, get the form filled out and sealed by a Land Surveyor or Civil Engineer. Another "as-built" survey will be required when construction is completed. **This form is important!** It proves that you built correctly, and it can be used to obtain the correct insurance rating.

Floodplain Fill Can Make Things Worse

Floodplains are supposed to store floodwater. If storage space is filled with fill material, future flooding may be worsened. Your community may require an engineering analysis ("no rise" certificate) to show that floodplain fill will not alter flooding. Floodplain fill can alter valuable floodplain functions, including wildlife habitat and wetlands.



Make sure your floodplain fill project won't harm your neighbors. Floodway fill is allowed **only** if an engineering evaluation demonstrates that "no rise" in flood level will occur (see page 38).

Required Floodway "No Rise" Certification

- Floodways can be dangerous because water may flow very fast.
- Development is not allowed unless "no rise" in flood elevations, floodway elevations, and floodway widths is certified.
- An engineer must evaluate the hydraulic impact of proposed development.

ENGINEERING "NO RISE" CERTIFICATION (example)

This is to certify that I am a duly qualified engineer licensed to practice in the State of California. I further certify that the attached technical data support the finding that the proposed (Name of Development) will not cause a rise in the Base Flood Elevations in the floodway 0f (Name of Stream).

National Flood Insurance Program

Signature _____ Seal _____

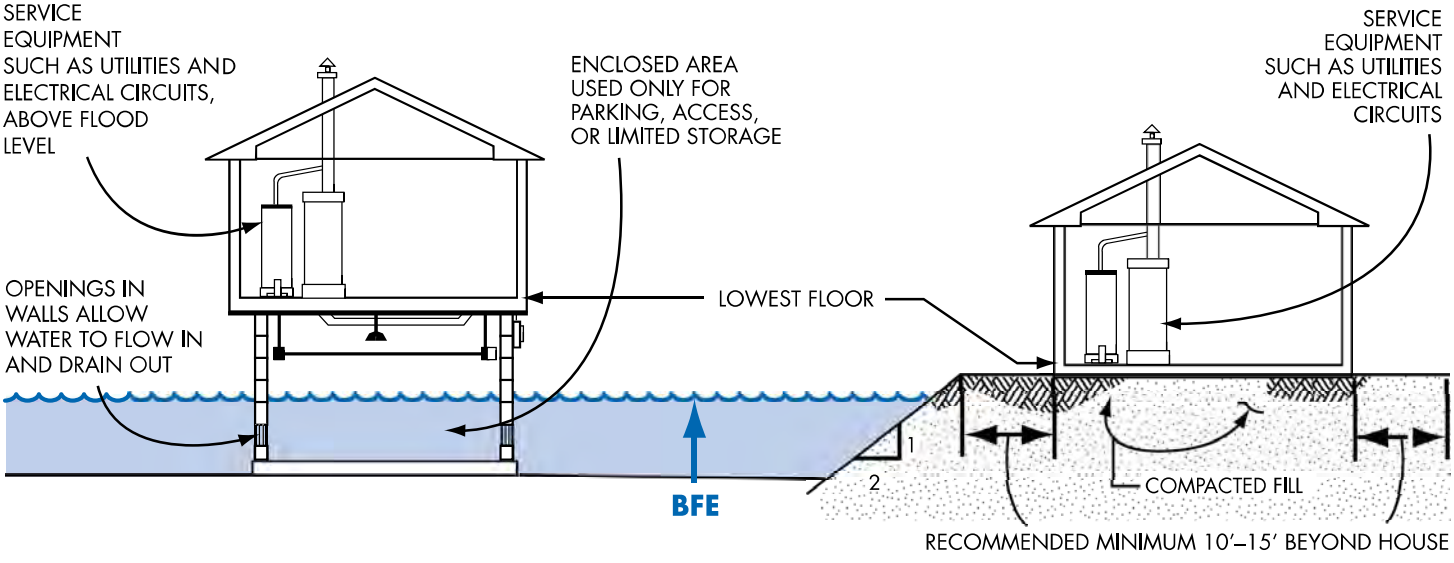
- A "no rise" certification is required and must be signed, sealed, and dated by a registered professional engineer.
- Check with your community for guidance before you decide to work in a floodway.

The engineering analysis must be based on technical data obtained from FEMA.
Save time and money – don't build in the floodway!

How to Elevate Your Floodplain Building (Riverine)

ELEVATE ON FOUNDATION WALLS

ELEVATE ON FILL

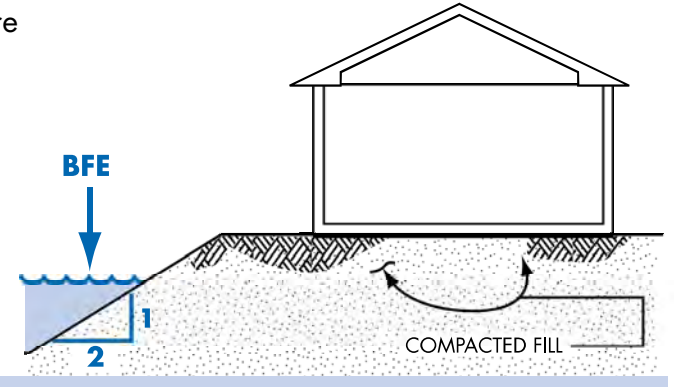


CAUTION! Enclosures (including crawlspaces) have some special requirements (see pages 41 and 47). Note: When the walking surface of the lowest floor is at the BFE, under-floor utilities are not allowed. Fill used to elevate buildings must be placed properly (see page 40).

Compaction of Floodplain Fill

Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet floodplain requirements, floodplain fill should:

- Be good clean soil, free of large rocks, construction debris, and woody material (stumps, roots)
- Be machine-compacted to 95 percent of the maximum density (determined by a design professional)
- Extend 10 to 15 feet beyond the footprint of the structure
- Have graded side slopes that are not steeper than 2:1 (one foot vertical rise for every 2 feet horizontal extent); flatter slopes are recommended
- Have slopes protected against erosion (vegetation for "low" velocities, durable materials for "high" velocities – determined by a design professional)



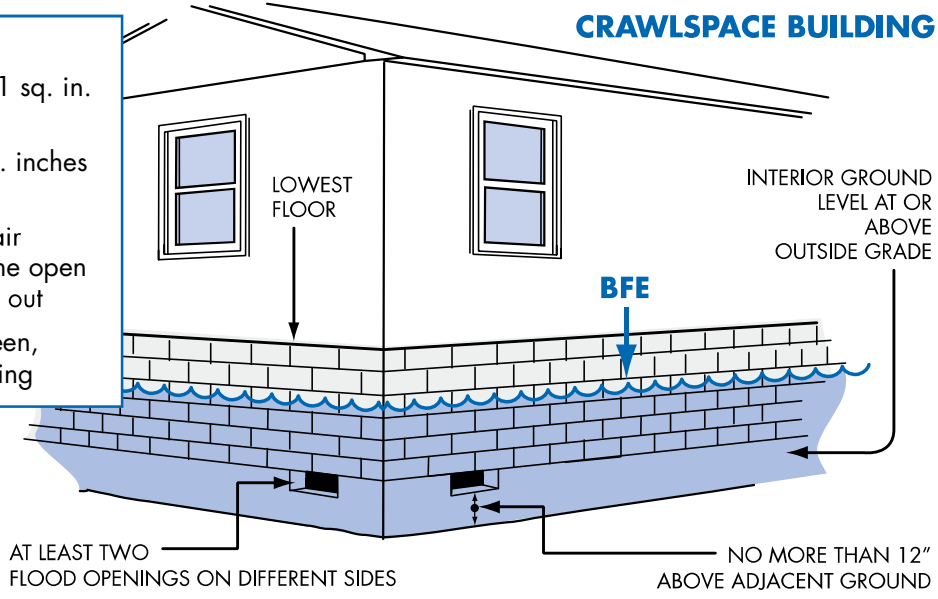
Your community may ask for certification of the elevation, compaction, slope, and slope protection materials. FEMA's MT-1 application includes a certification form for this purpose.

Enclosures Below the BFE

NOTE:

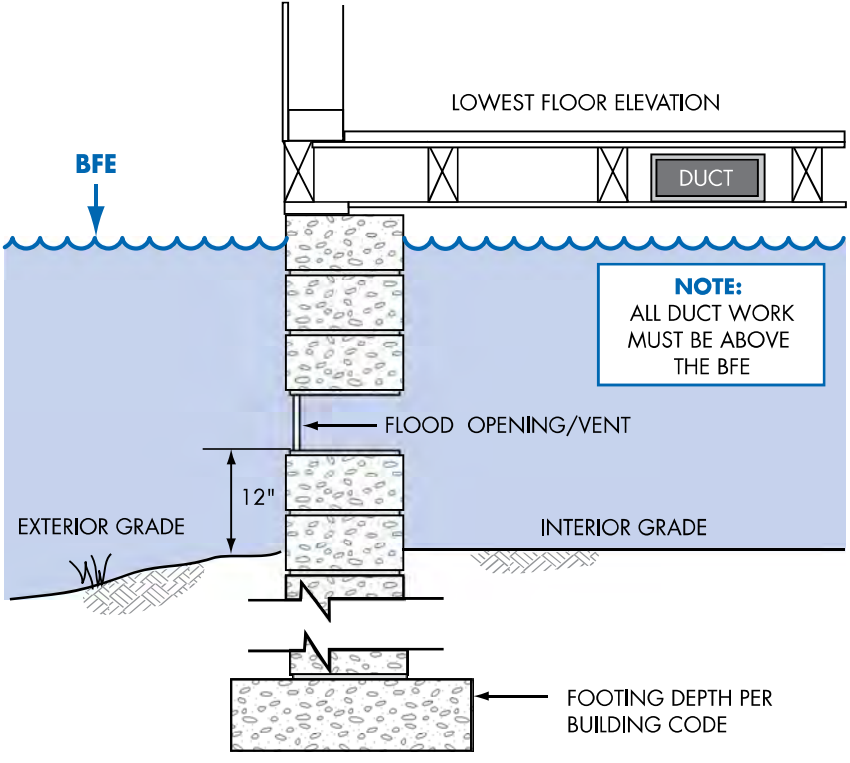
- Total net area of all total openings is 1 sq. in. per sq. ft. of enclosed area
- A 25′ x 45′ building needs 1,125 sq. inches of openings
- If inserted in flood openings, typical air ventilation units must be disabled in the open position to allow water to flow in and out
- A typical air ventilation unit, with screen, provides 42 to 65 sq. inches of opening

ALTERNATIVE: Engineered openings are acceptable **if certified** to allow adequate automatic inflow and outflow of floodwaters.



Solid perimeter wall foundations can enclose flood-prone space. A crawlspace is a good way to elevate just a couple of feet. In all cases, the following are required: flood vents/openings, elevated utilities, flood-resistant materials, and limitations on use.

Crawlspace Details

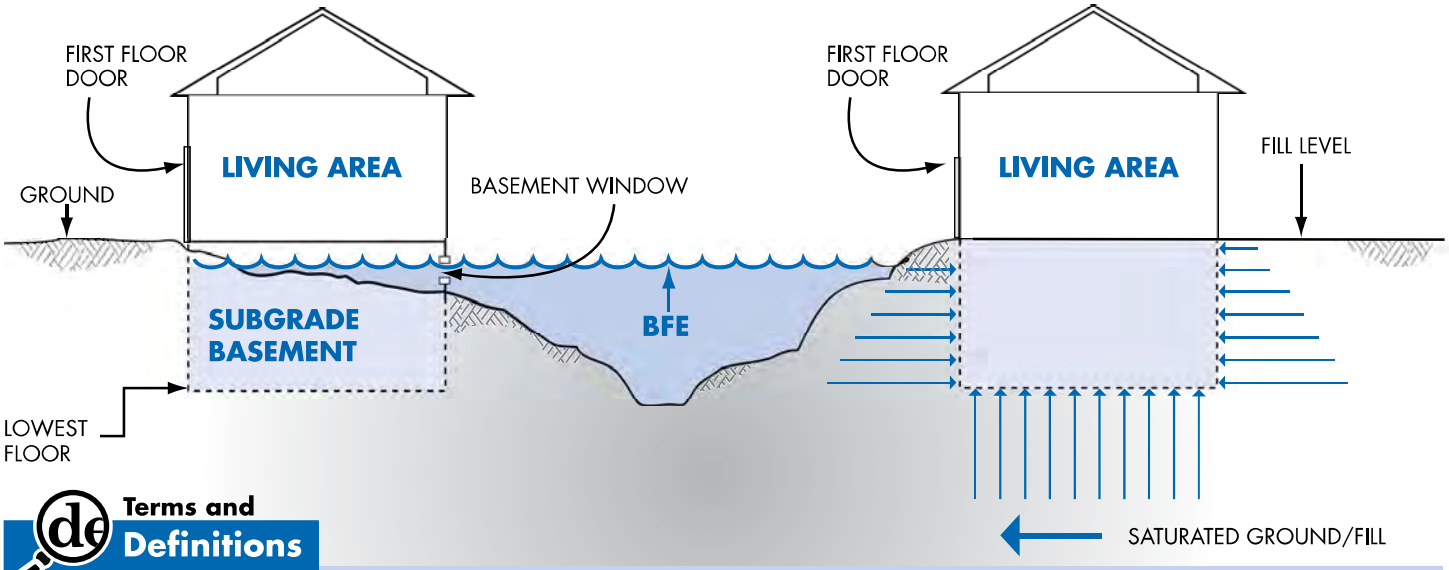


- The Lowest Floor Elevation must be at or above the BFE.
- The bottom of flood openings/vents must be no more than 12 inches above grade.
- Standard ventilation units must be disabled in the "open" position to allow water to flow in and out.
- Interior grade must be equal to or higher than exterior grade on at least one side.

Calculate Net Flood Opening:

A building that measures 25' x 45' has 1,125 square feet of enclosed crawlspace. Flood vents must provide 1,125 sq. in. of net open area (or have certified engineered openings). If a standard air vent unit provides 60 sq. in. of net open area, 19 vent units are required to satisfy the flood opening requirement (1,125 divided by 60).

Basements Are Unsafe

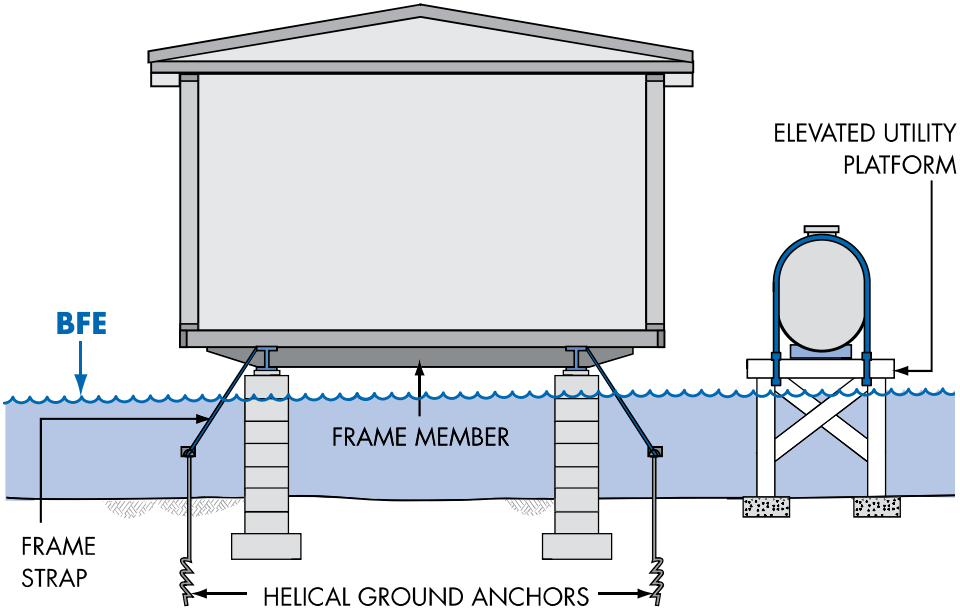


Terms and Definitions

A **basement** is any portion of a building that has its floor sub-grade (below ground level) on all sides.

Basements below the BFE **are not** allowed in new development and flood insurance coverage is very limited in existing basements for a very good reason. It only takes an inch of water over the sill and the entire basement fills up! Excavating a basement into fill doesn't always make it safe because saturated groundwater can damage the walls.

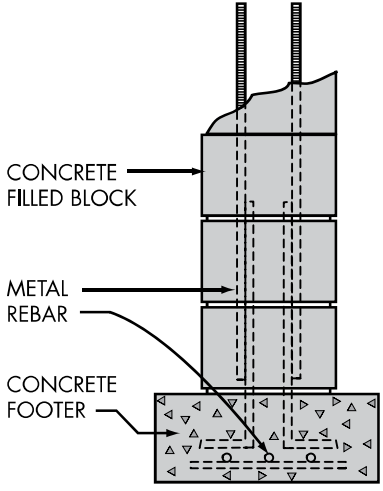
Manufactured Homes Require Special Attention



Manufactured homes must be anchored to resist flotation, collapse, or lateral movement by being tied down in accordance with your community's ordinance or the manufacturers' installation specifications.

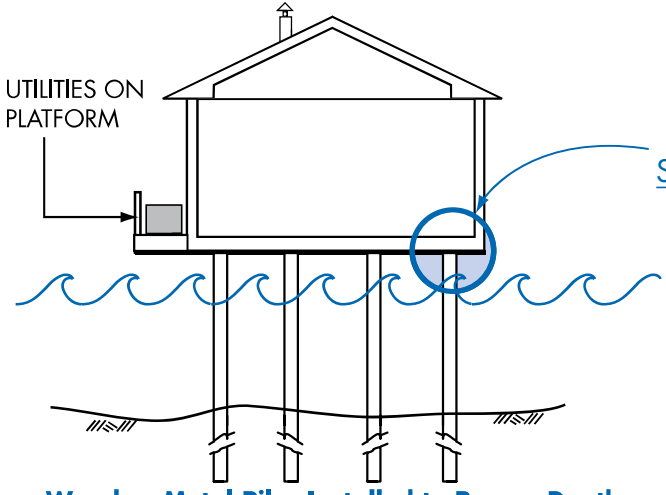
Experience shows that manufactured homes are easily damaged. As little as 1 foot of water can cause substantial damage.

Dry stacked blocks are not acceptable — they will **NOT** withstand a flood.



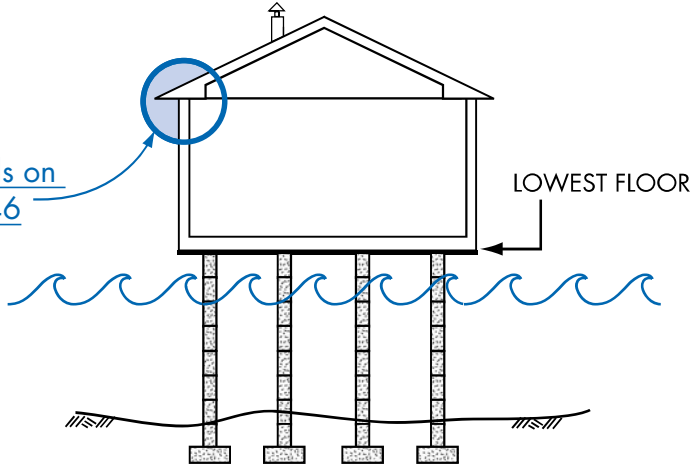
Typical Elevation Methods for Coastal Buildings

Elevate on Pilings



Wood or Metal Piles Installed to Proper Depth

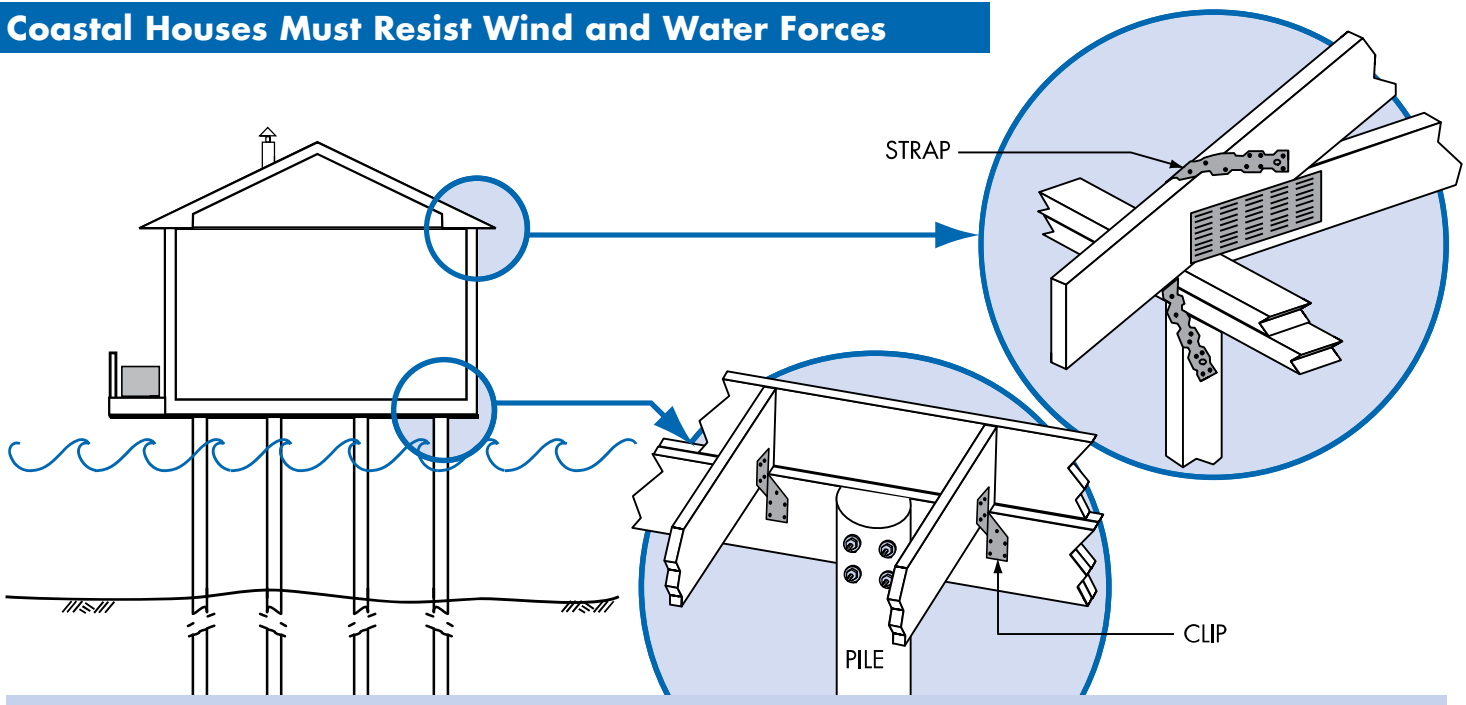
Elevate on Columns



Reinforced Masonry or Concrete Columns on Spread Footers

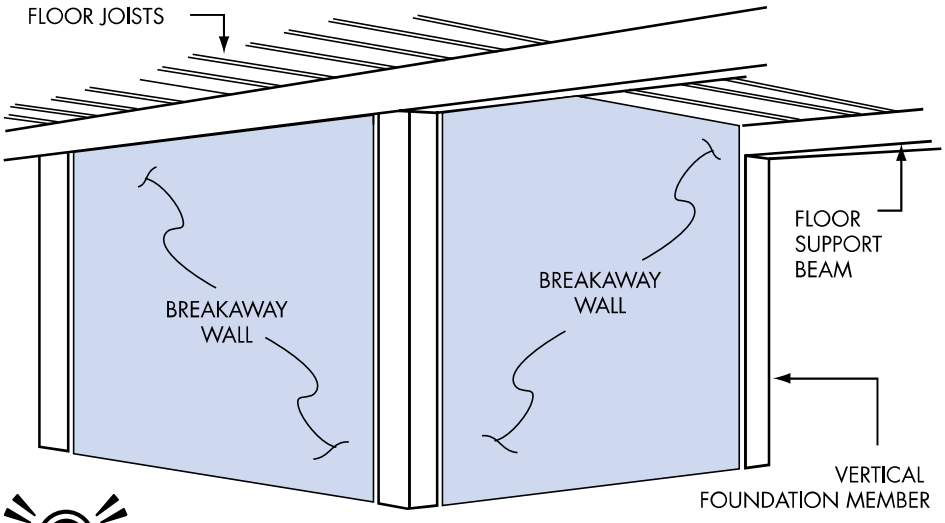
In V Zones the design specifics will be determined by your architect or engineer based on your site, including how your building will be elevated and how deep in the ground the foundation elements will extend. Your community will require certified or sealed building designs and plans (see page 48).

Coastal Houses Must Resist Wind and Water Forces



Coastal buildings may be exposed to both high winds and floodwater, so they must be built to hold together during storms. These details are only examples. Your architect or engineer will specify the type of clips and straps to keep the roof and building connected to the foundation.

Enclosures Below V Zone Buildings



Important

Information

Do not modify an enclosure below an elevated V Zone building (or any zone for that matter)! It is a violation of your community's regulations, and you may have increased damage when it floods. Plus, your flood insurance policy will cost a lot more!

Avoid building an enclosure under your V Zone building. If you must enclose a small area, your community will require:

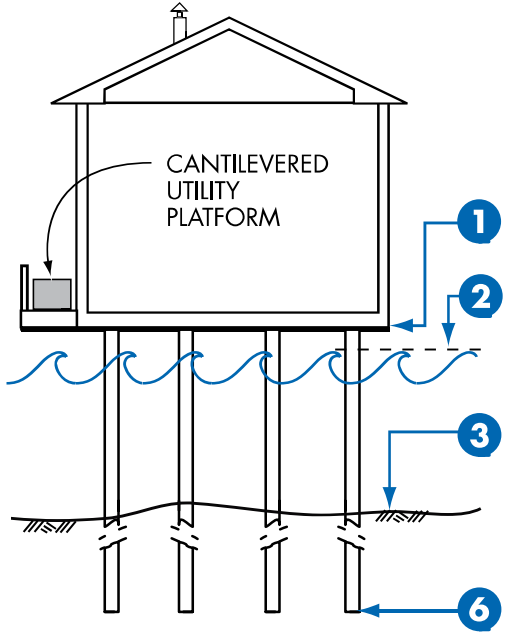
- Walls must be designed to collapse or "breakaway" under storm and flood conditions
- Must be unfinished and use flood resistant materials
- Utility wires and pipes should not go through or be attached to the breakaway walls
- Enclosed area is to be used only for parking, building access, or limited storage
- No bathrooms, utility rooms, or electric service below BFE
- Size limited to less than 300 square feet (or insurance premiums are higher)

The V Zone Certification (Sample)

V Zone Building and Performance Certification (partial)

Elevation Information

1. Elevation of the Bottom of the Lowest Horizontal Structural Member..... 17 feet
2. Base Flood Elevation (BFE)..... 16 feet
3. Elevation of Lowest Adjacent Grade (LAG)..... 6 feet
4. Foundation type: Piling X/ Post __/ Pier __/ Column __/ Fill __/ Shear Wall __/ Enclosed Wall __/
   Foundation Description: DRIVEN WOOD PILES, NO OBSTRUCTIONS EXCEPT OPEN STAIRS
5. Approximate depth of scour/erosion used for foundation design..... 3 feet
6. Embedment depth of pilings or foundation below LAG..... 16 feet

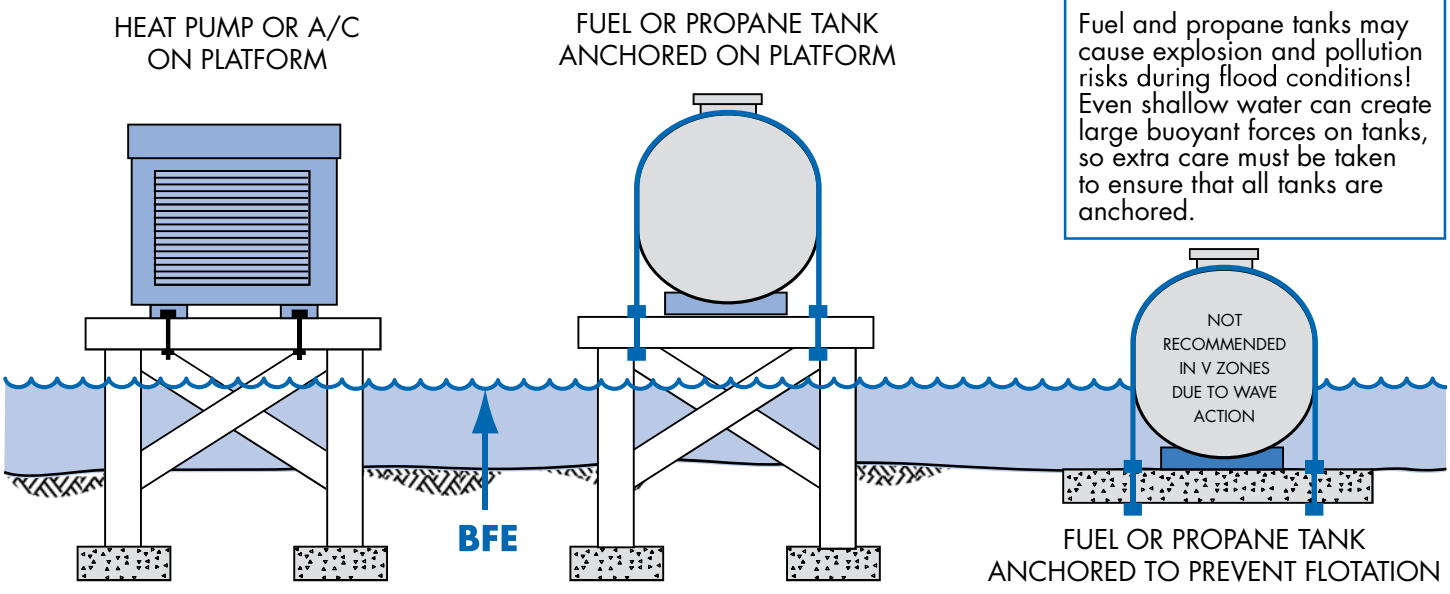


A Registered Professional Engineer or Architect must review or prepare your building design and provide a signed and sealed statement that the design meets minimum design and construction requirements.

Note: You will also have to submit an "as-built" Elevation Certificiate when construction is finished.

Resource: *Coastal Construction Manual* (FEMA 55C). Revised in 2000, this interactive CD is a useful tool for engineers and architects who design buildings in V zones.

Utility Service Outside Buildings

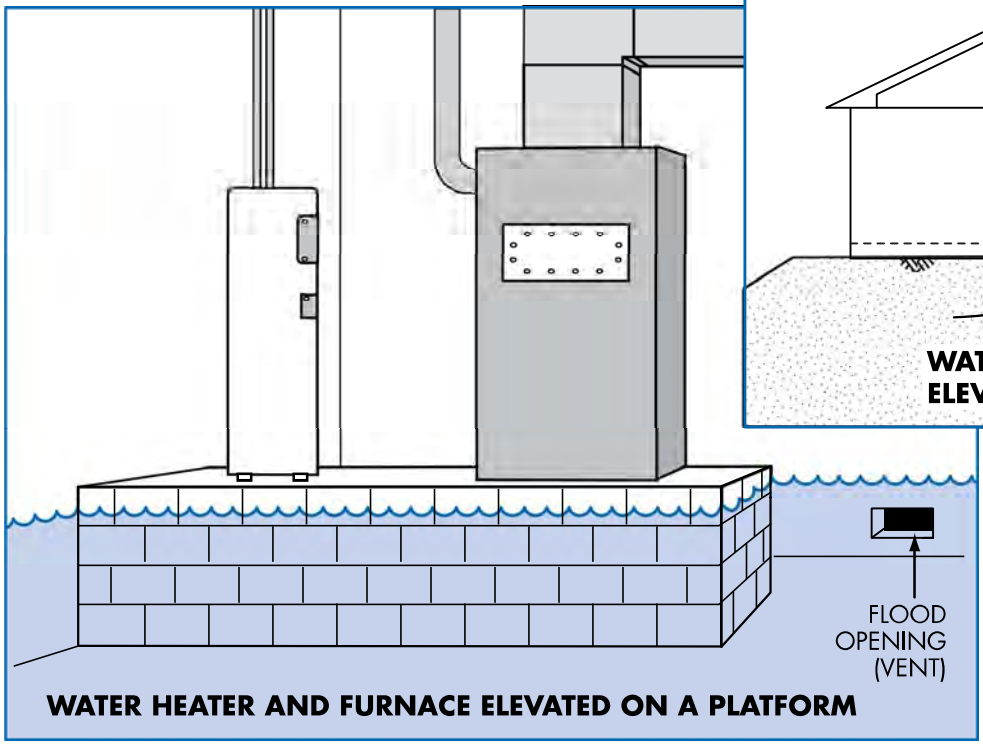


Important Information

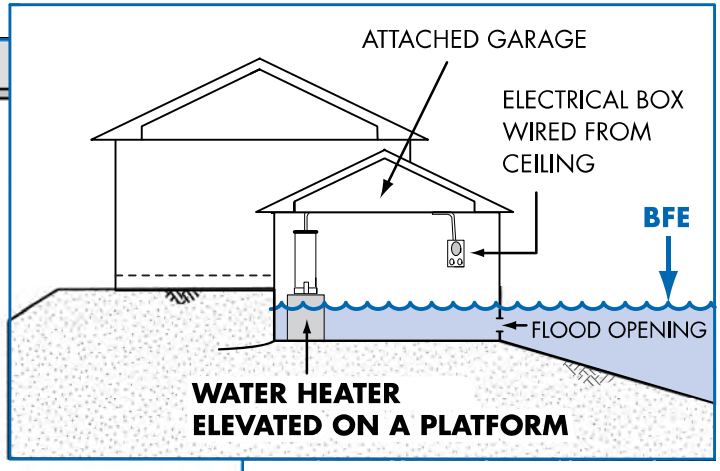
Fuel and propane tanks may cause explosion and pollution risks during flood conditions! Even shallow water can create large buoyant forces on tanks, so extra care must be taken to ensure that all tanks are anchored.

Whether inside an attached garage or outside the building, all utilities, appliances and equipment must be elevated above the BFE or protected against flood damage. Utilities include plumbing, electrical components, gas lines, fuel tanks, and heating and air conditioning equipment.

Utility Service Inside Enclosures



WATER HEATER AND FURNACE ELEVATED ON A PLATFORM

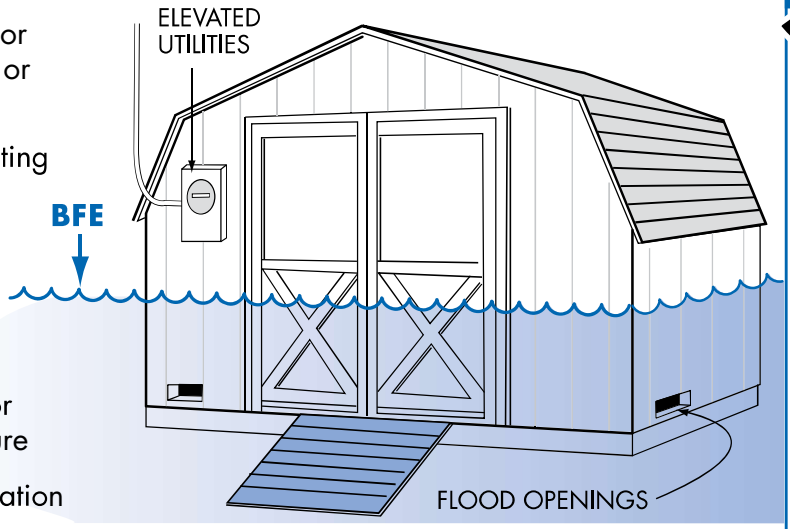


**WATER HEATER
ELEVATED ON A PLATFORM**

All utilities, appliances, and equipment must be elevated above the BFE or protected. Utilities include plumbing, electrical components, gas lines, and heating and air conditioning equipment.

Accessory (Appurtenant) Structures

- Not habitable
- Used only for parking or storage (not pollutants or hazardous materials)
- Anchored to resist floating
- Flood openings/vents
- Built of flood-resistant materials
- Elevated utilities
- Cannot be modified for different use in the future
- Documented floor elevation



Even small buildings are "development" and permits or variances with noted conditions are required. They must be elevated or anchored and built to withstand flood damage.

Caution! Remember, everything inside is likely to get wet when flooding occurs.

Terms and Definitions

Accessory (Appurtenant) Structure means a structure that is located on the same parcel of land as a principal structure and its use is incidental to the use of the principal structure. Accessory structures may not be used for human habitation and must be designed to minimize flood damage. Examples: detached garages, carports, storage sheds, pole barns, and hay sheds.

Recreational Vehicles

In a flood hazard area, an RV must:

- Be licensed and titled as an RV or park model (not as a permanent residence)
- Be built on a single chassis
- Have inflated wheels and be self-propelled or towable by light truck
- Have no attached deck, porch, or shed
- Be used for temporary recreational, camping, travel, or seasonal use (no more than 180 days)
- Have quick-disconnect sewage, water, and electrical connectors

Important Information

Camping near the water?
Ask the campground or RV park operator about flood warnings and plans for safe evacuations.

RVs that do not meet these conditions must be installed and elevated like Manufactured Homes, including permanent foundations and tie-downs (see page 44).

Planning to Improve Your Floodplain Building?

To obtain a permit to improve an existing building:

- You must provide a copy of your construction contract or a cost estimate (including estimated market value of your own or donated labor and materials).
- Your community will compare the cost of the proposed work to the market value of your building and check the value of improvements.
- You may submit an independent assessment of the market value of the building, if performed by a licensed appraiser.
- If the cost of the improvement (or if the proposed work plus improvements) equals or exceeds 50% of the market value of the building, you must comply with the NFIP Substantial Improvement requirements.
- If the costs do not trigger Substantial Improvement requirements, then you should still consider ways to reduce future damage (see page 54).

Terms and Definitions

Substantial Improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This term includes structures which have incurred substantial damage from any cause (flood, fire, earthquake, hurricanes, tornadoes, etc.), regardless of the actual repair work performed (see page 58).

Important Information

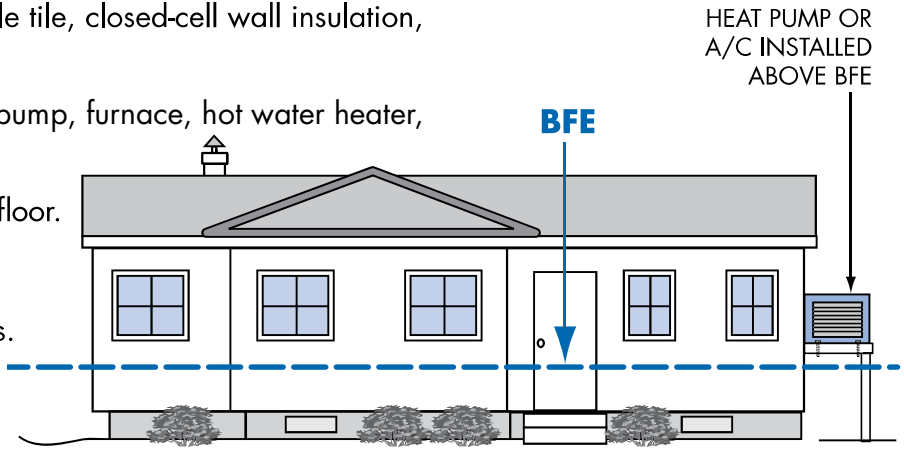
Improvements include:

- Renovation/ rehabilitation of the interior of the existing building (see page 55)
- Lateral addition, without renovation or structural alteration of the existing building (see page 56)
- Lateral addition, with renovation or structural alteration of the existing building (see page 57)
- Vertical addition (add new story).

Non-Substantial Improvements

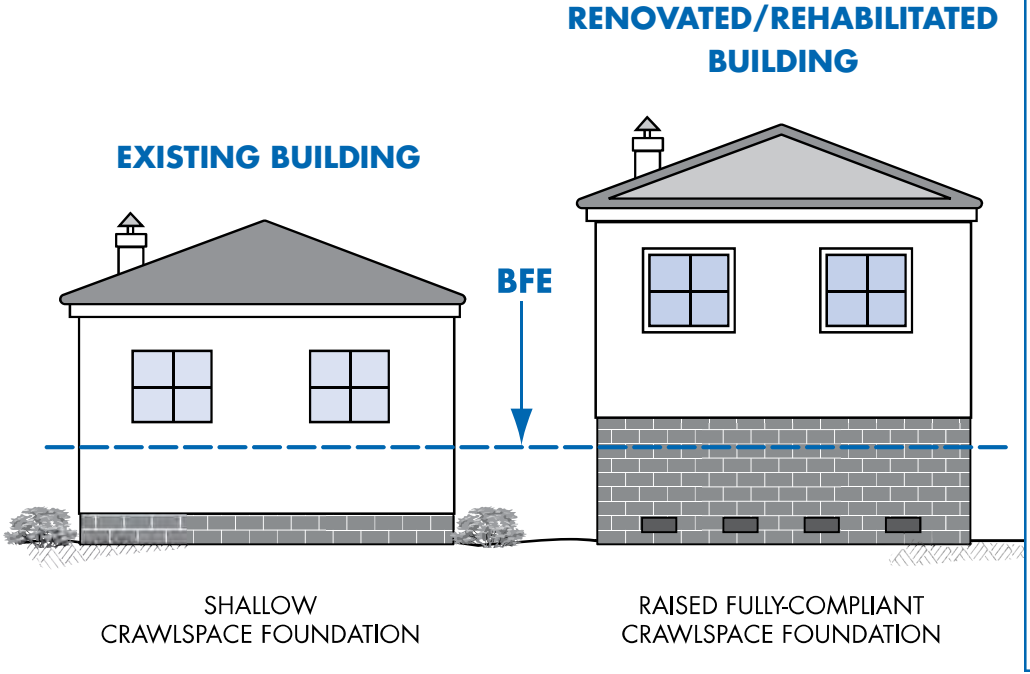
Your proposed improvements are "non-substantial" if the costs of all improvements are less than 50% of the market value of the building. Although you are not required to bring the existing building into compliance, there are many things you can do to reduce future flood damage. Find out the BFE at your location and consider the following:

- Use flood resistant materials, for example tile, closed-cell wall insulation, and polyvinyl wall coverings.
- Raise air conditioning equipment, heat pump, furnace, hot water heater, and other appliances on platforms.
- Install electrical outlets higher above the floor.
- Move ductwork out of crawlspaces.
- Retrofit crawlspaces with flood openings.
- Fill in below-grade crawlspaces/ utility space.



Note! Be sure to include ALL proposed work in your initial permit application. If you add more work after the permit is issued, your community will make another evaluation for Substantial Improvement.

Substantial Improvement: Renovation Only



Important Information

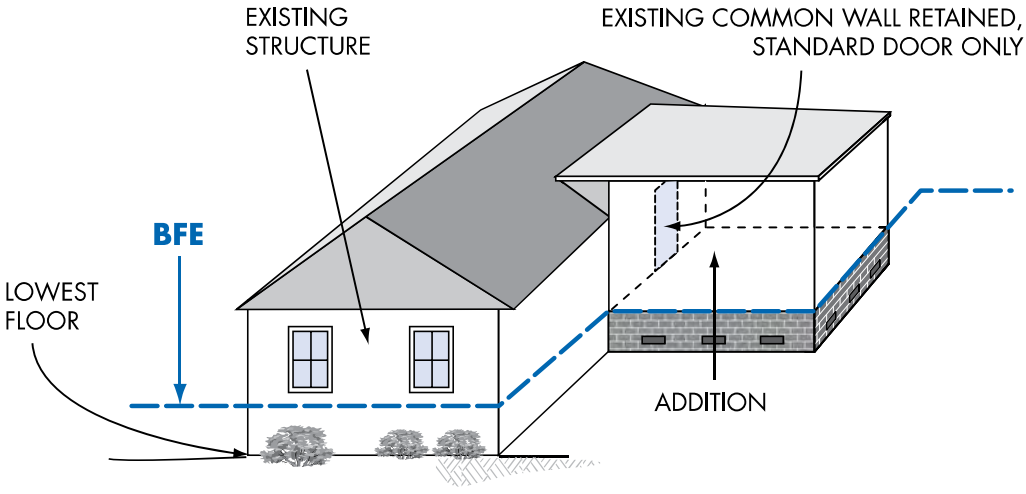
Floodplain buildings can be improved, renovated, rehabilitated or altered, but special rules apply.

Check with your local permit office before you begin. It will be easier to do it right the first time.

The cost to correct previously cited violations of state or local health, sanitary, or safety codes to provide safe living conditions can be excluded from the cost of renovations.

Alteration of a registered historic structure is allowed, as long as it will continue to meet the criteria for listing as a historic structure.

Substantial Improvement: Lateral Addition Only



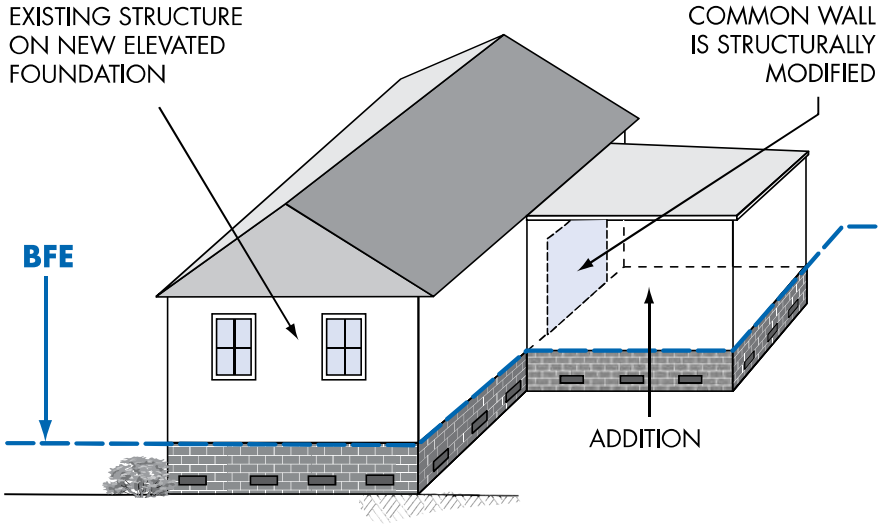
Important Information

See page 57 if your project to add a lateral addition also includes modifying the interior of the existing building or making structural modifications to the existing common wall.

You must get a permit from your community to build an addition to your floodplain building. If the existing building is not already properly elevated, then only the addition must be built with the lowest floor at or above the Base Flood Elevation provided:

- You make no interior modifications to the existing building; and
- You make no structural modifications to the existing common wall other than adding a standard sized door.

Substantial Improvement: Addition Plus Other Work

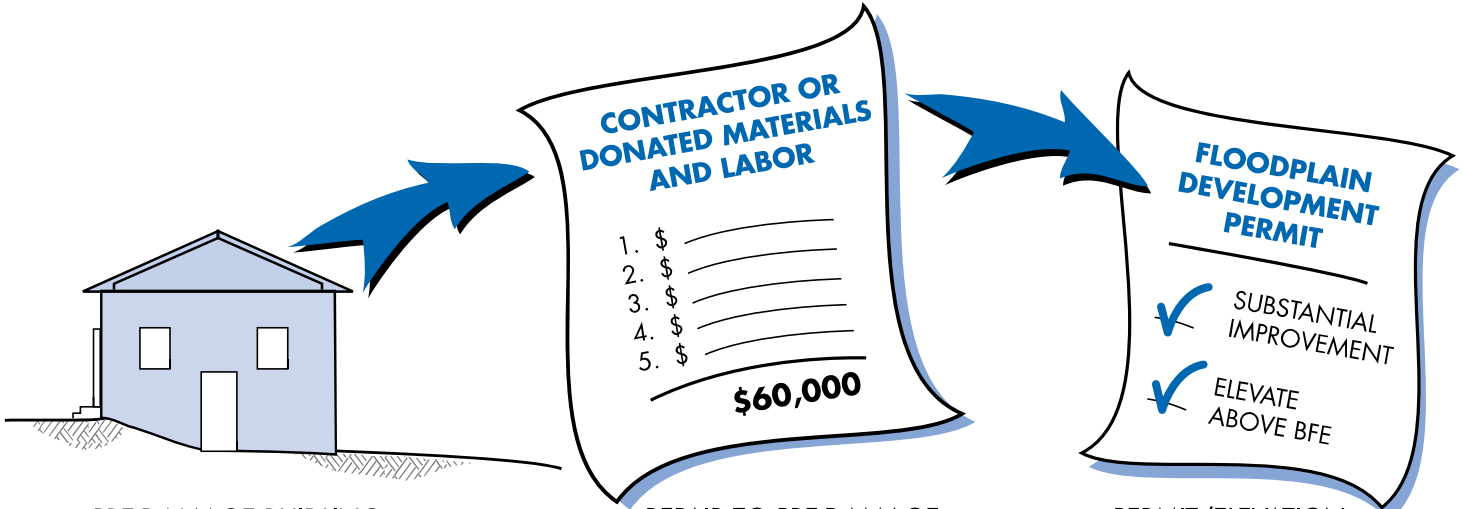


Your community must prepare an evaluation to determine if all of your proposed work will trigger the Substantial Improvement requirement. Substantial Improvement is triggered if:

- The work involves adding a new top floor, modifying the interior of the existing building, or structural modifications to the existing common wall (for lateral addition); and
- The cost of all proposed work plus the cost of improvements equals or exceeds 50% of the market value of the existing building.

Your community's permit office can help you determine which requirements apply. It is always a good idea to request a preliminary review before you get too far along with your plans.

What About After Damages?



PRE-DAMAGE BUIDLING
MARKET VALUE=$100,000

REPAIR TO PRE-DAMAGE
CONDITION = 60%

PERMIT/ELEVATION
REQUIRED

A permit is required to repair substantial damage from any cause — fire, flood, wind, or even a truck running into a building. Check with your community permit office to be sure.
You will be asked to provide a detailed cost estimate for repairs.
See page 60 for more information about elevating an existing building above a crawlspace.

Paying for Post-Flood Compliance

You may be eligible for up to $30,000 to help pay to protect your building from future flood damage – to bring it into compliance with your community's floodplain requirements – if all of the following apply:

USE THE ICC CLAIM TO:

ELEVATE THE HOUSE ON YOUR LOT

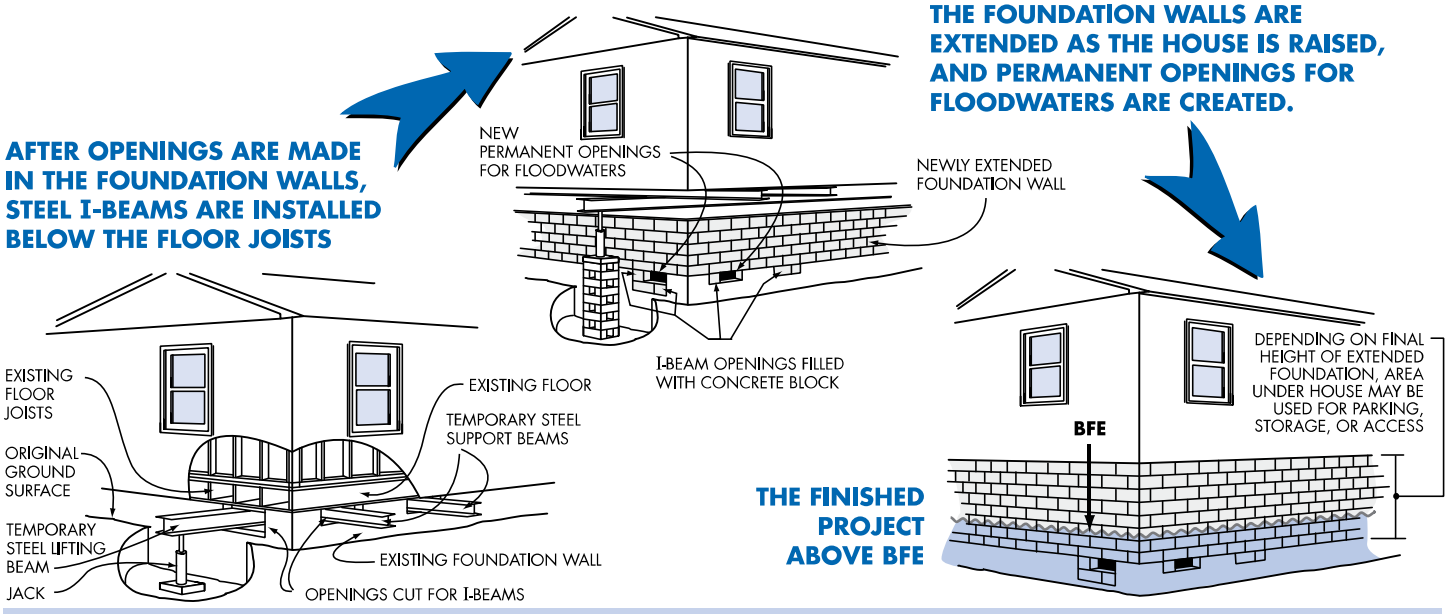
DEMOLISH AND REBUILD THE HOUSE

MOVE THE HOUSE TO HIGH GROUND

- You have NFIP flood insurance – it includes Increased Cost of Compliance (ICC) coverage.
- Your building is in the mapped Special Flood Hazard Area.
- Your community has made an official determination that the building was substantially damaged by flooding.
- You act quickly with your claims adjuster and community official to process all the required paperwork.

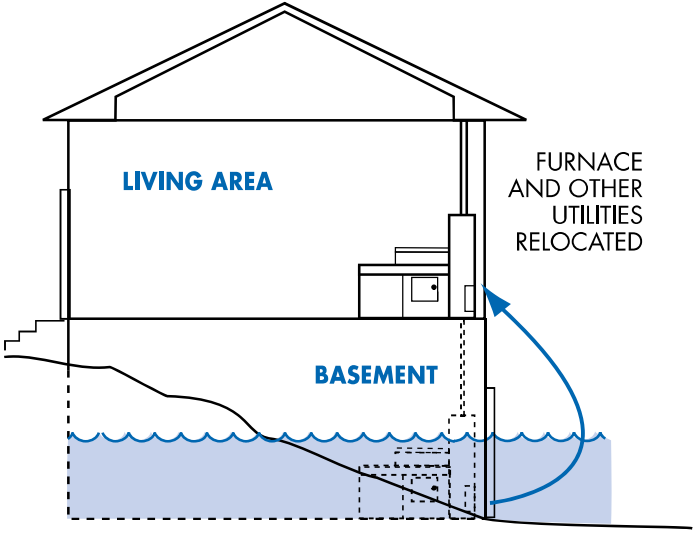
Owners whose buildings are substantially damaged are required to "bring the building into compliance" with floodplain requirements. Substantial damage is a special case of substantial improvement.

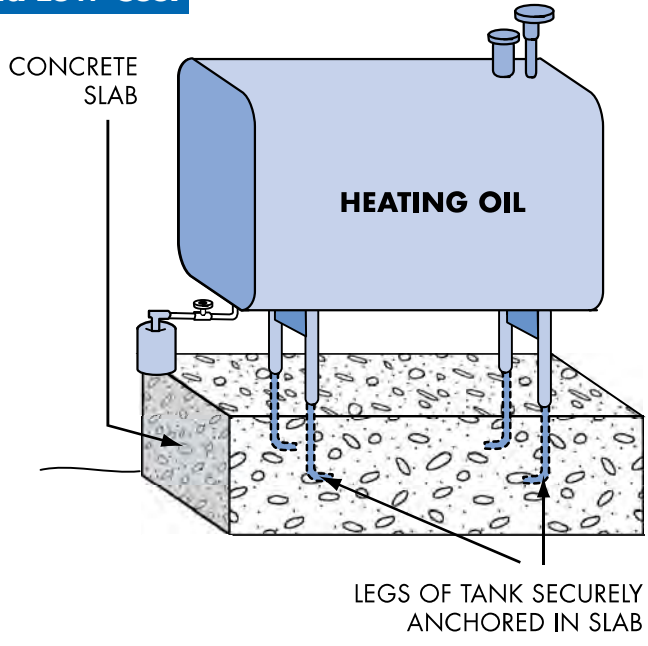
Elevating a Pre-FIRM Building



This is one way to elevate an existing building to comply with floodplain regulations. If your insured building is damaged by flood and your community determines it is substantially damaged, you may be eligible for an **Increased Cost of Compliance** payment. The State and FEMA can help with more information and options.

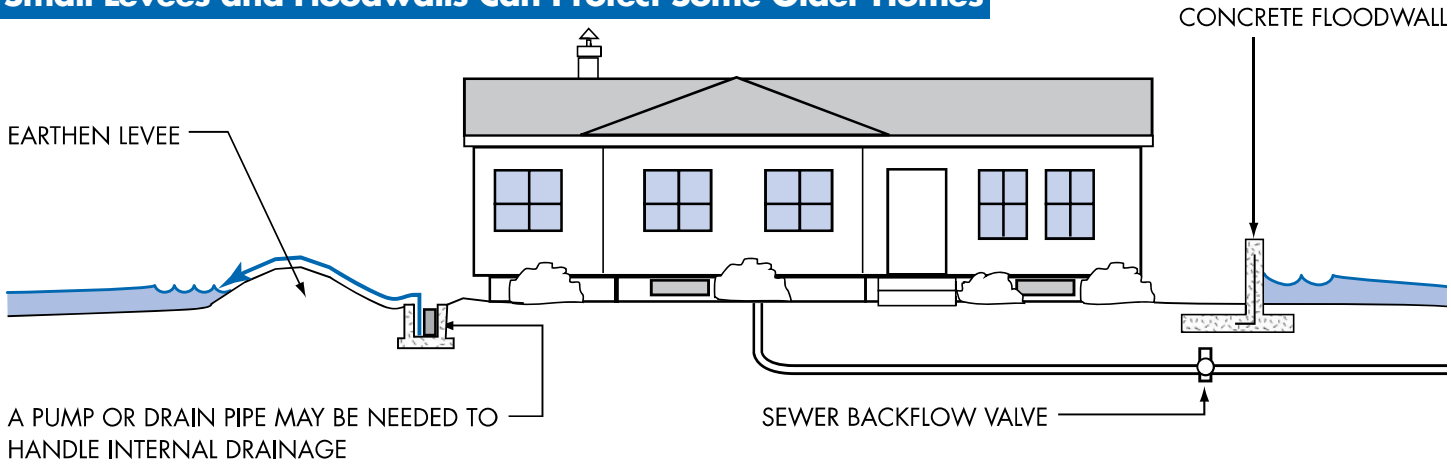
Some Flood Protection for Older Homes is Easy and Low Cost





Move water heaters, furnaces, and ductwork out of basements and crawlspaces. Anchor heating oil and propane gas tanks to prevent flotation. **Do not** store valuables or hazardous materials in a flood-prone crawlspace or basement. Use water-resistant materials when you repair.

Small Levees and Floodwalls Can Protect Some Older Homes



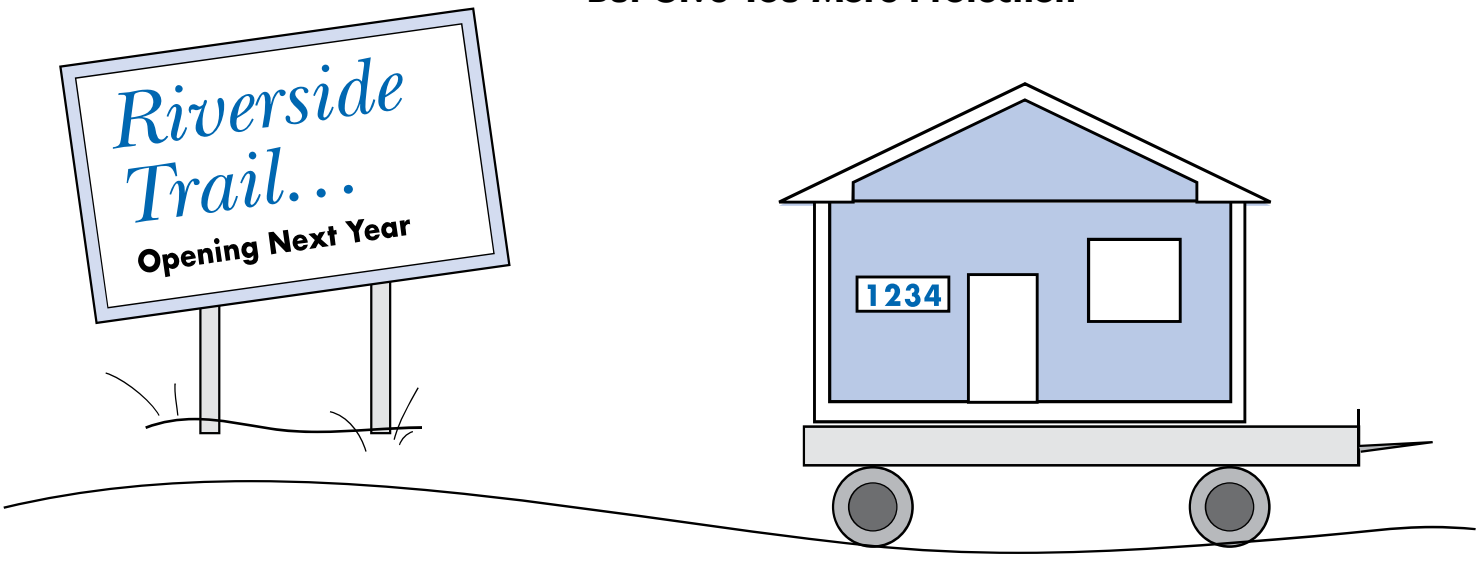
In areas where floodwaters aren't expected to be deep, sometimes individual buildings can be protected by earthen levees or concrete floodwalls. You must get a permit for those protection measures, and extra care must be taken if the site is in a Floodway. A small levee or floodwall cannot be use to achieve compliance for a new or substantially improved building, or one that is repaired after substantial damage.

Important! These protective measures will not reduce your flood insurance premium!

To learn more about flood fighting methods for levees and structures, go to www.fpm.water.ca.gov/training/floodfight_training.cfm

Some Flood Mitigation Projects are More Costly

But Give You More Protection



After floods, some communities buy out and demolish homes that were severely damaged. The acquired land is dedicated to open space and can be used for recreation or to help restore wildlife habitat and wetlands. Homes have been raised up on higher foundations, and others have been moved to safer high ground.

Be Prepared for Flood Emergencies

Everyone should be prepared for floods and other emergencies. You need to be prepared at home, at work, at school, and in your community.

Sometimes floods and other disasters can strike quickly and without warning. You may have to evacuate your neighborhood, workplace or school, or you may be trapped at home. Ask yourself – what would I do if basic services (water, gas, electricity and telephones) are interrupted, perhaps for several days? Local officials and emergency relief workers will be on the scene after disasters, but they cannot reach everyone right away. You need to be prepared to keep your family safer by preparing now:

- Learn about the risks in your community
- Make a family or workplace emergency plan
- Know where to go if you're told to evacuate
- Put together a disaster kit with supplies to last a couple of days

To learn more about preparing for disasters, visit the American Red Cross at www.redcross.org and click on "Get Prepared."

Turn Around Don't Drown™

Learn about flood risks and follow these safety rules:

- When flooding is expected, stay away from creeks, streams, and rivers.
- NEVER drive through flooded roads – they may be washed out.
- Passenger cars may float in only 18-24 inches of water.
- Be especially cautious at night when it is harder to recognize dangers.
- Just 6 inches of fast-moving water can knock you off your feet.
- www.weather.gov/os/water/tadd/.

State Reclamation Board

Formed in 1911, the State Reclamation Board's mission is to " . . . control flooding along the Sacramento and San Joaquin Rivers and their tributaries in cooperation with the U.S. Army Corps of Engineers." The Board administers a permit and enforcement program to ensure the structural and hydraulic integrity of the flood control system in the Central Valley. The program is authorized by statute and defined in Title 23 of the California Code of Regulations. The regulations provide technical standards for some levee and floodway projects.

Encroachment permits are required for work on any existing or proposed encroachments in "designated floodways" (primarily levee and floodway activities). Examples of projects include pipeline crossings, levee improvements, pumping stations, drainage facilities, environmental restoration projects, and bridges.

The Board's Floodway Protection Section processes applications and formulates permit conditions for approximately 20 projects each month. Each year the section handles about 3,500 non-permit related requests, including determining compliance with the Public Records Act, reviewing of environmental documents, commenting on other projects within the Board's jurisdiction, generating public notices, and responding to other inquiries.

Designated Floodway refers to the channel of the stream and that portion of the adjoining floodplain reasonably required for the passage of a design flood. The term includes the floodway between existing levees as adopted by the Board or the Legislature. For more information about Designated Floodways and the Board's permit program, check online at www.recbd.ca.gov/.

Useful Resources and Common Acronyms

Useful Resources

- The American Red Cross addresses disaster safety, being prepared, and repairing homes (Disaster Services): **www.redcross.org**
- FEMA has developed materials to help families and businesses prepare for floods and recover from disasters: **www.fema.gov/library**
- NFIP regulations (Parts 59, 60, 65, and 70): **www.fema.gov/business/nfip/laws1.shtm**
- CRS Resource Center: **www.training.fema.gov/EMIWeb/CRS**
- Governor's Office of Emergency Services (coordinates hazard mitigation grant programs): **www.oes.ca.gov**
- State Reclamation Board: **www.recbd.ca.gov**
- Association of State Floodplain Managers:**www.floods.org**
- CA/NV/HI Floodplain Management Association: **www.floodplain.org**

Common Acronyms

- BFE = Base Flood Elevation
- DWR = Department of Water Resources
- EC = Elevation Certificate
- FEMA = Federal Emergency Management Agency
- FIRM = Flood Insurance Rate Map
- ICC = Increased Cost of Compliance
- NFIP = National Flood Insurance Program
- SFHA = Special Flood Hazard Area (100-year floodplain)

Want to Learn More?

- For advice on flood information and permits, call your community's building permit office, engineering, or planning department.
- Learn about California's initiatives to improve flood protection and flood safety at **www.floodsafe.water.ca.gov**.
- To order flood maps, call FEMA's Flood Map Service Center – (800) 358-9616 or enter the FEMA Map Store to order online at **http://msc.fema.gov**.
- Consumer information about flood insurance, flood risks, and flood maps is online at **www.floodsmart.gov**. Click on "Related Links" then "Flood Hazard Maps" to learn more about maps and map modernization.
- FEMA's online publications can be found at **http://www.fema.gov/library**. Search by key word, title, or publication number. Order free printed copies at (800) 480-2520.
- To learn about flood insurance, call your insurance agent. Most insurance companies can write an NFIP policy for you. If you need more help, call the National Flood Insurance Program's toll free number to get the name of an agent in your area who does write flood insurance, (888) 356-6329.
- Find online Elevation Certificate training for surveyors by going to **www.fema.gov** and search on "Elevation Certificate." Also visit **www.fpm.water.ca.gov** and click "On-line Training."
- To find out how many NFIP flood insurance policies are in force in your community, or how many claims have been paid since 1978, go to **www.fema.gov/business/nfip/** and click on "Flood Insurance Statistics."

C.2 DWR General Safety Plan Element Review Crosswalk

General Plan Safety Element Review Crosswalk

C

CENTRAL VALLEY FLOOD PROTECTION BOARD
GENERAL PLAN SAFETY ELEMENT REVIEW CROSSWALK

The General Plan Safety Element Review Crosswalk is based on the currently effective requirements of Government Code Section 65302.7, which state each city and county within the boundaries of the Sacramento-San Joaquin Drainage District (SSJDD) must submit the draft safety element, or draft amendment to the safety element, to the Central Valley Flood Protection Board (CVFPB) for review 90 days prior to element adoption. The CVFPB then has 60 days to review the safety element and provide written recommendations for changes regarding:

1. Uses of land and policies in areas subjected to flooding that will protect life, property, and natural resources from unreasonable risks associated with flooding.
2. Methods and strategies for flood risk reduction and protection within areas subjected to flooding.

Each city and county must consider the Board's recommendations prior to the adoption of the draft safety element. If the legislative body determines not to accept all or some of the recommendations, findings must be made in writing to the Board that states the reasons why. If the Board's recommendations are not available within 60 days, action can be taken by the local jurisdiction without the recommendations devoid of penalty; however, if recommendations are submitted after the 60 days, the local governing body must consider the recommendations at the next time the jurisdiction considers amendments to the safety element.

Consultation with the Central Valley Flood Protection Board

Prior to preparation or revision of the safety element cities and counties must consult with the CVFPB based on the currently effective requirements of Government Code Section 65302(g)(5). The purpose of the consultation with the CVFPB is to assist with guidance related to areas subject to flooding and to direct jurisdictions to the most current relevant technical information available regarding flood risk reduction and protection. It is recommended that cities and counties consult with the CVFPB through written communication, phone calls, and/or electronic communication at http://www.cvfpb.ca.gov/.

PART 1 – INSTRUCTIONS

Please fill out the application information below under Part 2, along with the checklist requirements within Part 3, Sections I and II "jurisdictions to fill out" columns and return, along with the draft safety element to:

Central Valley Flood Protection Board (CVFPB), Encroachment Control & Land Use Section
3310 El Camino Avenue, Room 151
Sacramento, California 95821

PART 2 – APPLICATION INFORMATION

Jurisdiction to Fill Out			
Jurisdiction:	**Mailing Address:**		
Jurisdiction Contact/Title:	**Phone Number:**	**E-mail Address:**	**Date of draft safety element:**
CVFPB Use Only			
CVFPB Reviewer/Title:		**CVFPB Receipt Date:**	

PART 3 – CHECKLIST OF REQUIREMENTS

Government Code Section 65302(g) includes 2007 State flood risk management legislative direction to local jurisdictions to review and revise the general plan safety element to identify new information regarding flood hazards. For guidance regarding how to respond to the specific requirements under Section I and II below, reference the Department of Water Resources' *Handbook for Implementing California Flood Legislation into Local Land Use Planning* at http://www.water.ca.gov/floodmgmt/ or http://www.water.ca.gov/LocalFloodRiskPlanning/.

This Review Crosswalk serves as a typical checklist that is required by the CVFPB and other agencies; however, the CVFPB and other agencies may ask for more information in addition to this checklist.

Items to Consider before Filling out the Review Crosswalk

Cities and counties are required to submit the draft general plan safety element or draft general plan safety element amendments to the CVFPB only if the bottom two conditions apply:

1. Is the city or county located within Sacramento-San Joaquin Drainage District? If yes, continue with the Review Crosswalk.
2. Is it a draft general plan safety element or draft general plan safety element amendment? If yes, continue with the Review Crosswalk.

Scoring System

The scoring system for the Review Crosswalk is based on the review of the safety element requirements under Sections I and II below and the resulting findings from the CVFPB if the requirements have been "met" or "not met."

Section I: Identification of Flood Hazard Information

Jurisdiction to Fill Out			CVFPB Use Only		
Safety elements must identify information regarding flood hazards per GC 65302(g)(2)(A)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/ Page #**	**Board Reviewer's Comments**	**Score** ✓ **MET**	**Score** ✓ **NOT MET**
i. Does the new or updated safety element include flood hazard zones, as identified by FEMA?		Page_____		☐	☐

Jurisdiction to Fill Out			CVFPB Use Only		
Safety elements must identify information regarding flood hazards per GC 65302(g)(2)(A)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/ Page #**	**Board Reviewer's Comments**	**Score** ✓ MET	**Score** ✓ NOT MET
ii. Does the new or updated safety element include National Flood Insurance Program (NFIP) maps, published by FEMA?		Page_____		❑	❑
iii. Does the new or updated safety element contain information about flood hazards available from the U.S. Army Corps of Engineers including the Corps Sacramento and San Joaquin River Basins Comprehensive Study?		Page_____		❑	❑
iv. Does the new or updated safety element include dam failure inundation maps, available from CalEMA (prepared pursuant to GC Section 8589.5)?		Page_____		❑	❑

Jurisdiction to Fill Out			CVFPB Use Only		
Safety elements must identify information regarding flood hazards per GC 65302(g)(2)(A)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/ Page #**	**Board Reviewer's Comments**	**Score** ✓ **MET**	**Score** ✓ **NOT MET**
v. Does the new or updated safety element include designated floodway maps, available from the CVFPB?		Page_____		❑	❑
vi. Does the new or updated safety element include Awareness Floodplain Mapping Program maps and 200-year flood plain maps, available from DWR?		Page_____		❑	❑
vii. Does the new or updated safety element include maps of levee flood protection zones (LFPZs), available from DWR?		Page_____		❑	❑

Jurisdiction to Fill Out			CVFPB Use Only		
Safety elements must identify information regarding flood hazards per GC 65302(g)(2)(A)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/ Page #**	**Board Reviewer's Comments**	**Score** ✓ MET	**Score** ✓ NOT MET
viii. Does the new or updated safety element include areas subject to inundation in the event of the failure of project or nonproject levees or floodwalls (contact DWR for assistance, if needed)?		Page_____		❑	❑
ix. Does the new or updated safety element include historical data on flooding including locally prepared maps of areas that are subject to flooding, areas that are vulnerable to flooding after wildfires, and sites that have been repeatedly damaged by flooding, varies by Jurisdiction (contact DWR for assistance, if needed)?		Page_____		❑	❑

Jurisdiction to Fill Out			CVFPB Use Only		
Safety elements must identify information regarding flood hazards per GC 65302(g)(2)(A)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/ Page #**	Board Reviewer's Comments	Score ✓ MET	Score ✓ NOT MET
x. Does the new or updated safety element include existing and planned development in flood hazard zones, including structures, roads, utilities, and essential public facilities, varies by jurisdiction (contact DWR for assistance, if needed)?		Page_____		❑	❑
xi. Does the new or updated safety element include reference to local, state, and federal agencies with responsibility for flood protection, including special districts and local offices of emergency services?		Page_____		❑	❑

Section II: Protection of the Community from the Unreasonable Risks of Flooding

Jurisdiction to Fill Out					CVFPB Use Only		
Based on the above information in Section I, safety elements must establish a set of comprehensive goals, policies, and feasible implementation measures under GC 65302(g)(2)(B) and 65302(g)(2)(C)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/Page #**			**Board Reviewer's Comments**	**Score**	
		✓ Goal	**✓ Policy**	**✓ Imp. Measure**		**✓ MET**	**✓ NOT MET**
Do the new or updated safety element goals, policies, and implementation measures accomplish the following:							
I. Avoid or minimize the risks of flooding to new development?		Page_____					
		❑	❑	❑		❑	❑
II. Part a: Evaluate whether new development should be located in flood hazard zones?		Page_____					
		❑	❑	❑		❑	❑

Jurisdiction to Fill Out					CVFPB Use Only		
Based on the above information in Section I, safety elements must establish a set of comprehensive goals, policies, and feasible implementation measures under GC 65302(g)(2)(B) and 65302(g)(2)(C)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/Page #** ✓ **Goal**	✓ **Policy**	✓ **Imp. Measure**	**Board Reviewer's Comments**	**Score** ✓ **MET**	✓ **NOT MET**
Do the new or updated safety element goals, policies, and implementation measures accomplish the following:							
II. Part b: Identify construction methods or other methods to minimize damage if new development is located in flood hazard zones?		Page_____ ❑	❑	❑		❑	❑
III. Maintain the structural and operational integrity of essential public facilities during flooding?		Page_____ ❑	❑	❑		❑	❑

Jurisdiction to Fill Out					CVFPB Use Only		
Based on the above information in Section I, safety elements must establish a set of comprehensive goals, policies, and feasible implementation measures under GC 65302(g)(2)(B) and 65302(g)(2)(C)	**Jurisdiction's Notes for CVFPB Reviewer**	**Location in the Safety Element/Page #** ✓ **Goal**	✓ **Policy**	✓ **Imp. Measure**	**Board Reviewer's Comments**	**Score** ✓ **MET**	✓ **NOT MET**
Do the new or updated safety element goals, policies, and implementation measures accomplish the following:							
IV. Locate, when feasible, new essential public facilities outside of flood hazard zones (including hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities) or identify construction methods or other methods to minimize damage if these facilities are located in flood hazard zones?		Page_____ ❑	❑	❑		❑	❑

Jurisdiction to Fill Out					CVFPB Use Only		
Based on the above information in Section I, safety elements must establish a set of comprehensive goals, policies, and feasible implementation measures under GC 65302(g)(2)(B) and 65302(g)(2)(C)	Jurisdiction's Notes for CVFPB Reviewer	Location in the Safety Element/Page # ✓ Goal	✓ Policy	✓ Imp. Measure	Board Reviewer's Comments	Score ✓ MET	✓ NOT MET
Do the new or updated safety element goals, policies, and implementation measures accomplish the following:							
V. Establish cooperative working relationships among public agencies with responsibility for flood protection?		Page_____ ❑	❑	❑		❑	❑

Section III – Additional Considerations and Information the Central Valley Flood Protection Board Recommends Including

- Identify evacuation routes in the event of floods or dam failure inundations.
- If the city or county is vulnerable with inundation by more than one dam failure, delineate each dam inundation area resulting from each dam failure.
- The safety element and/or land use element must mention that if any project, including the modification of an existing project, falls within the jurisdiction regulated by the CVFPB, the city or county must apply for an encroachment permit from the Board. The Board exercises jurisdiction over the levee cross-section, the waterward area between project levees, a 10-foot-wide strip adjacent to the landside levee toe, within 30 feet of the top of the banks of unleveed project channels, and within designated floodways adopted by the Board. Activities outside of these limits which could adversely affect flood control projects are also under Board jurisdiction.
- Include a plan that differentiates the existing and planned development areas, and also includes flood hazard zones (associated with the above Section I, "x").
- Include geographic information systems (GIS) electronic mapping that layers floodplain mapping information, land use designations, safety evacuation routes, natural features, dam failure inundation, and other applicable flood risk management information on one figure at a minimum scale of 11x17 format.

CVFPB Use Only	
Section I Req. Met: _____/11	**Section II Req. Met: _____/6**
Section I Req. Not Met: _____/11	**Section II Req. Not Met: _____/6**

CVFPB Use Only
Comments:

Appendix D.
Mitigation Strategy

D.1 Survey Results

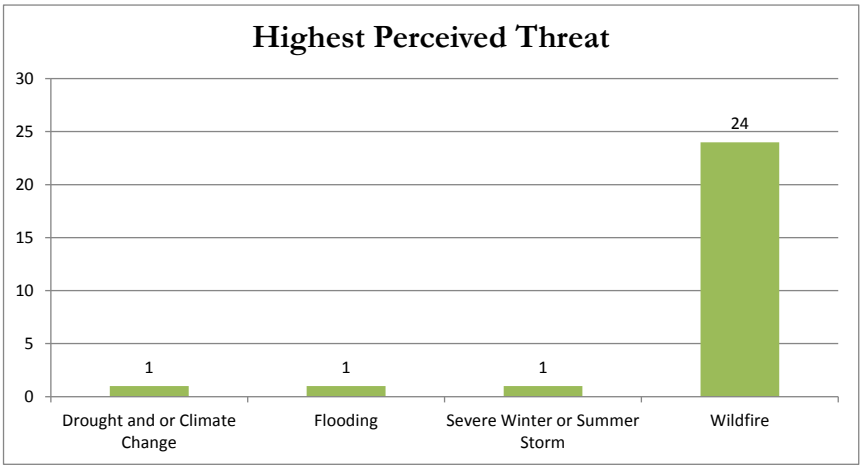
D.2 STAPLE/E Scoring Table

D.2 Mitigation Action Table

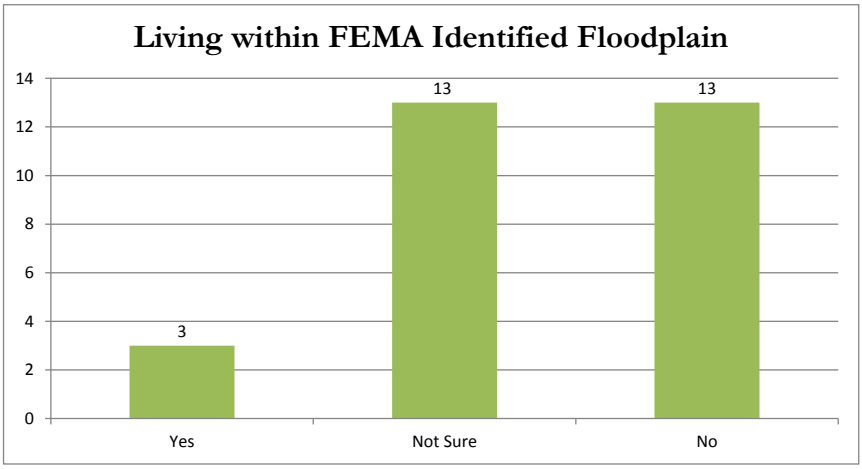
D.1 Survey Results

This appendix contains the tabulated results from the hazard mitigation survey discussed in Section 6. The decision to include a survey in the 2013 plan update was driven by an effort to solicit public comment with a survey tool. This has given Plumas County a better understanding of the communities served by the county, their perception of Local and Personal preparedness to deal with disasters and their general understanding of hazard mitigation process and action types. In all, 30 responses were received over the course of one week. Listed below are the questions that were asked and the results for each.

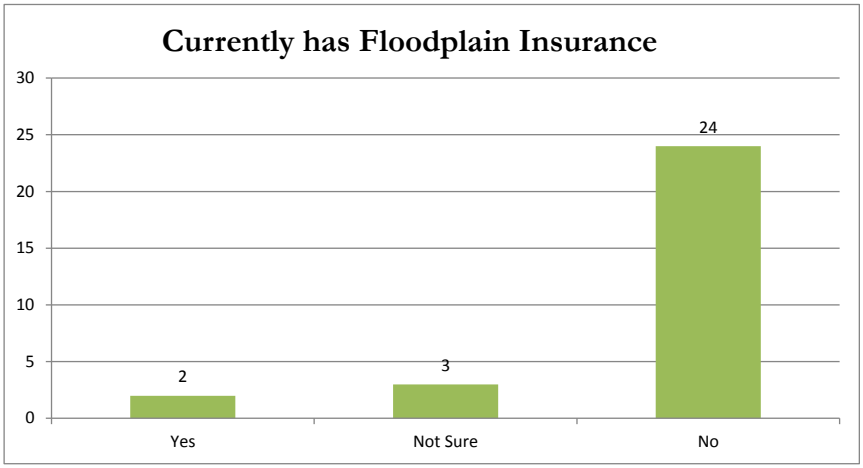
Q1. Please select the one hazard you think is the highest threat to your neighborhood.



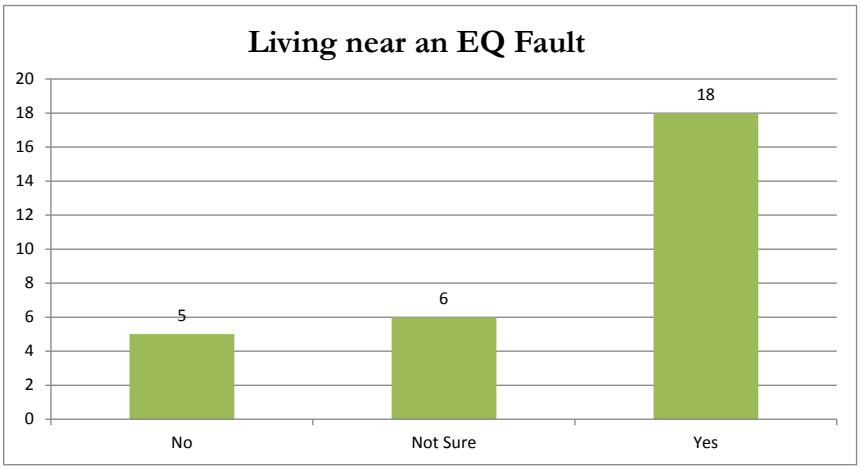
Q2. Is your property located in or near a FEMA designated floodplain?



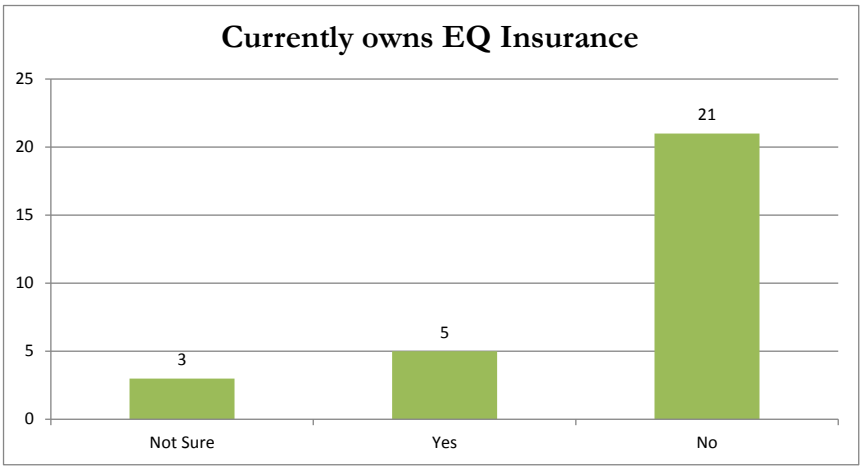
Q3. Do you have flood insurance?



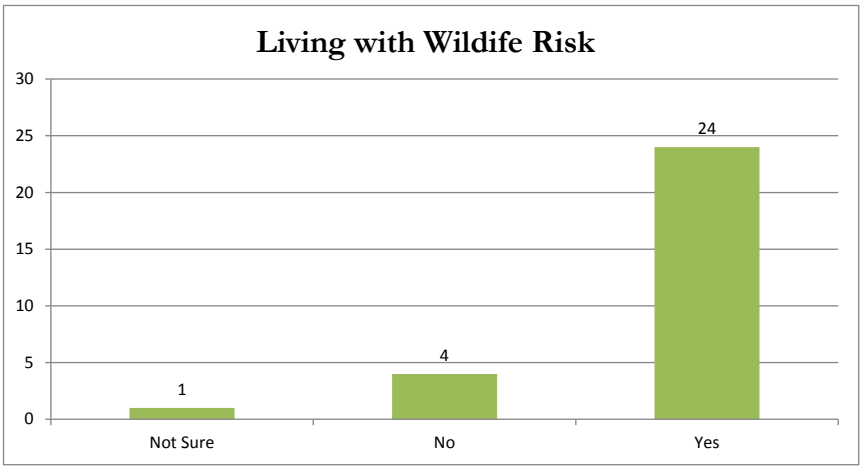
Q4. Is your property located near an earthquake fault?



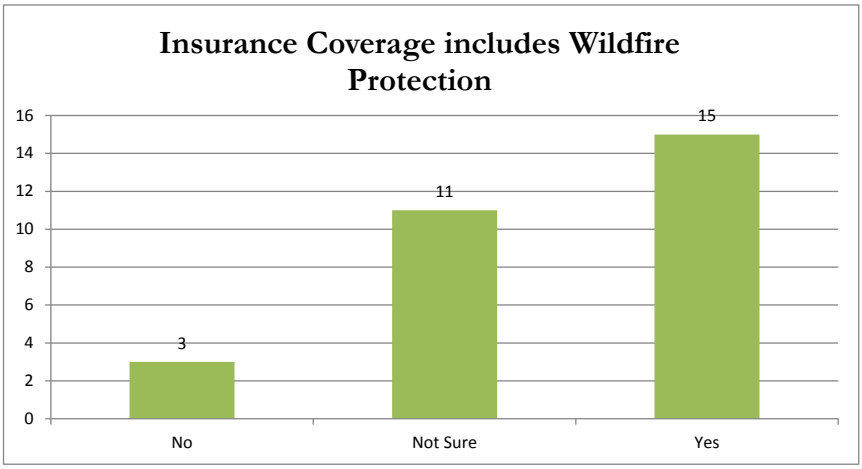
Q5. Do you have earthquake insurance?



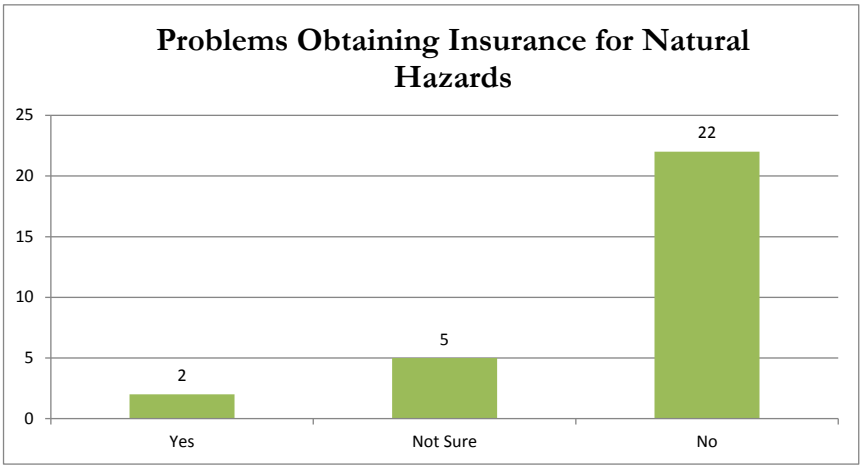
Q6. Is your property located in an area at risk for wildfires?



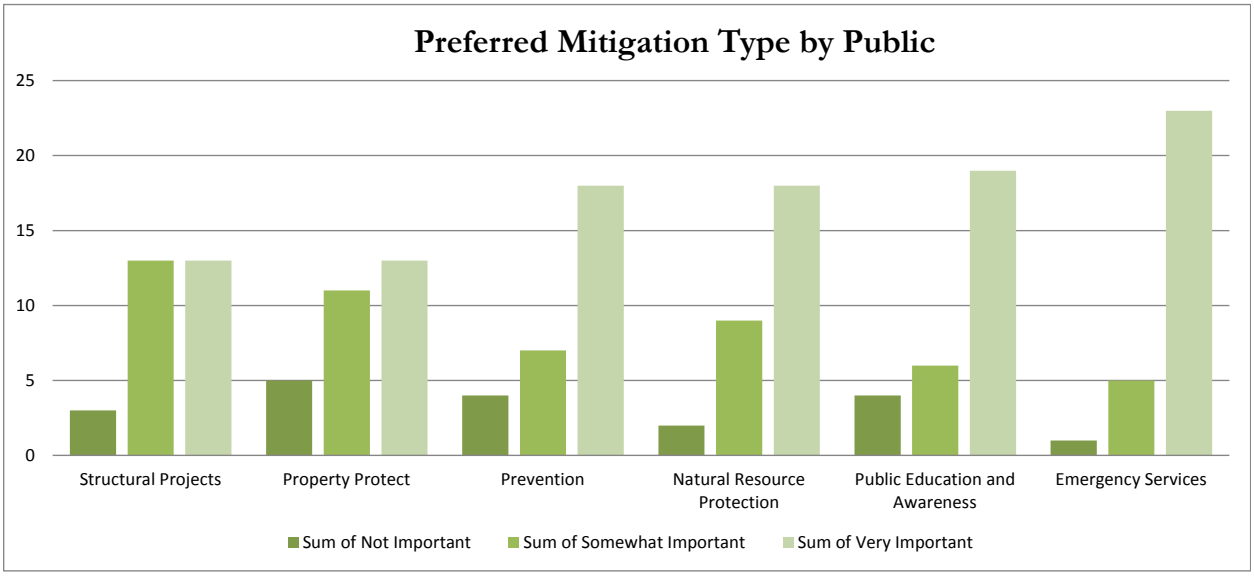
Q7. To the best of your knowledge, does your homeowners insurance policy provide coverage for damage from wildfires?



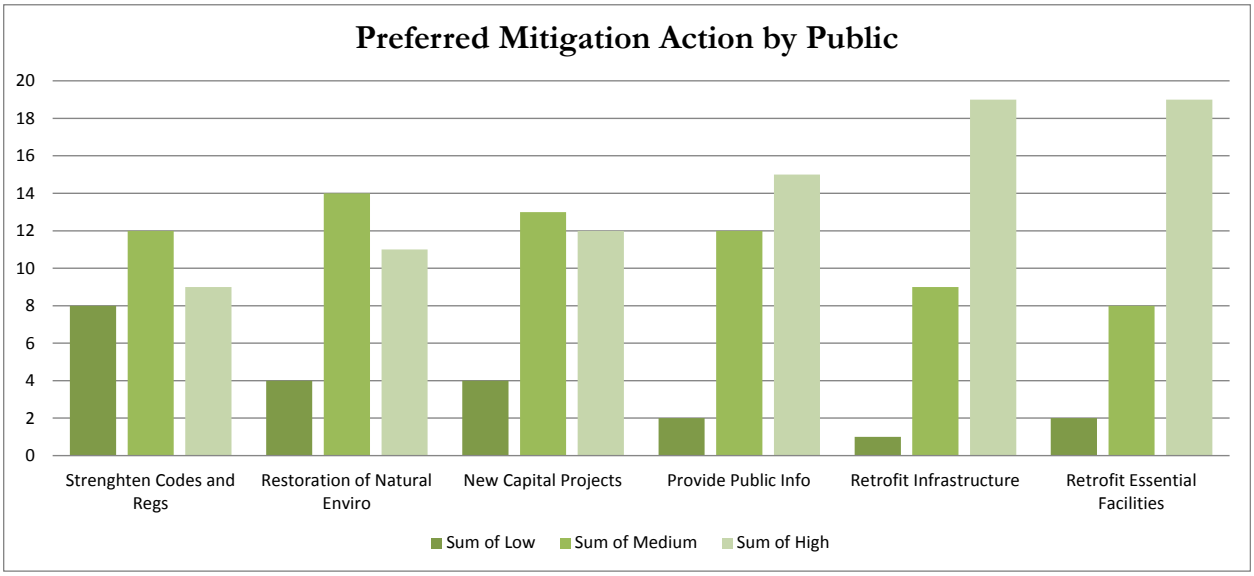
Q8. Have you ever had problems getting home owner's or renter's insurance due to risks from natural hazards?



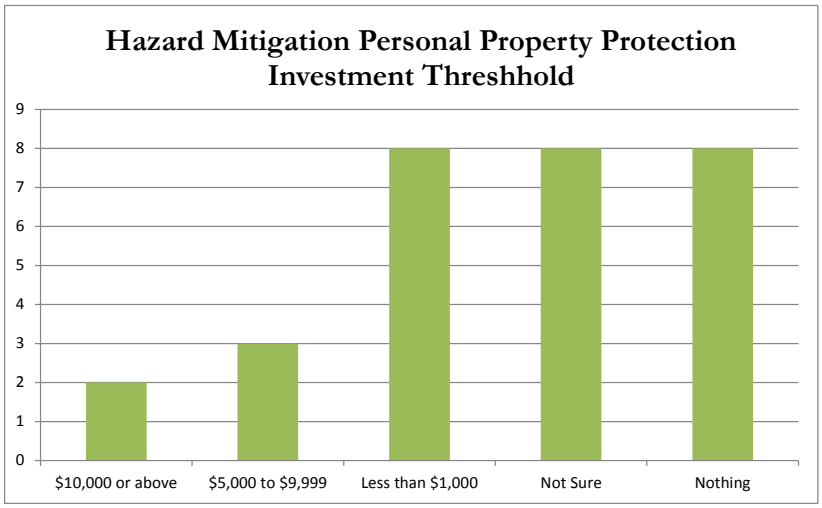
Q9. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



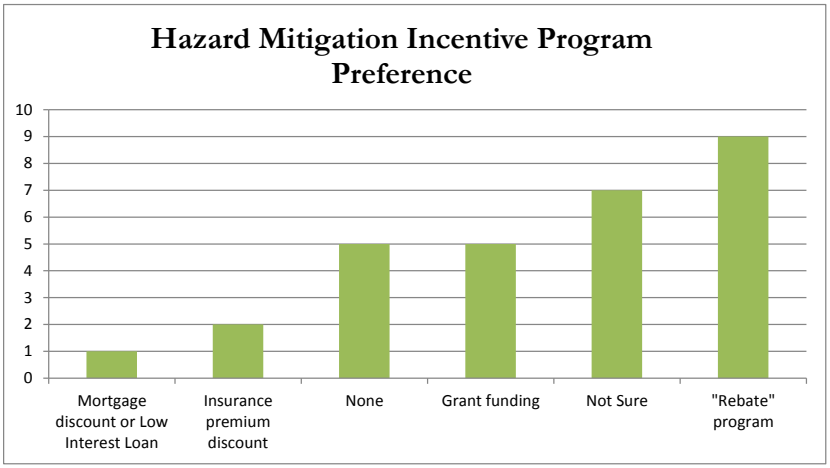
Q10. What types of projects do you believe the County, State or Federal agencies should be doing in order to reduce damage and disruption from hazard events within Plumas County? Please rank each option as a high, medium or low priority.



Q11. If you own a home, how much money would you be willing to spend to retrofit your home to reduce risks associated with disasters? (for example, by elevating a home above the flood level, performing seismic upgrades, or replacing a combustible roof with non-combustible roofing).



Q12. If you own your home, which of the following incentives would encourage you to spend money to retrofit your home to protect against disasters?



D.2 STAPLE/E Scoring Table

	STAPLEE Criteria	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)		E (Economic)			E (Environmental)			SCORE
	Scoring: For each consideration, indicate a (↑) for favorable, and a (□) for less favorable. When you complete the scoring, negatives will indicate gaps or shortcomings in the particular action, which can be noted in the Comments section. For considerations that do not apply, fill in N/A for not applicable. Only leave a blank if you do not know an answer. In this case, make a note in the Comments section of the "expert" or source to consult to help you evaluate the criterion.	Community Acceptance	Effect on Large Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Existing Business Process	Maintenance / Operations	Political Support	Local Champion	Public Support	County Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Local Funding Method	Effect on Land / Water	Effect on HAZMAT Locaitons	Consistent with Community Environmental Goals	
Mitigation No.	***ALL HAZARD GOAL, Minimize the losses of life and property due to Wildfire in Plumas County.***																				
AH-1	*Continue to enforce and enhance the California Building Codes and Plumas County regulations that reduce natural hazard risk.*	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	□	↑	□	↑	↑	↑	↑	17
AH-2	*Continue providing hazard related literature/information to citizens and provide speakers to civil groups regarding hazard related activities.*	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	□	N/A	N/A	N/A	15
Mitigation No.	***Goal 1, Minimize the losses of life and property due to Wildfire in Plumas County.***																				
WF-9	*Continue community based Hazardous Fuel Reduction (HFR) projects to modify fire behavior.*	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	□	↑	↑	↑	↑	18
WF-10	*Develop Countywide implementation plan for PRC 4291 administration and enforcement.*	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	□	↑	□	□	↑	↑	↑	16
WF-1	*Assess Plumas District Hospital property for possible fuel load reduction projects.*	↑	□	↑	↑	□	↑	□	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	N/A	↑	15
WF-3	*Develop and maintain a position for "County Fire Marshall".*	↑	↑	↑	↑	↑	□	□	↑	↑	↑	↑	↑	↑	↑	□	↑	N/A	↑	N/A	14
WF-4	*Continue to expand Fire Protection Districts.*	↑	↑	↑	↑	↑	□	□	□	↑	↑	↑	↑	□	↑	□	↑	↑	↑	↑	14
WF-6	*Create defensible Space assistance (PRC 4291) for Seniors, Disabled and Low Income Citizens.*	↑	↑	↑	↑	↑	↑	□	□	↑	↑	↑	↑	↑	↑	□	↑	N/A	N/A	N/A	13
WF-7	*Create homeowner incentives for fire safe house signing - to meet CA Fire Safe Standards (PRC 4290) criteria.*	↑	↑	↑	↑	□	↑	□	↑	↑	↑	↑	↑	↑	↑	□	□	N/A	N/A	N/A	12
WF-5	*Fund roof replacement projects for homeowners.*	↑	□	↑	↑	□	↑	↑	□	↑	↑	↑	□	↑	↑	□	□	N/A	↑	N/A	11
WF-8	*Construct alternate community escape routes for high risk communities.*	↑	↑	↑	↑	□	↑	□	□	↑	↑	↑	↑	↑	↑	□	□	N/A	N/A	N/A	11
WF-2	*Evaluate Cultural Resources for Wildfire risk.*	↑	□	↑	↑	□	□	□	↑	↑	↑	↑	□	□	↑	↑	□	N/A	N/A	↑	10
WF-11	*Expand and upgrade Quincy Airport to reduce flood risk.*	↑	↑	↑	↑	↑	□	□	↑	↑	↑	↑	↑	↑	↑	↑	□	N/A	N/A	↑	14
Mitigation No.	***Goal 2, Minimize the losses of life and property due to Severe Weather in Plumas County.***																				
SW-1	*Develop rebate program to incentivize the installation of snow protectors on propane regulators.*	↑	□	↑	↑	□	↑	□	↑	↑	↑	↑	↑	↑	↑	↑	□	N/A	↑	N/A	13
SW-2	*Create reverse 911 system capability for functional needs populations in remote locations.*	↑	↑	↑	↑	□	↑	□	↑	↑	↑	↑	↑	↑	↑	□	↑	N/A	N/A	N/A	13
SW-3	*Mitigate severe weather impacts to vulnerable populations through home repairs and distribution of critical supplies.*	↑	↑	↑	↑	□	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	N/A	N/A	N/A	15
Mitigation No.	***Goal 3, Minimize the losses of life and property due to Flooding in Plumas County***																				
FL-1	*Work with property owners in repetitive flood loss (RL) areas to identify the best alternative to flood proofing RL properties.*	↑	□	□	↑	↑	□	□	↑	↑	□	↑	↑	□	↑	□	□	↑	↑	↑	11
FL-2	*Develop and Maintain Storm Drainage Inventory Maps and database.*	↑	↑	↑	↑	↑	↑	□	↑	↑	↑	↑	↑	↑	↑	↑	↑	□	N/A	□	15
FL-3	*Continue countywide drainage system maintenance and clearing program.*	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	□	↑	↑	↑	↑	N/A	↑	17
FL-4	*Continue right-of-way and drainage easement permitting.*	↑	↑	↑	□	□	↑	↑	↑	↑	□	□	□	□	↑	↑	↑	↑	N/A	↑	12
FL-5	*Develop flood protection measures study for Plumas District Hospital.*	↑	↑	↑	↑	↑	↑	□	□	↑	↑	↑	↑	↑	↑	□	↑	↑	N/A	↑	15
FL-6	*Develop flood protection measures study for Plumas School District Office Structure (1908).*	↑	↑	↑	↑	↑	□	□	↑	↑	↑	↑	↑	↑	↑	□	↑	↑	N/A	↑	15
FL-7	*Work with Sierra Valley Christian School to evaluate flood risk.*	↑	↑	↑	□	□	↑	□	□	↑	↑	↑	↑	↑	↑	□	↑	↑	N/A	↑	13
FL-8	*Develop flood control enhancements for Henchels Drainage Area (Boyle's Creek).*	↑	□	↑	↑	↑	↑	□	□	↑	↑	↑	↑	□	↑	□	□	↑	↑	↑	13
FL-9	*Clear debris and vegitation from area behind Les Schawb.*	↑	□	↑	□	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	17
FL-10	*Evaluate Indian Valley for flooding issues in a localized setting.*	↑	↑	↑	↑	↑	↑	□	↑	↑	↑	↑	↑	↑	↑	□	↑	↑	↑	↑	17
Mitigation No.	***Goal 4, Minimize the losses of life and property due to Geologic Hazards in Plumas County***																				
LS-1	*Implement bank stabilization projects based upon criteria developed during HMP Risk Assessment for Landslide.*	↑	↑	□	↑	↑	□	□	↑	↑	↑	↑	↑	↑	↑	↑	↑	N/A	↑	↑	15
LS-2	*Implement landslide / rockslide railway risk reduction working group to share information and data.*	↑	□	↑	↑	□	□	□	↑	↑	□	↑	↑	↑	↑	↑	↑	N/A	↑	N/A	12
Mitigation No.	***Goal 5, Minimize the effects of Drought and Climate Change in Plumas County***																				
DRT-1	*Continue and enhance drought montioring programs through the County Agricultural Commissioners Office.*	↑	□	↑	□	↑	↑	↑	↑	↑	□	↑	↑	□	□	↑	↑	↑	N/A	↑	13
Mitigation No.	***Goal 6, Minimize the losses of life and property due to Dam Failure in Plumas County***																				
DF-1	*Develop reverse 911 System for Residents and Businesses in Dam Inundation Zones.*	↑	□	↑	↑	↑	↑	□	↑	↑	↑	↑	↑	↑	↑	□	↑	N/A	↑	N/A	14
DF-2	*Develop better dam inundation mapping all High Hazard dams within Plumas County*	↑	□	□	↑	↑	□	□	□	↑	↑	↑	□	□	↑	□	↑	N/A	↑	N/A	9
DF-3	*Evaluate hazardous material sites, shelters, day care centers, and other functional needs facilities for Dam Hazards.*	↑	□	↑	↑	↑	↑	□	↑	↑	↑	↑	↑	↑	↑	□	↑	N/A	↑	N/A	14

D.3 Mitigation Action Table

PLUMAS COUNTY 2013 HAZARD MITIGATION ACTION TABLE

Office of Emergency Services

No.	Hazard	Type	Specific Mitigation Strategy	Description	Responsible Parties	Funding Source	Time Line	Resources / Cost	Goals Addressed	STAPLEE SCORE
AH-2	All Hazard	PE&A	Assist Citizens and Business to participate in hazard mitigation activities.	Expand information & education to residents via Plumas County OES, fire departments, and Plumas County Fire Safe Council and other partner agencies. Identified agencies should continue to provide and expand informational and educational programs for residents, property owners, and communities. Projects can include: 1) Targeted Mailers from County to high-risk addresses. 2) PSA in Internet and Newspaper (Adjust per public survey). 3) Social Media Development (Need staff time). 4) Provide speakers to civil groups regarding hazard related activities. 5) Preparation and Distribution of Personnel Safety Kits (Updated from 2006 HMP to include current needs.)	PC OES	General Fund / EMPG	1-5 Yrs	$5,000 / YR (2013-2018)	ALL HAZARD GOAL	15
AH-1	All Hazard	PRV	Continue to enforce and enhance the California Building Codes and Plumas County regulations that reduce natural hazard risk.	County has adopted and enforces: The California Building Code The Uniform Code for Abatement of Dangerous Buildings The California Electrical Code The State Housing Law The California Mechanical Code The California Plumbing Code The California Fire Code	Planning and Building Services	UNKNOWN	ONGOING	UNKNOWN	ALL HAZARD GOAL	17
WF-8	Wildfire	ES	Construct alternate community escape routes for high risk communities.	In the Wildland Urban Interface. Communities, industrial landowners, along with local, state, and federal agencies should work collaboratively to identify and pursue funding to improve access for evacuations. Access communities for evacuations in and out of the community in the wildland urban interface (WUI) - A number of existing "at risk" communities in Plumas County presently only have "one way" in and out of their community. Evacuation planning - many of the County's communities have evacuation plans and identified evacuation assembly areas. Efforts by the County should continue to work towards providing plans to those communities without one. Based upon final evacuation planning efforts provide alternatives to constructing and or re-purposing existing routes to mitigate wildfire risk to communities.	PC SO, PC Public Works, Plumas County Fire Safe Council	PDM Grant	1-5 Yrs	$500,000 / Each Community with Access Issue	GOAL 1	11
WF-2	Wildfire	PRV	Evaluate Cultural Resources for Wildfire risk.	Cultural Resources located within the "Very High" Fire Hazard Severity Zone Include: ABBEY BRIDGE GUARD STATION, ALMANOR POST OFFICE, ANTELOPE HOUSE, CAMP ROGERS POST OFFICE, FANT GATHERING CORRAL, FLEMINGS SHEEP CAMP, JACKSON CREEK UNITED STATES FOREST SERVICE CABIN, LIGHTS CREEK GUARD STATION, OTIS RANCH, RHINEHART CABIN, RUFFA RANCH, SPRING GARDEN RANCH, THREEMILE GUARD STATION, WALKER MINE COMPRESSOR.	Planning Dept.	Misc. Grant Funding	1-5 Yrs	UNKNOWN	GOAL 1	16
WF-3	Wildfire	PRV	Develop and maintain a position for "County Fire Marshall"	Currently Plumas County Administrators cannot support a the position of "County Fire Marshall" to conduct Fire Inspections for Existing and New Buildings and communities. Fire Inspector's primary duties will be to develop and implement a fire inspection program. Duties also involve the enforcement of all applicable Fire Prevention, Laws, Regulations, Codes and Ordinances related to protection of life and property. The fire marshal position will also include evaluation of critical facilities, industrial sites and group camp sites in the "high" and "very high" Fire Hazard Severity Zones indicated in the PC HMP Risk Assessment Section.	PC OES	Mis. Grant Funding	1-5 Yrs	1 FTE for 2 years - 40 HRS a week. 1 Truck and Fuel for Truck. Salary Cost = $130,000	GOAL 1	15
WF-6	Wildfire	PRV	Create defensible Space assistance (PRC 4291) for Seniors, Disabled and Low Income Citizens.	Continue to seek funding assistance programs for PC FSC Defensible Space Assistance program for elderly & disabled citizens. Use HUD Section 8 program housing inspections perform defensible space consultations.	Plumas County Fire Safe Council, PC OES	PDM Grant	1-5 Yrs	UNKNOWN	GOAL 1	15
WF-4	Wildfire	PRV	Continue to expand Fire Protection Districts.	Implementation could be conducted with the formation of new districts, annexation to existing districts, or expansion of responsibilities of existing community service districts to include fire protection.	PC OES, Planning Dept, Fire Districts, LAFCo	UNKNOWN	1-5 Yrs	Minimum $10,000-$15,000 for LAFCO mapping changes.	GOAL 1	14
WF-7	Wildfire	PRV	Create homeowner incentives for fire safe house signing - to meet CA Fire Safe Standards (PRC 4290) criteria.	–Road, Address & House Signage: this factor is critical to agencies providing emergency services, not only for wildland fire purposes, but tall emergency vehicle access. Plumas County should strive to have all residences and communities meet CA Fire Safe Standards (PRC 4290) for road and address signage.	Plumas County Fire Safe Council	PDM Grant	1-5 Yrs	UNKNOWN	GOAL 1	12
WF-10	Wildfire	PRV	Develop Countywide implementation plan for PRC 4291 administration and enforcement.	Defensible Space Enforcement 0-100 feet (minimum) Enforcement of PRC 4291 (Defensible Space) in communities and the county is often difficult to obtain. While Public Resources Code 4291 requires that residents maintain at least 100 feet of defensible space, there are no mechanisms in place for uniform inspection obtaining compliance. Steps to Implementation May Include: 1) Develop processes to aid communities, fire districts, or other agencies in the enforcement of PRC 4291. 2) Explore homeowner incentives for Defensible Space Compliance - to make fire safe landscapes adjacent to homes.	PC OES, CAL FIRE	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 1	10
WF-1	Wildfire	NRP	Assess Plumas District Hospital property for possible fuel load reduction projects.	Area to the South of Plumas District Hospital should be thinned and cleared. Noted on Oct. Field Visit. Small wooded area owned by the hospital, south of should be evaluated for a hazardous fuel reduction assessment project.	Plumas County Fire Safe Council	PDM Grant	1-5 Yrs	$25,000	GOAL 1	18

WF-9	Wildfire	NRP	Continue community based Hazardous Fuel Reduction (HFR) projects to modify fire behavior.	Vegetation in and around Communities –at-Risk - While many communities have begun to develop Hazardous Fuel Reduction (HFR) projects, there is much untreated land between structures and in common areas throughout the county. Projects include fuel breaks around, &/or fuel reduction within, the community. Steps to get there: 1)Implement funded HFR projects 2) Continue to collaboratively pursue funding for community HFR projects. 3) Explore incentives for landowners to reduce hazardous fuels around property. 4) Explore incentives and opportunities for large landowners adjacent to communities to reduce hazardous fuels. 5) Support biomass utilization projects in Co such as cogeneration facilities or pellet plant. (Shelf-ready projects are on file with Plumas Fire Safe Council.)	Plumas County Fire Safe Council	PDM Grant	1-5 Yrs	UNKNOWN	GOAL 1	11
WF-11	Wildfire	PP	Expand and upgrade Quincy Airport to reduce flood risk.	Expand and upgrade Quincy Airport to provide Fire Protection Tankers a reliable and safe landing strip during times when air operations are critical from the Quincy Airport. Large portions of the Quincy Airport facilities and landing strip are within the FEMA identified flood plain. Flood mitigation messures should be made to flood proof or protect airstip from flooding. This airport is a critical resource the the community; the airport serves as a POD for supplies during large scale flooding, and provides support to air tankers during summer wildfire season.	PC Faclities, PC OES, PC Public Works	Federal Grants	5-10 Yrs	UNKNOWN	GOAL 1	14
WF-5	Wildfire	SP	Fund roof replacement projects for homeowners.	Roofing - Efforts should be made to eliminate all wood shake roofs in Plumas County. Shake roofs are a leading cause of home loss in wildfires. Continue Seeking Financial assistance programs for wood shake roof replacement - through Plumas County Housing Authority and Community Development Commission for qualifying individuals.	PC OES, Plumas County Fire Safe Council	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 1	14
SW-2	Severe Weather	PE&A	Create reverse 911 system capability for functional needs populations in remote locations.	Compile winter storm hazard mitigation information and post information through Public Service Announcements and reverse 911. Coordinate services announcements with supply locations and other emergency services.	PC OES	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 2	13
SW-1	Severe Weather	PRV	Develop rebate program to incentivize the installation of snow protectors on propane regulators.	Propane Tank Regulators exposed to falling snow, ice or branches may place homes at a risk of loss from propane explosions in the winter months. Educate residents on need for snow protectors over regulators - to protect them from being severed by snow, ice or branches.	Plumas County Fire Safe Council	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 2	13
SW-3	Severe Weather	SP	Mitigate severe weather impacts to vulnerable populations through home repairs and distribution of critical supplies.	Assist citizens with minor home repairs as an ongoing severe weather mitigation program. Use an outreach organization in Plumas County serving "in need" families by performing a variety of home repairs, snow removal, repairing egress areas, weather proofing, and propane regulator protection. Public Health to establish and locate food drop areas throughout the county during severe winter storms. Low Income Population and populations over age 65 in remote locations should be identified. Locate and designate PODS throughout Plumas County as well as CRDP for the main distribution locations for identified populations.	PC OES	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 2	15
FL-3	Flood	PRV	Continue countywide drainage system maintenance and clearing program.	Develop an inventory of drainage channels that require annual maintenance. Begin maintaining a record of the flood channel maintenance that is already being done but not recorded throughout the County. This includes maintenance conducted by the Californian Conservation Corps and other partner agencies. Creating and maintaining a record of this flood channel maintenance activity will provide true operational need and budgets required to implement drainage clearing program across the county.	Public Works	Public Works Operating Budget, Grant Funding	Ongoing	2 (1/4 FTE) for 5 years - 5200 HRS. 1 Truck and Fuel for Truck. $160,000	GOAL 3	17
FL-9	Flood	PRV	Clear debris and vegetation from area behind Les Schwab.	This area is located near or in the FEMA 100-YR Flood Zone. CCC cleared other areas associated with this drainage inlet hazard. Storm grate behind facility becomes clogged with debris causing water to overtop and flow into building. Typically only floods with major events, not large storms; recalled events were in 1986, 1993, and 1997. Overtopping waters also flow into a nearby home and businesses further downhill. Drainage improvements may reduce risk for local residents and business owners.	Public Works, Engineering	Public Works Operating Budget, Grant Funding	1-5 Yrs	UNKNOWN	GOAL 3	17
FL-2	Flood	PRV	Develop and Maintain Storm Drainage Inventory Maps and database.	Update and maintain GIS database and mapping system to include information on various infrastructure and systems/areas that are of benefit in pre-planning for emergencies or mitigation. Data can include: drainage inlets, culvert diameter, lengths material, invert elevations, crossings etc....	Planning (GIS) & Engineering	Public Works Operating Budget, Grant Funding	1-5 Yrs	One GIS personnel (1 FTE), One Computer and GPS Equipment: $100,000	GOAL 3	15
FL-4	Flood	PRV	Continue right-of-way and drainage easement permitting.	During easement permitting actions, considering emergency vehicle access and flood zone related issues in permitting decisions; including levee maintenance and access to private levees.	Public Works	Public Works Operating Budget, Grant Funding	Ongoing	UNKNOWN	GOAL 3	12
FL-10	Flood	PP	Evaluate Indian Valley for flooding issues in a localized setting.	This area is known to have repetitive flooding and a detailed flood study should be developed to explore concepts to reduce flood risk. As part of this effort evaluate Flood Proofing Alternatives for Mt. Hough Estates and Cresent Mills repetitive flood loss areas. County NFIP programs losses: NFIP Community Overview: FEMA has reported five (5) SL properties and one (1) RL property in Mt. Hough Estates. The SL properties account for	Engineering, Planning Department (GIS), and PC OES	UNKNOWN	1-5 Yrs	$150,000 for Flood Study and Mitigation Action alternative matrix and Cost Estimating	GOAL 3	17
FL-5	Flood	SP	Develop flood protection measures study for Plumas District Hospital.	This facility is located near or in the FEMA 100-YR Flood Zone. Flood studies should be conducted to develop alternatives to flood proofing measures. Flood proofing measures can include flood proofing hospital structure or enhancing the drainage system to meet 100-YR storm events. Storm grate on south side of West Main Street becomes	Public Works, Engineering, Plumas District Hospital	PDM Grant	1-5 Yrs	$50,000	GOAL 3	15
FL-6	Flood	SP	Develop flood protection measures study for Plumas School District Office Structure (1908).	This facility is located near or in the FEMA 100-YR Flood Zone. Flood studies should be conducted to develop alternatives to flood proofing measures. Flood proofing measures can include flood proofing school district structure or enhancing the drainage system to meet 100-YR storm events.	Facilities Services, Plumas Unified School District	PDM Grant	1-5 Yrs	$50,000	GOAL 3	15
FL-7	Flood	SP	Work with Sierra Valley Christian School to evaluate flood risk.	This facility is located near or in the FEMA 100-YR Flood Zone. Flood studies should be conducted to develop alternatives to flood proofing measures. Flood proofing measures can include flood proofing school district structure or enhancing the drainage system to meet 100-YR storm events.	OES	N/A		$50,000	GOAL 3	13
FL-8	Flood	SP	Develop flood control enhancements for Henchels Drainage Area (Boyle's Creek).	This facility is located near or in the FEMA 100-YR Flood Zone. This drainage area has been known to cause flooding damage at the Plumas School District Office, and other localized flooding. Survey, existing conditions evaluation and flood study should be conducted for the entire length of Boyle's Creek.	Public Works, Engineering	PDM Grant	1-5 Yrs	$100,000	GOAL 3	13

FL-1	Flood	SP	Work with property owners in repetitive flood loss (RL) areas to identify the best alternative to flood proofing RL properties.	The total dollar amount of claims paid to date by the NFIP is $420,770. to date. A RL property is a FEMA designation defined as an insured property that has made two or more claims of more than $1,000 in any rolling 10-year period since 1978. The following areas as described in HMP as RL areas should be evaluated for flood proofing measures: 1) Plumas Eureka Loss Area 2) American Valley Loss Area 3) Mt. Hough Estates Loss Area 4) Genesee Loss Area 5) Twain Loss Area 6) Sloat Loss Area 7) Other localized Areas	Planning and Building Services	UNKNOWN	Long Term	27 RL or SRL Properties. 15k per RL property = $405,000	GOAL 3	11
LS-1	Landslide	PRV	Implement bank stabilization projects based upon criteria developed during HMP Risk Assessment for Landslide.	Over 964 Miles of Roadway have been identified with "High" Landslide Risk as a result of the Plumas County HMP Risk Assessment. This data can be used to develop landslide mitigation projects in high hazard areas.	Public Works, Engineering, Planning Department (GIS)	UNKNOWN	1-5 Yrs	$10,000 / GIS personnel and equipment. Road crew verification of results.	GOAL 4	15
LS-2	Landslide	PRV	Implement landslide / rockslide railway risk reduction working group to share information and data.	Over 40 Miles of rail lines have been identified with "High" Landslide Risk. Use PC Risk Assessement information, to develop criteria for evaluating landslide risk to high hazard railway.	Public Works, Engineering, Planning Department (GIS),	UNKNOWN	1-5 Yrs	GIS personnel and equipment. Rail Crew verification of results.	GOAL 4	12
DRT-1	Drought & Climate Cha	NRP	Continue and enhance drought monitoring programs through the County Agricultural Commissioners Office.	Continue programs of having Agricultural Commissioner determine drought conditions causing severe effects on agricultural producers and notifying local OES and Board of Supervisors of emergency and preparing County Agricultural Commissioner Disaster Report and seeking implementation of USDA Emergency Loan Program.	Agricultural Commissioner, Emergency Services, Services Board of	N/A	Ongoing	Ag. Commissioner Position Training.	GOAL 5	13
DF-1	Dam Failure	ES	Develop reverse 911 System for Residents and Businesses in Dam Inundation Zones.	System in use, however can be programmed to include residents and business located within Dam Inundation Zones	PC OES, PC SO	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 6	14
DF-3	Dam Failure	ES	Evaluate hazardous material sites, shelters, day care centers, and other functional needs facilities for Dam Hazards.	The following facilities are located near or in a Dam Inundation Zones. 1) Shelters : GRAEAGLE COMMUNITY CHURCH, PORTOLA MEMORIAL HALL 2) Day Care Center: MOUNTAIN MONTESSORI PRESCHOOL 3) Assisted Living Facilities: HEAVENLY HOME 4) Propane Storage Sites: 1633- PORTOLA - SUBURBAN, AMERIGAS, BI-STATE PROPANE - HERITAGE PROPANE, HIGH SIERRA PROPANE	PC OES, PC SO	UNKNOWN	1-5 Yrs	75,000	GOAL 6	14
DF-2	Dam Failure	ES	Develop better dam inundation mapping for all High Hazard dams within Plumas County,	Work with dam owners and Cal EMA to integrate inundation zone mapping into EAPs. Must update NID record CA00530 to reflect closest community of Greenville, 2 miles away.	PC OES, Cal EMA, CA DWR, & Dam Owner	UNKNOWN	1-5 Yrs	UNKNOWN	GOAL 6	9

Appendix E.
Plan Maintenance

E.1 Mitigation Action Implementation Plans

E.2 Mitigation Action Progress Reports

E.3 Annual HMP Review Questionnaires

E.1 Mitigation Action Implementation Plans

E.1.1 Mitigation Action AH-2

Mitigation Action Description	
Action: Assist Citizens and Business to participate in hazard mitigation activities. **Description:** Expand information & education to residents via Plumas County OES, fire departments, and Plumas County Fire Safe Council and other partner agencies. Identified agencies should continue to provide and expand informational and educational programs for residents, property owners, and communities. Projects can include: 1) Develop targeted information such brochures, handouts, websites regarding various hazard mitigation issues and activities. 2) PSA in Internet and Newspaper (Adjust per public survey). 3) Social Media Development (Need staff time). 4) Provide speakers to civil groups regarding hazard related activities.	
Implementing Agencies	
Lead Agency (ies):	Plumas County OES
Roles and Responsibilities of Lead Agency (ies):	Develop Content and Media Campaigns
Support Agency (ies):	Community Service Districts, Local Churches and allied agencies based on mitigation activity
Roles and Responsibilities of Support Agency (ies):	Delivery and content of marketing collateral.
Preliminary Identified Tasks	
1-Develop subject for first outreach campaign	
2-Develop timetable for first outreach campaign	
3-Select media types	
4- Estimate cost of media types and select most cost effective solution	
Implementation Costs	
Estimated Capital Costs:	$5,000 for Printing,Mitigation Assistance materials and staff hours for media content development.
Estimated Maintenance Costs:	$5,000 / YR (2013-2018)

Implementation Resources	
Financial Resources (Funding):	EMPG / CSDs
Technical Assistance Resources:	Cal EMA
Materials Needed	
(Equipment, Vehicles, and Supplies):	**Readily Available (RA)/Need to Purchase (NTP)**
Printing Supplies	NTP
Paper	NTP
Hazard Mitigation marketing collateral from Cal EMA and FEMA	RA
Implementation Timeframe	
Estimated Mitigation Action Start Date:	Dec 2012
Estimated Mitigation Action Completion Date:	Yearly / On-Going

E.1.2 Mitigation Action WF-8

Mitigation Action:	
Action: Construct alternate community escape routes for high risk communities. **Description:** In the Wildland Urban Interface, communities, industrial landowners, along with local, state, and federal agencies should work collaboratively to identify and pursue funding to improve access for evacuations. Access communities for evacuations in and out of the community in the wildland urban interface (WUI) - A number of existing "at risk" communities in Plumas County presently only have "one way" in and out of their community. Evacuation planning - many of the County's communities have evacuation plans and identified evacuation assembly areas. Efforts by the County should continue to work towards providing plans to those communities without one. Based upon final evacuation planning efforts provide alternatives to constructing and or re-purposing existing routes to mitigate wildfire risk to communities.	
Implementing Agencies	
Lead Agency (ies):	PC Public Works
Roles and Responsibilities of Lead Agency (ies):	Develop design and Cost Estimates for Secondary Access Roads
Support Agency (ies):	PC SO, Plumas County Fire Safe Council, local fire departments
Roles and Responsibilities of Support Agency (ies):	Develop list of communities needing secondary access routes.
Preliminary Identified Tasks	
1-Develop prioritization criteria for communities requiring secondary access.	
2-Crossreference communities with CWPPs and Fire Safe Council Personnel	
3-Determine routes and develop preliminary survey of site.	
4-Develop Primary Engineering Designs (PEDs) and cost estimates of particular segments.	
5-Determine on-sight environmental constraints if any and determine environmental documentation requirements.	
Implementation Costs	
Estimated Capital Costs:	$500,000 per community.
Estimated Maintenance Costs:	N/A
Implementation Resources	
Financial Resources (Funding):	HMGP
Technical Assistance Resources:	Survey, Cost Estimating.

Materials Needed	
(Equipment, Vehicles, and Supplies):	**Readily Available (RA)/Need to Purchase (NTP)**
Survey Crew	RA
Field Vehicles	RA
Heavy and Light Construction Equipment	RA (Complete List and Cost for mobilization shall be completed by Public Works.)
Implementation Timeframe	
Estimated Mitigation Action Start Date:	2014
Estimated Mitigation Action Completion Date:	2018

E.1.3 Mitigation Action FL-10

Mitigation Action	
Action: Evaluate Indian Valley for flooding issues in a localized setting. **Description:** This area is known to have repetitive flooding and a detailed flood study should be developed to explore concepts to reduce flood risk. As part of this effort evaluate Flood Proofing Alternatives for Mt. Hough Estates and Crescent Mills repetitive flood loss areas. County NFIP programs losses: NFIP Community Overview: FEMA has reported five (5) SL properties and one (1) RL property in Mt. Hough Estates. The SL properties account for $120,479 in claims and the RL property accounts for $43,457 in claims.	
Implementing Agencies	
Lead Agency (ies):	Plumas County OES
Roles and Responsibilities of Lead Agency (ies):	Project Scope and Definition Development
Support Agency (ies):	Public Works
Roles and Responsibilities of Support Agency (ies):	Grant Application Development and Submittal / Cost Estimating
Preliminary Identified Tasks	
1.- Develop Outline / Project Management Plan for Flood Risk Reduction in Indian Valley	
2- Gather flood study material from Federal, State and Local Resources. This includes FEMA Flood Insurance Study Text, DWR Flood Gauge Data and other hydrologic and hydraulic Studies	
3- Access Flows in the Area	
4- Determine flood elevations and the floodway (via a hydraulic analysis)	
5 -Determine Elevation of Repetitive Loss Properties	
6 – Develop a list of possible flood proofing methods and weigh the alternatives of each	
7- Develop Cost estimates for each preferred alternative	
8- Develop a Benefit Cost Analysis for each alternative	
9- Develop application for FEMA Flood Management Assistance (FMA) and other grant opportunities through the HMA program.	

Implementation Costs	
Estimated Capital Costs:	$150,000 for Flood Study and Mitigation Action alternative matrix and Cost Estimating
Estimated Maintenance Costs:	$20,000 each year for Flood Proofing Public Assistance.
Implementation Resources	
Financial Resources (Funding):	Staff Time and Current Operational Budgets for Steps 1 through 9 listed above.
Technical Assistance Resources:	H&H Technical Personnel, Survey Team, Cost Estimating
Materials Needed	
(Equipment, Vehicles, and Supplies):	**Readily Available (RA)/Need to Purchase (NTP)**
Survey Crew	RA
hydrologic and hydraulic software tools	NTP
RS Means Cost Estimating Software	NTP
Implementation Timeframe	
Estimated Mitigation Action Start Date:	Summer 2015
Estimated Mitigation Action Completion Date:	Summer 2016

E.1.4 Mitigation Action LS-1

Mitigation Action	
Action: Implement bank stabilization projects based upon criteria developed during HMP Risk Assessment for Landslide. **Description:** Over 964 Miles of Roadway have been identified with "High" Landslide Risk as a result of the Plumas County HMP Risk Assessment. This data can be used to develop landslide mitigation projects in high hazard areas.	
Implementing Agencies	
Lead Agency (ies):	Plumas County Public Works
Roles and Responsibilities of Lead Agency (ies):	Criteria Development
Support Agency (ies):	Planning Department
Roles and Responsibilities of Support Agency (ies):	Data Maintenance
Preliminary Identified Tasks	
1- Refine Plumas County HMP GIS data for use in Plumas County Public Works Operations	
2- Develop Criteria and Road Priority Matrix	
3- Evaluate Sections of Road based from Step 2 for bank stabilization projects.	
4 – Develop list of possible bank stabilization methods and weigh the alternatives of each	
5- Develop Cost estimates for each preferred alternative	
6- Develop a Benefit Cost Analysis for each alternative	
7- Develop applications information for grant opportunities through Federal and State programs.	
Implementation Costs	
Estimated Capital Costs:	$10,000
Estimated Maintenance Costs:	UNKNOWN
Implementation Resources	
Financial Resources (Funding):	State Highway Funding, Public Works Operational Budgets
Technical Assistance Resources:	Cal Trans, California Geological Survey

Materials Needed	
(Equipment, Vehicles, and Supplies):	**Readily Available (RA)/Need to Purchase (NTP)**
Computer Equipment with GIS	RA
Field Survey Crew with Vehicle	RA
Implementation Timeframe	
Estimated Mitigation Action Start Date:	Summer 2014
Estimated Mitigation Action Completion Date:	Summer 2015

E.1.5 Mitigation Action DRT-1

Mitigation Action	
Action: Continue and enhance drought monitoring programs through the County Agricultural Commissioner's Office. **Description:** Continue programs of having Agricultural Commissioner determine drought conditions causing severe effects on agricultural producers and notifying local OES and Board of Supervisors of emergency and preparing County Agricultural Commissioner Disaster Report and seeking implementation of USDA Emergency Loan Program.	
Implementing Agencies	
Lead Agency (ies):	Plumas County Ag Commissionaire
Roles and Responsibilities of Lead Agency (ies):	Localized Drought Reporting
Support Agency (ies):	Plumas County OES, Plumas County Planning
Roles and Responsibilities of Support Agency (ies):	Reporting Drought Conditions to Public and BOS
Preliminary Identified Task	
1- Identify various indicators of drought through other drought monitoring agencies such as NOAA the U.S. Drought Monitoring Services and through California DWR. Various indicators include such as rainfall, snowpack, stream flow, and more	
2 – Work thru landowners with ground water wells to develop county wide ground water monitoring program. This can include the development of mitigation grants for well monitoring equipment.	
3- Track drought indicators from Step 1 and 2 to monitor drought and determine warning thresholds.	
4- Develop Public Announcements on Drought Conditions and Post to Media Outlets	
5- Develop method to inform BOS earl and often regarding drought conditions	
6- Record Crop Losses if any from local growers.	
7- If conditions persist, develop emergency declaration information in support of BOS.	
Implementation Costs	
Estimated Capital Costs:	24 well head monitoring devices. 2k for Installation and Parts $48K for equipment and monitoring unit at county building

Estimated Maintenance Costs:	$5,000 a year for well head monitoring equipment repair and gas for field operations.
Implementation Resources	
Financial Resources (Funding):	Federal Funding Needed
Technical Assistance Resources:	
Materials Needed	
(Equipment, Vehicles, and Supplies):	**Readily Available (RA)/Need to Purchase (NTP)**
Well Head Monitoring Devices	NTP
Vehicle for Field Monitoring	RA
Implementation Timeframe	
Estimated Mitigation Action Start Date:	Summer 2014
Estimated Mitigation Action Completion Date:	Summer 2018

E.2 HMP Mitigation Action Progress Report

Action _____ Progress Report

Progress Report Period:_____ to _____

(date) (date)

Project Title:_____ Project ID#_____

Responsible Agency:_____

Address:_____

City:_____

Contact Person:_____

Phone#: _____ email address:_____

List Supporting Agencies and Contacts:_____

Total Project Cost:_____

Funding Source:_____

Anticipated Cost Overrun/Underrun:_____

Date of Project Approval:_____ Start date of the project:_____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase):_____

Milestones	Completed (✓)	Projected Date of Completion

MHMP Goal Addressed: _____

Indicator of Success:_____

_____

_____

_____

Project Status

□ Project on schedule

□ Project completed

□ Project delayed*

*explain _____

_____

□ Project cancelled*

*explain _____

_____

Project Cost Status

□ Cost unchanged

□ Cost overrun*

*explain_____

_____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

_____

_____

B. What successes have you encountered, if any?

_____

_____

_____

C. What obstacles, problems, or delays have you encountered, if any?

_____

D. How was each problem resolved?

E. Based on the past experiences (successes and obstacles), what changes, if any, need to be made to ensure completion?

Next Steps: What are the next step(s) to be accomplished over the next reporting period?

Other Comments:

E.3 Annual HMP Review Questionnaires

Annual MHMP Review Questionnaire

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Have there been local staffing changes that would warrant inviting different members to the planning team?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done more efficiently?			
	Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the implementation team?			
	Has the Steering Committee undertaken any public outreach activities regarding the MHMP or implementation of mitigation actions?			
HAZARD PROFILES	Has a natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this MHMP and should be?			
	Are additional maps/data or new hazards studies available? If so, what have they revealed?			

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
VULNERABILITY ANALYSIS	Do any new critical facilities or infrastructure need to be added to the asset lists?			
	How will the vulnerability analysis be affected by additional maps/data or new hazard studies?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
	Has the vulnerability analysis changed as a result of the implementation of mitigation actions?			
MITIGATION STRATEGY	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Is the goal still applicable?			
	Should new mitigation actions be added to the Mitigation Action Plan?			
	During implementation of the mitigation actions, what has proven effective? What has proven not effective?			
	Do existing mitigation actions listed in the Mitigation Action Plan need to be reprioritized deleted, or revised?			
	Are the mitigation actions listed in the Mitigation Action Plan appropriate for available resources?			

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING MECHANISMS	Has the Mitigation Action plan been incorporated into existing planning mechanisms? If yes, please list what other planning mechanisms and in what way.			
	Has the Mitigation Action plan incorporated existing planning mechanisms? If yes, please list these existing planning mechanisms and what elements were incorporated and how.			

Plumas County Resolution Number 14-7995

A RESOLUTION ADOPTING THE 2014 PLUMAS COUNTY HAZARD MITIGATION PLAN

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan recognizes the threat that natural hazards pose to people and property of Plumas County; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the Federal Emergency Management Agency (FEMA) a mitigation plan that outlines processes for identifying natural hazards, risks, and vulnerabilities, and

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan acknowledges the requirements of Section 322 of DMA 2000 to have an approved plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan has been developed by the Plumas County Office of Emergency Services in cooperation with other county departments, local officials, and the citizens of Plumas County, and

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards,

NOW, THEREFORE, BE IT RESOLVED, that Plumas County adopts the 2014 Plumas County Hazard Mitigation Plan as an official plan; and the respective officials and agencies identified in the implementation strategy of the plan are hereby empowered to implement the recommended activities assigned to them.

BE IT FURTHER RESOLVED, Plumas County will submit this Adoption Resolution to the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials to enable the Plan's final approval.

The forgoing resolution was duly passed and adopted by the Board of Supervisors of the County of Plumas, State of California at a regular meeting of the Board of Supervisors on August 19, 2014 by the following vote:

Ayes: SUPERVISORS THRALL, GOSS, SIMPSON, KENNEDY

Noes: NONE

Absent: SUPERVISOR SWOFFORD

Abstain: NONE

Chair, Board of Supervisors

Attest:

Clerk of the Board of Supervisors

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

RECEIVED
JUN 27 2014
Plumas County
Environmental Health

June 18, 2014

Jerry Sipe
Director
Plumas County Office of Emergency Services
270 County Hospital Road #127
Quincy, California 95971

Dear Mr. Sipe:

We have completed our review of the *Plumas County Hazard Mitigation Plan,* and have determined that this plan is eligible for final approval pending its adoption by Plumas County.

Formal adoption documentation must be submitted to the Regional office by the lead Jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. We will approve the plan upon receipt of the documentation of formal adoption.

If you have any questions regarding the planning or review processes, please contact Phillip Wang, Hazard Mitigation Planner at (510) 627-7753, or by email at phillip.wang@fema.dhs.gov.

Sincerely,

Jeffrey D. Lusk
Acting Director
Mitigation Division
FEMA Region IX

cc: Kirby Everhart, California State Hazard Mitigation Officer
Jose Lara, California Office of Emergency Services, Mitigation Planning

BOARD AGENDA REQUEST FORM

Department: Office of Emergency Services

Authorized Signature: _____

Board Meeting Date: August 19, 2014

Request for 5 minutes for presentation

(If a specific time is needed, please contact the Clerk of the Board directly.)

Consent Agenda: ☐ Yes ☑ No

Description of Item for the Agenda (This is the wording that should appear on the agenda):

A. Approve a resolution adopting the 2014 Plumas County Hazard Mitigation Plan

B.

C.

Review by Necessary Departments:

I have had this item reviewed and approved by the following departments:

County Counsel

If another department or the CAO is opposed to an agenda item, please indicate the objection:

Attached Documents:

Contracts/Agreements:
Three copies? (Y☐/N☐)
Signed? (Y☐/N☐)

Budget Transfers Sheets:
Signed? (Y☐N☐)

Other: _____

Publication:

☐ Clerk to publish on _____.
☐ Notice to be published ____ days prior to the hearing.
☐ Notice attached and e-mailed to Clerk.
_____ (if a specific newspaper is required, enter name here.)
☐ Dept. published on _____ (Per Code §_____).
☐ Copy of Affidavit Attached.

County Ordinances-Procedural Requirements for Adoption, Amendment or Repeal:

I have complied with the policy adopted by the Board regarding County Ordinances Procedural Requirements:

Yes: ☐ No: ☐ Not Applicable: ☐

If Not Applicable, please state reason why:

The deadline to place an item on the agenda for the following week's board meeting is Monday at 12:00 p.m. If the Monday deadline falls on a holiday, the deadline is then the Friday before the Holiday.

Plumas County Office of Emergency Services

270 County Hospital Road #127
Quincy, California 95971

Phone: (530) 283-6332
Fax: (530) 283-6241

Date: August 1, 2014

To: Honorable Board of Supervisors

From: Jerry Sipe

RE: Agenda Item for August 19, 2014

Recommendation: Approve a Resolution Adopting the 2014 Plumas County Hazard Mitigation Plan.

Background and Discussion: The Plumas County Hazard Mitigation Plan (HMP) is the official statement of the County's commitment to preventing and minimizing the effects of natural disasters. This plan identifies natural hazards most likely to affect the County and establishes goals and priorities to lessen their impacts.

As required by the federal Disaster Mitigation Act of 2000, local jurisdictions must update their plans every 5 years. Maintaining a current plan also keeps the county eligible for post-disaster mitigation funding. As the Board will recall, the Office of Emergency Services retained a consultant, Baker Incorporated, to evaluate the hazards and update our plan. Last June, this plan was approved by the Board for submittal to Cal OES and the Federal Emergency Management Agency (FEMA). As stated in the attached letter from FEMA dated June 18, 2014, the updated Plumas County Hazard Mitigation Plan meets the state and federal standards and will be approved pending formal adoption by this Board.

At this time, the Board is asked to approve a resolution adopting the 2014 Plumas County Hazard Mitigation Plan. The draft HMP (pending Board adoption and FEMA final approval) is available for download at http://countyofplumas.com/index.aspx?NID=2218

If you have any questions, please do not hesitate to contact me at 283-6367. Thank you.

enclosures

Plumas County Resolution Number _____

A RESOLUTION ADOPTING THE 2014 PLUMAS COUNTY HAZARD MITIGATION PLAN

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan recognizes the threat that natural hazards pose to people and property of Plumas County; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the Federal Emergency Management Agency (FEMA) a mitigation plan that outlines processes for identifying natural hazards, risks, and vulnerabilities, and

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan acknowledges the requirements of Section 322 of DMA 2000 to have an approved plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan has been developed by the Plumas County Office of Emergency Services in cooperation with other county departments, local officials, and the citizens of Plumas County, and

WHEREAS, the 2014 Plumas County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards,

NOW, THEREFORE, BE IT RESOLVED, that Plumas County adopts the 2014 Plumas County Hazard Mitigation Plan as an official plan; and the respective officials and agencies identified in the implementation strategy of the plan are hereby empowered to implement the recommended activities assigned to them.

BE IT FURTHER RESOLVED, Plumas County will submit this Adoption Resolution to the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials to enable the Plan's final approval.

The forgoing resolution was duly passed and adopted by the Board of Supervisors of the County of Plumas, State of California at a regular meeting of the Board of Supervisors on August 19, 2014 by the following vote:

Ayes:

Noes:

Absent:

Abstain:

_____

Chair, Board of Supervisors

Attest:

_____

Clerk of the Board of Supervisors

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

RECEIVED
JUN 27 2014
Plumas County
Environmental Health

June 18, 2014

Jerry Sipe
Director
Plumas County Office of Emergency Services
270 County Hospital Road #127
Quincy, California 95971

Dear Mr. Sipe:

We have completed our review of the *Plumas County Hazard Mitigation Plan,* and have determined that this plan is eligible for final approval pending its adoption by Plumas County.

Formal adoption documentation must be submitted to the Regional office by the lead Jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. We will approve the plan upon receipt of the documentation of formal adoption.

If you have any questions regarding the planning or review processes, please contact Phillip Wang, Hazard Mitigation Planner at (510) 627-7753, or by email at phillip.wang@fema.dhs.gov.

Sincerely,

Jeffrey D. Lusk
Acting Director
Mitigation Division
FEMA Region IX

cc: Kirby Everhart, California State Hazard Mitigation Officer
Jose Lara, California Office of Emergency Services, Mitigation Planning

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

September 15, 2014

Gerald Sipe
Director
Plumas County Office of Emergency Services
270 County Hospital Road #127
Quincy, California 95971

Dear Mr. Sipe:

We have completed our final review of the *Plumas County Hazard Mitigation Plan,* officially adopted by Plumas County, California on August 19, 2014, and found the plan to be in conformance with Title 44 Code of Federal Regulations (CFR) Part 201.6 *Local Mitigation Plans.*

The approval of this plan ensures Plumas County continued eligibility for project grants under FEMA's hazard mitigation assistance programs, including Hazard Mitigation Grant Program, Pre-Disaster Mitigation and Flood Mitigation Assistance grant programs. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted. Approved mitigation plans are eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at *www.fema.gov/business/nfip/crs.shtm* or through your local floodplain manager.

FEMA's approval of the *Plumas County Hazard Mitigation Plan* is for a period of five years, effective starting the date of this letter. Prior to September 15, 2019, Plumas County is required to review and revise the plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding. The enclosed plan review tool provides additional recommendations to incorporate into the plan during the plan maintenance process.

If you have any questions regarding the planning or review processes, please contact Phillip Wang, Hazard Mitigation Planner at (510) 627-7753, or by email at phillip.wang@fema.dhs.gov

Sincerely,

Jeffrey D. Lusk
Division Director
Mitigation Division
FEMA Region IX

Enclosure

cc: Gina Buccieri-Harrington, Acting State Hazard Mitigation Officer
Jose Lara, Chief, Hazard Mitigation Planning