Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan (MHMP)

Including the participating jurisdictions of the City of Marysville, City of Wheatland and the Yuba County Water Agency

Final March 2015

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Acknowledgements

Howell Consulting would like to thank those Departments and Agencies who participated in the planning and development of this document, particularly Scott Bryan, Yuba County Office of Emergency Services.

The official Yuba County Multi-jurisdictional Local Hazard Mitigation (MHMP) Planning Team provided the oversight and dedication to this project that was required and without their commitment; this project would not be possible. The Planning Team members are as follows:

MHMP Planning Team Members

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As with any working plan, this revision represents planning strategies and guidance as understood as of the date of this plan's release. This plan identifies natural hazards and risks and identifies the hazard mitigation strategy to reduce vulnerability and should assist the communities of Yuba County to be more disaster resistant and sustainable.

Formal Plan Adoption Documentation

Yuba County and the following jurisdictions City of Marysville, Wheatland and the Yuba County Water Agency will submit this 2014 Yuba County Multi-jurisdictional Local Hazard Mitigation Plan (MHMP) to the Yuba County Board of Supervisors and the jurisdictional Boards and Councils upon successful completion of state and federal review and conditional approval. Yuba County wishes to receive approval pending adoption. The plan will be submitted to the Board of Supervisors/jurisdictional Boards/Councils as a regularly scheduled agenda item with room for additional public and departmental comment.

Our approach to this final element is due to the need to remain cost effective in the planning process. The resolution will be inserted immediately after this page and before the table of contents. As part of the agenda report, the basic requirements for the plan, the scope of the document and the need to revise every five years, will be clearly stated.

(Resolution from Yuba County and participating jurisdictions seeking formal approval inserted here)

Introduction and Overview

Purpose of Plan

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

The Federal Emergency Management Agency (FEMA) has made reducing losses from natural disasters one of its primary goals. Hazard mitigation planning and subsequent implementation of projects, measures, and policies developed through those plans, is the primary mechanism in achieving these goals. Mitigation planning has resulted in the implementation of projects that have successfully reduced disaster damages.

This revised plan was developed pursuant to the regulations of the Disaster Mitigation Act (DMA) of 2000. The DMA revises the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding Section 322, which provides new and revitalized emphasis on hazard mitigation, including a new requirement for local mitigation plans. These new local mitigation-planning regulations are implemented through 44 CFR Part 201.6.

The DMA requires state and local governments to develop multi-hazard mitigation plans to maintain their eligibility for certain federal disaster assistance and hazard mitigation funding programs. Communities at risk from natural disasters cannot afford to jeopardize this funding.

More importantly, proactive mitigation planning at the local level can help reduce the cost of disaster response and recovery to property owners and government by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. Yuba County and its participating jurisdictions the City of Marysville, Wheatland and the Yuba County Water Agency have been affected by several disasters in the past and are committed to reducing disaster impacts and maintaining eligibility for federal mitigation grant funding.

What's New in the 2014 Hazard Mitigation Plan?

This plan update involved a comprehensive review and update of each section of the 2007 plan and includes an assessment of the success in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan. In fact, based in part on the issuance of the new October 1, 2011 Local Mitigation Plan Review Guide, the 2007 plan has been reorganized, updated, and rewritten in its entirety. Only the information and data still valid from the 2007 plan was carried forward as applicable into this plan update.

AB 2140 Compliance

The revised and updated plan was prepared in coordination with the Yuba County Health and Safety Element of the Yuba County General Plan, as the planning effort has many common overlapping issues. The 2014 plan and the General Plan, Public Health & Safety Element are considered complimentary documents that address natural hazards and works toward

enhancing mitigation efforts.

Natural Hazards Focus

The Planning Team for this planning cycle agreed by consensus to only address natural hazards. This differs from the 2007 planning process, which addressed technological and human-caused hazards. This decision slightly changed the overall goals and objectives listed in the 2007 plan and those have been updated accordingly.

Update on 2007 Mitigation Projects

Yuba County and its various communities have been very successful in implementing actions identified in the 2007 Plan Mitigation Strategy, thus, working diligently towards meeting their 2007 goals. Some of those goals and success stories are listed below.

Success Stories

Levee Improvements

A majority of all the levee improvement projects listed in the 2007 plan have been completed. The Three Rivers Levee Improvement Agency (TRLIA) has led this effort with many contributing partners. Their success shows the County and participating jurisdictions dedication to the goals and objectives set forth in their mitigation efforts

Public Education and Awareness Program

During the last several years, the Yuba County Public Works, Community Rating System Coordinator, the Office of Emergency Services together with the Yuba County Water Agency continued an aggressive public outreach campaign to raise awareness of the flood hazards facing Yuba County, the flood safety and property protection measures appropriate for these flood hazards, flood-related public information activities implemented within the community, and the anticipated revision of the Flood Insurance Rate Maps (FIRMs) covering all of Yuba County. This annual report evaluates the projects implemented under this public outreach strategy. Overall, the outreach is considered to have been extremely effective, and was comprised of the following elements:

- Letters mailed directly to owners of over 1,500 properties located within the floodplain areas;
- Special workshops held for local government officials; engineers, builders & developers; real estate agents, insurance agents and lenders;
- Newspaper interviews and articles published in the local papers;
- Appearances before the Yuba County - Board of Supervisors (all broadcasted on public access channel);
- Internal training for County staff;
- Public Awareness Month (October); and
- Various public outreach letters required under the Community Rating System.

The County wants to continue this effort and add enhancements to the public outreach campaign and website for the upcoming planning period. This mitigation activity will be continued and has been completed for the 2007 planning cycle. In addition, these success stories show the integration of the requirements of the local hazard mitigation planning process into other planning mechanisms (Element C6.)

Goals and Objectives

The process of developing the Yuba County MHMP and the participating jurisdictions requires collaboration with federal, state and local governmental agencies and special districts. Information and the process required for the development of the MHMP were provided by the participating agencies and stakeholders.

This plan, which is a living document, will be used to guide hazard mitigation planning and strategies in Yuba County. The planning process provided for the collaboration and participation among stakeholders for the development of the MHMP adopting the following Mission Statement:

> *To prevent losses by identifying and implementing hazard mitigation strategies and projects to reduce and eliminate long-term risk to people, property and the environment.*

The Planning Team voted to retain the goals and objectives for the most part listed in the 2007 plan to ensure consistency for the projects carried over from that plan into this planning effort. The only minor change made to the goals was the removal of the wording "man-made hazards" as this planning effort will only examine the natural hazards in Yuba County and its participating jurisdictions. Overall, the goals and objectives were still consistent with the direction of the county regarding mitigation efforts and based upon the risk assessment completed. Those goals are as follows:

1. Prevent personal injury, loss of life, and damage to property and the environment from natural hazards;
2. Promote public awareness and understanding of natural hazards and the risks they present to quality of life and the economy;
3. Enhance the ability of Yuba County and participating jurisdictions to respond to the effects of hazards on people, property, and the environment;
4. Continue to support partnerships with private and public sector agencies, businesses, and organizations to further comprehensive planning and implementation of mitigation measures;
5. Encourage individual responsibility from Yuba County residents for their exposure to natural hazards and the risk they present to life, property, and the environment; and
6. Continue the hazard mitigation planning process in support of the Disaster Mitigation Act 2000 by:

    - Organizing and Identifying Resources
    - Assessing Risks and Vulnerabilities
    - Identifying Hazard Mitigation Measures
    - Updating Mitigation Plans

Scope

Hazard mitigation is defined as sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Hazard mitigation planning is the process through which hazards that threaten communities are identified; likely impacts are determined, prioritized and implemented. This revised plan continues the natural hazard mitigation planning process for

Yuba County and participating jurisdictions including the Cities of Marysville, Wheatland and the Yuba County Water Agency. The updated plan identifies natural hazards and risks within Yuba County and identifies the hazard mitigation strategy to reduce vulnerability and make the communities of Yuba County more disaster resistant and sustainable. Information in this plan can be used to help guide and coordinate mitigation activities and local land use decisions.

Yuba County and participating jurisdictions initially developed this hazard mitigation plan to reduce future losses to the County and its communities resulting from natural hazards. The revised plan also was prepared to meet the evolving requirements of the Disaster Mitigation Act of 2000 and FEMA working programs – Including but not limited to the FEMA Hazard Mitigation Grant programs: Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA) and the Hazard Mitigation Grant Programs (HMGP) and in addition to meet the subsequent changes to the FEMA local planning guidance and revised FEMA crosswalks.

The Yuba County Local Hazard Mitigation Plan continues to be a multi-jurisdictional plan that covers the following local governments who participated in the planning process:

- Yuba County
- City of Marysville
- City of Wheatland
- Yuba County Water Agency

The planning process followed and continues the methodology prescribed by FEMA, which began with the formation of a Local Hazard Mitigation Planning Team comprised of key stakeholders from Yuba County, participating jurisdictions, and state and invited federal agencies. The Planning Team conducted a revised risk assessment to examine the recorded history of losses resulting from natural hazards, assess probability and magnitude of future hazard events, and analyze the county's assets at risk to hazards. The risk assessment indicated that floods, wildfire, severe weather and earthquakes are the hazards most likely to significantly affect people and property in the county. Planning Team members are listed in **Table A2**.

County Overview

Geography

Yuba County is located in the northern Sacramento Valley, approximately 40 miles north of the State Capital in Sacramento (see county map on the following page). Its boundaries stretch from the farms and orchards of the valley to the timberlands of the Sierras. Fifty–seven miles in length and 22 miles at its widest point, Yuba County encompasses 644 square miles. The County has a varied geography, which includes the Yuba, Feather and Bear Rivers, forested mountains, wooded foothills, streams, lakes, and agricultural croplands that vary from orchards and vineyards to large rice farms. Elevations range from 20 feet above sea level in the South County to nearly 4,820 feet in northern Yuba County.

County of Yuba

Weather

The climate in Yuba County is considered Mediterranean and cycles through a cool rainy winter season and a dry summer season. Summers are hot and dry and winters are cool and wet, with most of the year's rain falling from late October through early April. While the higher County

elevations receive snow, snowfall is rare at the lower elevations.

Precipitation increases with elevation in Yuba County. The total annual precipitation is 21.04 at Marysville, in the eastern extreme of the county at an elevation of 65 feet. While the majority of precipitation falls in the autumn and winter months, nearly 34 percent usually falls in March through October. Thunderstorms occur on about 5 days each year, and most often occur in April.

The prevailing winds in Marysville are usually from the southwest and the average wind speed is highest (approximately 9.8 miles per hour) in June. The southwesterly winds in the valley result from the north–south orientation and heating of the valley floor, which deflect the westerly winds coming through the Carquinez Straits northward. Strong northerly winds occasionally occur.

History

Yuba County was named for the Yuba River by Captain John Sutter. The County is one of the original 28 counties in California, incorporated in 1850 at the time of California's statehood. Yuba County was created to function both as a local government and as an arm of the State of California providing services to the people of the county. The population in the County in the 1850's was over 60,000.

The County has a rich and colorful history dating back to the California Gold Rush. The historic town of Marysville was founded in 1851 and was the gateway for gold miners to the Mother Lode. Of significance in California history is Marysville's standing as the third largest city in 1852, after San Francisco and Sacramento. The City of Wheatland, geographically positioned at the only crossing of the Bear River, was incorporated by an Act of the Legislature in 1874.

The strategic location of the Yuba Basin and the confluence of the Yuba, Feather and the Bear Rivers have provided valuable resources yet continues to plague the County with a history of flood disasters. The county's history of disasters dates back to the Native Americans who relocated their camps to higher ground during the rainy season. Hydraulic mining during the Gold Rush Era filled rivers and streams with debris, adding to the flooding. The legendary floods of 1862 and 1866 emphasized the need to develop systems to protect lives and property. In 1862 the first levees were built to protect the City of Marysville, and by 1875 Marysville began to surround itself with levees. Hydraulic mining methods used high-pressure streams of water to wash away ancient, gold bearing river channel deposits hundreds of feet thick. The clay, silt, sand, gravel and cobbles were washed in sluice tunnels, which drained the hydraulic pits. These "tailings" were dumped into streams and rivers. From 1860 to 1890 several hydraulic mines in the Yuba River watershed generated millions of cubic yards of tailings, which choked the Yuba River and caused flooding of farmlands down river. In 1884 the dumping of hydraulic mine tailings into drainages was prohibited. As a result, this method of mining became uneconomical and all

hydraulic mines shut down by the early 1900's.

The picture on the previous page is believed to be flooding from the winter of 1866-1867. The Catholic Cathedral pictured on the right side of the street was built in 1855 and still stands today.

Geopolitical Jurisdiction

Yuba County Government

Yuba County operates under the California Government Code and was established in 1850 as one of the original California counties. The Yuba County Board of Supervisors is the policymaking legislative body of the County. The Board's five members are elected by district and serve on a part-time basis. The Board sets tax levies, makes appropriations, and adopts and approves the annual operating and capital budgets for the County.

Every County citizen, including city residents, has an opportunity to vote for County-elected officials. Day-to-day operations in Yuba County are managed by the County Administrator. Department heads run each department and report to the County Administrator. Elected officials who also serve as department heads do not report to the County Administrator. Some appointed positions, such as the Public Health Officer, report directly to the Board of Supervisors.

Yuba County provides regional services to all residents of the County, including people who live in cities. These include courts and related legal services, property tax appraisals and collections, criminal detention, rehabilitative services, public health care, records and elections, flood control, and water quality. In unincorporated communities, the County provides additional local services such as building and land use development, emergency management fire code enforcement, police protection, road construction and maintenance, and animal control. Other local services in unincorporated communities are provided by fire, utility, reclamation, irrigation, and water districts, which operate independently of County government.

The majority of Yuba County's funding is derived from taxes and charges for services. Other revenues include licenses and permits, intergovernmental revenue, federal grants (direct and indirect), federal shared revenues, state grants, state shared revenues, state entitlements, grants from local units, intergovernmental payment, fines and forfeits, and miscellaneous revenue. The picture to the left shows the Yuba County Government Center in Marysville.

Incorporated Cities

Yuba County has two incorporated cities: the City of Marysville and the City of Wheatland. Both

Cities are governed by elected city councils.

Marysville
The City of Marysville, the county seat of Yuba County, is one of California's historic cities. Its history as a community dates back to the Gold Rush days when the city was formally established in 1851. The city was once the third largest city in the State of California. Strategically located 40 miles north of Sacramento, Marysville is at the crossroads of State Highways 70 and 20. The population of the city according to the 2010 Census data is approximately 12,072.

Commercial, agricultural, recreational, educational and industrial activities for the Yuba-Sutter area center around Marysville, giving rise to the nickname "Hub City." Marysville is one of the top five commercial centers in the surrounding 27 counties. It is served by two railroad lines, two highways, a regional airport and a private bus line. Marysville, along with Yuba City, its neighbor across the Feather River, has long been one of the leading agri-business centers of California. Other business comes from retail sales, manufacturing, rice farming, stock raising and mining. Beale Air Force Base, to the east, also contributes significantly to the community's economy. Outdoor enthusiasts enjoy hunting, fishing, boating, swimming, golf, tennis and many other sports in Marysville and the nearby countryside and mountains.

For more information on the City of Marysville refer to their Community Profile Annex attached to this base plan.

Wheatland
The City of Wheatland is nestled at the northeastern edge of California's vast central Sacramento Valley. It is located 34 miles north of Sacramento. Wheatland is home to many Beale Air Force Base personnel.

The future looks good for the ever-growing community of Wheatland. With increased personnel planned for Beale Air Force Base, the area's booming housing market, and planned economic development in Yuba County and within Wheatland itself, the community is a great place to live, work, and play.

Wheatland is located at the gateway of California's "Mother Lode" gold rush country and has a vast and colorful history. As the first settlement reached in California by emigrant wagon trains using the Overland Emigrant Trail (now known as the Donner Trail), this area was an original part of the 1844 Don Pablo Gutierrez land grant. It was sold at auction to William Johnson in 1845.

The survivors of the ill-fated Donner Party were brought to the Johnson Ranch after being rescued in 1846. In 1849 part of the ranch was set aside as a government reserve-Camp Far West. In 1866, the town of Wheatland was laid out on a portion of the grant. The City of Wheatland was established in 1874. According to the 2010 Census data the population is approximately 3,456 and is one of the fastest growing areas in Yuba County.

For more information on the City of Wheatland refer to their Community Profile Annex attached to this base plan.

Beale Air Force Base

The former Camp Beale is located approximately 45 miles north of Sacramento and 20 miles east of Marysville in the Northern California foothills. In 1942 the Department of Defense purchased 87,000 acres to use as a full service combat training facility. In 1948 the Camp transferred from the Army to the Air Force. In 1959 through 1965, 64,000 acres were sold to the public, keeping 23,000 acres for Beale Air Force Base.

Beale AFB (Air Force Base), home of the 9th Reconnaissance Wing, is home to more than 3,000 military personnel. The 9th Reconnaissance Wing maintains a high state of readiness at Beale and multiple overseas operating locations. Beale Air Force Base has contributed to the history and vision for Yuba County. It has served as vital resource and partner for the community, responding to disasters and emergencies in Yuba County and throughout the world.

Since 1992 the Air Combat Command has been stationed at Beale Air Force Base with the Phased Array Warning System (PAVE PAWS) Radar Site, designed to track a global satellite or detect possible attack by missiles. Currently Beale AFB is home to the U-2 Reconnaissance Aircraft, the T-38 Jet Trainer, and the KC-135 Tanker. The first Global Hawk arrived at Beale in 2004. The base currently covers nearly 23,000 acres and is home for over 7,000 military, civilian and contract personnel.

Unincorporated Yuba County

Most of Yuba County is unincorporated and falls under the jurisdiction of the county government. There are numerous small communities scattered throughout the county, many of them with historic ties to the California Gold Rush of the 1850's. The following is a description of those communities.

Arboga

Arboga is a small community about five miles south of Marysville. The community lies between the Feather River and State Route 70 in the southern portion of Yuba County. Arboga is in the Linda Fire Protection District for fire and emergency services and Reclamation District 784 for flood protection. Most of the homes in Arboga have been there a long time and have aging water and sewer systems. The community was inundated by major floods in 1986 and 1997.

Browns Valley

Browns Valley is a small community about 12 miles northeast of Marysville. The community lies along both sides of Marysville Rd., the main thoroughfare to the foothill areas of Yuba County. Historically Browns Valley was a bustling community during the gold rush era when surface mining gave way to quartz mining. From 1863-1867 mines were being dug hundreds of feet deep in the area and at least three stamp mills were in operation. Browns Valley currently has about a dozen small locally owned businesses and a Post Office.

Brownsville-Challenge

These two communities got their start during the gold rush days, becoming important sources of lumber from the forests surrounding them. I. E. Brown built a lumber mill in 1851, hence the

town was named Brownsville. Challenge had a lumber mill shortly thereafter in 1856. These two communities are so close together that they share services and have become a census designated place (CDP).

The communities are in the northeastern portion of Yuba County at an elevation range of 2,100 feet to 2,500 feet. They receive large amounts of rain annually as well as snow, but like to remind the valley folks that they are above the fog.

This is still a small but thriving community. There is a medical/dental facility, a large community park and pool, an active theater company complete with a small theater and a private airport "Areo Pines Airport". The community supports many small businesses and each community has a Post Office.

Camptonville

The community of Camptonville is a 56 square-mile area of the Tahoe National Forest, in the northeastern portion of Yuba County. State Highway 49 runs north and south through the area, with New Bullards Bar Reservoir on its western boundary. The town itself is off Highway 49 on a ridge between the North Fork and the Middle Fork of the Yuba River. It was a thriving town in Gold Rush days, having fifty saloons at one time and a bowling alley, serving as a stopping point for travelers coming from Donner Pass.

District 10

District 10 is an agricultural area north of Marysville running north along the eastern bank of the Feather River to Honcut Creek on the north, which is also the northern boundary of the county. District 10 is part of the District 10-Hallwood Community Services District, which is responsible for fire protection and emergency response. The area gets its name from Reclamation District 10, which was established there in 1913. State Highway 70 runs north south through the center of the District. The area has many large agricultural operations, but is otherwise sparsely populated with a few small private businesses.

Dobbins-Oregon House

The communities of Dobbins and Oregon House are in the northeastern portion of Yuba County, in the heart of the California Gold Country in the foothills of the Sierra Nevada. The communities are spread along both sides of Marysville Road, which runs north by northeast between State Highways 20 and 49.

The community of Dobbins is located 31 miles northeast of Marysville and was named for a ranch once owned by William and Mark Dobbins who settled in 1849 on the creek that bears their name.

The community of Oregon House is situated 24 miles northeast of Marysville, and was first settled in 1850. The "Oregon House" for which the community is named was built in 1852, and was the site of a grand party in 1853 on the anniversary of the battle of New Orleans.

The communities are referred to as the Dobbins-Oregon House because of their close proximity to each other and the shared services. Collectively they are part of the Dobbins-Oregon House Fire Protections District and have a local citizen group, DOACT (Dobbins-Oregon House Action Committee) which is active in the affairs of the community and issues in the county, which affect

the area at large. There are two schools in the community: Dobbins School, a public K-5 elementary school, and Lewis Carroll School, a private school for daycare/ pre-school through 8th grade. A small medical clinic, New Bullard's Bar Dam and power station, Collins Lake and 3 private RV/camping reserves are part of the community. The Cal Fire has a station and the University of California at Davis has an agricultural experimental field station close to the community.

Hallwood

The community of Hallwood is east of Marysville along both sides of State Highway 20 which runs east-west from Marysville to Nevada City. The boundary is roughly the Yuba River by Marysville on the southeast, Woodruff Lane and State Route (SR) 20 to the north, and Jack Slough on the northwest, then back to the Marysville city limits. The community has a K-8th grade school, a couple of churches and a few small businesses scattered through the community. The population is mostly on the roads leading away from SR 20.

Hallwood is part of the Hallwood-District 10 Community Services District (CSD). The CSD is responsible for fire protection and emergency medical response and contracts with Cal Fire for those services. Teichert's Aggregate Mining began in Hallwood in 1953 and is a major employer through the mining and transport of aggregate from the Yuba River Gold Fields. The amount of truck traffic is a serious problem in this community, especially because of the elementary school, businesses, and church on SR 20 where the trucks come on to the highway.

Linda

The name for the community has its roots deep in Yuba County history. In 1849 the "Linda Company" arrived aboard the Steamship Linda and disembarked intending to establish a town at the edge of the gold fields. Town lots were sold, a few buildings erected and a ferry established to cross the Yuba River. In December of 1856 a bridge was constructed, but the town never grew. The bridge was swept away in the great flood of December 1861. By 1879 the site of the town was covered with sand and overgrown with willows, and the Yuba River swept over it in the winter.

Over the years Linda was once again established on the south bank of the Yuba River, but seemed destined to be swept away again. A breach in the levee in 1986 put Linda under 15 feet of water, totally inundating the Peach Tree Mall that was only a few years old. The flood was devastating to the community.

Linda rebuilt and is now a thriving community. The population is approximately 17,773 according to the 2010 Census data. Linda falls under the jurisdiction of Reclamation District 784, which is responsible for flood protection and internal drainage. RD 784 has been making improvements to the levees since the 1986 flood. The Linda County Water District supplies domestic water and water for fire protection. The Linda Fire Protection District provides fire protection and emergency medical response. Linda is home to Yuba Community College.

Loma Rica

Loma Rica is a rural community about 15 miles north east of Marysville along Loma Rica Road. The community has a small downtown with several businesses, including two grocery stores, a barber shop, realtor, and two eating establishments. Several churches are scattered among the businesses.

The community is very active with the schools. Loma Rica Elementary School is attended by the local children grades K-4th. Foothill Intermediate School is a feeder school for the surrounding communities for 5th through 8th graders. Loma Rica lies within the Loma Rica-Browns Valley Community Services District which provides fire protection and emergency medical services by contract with Cal Fire.

Olivehurst

The community of Olivehurst is on the west side of State Highway 70, near the junction with State Highway 65. 2010 Census data shows that there are approximately 13,656 people in Olivehurst. Olivehurst is a vibrant community of diverse cultures. The public schools are Lindhurst High School, Yuba Gardens Intermediate School and Elle Elementary School, all in the Marysville Joint Unified School District. Community services are provided by the Olivehurst Public Utility District (OPUD). OPUD operates a water treatment plant, provides domestic water, fire protection, and a park and recreation facilities for the residents.

Olivehurst is experiencing rapid growth, putting a strain on the aging water and sewer facilities. Parts of the community were twice devastated by flooding in recent history. First in 1986 when a levee failed on the Yuba River north of the community, and then again in 1997 when a levee failed east of Olivehurst on the Feather River.

Plumas Lake

Plumas Lake had its beginning as “Plumas Landing” in 1850 when it was established on the Feather River at the mouth of Reeds Creek. This point in the river bank was high enough to accommodate steam boats arriving from the south. The town of “Plumas” was laid out by Capt. John A. Sutter and George H. Beach but it never amounted to anything. The present day community of Plumas Lake is in the south part of Yuba County between the Feather River and the north/south route of State Highway 70. Plumas Lake is 10 miles south of Marysville and just 30 miles north of Sacramento, making it an easy commute for residents working in Sacramento.

The area has experienced major growth since 2003 when large numbers of homes began to be built. Full build out is expected be 13,000 homes with a population of 36,000. The community boasts a fire station and a brand new school in the Plumas School District. Fire Protection is provided by the Linda Fire Protection and water and sewer service is from the Olivehurst Public Utility District (OPUD).

Smartville

The community of Smartville is nestled in the south eastern portion of Yuba County near the Nevada County line and the Yuba River. State Highway 20 runs east and west close to the town. Smartville was named for James Smart who built a hotel there in the spring of 1856 among a few cabins occupied by miners.

Smartville had its beginnings as a mining camp. Hydraulic mining began in the area on a small scale in 1854, and twenty-five years later it was still producing gold and was one of three immense hydraulic mines in the area. The other two were in Timbuctoo and Sucker Flat. Nearby Sicard Flat had two hydraulic pipes running day and night. The towns of Timbuctoo, Sucker Flat, and Sicard Flat eventually disappeared and only Smartville remains as a quiet community in a once thriving mining town.

The present day Smartville is but a shadow of its former days. Gone are the Wells Fargo Express Office, Western Union Telegraph, hotels, saloons, general stores, drug stores, schools, insurance agents, physicians, etc. Smartville now boasts the Smartville Volunteer Fire Protection District with a modern firehouse, a few historic buildings, a post office, and a few dozen residences. The old Rose Bar School is now a day care center for the many residents that commute from here to work in nearby cities.

Strawberry Valley
Strawberry Valley is a tiny community forty-three miles north east of Marysville in the mountains of upper Yuba County on the northwestern boundary of Yuba and Butte Counties. Strawberry Valley has a post office, store, historic cemetery and a few scattered residences.

The local Native Americans called the area "Pomingo". Captain William Mock gave Strawberry its name for all the wild strawberries that grew in the valley.

For more information on the Unincorporated Areas in Yuba County refer to the Unincorporated Yuba County Community Profile Annex attached to this base plan.

Flood Control Agencies

Yuba County Water Agency
Established in 1959 by an act of the State Legislature and headquartered in historic Marysville, California, Yuba County Water Agency is a public agency governed by a 7-member Board of Directors comprised of the five members of the Yuba County Board of Supervisors and two members elected at large. When bid in 1966, the $180 million Yuba River Development Project was the largest single non-federal, non-state construction contract of its kind. Today, YCWA owns and operates 4 dams with a storage capacity of roughly 1 million acre-feet of water and associated powerhouses capable of generating approximately 397 Mw of energy. Additionally, Bullards Bar Reservoir provides a multitude of recreational activities. The Agency delivers about 310,000 acre-feet of water to local irrigation districts annually. A leader in water transfers and fisheries restoration, YCWA is involved in many constructive efforts with local, state and federal agencies, and conservation groups.

The primary functions of the Agency are development and sale of hydroelectric power, flood control, fisheries enhancement, recreation, conservation and storage of water and wholesale of water to member districts. The Agency has an annual budget exceeding $9 million.

For more information on the YCWA refer to their Community Profile Annex attached to this base plan.

Three Rivers Levee Improvement Authority
The Three Rivers Levee Improvement Authority (TRLIA), a joint powers agency, was established in May 2004 by the County of Yuba and Reclamation District 784 to finance and construct levee improvements in south Yuba County.

TRLIA's mission is to provide 200-year flood protection. Four work phases were identified to achieve that goal along the Yuba, Feather, and Bear Rivers and the Western Pacific Interceptor

Canal.

To date, the Feather River Levee Improvements represent the bulk of the fourth phase of work. In total, more than $405 million is being invested in flood protection improvements, approximately half of which is being paid for by the State of California.

Reclamation Districts

Reclamation Districts in Yuba County provide protection through a system of levees on the Yuba, Bear, and Feather Rivers. Local Reclamation Districts are responsible for the maintenance and operation of levees and pumps. Maintenance is generally provided by volunteers. There are five levee maintenance districts in Yuba County. As in most cases, the needs and resources vary from district to district. Three of the districts include at least some urbanized area, while two are predominately agricultural.

The levee systems are under the jurisdiction of each Reclamation District in which the levee or portion of the levee is located. Any improvements to the levee systems or other types of improvements to remove areas from the floodplain are the responsibility of the Reclamation Districts and will require an adequate comprehensive financing system to provide system maintenance to FEMA required standards. The reclamation districts are shown in **Figure 1 – Reclamation Districts in Yuba County.**

Reclamation District 10

Reclamation District 10 was established by special legislation in 1913, and encompasses approximately 12,000 acres and includes 23.4 miles of levees. The boundaries are Honcut Creek to the north, the Marysville Levee to the south, the Feather River to the west, and the Union Pacific Railroad Tracks to the east. The District includes about 50 businesses including 31 farms, 13 ag-related businesses, and numerous other small businesses scattered along State Highway 70 which runs north-south though the center of the District from Marysville to the Butte County line and Honcut Creek.

This is a rural district with very limited resources. It relies on a volunteer staff for maintenance of the levee system of 23.4 miles. The District is governed by a three-member board of volunteers who are elected or appointed by area residents. Board membership is a non-paying position. The District funding is derived from county-based taxes.

The District is responsible for the maintenance of the levees along the east bank of the Feather River. Maintenance includes the control of vegetation, erosion, rodents, and maintenance of access roads for patrolling and emergency access. The maintenance is performed by local farmers and community volunteers who are not compensated. During periods of high water the levees are patrolled by volunteers to safeguard against possible leaks or undetected erosion. Maintenance of the project levees is accomplished in accordance with Federal and State regulations.

Many of the farmers and community members have a long history in the area; and as such are concerned that the levee structures are being weakened by beavers, rodents, soil erosion, storms, and high water events. The levees are also being further eroded and undermined by trees, brush, debris, refuse piled on or near the levees, and illegal driving on the levees. A few residents remember the levee failure of 1937 when huge storms hit the north state and water

was up to the rooftops in the south end of the District. In 1955 when a levee failed in Sutter County, water was to the top of the levees. When communities south of Marysville were inundated with flood waters in 1986 and 1997, additional pumps were placed at the south end of the District to pump water over the levees to relieve pressure and prevent flooding of internal storm water.

Reclamation District 784
D 784 was established in May 1908, and operates under the authority of the State of California's Central Valley Flood Protection Board and the Department of Water Resources. RD 784 covers approximately 29,000 acres including 37 miles of levees, more than 60 miles of internal drainage canals, and nine pumping stations.

The district's boundaries are: North - Yuba River, South- Bear River, West- Feather River, East- Western Pacific Interceptor Canal. The district encompasses approximately 2,000 commercial buildings and more than 12,500 residences.

A board of trustees made up of 5 local landowners is the local governing body and they are elected to serve 4-year terms.

Reclamation District 817
Reclamation District 817 operates on a small annual budget and is overseen by volunteers. RD 817 encompasses approximately 2,600 acres of primarily agricultural land directly west of Wheatland, California. It consists of two levee reaches of 7.7 miles.

RD 817 is adjacent to and west of RD 2103, which provides protection to Wheatland. Levee failures that occur in RD 2103 will allow flows to proceed west and will eventually pond on, and flood, the lands in RD 817. Thus RD 817 is subject to flooding from levees that are not in their district. Failure of RD 817 levees will not pond floodwaters high enough to flood Wheatland.

This district has no permanent staff and relies on volunteers. Maintenance is accomplished by using the farm crews of the farms protected. The farmers donate their management and equipment time but are reimbursed for the labor costs of the farm crews.

Reclamation District 2103
Reclamation District 2103 is responsible for maintenance and operation of 9.8 miles of levee including the Dry Creek levees, Bear River Levee, and the San Joaquin drainage canal.

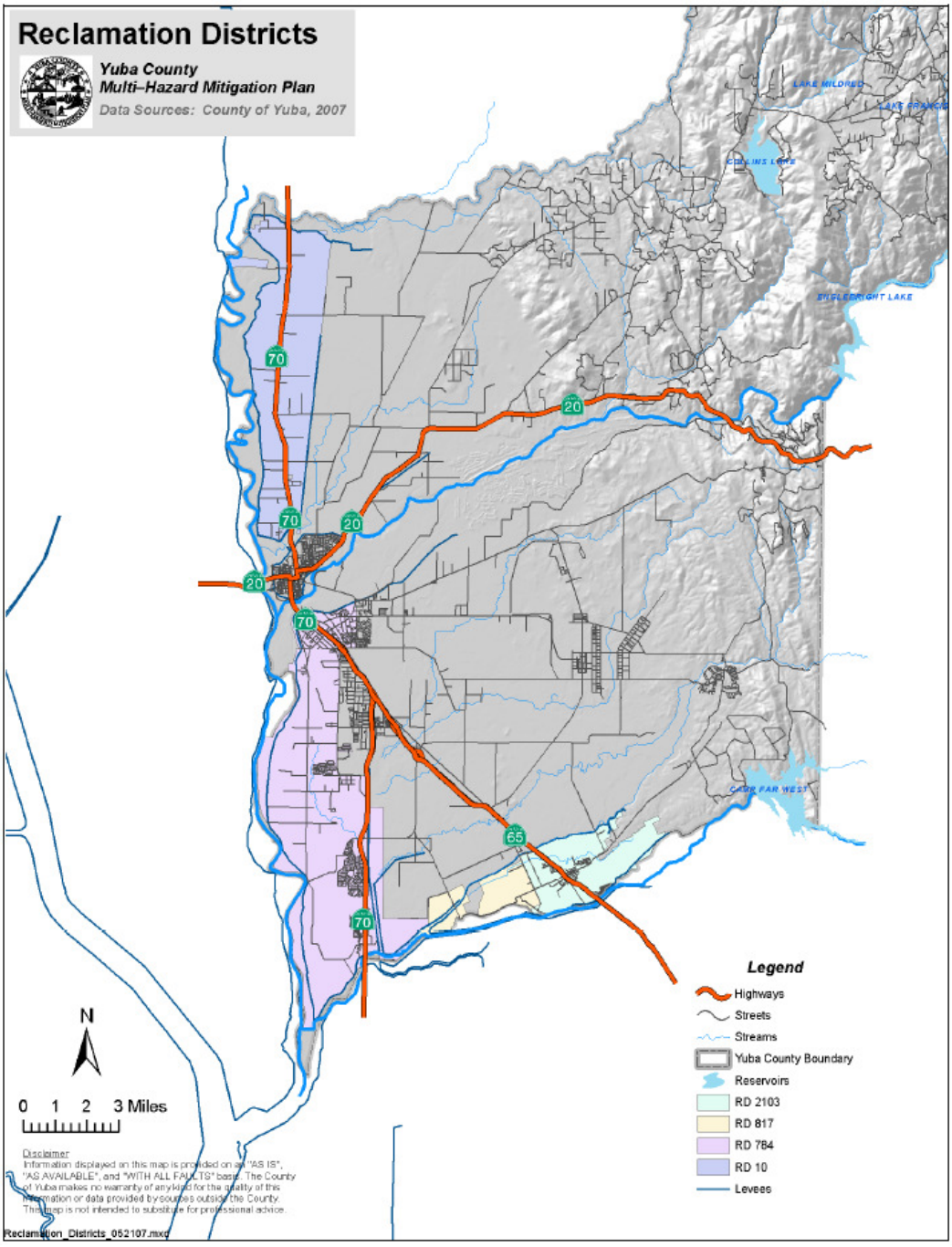
This is a rural and urban district with potential development in the formation. The City of Wheatland is in this district. This district has no permanent staff and relies on volunteers. Maintenance is accomplished by contracting out mowing and spraying.

Marysville Levee Commission
Yuba County has one levee commission. The Marysville Levee Commission is responsible for the operation and maintenance of the ring levee system that surrounds the City of Marysville.

The City of Marysville, an urban area of approximately 1,500 acres and 12,072 people, is ringed by 7.5 miles of levee, and an additional 3.9 miles along the north bank of the Yuba River extends upstream of Marysville, providing some protection to agricultural lands northeast of the city.

Some of the challenges they are facing include trees in levee slopes, sloughing on levee side slopes, and burning for vegetation control instead of mowing.

Figure 1 – Reclamation Districts in Yuba County



Source: 2014 Yuba County OES

Irrigation Districts

The irrigation and water districts of Yuba County are noted in the following. Each is governed by a Board of Directors elected from residents within each jurisdiction, without compensation. All

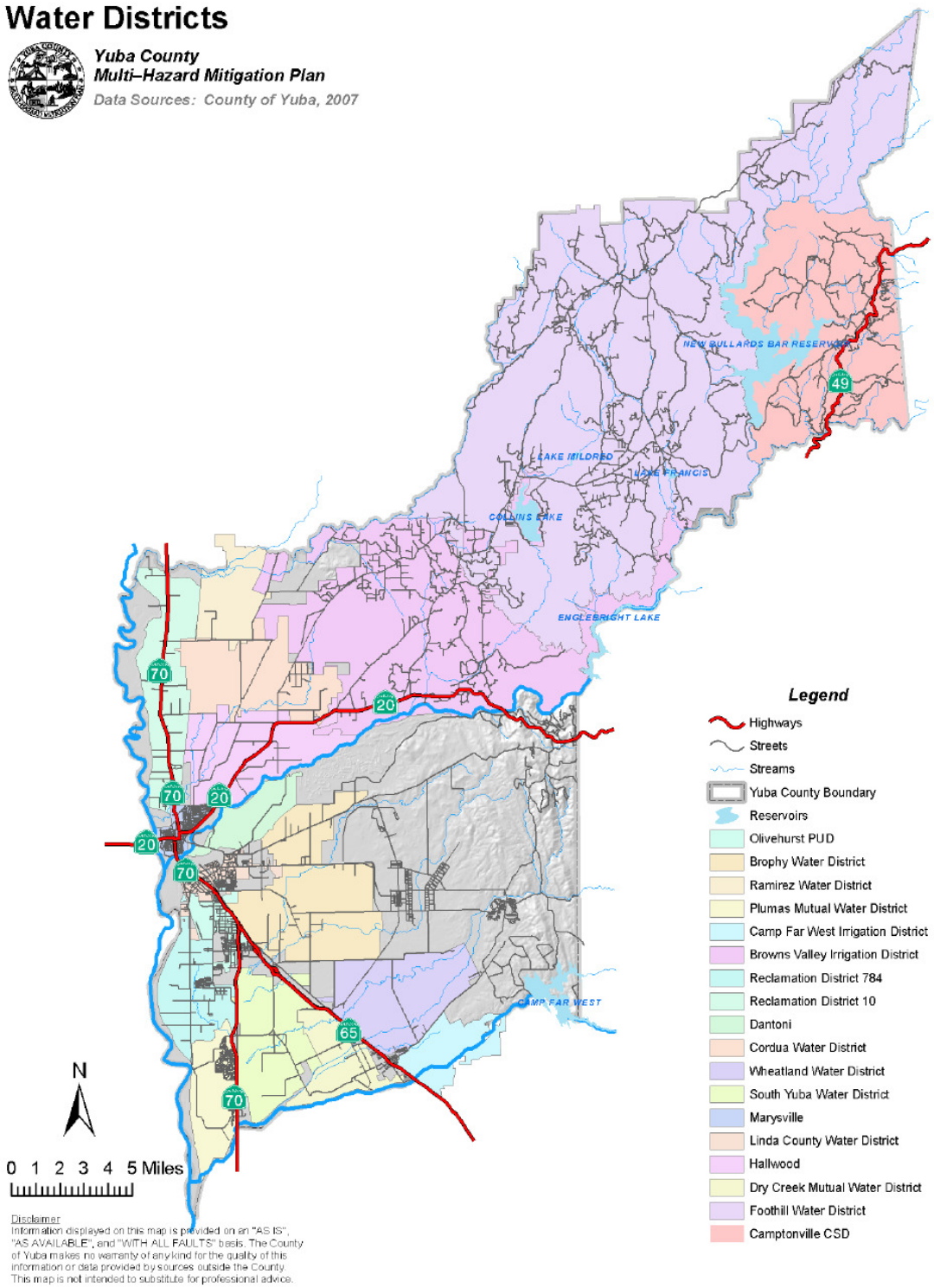
but one of the Districts are very small and rely completely on volunteers to maintain district facilities.

District facilities generally consist of ditches or other water conveyance systems. Water is for irrigation purposes and generally not potable. All irrigation and water districts in Yuba County were contacted and encouraged to participate in Hazard Mitigation Planning for the county and to develop plan annexes.

- Brophy Water District
- Browns Valley Irrigation District (BVID)
- Camptonville Water District (CWD)
- Cordua Water District
- Camp Far West Irrigation District
- Linda County Water District (LCWD)
- North Yuba Water District (NYWD)
- Ramirez Water District
- South Yuba Water District
- Wheatland Water District (WWD)

Figure 2 shows the Water/Irrigation Districts in Yuba County.

Figure 2 – Irrigation/Water Districts in Yuba County



Source: 2014 Yuba County OES

Fire Protection Districts

Fire protection and emergency response services for much of Yuba County is provided by fire protection districts. These districts generally consist of volunteer fire departments who have taken a leadership role in the communities they serve.

Fire protection districts are primarily staffed by volunteers, a situation which has become more difficult in recent years due to financial constraints and training requirements. **Figure 3** shows the fire districts in Yuba County. The following is a list of the fire districts:

- Dobbins-Oregon House Fire Protection District
- Foothill Fire Protection District
- Linda Fire Protection District (LFPD)
- Smartville Fire Protection District
- Wheatland Fire Protection District/Plumas Brophy Fire Protection District

Community Services Districts

Community Services Districts (CSD) are recognized governmental agencies that provide services to unincorporated areas of the County. The services provided by a CSD vary by district, with some concerning themselves with only one aspect of community service. All of the CSDs are entirely staffed by volunteers. Because of limited budgets few CSDs have current audits; the cost of annual auditing is prohibitive. This is a real concern to CDS personnel because of the audit requirements in obtaining funding for projects, training and equipment. The Community Service Districts in Yuba County are listed in the following:

Camptonville Community Service District

Camptonville Community Service District began formation in 1987 to solve the problems of the town's antiquated water system, and included the Volunteer Fire Department.

District 10-Hallwood Community Service District

The purpose of the District 10-Hallwood Community Service District is to raise and distribute money and other assets to promote, support, and maintain a level of Fire Service delivery capabilities, for the unincorporated areas of Yuba County described as District 10 and Hallwood.

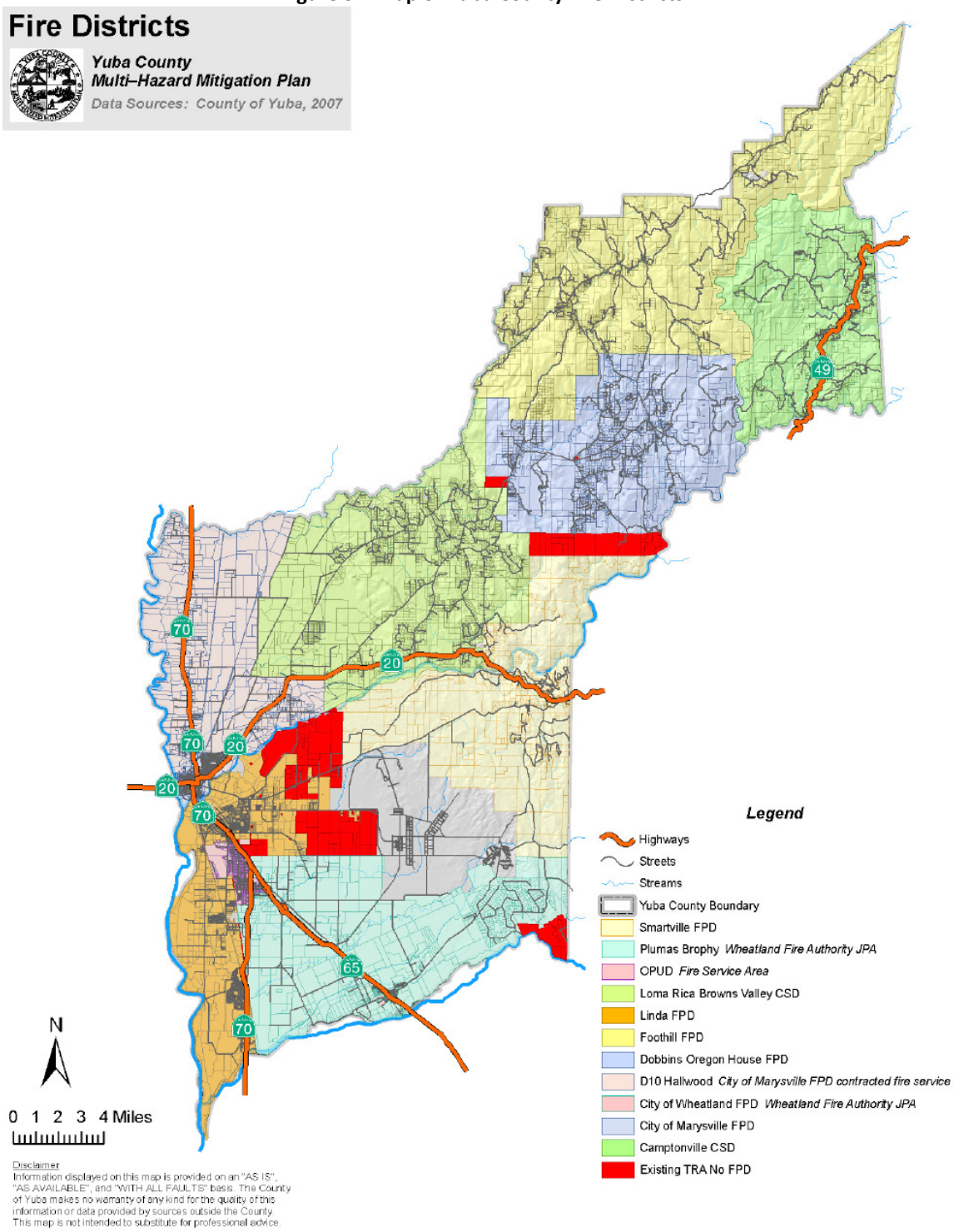
Loma Rica-Browns Valley Community Services District

Loma Rica-Browns Valley Community Services District supplies fire suppression, rescue and medical aid to its population.

River Highlands Community Service

The CSD is responsible for fire and police protection as well as ambulance service. The District collects monies from fees for water and sewer, including for new home hook-ups. River Highlands also levies an assessment for long-term debt retirement, which is collected by the County of Yuba and apportioned to the District.

Figure 3 – Map of Yuba County Fire Districts



Source: 2014 Yuba County OES

School Districts

Camptonville Union School District

Camptonville Union Elementary School District (CUESD) has one K-8 school which has been in continuous operation since 1871. Currently, the average enrollment is 70 students. The CUESD also sponsors the Camptonville Academy, a large independent study charter school serving Yuba, Butte, Nevada, Placer, and Sierra counties.

Marysville Joint Unified School District

Marysville Joint Unified School District (MJUSD) is a K-12 school district with twenty-five schools with plans for several more being prepared. The Marysville Joint Unified School District serves most of Yuba County, with schools in the northern foothills and the southern valley. The District, which is headquartered in the City of Marysville, consists of the following active schools:

- Alternative Education
- Arboga Elementary
- Browns Valley Elementary
- Cedar Lane Elementary
- Cordua Elementary
- Covillaud Elementary
- Dobbins Elementary
- Edgewater Elementary
- Ella Elementary
- Foothill Intermediate
- Johnson Park Elementary
- Kynoch Elementary
- Linda Elementary
- Lindhurst High School
- Loma Rica Elementary
- Marysville Charter Academy of the Arts
- Marysville High School
- McKenney Intermediate
- Olivehurst Elementary
- Yuba Feather Elementary
- Yuba Gardens Intermediate

In addition to the above schools, MJUSD also operates a State Preschool program facility and provides adult education at the District Office. MJUSD also owns the Old Dobbins School, currently leased to the Dobbins Grange, Old Oregon House School, currently leased to the Foothill Lions Club, Rose Bar School, currently leased to a private Preschool/Day Care business, and Old W.T Ellis School, currently vacant.

Plumas Lake School District

Plumas Lake School District (PLSD) is a K-8 school district serving South Yuba County. High school service for the area is provided by the Wheatland Union High School District.

The schools in PLSD provide comprehensive educational programs that are based upon a high standard of performance. The schools in the district are Cobblestone Elementary, Rio Del Oro Elementary and Riverside Meadows Intermediate. The district also has a K through 12th grade

charter school, Plumas Lake Charter School. This is an independent study program, with seat time for grades 9-12.

Wheatland Elementary School District
Wheatland Elementary School District (WESD) has three elementary schools, one middle school and one charter school. These five schools serve over 1,530 students, kindergarten through eighth grades. Beale Air Force Base is home to three of the District's five schools while the other two schools are located within the City of Wheatland.

Currently school campuses in the Wheatland Elementary School District include Far West and Lone Tree Schools (which also houses the Wheatland Charter School) on Beale AFB, Bear River Middle School, Wheatland Elementary School and Wheatland Pre-School located within the city of Wheatland. The District Office is located within the City limits at the site of the former Wheatland Elementary School. The District also operates a pre-school, a charter academy, and a California Montessori Project academy.

Wheatland Union High School District
Wheatland Union High School District (WUHSD) is a 9-12th grade school district that serves the City of Wheatland and the communities of Plumas Lake, Beale Air Force Base, and Smartville. The district operates one school. The first high school opened in 1907 as part of the Wheatland School District. A separate high school district was formed in 1923.

Yuba Community College District
Yuba College, founded in 1927, is in its 78th year of community service. It's located on a campus outside of Marysville with twenty-three buildings on a 160-acre site. In December 1965, the College District was reorganized to include Colusa, Sutter, and Yuba counties and in 1974-75 to include large portions of Glenn, Lake, and Yolo counties. The District now stretches across the broad central valley of California from high in the foothills of the Sierra Nevada to the Coast Range, and covers 4,192 square miles.

As a comprehensive community college, Yuba College offers a full array of certificates, two-year associate degrees and the associate degree for transfer to the university. Programs in the liberal arts, sciences, and vocational/technical fields are provided for individuals seeking careers in business, education, health and human services, the sciences, industry, and the trades.

Utility Districts

Olivehurst Public Utility District
The district was established in November 1948. Safe and clean drinking water and fire protection were its initial responsibilities. The district was formed after concerns of well water safety and the unsuitability of the community's soil for septic systems. It has since added sewer service, parks, recreation, and street lighting to its responsibilities. The district also serves areas within the Plumas Lake Specific Plan to the south. The District has the responsibility for:

- Delivery of drinking water
- Collection and treatment of sewer and storm water
- Fire protection through a system of hydrants
- Street lighting
- Park and recreational facilities

Cemetery Districts

Yuba County's Cemeteries are widely spread throughout the county. During the late 1840's and mid 1850's small communities began to develop along the rivers, foothill and mountain areas to provide services to the many people who were coming into the area in search of gold. With the influx of people and the difficulty traveling up and down the mountains, it became necessary to establish local burial grounds. Many of these cemeteries are rarely used today because of the small populations they serve. All of the cemeteries have historical and personal ties to the local communities, many with colorful stories and traditions.

Yuba County has eight Cemetery Districts that were established under state law in the 30's, 40's and 50's. These Cemetery Districts are governed by independent district boards, elected by the residents of the given district. A person must be a resident of the district to be buried in a district cemetery. Most of the cemeteries are small and all depend on local residents to sit on their governing boards and local volunteers for maintenance and upkeep. The cemetery districts in Yuba County are:

- Browns Valley Cemetery District
- Brownsville Cemetery District
- Camptonville Cemetery District
- Keystone Cemetery District
- Marysville City Cemetery
- Peoria Cemetery District
- Smartville Cemetery District
- Strawberry Valley Cemetery District
- Wheatland Cemetery District

Plan Organization and Structure

The Plan has been developed using a new structure and has been significantly modified from its previous format. The Plan is divided into several primary sections, each covering a component of the document as required under state and federal planning guidance. The primary sections are further supported by annexes and attachments that support specific issues discussed within the plan.

- **Introduction**
- **Element A: Planning Process**
- **Element B: Hazard Identification & Risk Assessment**
- **Element C: Mitigation Strategy**
- **Element D: Plan Review, Evaluation and Implementation**
- **Element E: Plan Adoption**
- **References**
- **Attachments**
- **Community Profile Annexes**
  - **Unincorporated Yuba County Annex**
  - **City of Marysville Annex**
  - **City of Wheatland Annex**
  - **Yuba County Water Agency Annex**
- **Planning Process Documentation**

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Element A: Planning Process

Requirement §201.6(b) An open public involvement process is essential to the development of an effective plan.

More often than not, communities are faced with having to deal with the aftermath of an unwanted hazard that can devastate areas of a community. While we cannot prevent disasters from happening, their effects can be reduced or eliminated through hazard mitigation planning, but only if a local government has the foresight to assess likely hazards and craft preventative measures before the next hazard event occurs. This Chapter describes the background of the hazard mitigation planning process in Yuba County.

The Yuba County Office of Emergency Services (OES) recognized the need and importance of revising this plan and was responsible for its initiation and for securing funding through a FEMA Pre-Disaster Mitigation 2012 Grant opportunity. The county contracted with Howell Consulting in 2013 to facilitate the revision and update to their 2007 MHMP. Howell Consulting's role was to assist Yuba County in the following:

- Form a local hazard mitigation Planning Team and include key stakeholders and representatives.
- Follow FEMAs planning guidance and follow the requirements set forth in the DMA 2000.
- Facilitate the planning process and identify the data requirements.
- Facilitate the process for public involvement and input.
- Work closely with the California Office of Emergency Services (Cal OES) on the development and review of the revised plan and planning process.
- Ensure coordination with Cal OES and FEMA Region 9 on review, approval and formal adoption of the plan by the Yuba County Board of Supervisors/Jurisdictional Boards and City Councils.

Yuba County utilized many of FEMA's multi-hazard mitigation planning guidance documents including the *Planning How-To Guides* to structure the overall facilitation and development of the planning process. The following sections describe the planning process.

Multi-Jurisdictional Participation

Each jurisdiction participating in this plan developed and revised its own annex, which provides a revised assessment of each jurisdiction's unique risks, as well as their mitigation strategy to reduce long-term losses. Each jurisdictional annex continues to address the following items:

- Community profile summarizing geography, history, economy, and population.
- Hazard information on geographically specific hazards.
- Hazard map(s) at an appropriate scale for the jurisdiction, if available.
- Number and value of buildings, critical facilities, and other community assets located in hazard areas, if available.
- Vulnerability in terms of future growth and development in identified hazard areas.

- Capability assessment describing existing regulatory, administrative, technical, and fiscal resources and tools, as well as outreach efforts and partnerships, and past mitigation projects.
- Mitigation actions specific to the jurisdiction.

Each jurisdiction was required to meet strict plan participation requirements defined at the beginning of the process, which included the following:

- Designating a representative to serve on the Yuba County Hazard Mitigation Planning Team.
- Participating in all of the Planning Team meetings and taking back the information from the Planning Team meetings and holding jurisdictional meetings to discuss specifics to that particular participating jurisdiction.
- Providing data and information to complete the jurisdictional annex, including identifying at least two mitigation actions per identified hazard.
- Reviewing and commenting on plan drafts.
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan and annex within their own jurisdiction.
- Formally adopting the mitigation plan and the jurisdictional annex.

All of the jurisdictions with annexes to this plan met all of these participation requirements. In most cases, the representatives for each jurisdiction brought together a Planning Team in addition to the overall Yuba County Planning Team at their jurisdiction's regularly scheduled meetings to help collect data, identify mitigation actions and implementation strategies, and review annex drafts.

Element A.1. Planning Process

Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Yuba County is an active county where emergency management issues are discussed, presented and recommended for approval by the Yuba County Board of Supervisors, the Marysville, Wheatland City Council and other jurisdictional Boards/Councils such as Yuba County Water Agency. The Yuba County OES staff distributed a formal invitation to key stakeholders, county, city, special districts, state and federal representatives to participate in the planning process by attending the official planning team/project kickoff meeting.

Hazard Mitigation Planning Team Tasks

Specific tasks were identified for the Planning Team in order to ensure that project goals for the plan revision were undertaken and completed. The following represents those primary Planning Team tasks:

- Coordinate tasks and activities with the Yuba County OES and participating jurisdictional planning forums to develop all-hazards disaster mitigation plan and oversee the

planning process.

- Prioritize hazards vs. resources.
- Select highest and best mitigation recommendations and develop those recommendations for further action by the Yuba Planning Team, together with their own agencies.
- Review planning drafts, recommendations and updates.
- Develop and implement long and short term goals.
- Integrate the plan with all phases of comprehensive emergency management planning.
- Provide for the implementation of Planning Team decisions.
- Encourage, coordinate and provide a methodology for the implementation of public input.
- Establish Hazard Mitigation Planning Team tasks to include but not be limited to the following:

    - Determine implementation ability and constraints for proposed hazard mitigation planning steps and development of strategies
    - Bring forward community concerns through private and public input
    - Identify implementation resources
    - Provide for the update of comprehensive emergency management plans on a scheduled basis
    - Evaluate and carry out mitigation activities
    - Assist in implementation of funding identification and procurement

- Ensure that adjacent jurisdictions, pertinent private entities and citizens are informed of the hazard mitigation planning process and offer each the opportunity for input into the plan.

A Planning Team was developed that included members from all participating jurisdictions. Since this was a multi-jurisdictional planning effort, the Planning Team representatives decided to work collectively on the plan and the jurisdictional annexes. Planning Team members were responsible for bringing specific information and data to and from the Planning Team from their respective jurisdictions and agencies seeking approval, such as Yuba County, the City of Marysville, Wheatland and the Yuba County Water Agency. Within each local participating jurisdiction, jurisdictional staff met with the Planning Team representative to develop and update their specific jurisdictional annex. These jurisdictional annexes were developed at their regularly scheduled meetings and with key departments in their governmental organization being contacted directly from that jurisdictional Planning Team representative and/or at their regularly scheduled department head meetings. All of the meetings at the local level followed the content and discussions at the Planning Team level as described in the following.

Planning Meetings and Process

The planning process officially began with a briefing to the Yuba County Board of Supervisors on the overall project under public comment. The County Administrative Officer, provided a preview of the website specifically developed for the project and also showed additional ways to see and participate in the Hazard Mitigation Planning Project. Each participating jurisdictions seeking approval signed a letter of commitment to the planning process.

In October 2013, a Project Kick-off/Planning Team meeting was held in Marysville, California. The overall schedule for the project was discussed, highlighting major project milestones and ending with the anticipated final revised draft plan submitted to FEMA for approval in 2014. The Howell Consulting Team gave a presentation to all attendees on Hazard Mitigation Planning and the Planning Process. Members of the public were also solicited to serve on the Planning Team and since many of the governmental representatives on the Planning Team also resided within Yuba County, those members served a dual role.

At the second meeting of the Planning Team also in Marysville, on March 27, 2014, the consultants provided information updates, survey results to date, public meeting information, asked for updates in data needed from the participating jurisdictions and provided an overview of the 2007 Mitigation Strategies. The focus of this meeting however, was the Hazard Identification and Risk Assessment process. The risk assessment process identifies and profiles relevant hazards and assesses the exposure to lives, property and infrastructure to these hazards. One of the goals of the risk assessment was to estimate the potential losses in Yuba County along with the participating jurisdictions from the identified hazard events. Planning Team members at this meeting evaluated the hazards in the 2007 plan and profiled which hazards occurred over the 5-year planning cycle. Element B covers the hazards identified in detail.

The third Planning Team meeting was held on May 14, 2014 in Marysville. The planning team meeting participants were lead through a series of discussions on current capabilities and mitigation actions and strategies. The most important outcome of this meeting was the collaboration of the progress the jurisdictions had made on existing hazard mitigation projects, despite receiving limited federal and state support, many of the initial 2007 projects have been completed by Yuba County jurisdictions. The Planning Team thoroughly reviewed the existing Mitigation Strategies, developed new strategies to meet the goals and objectives and prioritized those strategies for the operational area. The Planning Team members took the newly developed strategies back to their jurisdictions to gain input, feedback and approval. The Planning Team voted on the final Mitigation Strategies.

In June/July 2014, the draft plan was reviewed by the Yuba County Planning Team, jurisdictional representatives, the Yuba County Office of Emergency Services staff and management, and several other key county/jurisdictional staff and the public. In addition, each participating jurisdiction participated in a detailed review of the draft plan.

In June/July, Howell Consulting met with Planning Team Members via teleconference (due to summer schedules) to brief on the final draft plan and release it for comments to include the public comment. The plan was placed on the county website for public review and comment, placed at strategic locations around the county including, the County Administration and at each of the participating jurisdictional City Manager's Offices as part of the planning process. Additionally, fliers were posted on community bulletin boards in the census designated places within the County.

The **Table A1** shows a summary of the planning process meetings, their topics, dates, and locations.

Table A1 - Planning Team Meetings

Meeting Number	Title	Date	Location
1	Planning Meeting w/ Yuba Project Manager	08/29/13	Marysville
2	Kick-off/Planning Team roles and expectations	10/23/13; 10/30/13 10/30/13	Marysville; Wheatland; YCWA HQ
3	Planning Meeting w/ Yuba Project Manager	01/09/14	Marysville
4	Hazard Identification/Analysis, Vulnerabilities, General Update	03/27/14; 04/02/14 04/02/14	Marysville; Wheatland; YCWA HQ
6	Mitigation Strategy Review and Development	05/14/13	Marysville; Wheatland
7	Jurisdictional Site Visits, Mitigation Strategy, General Update	5/14/14	Marysville; Wheatland; YCWA HQ
8	Final Draft Briefing	08/07/14	Marysville; Teleconference
9	Final Comments	11/21/14	Email

Finally, in November 2014 the Planning Team communicated via email to go over any final comments on the draft plans and to finalize the documents to prepare for submission to Cal OES and FEMA. This was important also to go over some of the hazard maps that needed to be updated from the draft documents and review the vulnerabilities noted in the plan.

More information on the local planning process by each participating jurisdiction is noted in their community profile annex attached to this base plan.

Additionally, the Planning Team communicated during the planning process with a combination of in-person meetings, conference calls, email correspondence and communication through an online documents/data-sharing site. The meeting topics along with sign-in sheets and agendas are located in the Planning Process Documentation section of this plan. The official Planning Team **(Table A2)** is as follows:

Table A2 – Official Planning Team Members

Name	Title	Department	Jurisdiction
Planning Team Members			
Scott Bryan	OES Manager	Office of Emergency Services (County Project Lead)	Yuba County including all political subdivisions within the County; Project Manager
Van Boeck	CRS Coordinator	Public Works	Yuba County
Ron Johnson	Deputy	Sheriff's Department	Yuba County
Jerry Read	Deputy	Sheriff's Department	Yuba County
Rich Webb	Chief	Linda Fire Protection District	Linda
Allyn Wightman	Chief	Police Department	City of Wheatland
Jerilyn Anderson	Emergency Services Coordinator	Inland Region	Cal OES
Joe Waggershausen	Chief	Wheatland Fire Authority	City of Wheatland
Michal Healy		Marysville Joint Unified School District	Various
Andy Vasquez	Board of Supervisors	Board of Supervisors	Yuba County
Ray McKinney		Plumas Lake Unified School District	
John Osborn	Officer	Police Department	Yuba Community College
M. Page Hensley	Finance Manager	Yuba County Water Agency	Yuba County
P. Wade	Staff	Yuba County Water Agency	Yuba County
Mark Sayers	Staff	Irrigation District	Browns Valley
Christian Sachs	Administrative Sgt.	Marysville Police Department	City of Marysville
Doug Lofton	Staff	Water District	Linda
Lloyd Appleby		Fire Protection District	Dobbins Oregon House Fire Protection District
Wendy Hartman	Director of Planning, Housing and Community Services	Community Development Services Agency	Yuba County
Kevin Mallen	Director of Community Development & Services Agency	Community Development & Services Agency	Yuba County
Scotia Holmes Sanchez		Office of Education	Yuba County
Larry Davis		Three Rivers Levee Improvement	Yuba County

Name	Title	Department	Jurisdiction
		Authority	
Russ Brown	Public Information Officer	County Administrator's Office	Yuba County
Steve Fordice	Manager	Reclamation District 784	Various
Howell Consulting Team			
Brenna Howell	Project Manager/Lead Planner	Howell Consulting	Howell Consulting
Neal T. O'Haire	Facilitator	Howell Consulting	Howell Consulting
Jim Kniss	GIS Mapping Coordinator	Howell Consulting	Howell Consulting
Members of the Public			
Jack Amber			
Michal Healy			
Allyn Wightman			

Element A.2. Coordination with other Communities

Requirement §201.6(b)(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

Since the inception of this planning process a major forum for sharing this planning with adjacent jurisdictions is the Mutual Aid Regional Advisory Committee for California Mutual Aid Region III. Region III's members are contiguous counties to Yuba County. The value to this collaboration is that these counties share many of the same characteristics as Yuba County such as similar threats, politics, geography and culture. This coordinated process has been made possible by the support of many federal grant programs. Since many of the counties in Region III have already gone through the hazard mitigation planning process, their experience and advice has proven invaluable to Yuba County such as important information from Butte and Sutter Counties. Each of these meetings includes a local roundtable discussion where Yuba County has been able to freely and collaboratively share their local hazard mitigation planning process.

The Yuba County Office of Emergency Services (OES) is active in its coordination role with other communities and jurisdictions. Yuba County OES has attended many meeting forums over the planning period where the OES Manager discussed and presented the County's mitigation plan update process.

In addition, the Planning Team developed a list of neighboring communities, local and regional agencies involved in hazard mitigation activities, as well as other interests, to invite by letter to participate, review and comment on the Yuba County Multi-jurisdictional Local Hazard Mitigation Planning process. A copy of this letter is provided in the Planning Process Documentation section of this plan. The comments resulting from this effort were incorporated into the plan, as appropriate. The stakeholders invited to comment on the plan are located in

Table A3, in some cases those in Table A3 may be the same as the Official Planning Team members noted in Table A2.

Table A3 - Stakeholder Notifications/Coordination with other Communities

Name	Department
Mark Jokerst	Camptonville Fire
Brad Harris	CDF Nevada/Yuba/Placer
Mike Butler	Dobbins/Oregon House Fire
Rick Cunningham	Foothill Fire Protection District
Rich Webb	Linda Fire Protection District
Sean Griffis	Loma Rica Browns Valley Fire
Mike Carr	Marysville Fire Department
Wade Harrison	Olivehurst Fire Department
Mark Zamora	Smartville Fire Protection District
Joe Waggershauser	Wheatland Fire Authority
Walter Munchheimer	Marysville City Council
Stephen Wright	Wheatland City Council
Kevin Mallen	Yuba County Community Development
Scotia Holmes Sanchez	Yuba County Office of Education
Wendy Hartman	Yuba County Planning
Michael Lee	Yuba County Public Works
Van Boeck	Yuba County Public Works (CRS)
Jerry Read	Yuba County Sheriff's Department
Frank Miller	Marysville Levee District
Tom Schultz	Reclamation District 10
Dean Webb	Reclamation District 2103
Steve Fordice	Reclamation District 784
Joe Conant	Reclamation District 817
Paul Brunner	TRLIA
Sandra Ross	Camptonville School District
Gay Todd	Marysville Joint Unified School District
Jeff Roberts	Plumas Lake School

Name	Department
	District
Craig Guensler	Wheatland School District
Walter Cotter	Browns Valley Irrigation District
Doug Lofton	Linda County Water
Eric Manley	North Yuba Water District
Tim Shaw	OPUD
Sean Powers	River Highlands CSD
Curt Aikens	Yuba County Water Agency
Christian Sachs	City of Marysville
JeriLyn Anderson	Cal OES

In addition to the agency representatives invited to participate in the planning process the following agencies also received invitation to participate in the plan update process.

Federal
Federal Emergency Management Agency (FEMA)
United States Army Corps of Engineers (USACE)
United States Forest Service (Plumas, Tahoe, Feather River) (USFS)
United States Air Force–Beale AFB
National Weather Service

State
California Department of Transportation (CALTRANS)
California Department of Forestry and Fire Protection (Cal Fire)
California Department of Water Resources (DWR)
California Highway Patrol (CHP)
Natural Resource Conservation Service (NRCS)
California Governor's Office of Emergency Services (OES)
University of California, Davis (UCD) Cooperative Extension
Yuba Community College District

Adjoining County Jurisdictions
Butte County
Colusa County
Sutter County
Yuba City

Local Government/ County Special Districts
City of Marysville–Fire/ Police Department
City of Wheatland–Fire/ Police Department
Camptonville Community Service District–Fire, School, Water & Cemetery
Yuba County Water Agency

Olivehurst Public Utility District
River Highlands Community Service District
Yuba County Office of Education (YCOE)
Community Service Area # 2
Yuba Feather Community Services District

Education Offices/School Districts
Marysville School District
Plumas Elementary School District
Wheatland Elementary School District
Wheatland High School District

Fire Departments
Dobbins–Oregon House Fire Protection District
Foothill Fire Protection District
Linda Fire Protection District
Loma/Rica Browns Valley
Hallwood/District 10 Community Service District
Marysville Fire Department
Olivehurst Fire Protection District
Plumas/Brophy Fire Protection District
Smartville Fire Protection District
Wheatland Fire Department

Levee Districts
Marysville Levee District

Reclamation Districts
Reclamation District 10
Reclamation District 784
Reclamation District 817
Reclamation District 2103

Water/Irrigation Districts:
Browns Valley Irrigation District (BVID)
Brophy Water District
Cordua Irrigation District
Linda County Water District
Plumas Mutual Water District
Ramirez Water District
South Yuba Water District
Yuba County Water District

Utilities
Pacific Gas & Electric (PG&E)
Union Pacific Railroad (UPRR)
California Cities Water

Private Organizations
Yuba Sutter Disposal (YSDI)
Bi–County Ambulance
Dobbins/Oregon House Action Committee (DOACT)
Dobbins/Oregon House Fellowship of Friends
North Tree Fire
Sleep Train Amphitheatre

Private Non–Profit Organizations
American Red Cross
Rideout Hospital
Fremont Hospital
Yuba Watershed and Fire Safe Council
Yuba Feather Lions Club

Yuba County Departments
Administrative Services
Agricultural Commissioner
Economic Development
Environmental Health and Certified Unified Program Agency (CUPA) Program
Health and Human Services
Information Technology
Probation Department
Public Works
Sheriff's Office
Yuba County Resource Conservation District
Yuba County Office of Emergency Services

As part of the coordination with other agencies, the Planning Team collected and reviewed existing technical data, reports and plans. Yuba County and the participating jurisdictions used a variety of comprehensive planning mechanisms, such as land use and general plans, emergency operations plans, and municipal ordinances and building codes, to manage community growth and development. This information was used in the development of the hazard identification, vulnerability assessment, and capability assessment and in the formation of goals, objectives, and mitigation actions. These sources are documented throughout the plan and specifically in the capability assessment sections of each jurisdictional annex.

Element A.3. Public Involvement

Requirement §201.6(b)(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; Requirement §201.6(c)(1) [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

At the beginning of the planning project it was decided by Yuba County OES that early public outreach in all stages of the plan development would be a high priority, especially since the County has a large commitment to the Community Rating System program and the National Flood Insurance Program. The County commenced this project with a Board of Supervisors briefing in open public forum to discuss the purpose of this planning effort, to gain consensus on

the grant award, and to receive and overall approval by the Board of Supervisors to show their commitment to this plan update. Next, Yuba County OES advertised the planning process via a press release, which detailed the project website and asked the public to participate in the planning process. This press release also explained that a public survey was developed and was available on the Yuba County jurisdictional website, and a website created by the Howell Consulting Team located at www.yubahazards.com, posted on local message boards and handed out to various members of the public at events within Yuba County and the participating jurisdictions.

The public survey provided an opportunity for the public to share their opinions and participate in the mitigation planning process. The information provided aided in helping the Planning Team better understand the hazard concerns and identified area policies and projects that could potentially help lessen the impact of future hazard events in Yuba County. The public survey was a tool developed by the consulting team in coordination with the planning team in order to gain input from the public. This proved to be beneficial. There were 59 responses to the surveys and many comments and ideas on mitigation from the public received. The final survey numbers as well as the comments/ suggestions are located in the Planning Process Documentation section.

There was also a public workshop held by the county/participating jurisdictions. This workshop was held in the evening, during the week at a selected, accessible location (County Government Center) within Yuba County, so that the public could easily attend. The overall purpose of the meeting was to inform the public on the purpose and planning process for the local hazard mitigation plan development, present the types of hazards in or possibly affecting Yuba County, seek input from the public on priorities for risk reduction, and inform the public on how to comment on the draft plan. There were six (6) members of the public in attendance at the public workshop.

The Yuba County Public Information Officer advertised the planning process, project website and the public meeting to the following local media outlets on behalf of the County and the participating jurisdictions countywide.

- The Appeal-Democrat, a local daily newspaper
- The Rabbit Creek Journal, a local weekly newspaper
- The Territorial Dispatch, a local bi-monthly newspaper
- YubaNet.com, online
- KUBA 1600 AM, local radio news station

Yuba County also advertised the planning process with Floodplain Mailers (letters) that went to over 1,500 residents and businesses that were located in the floodplain. The County's Community Rating System Coordinator provided a listing of these businesses and residents to the Consultant.

Additionally, fliers were placed in less populated areas in each unincorporated area of the county at fire stations, libraries, and/or posted in grocery stores and other places frequented by local residents. The participating jurisdictions of Yuba County, City of Wheatland, Yuba County Water Agency and the Marysville Joint Unified School District all linked their websites to the county website and also linked to the www.yubahazards.com website. Public meeting opportunity dates are provided in **Table A4**.

Table A4 – Public Meeting/Plan Intro/Review Opportunities

Public Information/Meeting Opportunities	Date	Location
Yuba County Board of Supervisors Meeting	September 11, 2012	Yuba County Board Chambers
Project Website	Project duration	Project Website
Project Public Survey	Project duration	Project Website
Press Release	March 2014	Local Newspapers; County website; Project website
Public Workshop	03/27/14	Yuba County Government Center
Letter to Residents Living in Floodplain	April 2014	USPS Mail
Fliers Posted in County/Participating jurisdictions on Release of Draft Plan	June/July 2014	Hard Copies in local meeting/gathering places
Press Release	June 2014	Local Newspapers;

Once the first draft of the revised multi-jurisdictional plan and annexes had been developed, Yuba County made it available on their website and the www.yubahazards.com website. A hard copy was also available at the following locations: local libraries, Yuba County OES, Yuba County Administrator's Office, the City of Marysville, Wheatland City Manager's Offices and the Yuba County Water Agency's headquarters location. The same process described above in this section was followed. The jurisdictions announced the availability of the draft plan and the public comment period through press release from Yuba County's Public Information Officer. According to the responses received from the public participation survey, a consensus was made by the Planning Team to reach out to their populations electronically for plan review. Based on this review, no comments were received from the public on the draft plan. A copy of the press release is provided in Planning Process Documentation section of this plan.

A record of the public input, surveys and remaining planning process documentation are on file with Yuba County OES. There were no public comments from the final review from the public.

The overall process included the discussion of the hazard mitigation planning process into various public meetings such as Board or Supervisors, Emergency Management, Local and Regional Public Health, Fire Chief's, School Board and participating jurisdictional meetings and forums.

The agendas, presentations and attendance rosters for each of these public meetings are located in the Planning Process Documentation section attached to this plan.

Element A.4. Review and Incorporation of Exiting Plans

Requirement §201.6(b)(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Based on the capability assessment described throughout this plan, communities in Yuba County continue to plan and implement programs to reduce losses to life and property from natural hazards. This plan builds upon the momentum developed through previous and related planning and mitigation efforts and recommends implementing projects through the following plans, where possible:

- General Plans and zoning codes of Yuba County and the participating jurisdictions
- Emergency Operations Plans
- Capital Improvement Plans
- The Nevada-Yuba-Placer Unit Fire Management Plan
- June 2014 Draft Yuba Foothills Community Wildfire Prevention Plan
- Other community plans within the county, such as water master plans, storm water management plans, and parks and recreation plans
- Other plans and policies outlined in the capability assessment section of this plan

The General Plan for Yuba County and the 2007 Hazard Mitigation plan was a primary source used to update the Public Health & Safety Element of the General Plan. The Public Health & Safety Element is updated on a five-year cycle consistent with the mitigation plan to improve efficient use of county resources and to improve consistency within county plans and policies.

Element A.5. Plan Maintenance Process

Requirement §201.6(c)(4)(iii) [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Yuba County is dedicated to involving the public directly in review and updates of the Yuba County Multi-jurisdictional Local Hazard Mitigation Plan. Copies of the plan will be catalogued and kept at all appropriate agencies in the County as well as at the main library and posted on official websites.

Public meetings will be held as part of each annual review and the required five-year update of the plan. The meetings will provide a forum for public input to the plan. In addition to public meetings, the Yuba County OES office will provide an update to the Board of Supervisors on the process of mitigation planning in Yuba County. This will allow the public to comment and capture any relevant comments into the public record. Traditionally, Yuba County OES has held an annual meeting with the planning process participants to discuss progress in local mitigation efforts. This will continue through this new planning cycle. An example of this annual meeting is located in the Planning Process Documentation section of this plan.

Element A.6. Continued Public Involvement

Requirement §201.6(c)(4)(i) [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five year cycle.

The Yuba County Multi-jurisdictional Local Hazard Mitigation Planning Team has made the commitment to annually bring this plan before the public through public meetings and community posting so that citizens may make input as strategies and implementation actions change. Each jurisdiction is responsible for assuring that their citizenry are informed when deemed appropriate by the standing Planning Team. This plan will also be on the standing agenda of the Yuba County Operational Area meeting. This meeting is scheduled to occur at least annually and is led by Yuba County OES.

The Yuba County Office of Emergency Services Manager will be responsible for the monitoring, evaluating, and updating of the plan for the Operational Area. **Table A5** shows the designated positions in the participating jurisdictions that will also take lead in ensuring the plan is continually monitored, evaluated and updated.

Table A5 - Continued Public Involvement Responsibility

Name	Title	Department	Jurisdiction	Monitoring	Evaluating	Updating
Scott Bryan	OES Manager	Yuba County OES	Yuba County	X	X	X
Christian Sachs	Administrative Sgt.	City of Marysville Police Department	City of Marysville	X	X	X
Allyn Wightman	Police Chief	City of Wheatland Police Department	City of Wheatland	X	X	X
M. Page Hensley	Finance Manager	Yuba County Water Agency	Yuba County Water Agency	X	X	X

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Element B: Hazard Identification and Risk Assessment

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

§201.6(c)(2)(ii) [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:

§201.6(c)(2)(ii)(A) (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

§201.6(c)(2)(ii)(B) (B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.

§201.6(c)(2)(ii)(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Risk to natural hazards is a combination of hazard, vulnerability and capability. This section of the plan will look at both hazards and vulnerability. The risk assessment process identifies and profiles relevant hazards and assesses the exposure to lives, property and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential losses in Yuba County and the participating jurisdictions of the City of Marysville, Wheatland and the Yuba County Water Agency from a hazard event. This process also allows communities in Yuba County to better understand their potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce the risks from future hazard events in Yuba County.

In the early meetings with Yuba County and the Planning Team, data was reviewed from the following sources on hazards affecting the county, those sources were: the Federal and State Disaster Declaration History, the State of California Hazard Mitigation Plan (2010), the revision and update State of California Hazard Mitigation Plan (2013) the entire Yuba County General Plan (2030), the plans from the participating jurisdictions and interviews of staff that live and work in Yuba County, participating jurisdictional staff and subject matter experts.

The Planning Team, during their March 2014 meeting, came to agreement on significant hazards to Yuba County. The Planning Team agreed not to address technological or human-caused hazards, which are addressed in emergency operations plans for the county/cities and participating jurisdictions. The hazards contained in this planning effort are in alphabetical order and listed below.

- Earthquake
- Flood
- Severe Weather
- Wildfire

- Volcano

Non-Profiled Hazards

The Planning Team reviewed data and discussed several other hazards, which were eliminated from further discussion because they occur rarely and/or their impacts are not significant. The list below details these hazards and provides a brief explanation for their omission from further profiling.

- Avalanche - Snowfall is extremely rare to nonexistent across the planning area.
- Coastal Erosion/Storm - Hazard does not occur due to distance from coasts and ocean.
- Hailstorm - Severe thunderstorms during which hail normally occurs are rare.
- Hurricane - Hazard does not occur due to distance from ocean.
- Land Subsidence - Land subsidence does occur in many areas but primarily affects water wells, which local agencies address.
- Tsunami - Hazard does not occur due to distance from ocean.

The remainder of this section begins with an overview of the history of declared disasters in Yuba County followed by the profiles of identified hazards.

Disaster Declaration History

One method to identify hazards is to look at the events that have triggered federal and/or state disaster declaration that included Yuba County. **Table B1** lists the disaster declarations where Yuba County was designated federal and/or state disaster declarations since 1982 to the present.

Table B1 - Yuba County Disaster Declaration History 1982-present

Hazard Type	Disaster Name	Disaster Number	State Declaration	Federal Declaration
Heavy rains, high winds, flooding, levee breaks	1982-83 Floods	DR-677	X	X
Broken levee	Spring Storms – 1986 South Yuba County Flood	DR-758	X	X
Extended freezing Temperatures	Severe Weather Freeze	DR-984	X	X
Severe winter storm	1995 Winter Storms	DR-1044	X	X
Severe winter storm	1995 Late Winter Storms	DR-1046	X	X
Wildland fire	Williams Fire		**X**	**X**

Hazard Type	Disaster Name	Disaster Number	State Declaration	Federal Declaration
Broken levee	Winter Storms – South Yuba County Flood	DR-1155	X	X
Winter storms/flooding	El Nino '98 Winter Storms	DR-1203	X	X
Wildland (Pendola) Fire	Northern CA Fires	EM-2140	X	X
Severe Weather– flooding	2005-2006 Winter Storms	DR-1628	X	X
Drought	California Drought		X	

Source: 2014 Yuba County OES, Cal OES and FEMA

The majority of declarations were declared for flooding and severe weather. There have been no Federal Disaster Declarations in Yuba County since 2006.

Methodology

The hazards identified in Yuba County by the Planning Team are profiled in this section. Hazard profiles provide information on the hazard description, extent and magnitude, previous occurrences, and probability of future occurrence. The sources used to collect this information for Yuba County included the following:

- Disaster declaration history from Yuba County, Cal OES and FEMA.
- California State Multi-Hazard Mitigation Plan (2010, 2013).
- Yuba County Emergency Operations Plan (2008), Jurisdictional plans and documents and the Public Health & Safety Element of the Yuba County General Plan (2030) and those General Plans of the participating jurisdictions.
- Yuba County Multi Hazard Mitigation Plan (2007).
- Flood Insurance Study (FIS) February 18, 2011
- Flood Insurance Rate Maps (FIRMs) February 18, 2011
- CWPP, Yuba County Draft (June 2014)
- Geographic Information Systems (GIS) data from Cal OES and other state agencies, the U.S. Geological Survey, and the Yuba County Planning Department.
- Information collection from the Planning Team meetings and by each participating jurisdiction (City of Wheatland, City of Marysville and the Yuba County Water Agency) profiling hazards in their area.

A detailed profile for each of the identified hazards compiles information on the following characteristics of the hazard:

Geographic Extent

Descriptor
No Physical Damage - No secondary impacts
Limited - Less than 10% of County affected
Significant - 10-50% of County affected
Extensive - 50-100% of County affected

Potential Magnitude

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

Previous Occurrences

This section includes information on historic incidents, including impacts, if known. An Information Collection Tool was used to capture information from participating jurisdictions on past occurrences. Information from the Planning Team was combined with other data sources such as the National Weather Service.

Probability of Future Occurrence

Descriptor
Unlikely - Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.
Occasional - Between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
Likely - Between 10 percent and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.
Highly Likely - Near 100 percent chance of occurrence next year or happens every year.

The probability, or chance of occurrence, was calculated where possible based on existing data. Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year.

An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of that hazard occurring in any given year.

Element B.1 Hazard Descriptions

Element B.2 Previous Occurrences and Probability of Future Occurrences

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

Earthquake

Hazard Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. The magnitude of earthquakes is usually measured using the Richter scale; a logarithmic scale calculated from the amplitude of the largest seismic wave recorded for the earthquake.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of damage to structures during earthquakes. Seismologists have developed the Mercalli scale to quantify the shaking intensity of an earthquake's effects, which is measured by how an earthquake is felt by humans and the damage to buildings.

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks such as water, power, gas, communication, and transportation lines. Other damage-causing effects of earthquakes are surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, seiches, liquefaction, and dam failure.

In populated areas, the greatest potential for loss of life and property damage can come as a result of ground shaking from a nearby earthquake. The degree of damage depends on many interrelated factors. Among these are the Richter magnitude, focal depth, distance from the causative fault, duration of shaking, type of surface deposits or bedrock, presence of high ground water, topography, and finally, the design, type, and quality of building construction.

Geographic Extent

Several earthquake fault zones lie in or near Yuba County shown in Figure 4. These include the Swain Ravine fault zone, Bear Mountain fault zone, and Spenceville fault. According to the California Geological Survey, these faults have not had activity since the Quaternary epoch, greater than 10,000 years ago. These faults are likely the remnants of a suture zone several million years old where portions of the oceanic crust were scraped off of the Pacific Plate during subduction under the North American Plate. Therefore, these faults are the likely remains of previous tectonic activity, and current tectonic activity regarding these plates has transferred to the Gulf of California spreading rift and corresponding translational movement of the San

Andreas Fault.

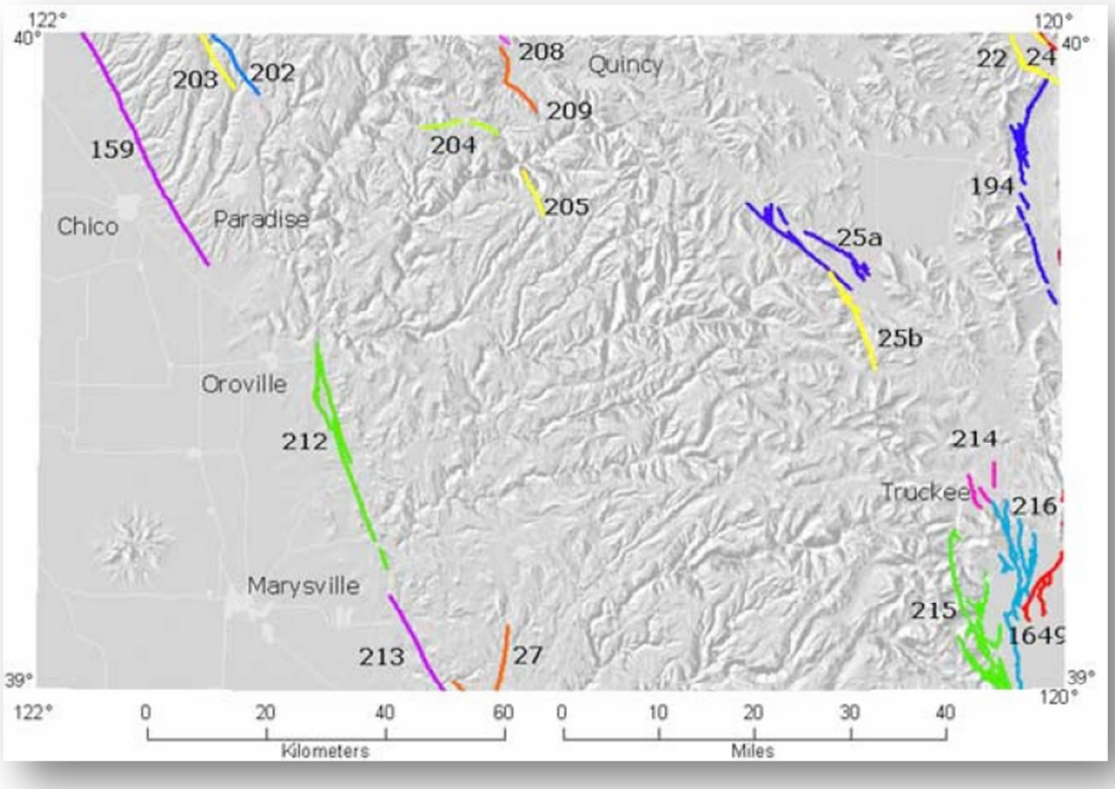
The **Swain Ravine** fault zone lines in a line from the southeast to the northwest along the foothills from approximately two miles south of Hammonton Road to the County boundary.

The **Rescue Lineament–Bear Mountains** fault zone lies generally south of the County boundary near Camp Far West Lake. The Yuba County Jurisdiction has not sustained damages attributed to earthquakes, dam failures, or landslides due to seismic activity as far as records have been maintained. Yuba County has not proclaimed a local state of emergency due to earthquake events, including the 6.1 earthquake which occurred near Oroville in 1975.

The **Spenceville** fault zone lies in a line from the southeast to the northwest along the foothills from the County boundary in the south to approximately two miles south of Hammonton–Smartville Road.

Those mentioned above and other regional fault zones that could affect Yuba County are shown in **Figure B1**.

Figure B1 - Regional Fault Zones



Source: 2014 Yuba County Hazard Mitigation Planning Team

Regional Fault Zone Identifiers

Number	Name
22	Honey Lake fault zone
24	Fort Sage fault
25a	Mohawk Valley fault zone, Mohawk Valley section
25b	Mohawk Valley fault zone, Sierra Valley section
27	**Bear Mountain fault zone**
159	Chico Monocline
194	Last Chance fault zone
202	Beaver Creek fault
203	Cohasset Ridge fault
204	Haskins Valley fault
205	Unnamed faults west of Hat Creek
208	Crablouse Ravine fault
209	Bottle Springs fault
212	**Swain Ravine fault zone**
213	**Spenceville fault**
214	Unnamed faults south and east of Truckee
215	Tahoe–Sierra frontal fault zone
216	West Tahoe–Dollar Point fault zone
1649	North Tahoe fault (Nevada)

The Geographic Extent of Earthquakes in Yuba County is Limited - Less than 10% of County affected .

Potential Magnitude

Factors which figure predominately in the levels of damage from earthquakes are:

- Impact of earthquake epicenter
- Impact of quake magnitude
- Impact of time of day
- Impact of construction materials and practices

Earthquakes are a particularly destructive natural hazard. According to FEMA's 2001 HAZUS99 assessment of earthquake damage, there is estimated to be annualized losses of 3.26 billion dollars to the general building stock in California alone (FEMA 2001). Additionally, this figure does not include critical facilities and other infrastructure (FEMA 2001).

The severity of an earthquake can be expressed both as magnitude and as intensity. Magnitude is usually expressed with Arabic numerals and characterizes the size of an earthquake by the energy released as shown in **Table B2**. The intensity of an earthquake is usually expressed in roman numerals and indicates the local effects and the potential for damage produced on the Earth's surface. The difference between magnitude and intensity is analogous to a radio broadcasting station. Magnitude can be compared to the power output in kilowatts, while intensity is comparable to signal strength on a receiver at a given locality. Thus damage from an earthquake is dependent upon the magnitude of the event and the distance from the event epicenter.

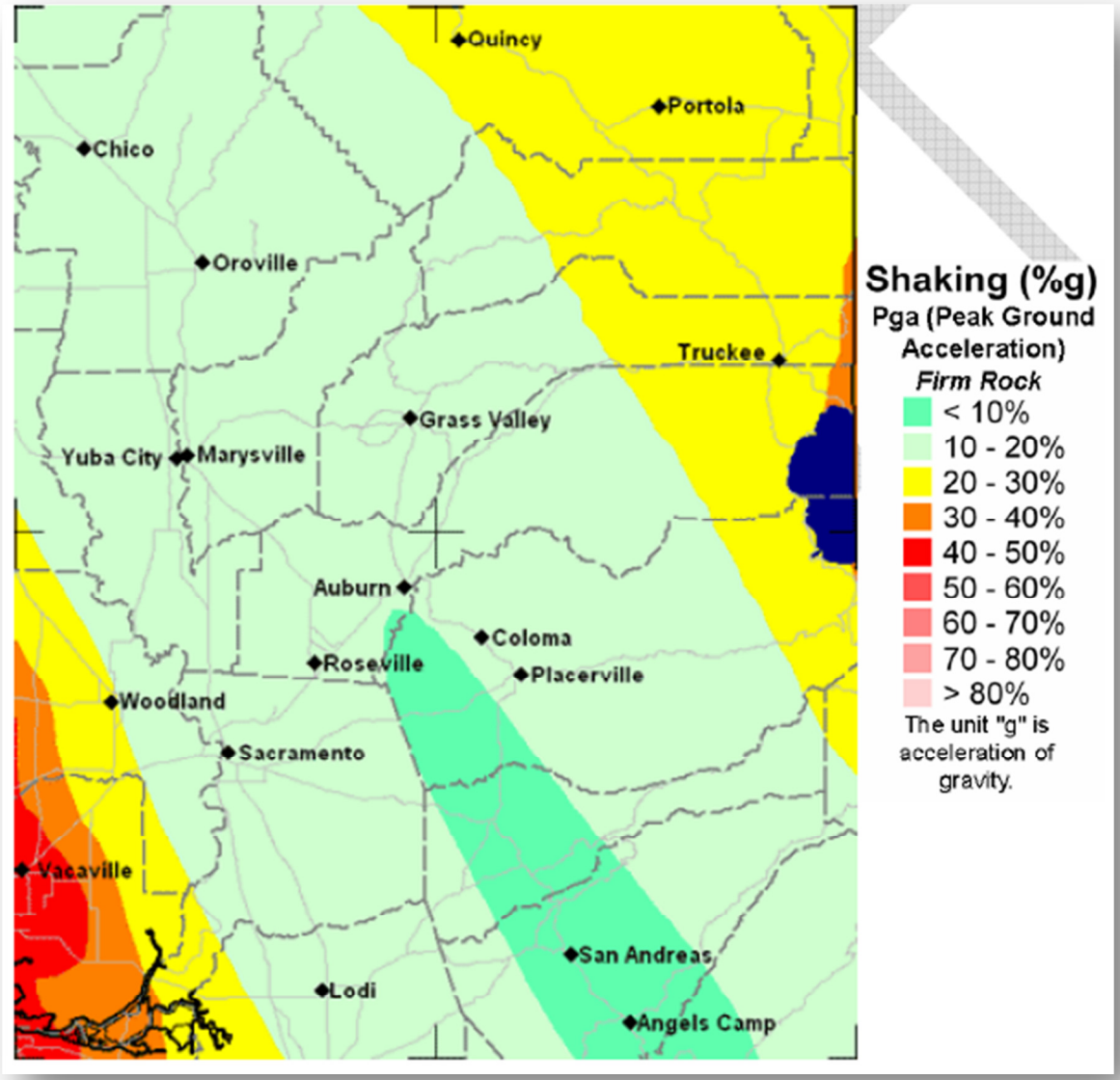
Table B2 – Earthquake Magnitude/Intensity

Earthquake Magnitude							
Description	**Minor**	**Light**	**Moderate**	**Strong**	**Major**	**Great**	**Rare great**
Magnitude	3.0–3.9	4.0–4.9	5.0–5.9	6.0–6.9	7.0–7.9	8.0–8.9	9.0 or greater
Effects	Often felt, no damage	Pictures move	Major damage to poorly constructed buildings, chimneys crack and fall	Destructive within 100-mile circumference	Serious damage over larger areas	Serious damage over several hundred mile diameter	Devastation in several thousand mile diameter

Earthquake Intensity							
Perceived Shaking	**Very light**	**light**	**moderate**	**strong**	**Very strong**	**violent**	**extreme**
Potential Damage	Dishes rattle	Pictures move	Objects fall	Nonstructural damage	Moderate damage	Ground cracks	Buildings destroyed
Peak Ground Acceleration			0.12	0.21	0.36	0.53	0.71
Modified Mercalli Intensity	IV	V	VI	VII	VIII	IX	X+

According to the United State Geological Survey, the California Seismic Safety Commission, and the California Geological Survey, the County is subject to the least ground shaking and lies with the 10% to 20% gravity zone shown in **Figure B2**. The figure depicts the peak ground acceleration for Yuba County. This number is a representation of the potential maximum ground acceleration that could be expected during an earthquake as a percentage of the force of gravity. A relationship can be established between the intensity of an earthquake and the corresponding peak ground acceleration. As can be seen, during the most intense earthquakes (intensity XII) when objects are thrown into the air, gravity is being exceeded, therefore a number greater than 1.0 is shown for peak ground acceleration (1.0 equals the force of gravity).

Figure B2 - Peak Ground Acceleration



Source: 2014 Yuba County Hazard Mitigation Planning Team

The Yuba County Water Agency conducted a detailed review of potential seismic sources in relation to New Bullards Bar Dam in 2004. The study involved research of faults and lineaments in the region to check for displacement along the features, review of potential seismic sources, controlling faults and maximum credible earthquake and an estimation of the range of ground motions. Of the identified or inferred lineaments or faults in the region identified by the California Department of Water Resources, Division of Safety of Dams most are believed to be inactive according to the Division of Safety of Dams criteria for faults as noted in the study (Geomatrix 2004). For active faults in the vicinity of the dam, peak bedrock accelerations range from 6.5 to 6.75 in maximum magnitude at distances of 21 to 26 kilometers (km) from the dam. As a result, the study recommended that the 84th percentile response spectrum for a minimum earthquake, 0.2g peak horizontal acceleration (0.2 times the acceleration of gravity) be used for

analysis of New Bullards Bar Dam (Geomatrix 2004).

The New Bullards Bar Dam is inspected visually three times per week for any changed conditions such as increased leakage, cracking, or settlement. Downstream flows are continuously monitored by the Colgate Power Plant and the PG&E Wise Power Plant. There is no change in surveillance with the seasons. In addition, two seismic sensors are located at each end of the new Bullards Bar Dam. An earthquake that registers 5.5 within 50 miles of the dam triggers the Yuba County Water Agency to inspect the dam.

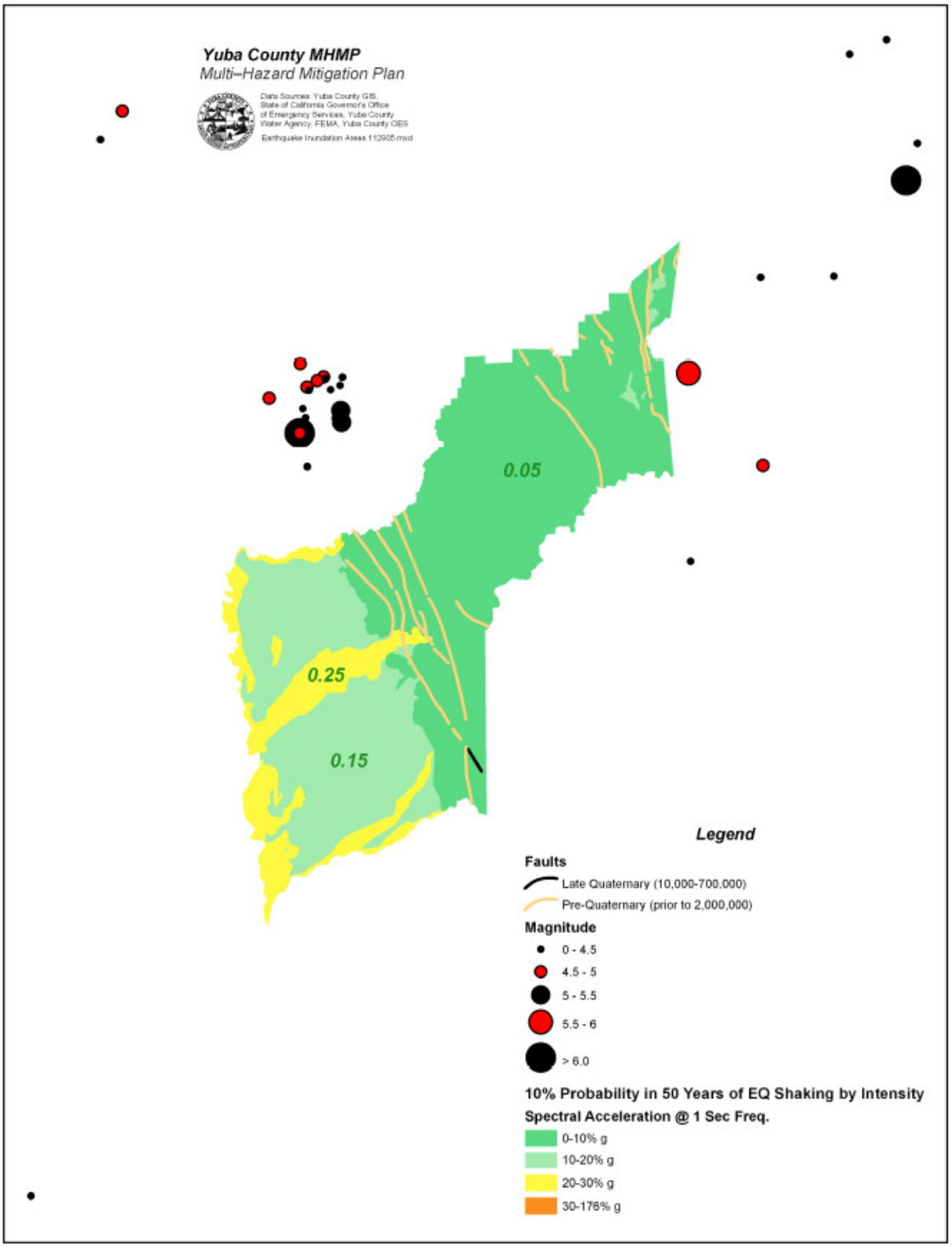
In addition to the direct physical damage that can result from the motion of the earthquake, damage can result from liquefaction or even earthquake–induced fire. Liquefaction occurs where water–logged soils near the ground surface lose compaction during strong ground motion. This can cause building foundations to shift and result in significant structural damage (http://earthquake.usgs.gov). These types of soils are typically found in areas of low–lying, current, or former floodplains. A prime example of the damage that can result from liquefaction was seen during the 1989 Loma Prieta earthquake near Santa Cruz, California. In the Marina District of San Francisco, an area filled–in with sediments derived from the San Francisco Bay, some of the worst building damage was found on these sediments. Examination of **Figure B3** shows that the portions of the county within or directly adjacent to the floodplains of the Bear, Feather, and Yuba Rivers are areas of the greatest peak ground acceleration. Shaking is the dominate and most widespread cause of future damage from earthquakes within Yuba County. While the majority of the County will experience moderate shaking (0.15), areas of Yuba County along the Yuba, Feather, and Bear Rivers will experience strong shaking (0.25) from an earthquake event.

The Potential Magnitude of earthquake hazards in Yuba County could be Catastrophic - More than 50 % of property affected and severely damaged; shutdown of shutdown of facilities for more than 30 days; and/or multiple deaths.

Previous Occurrences

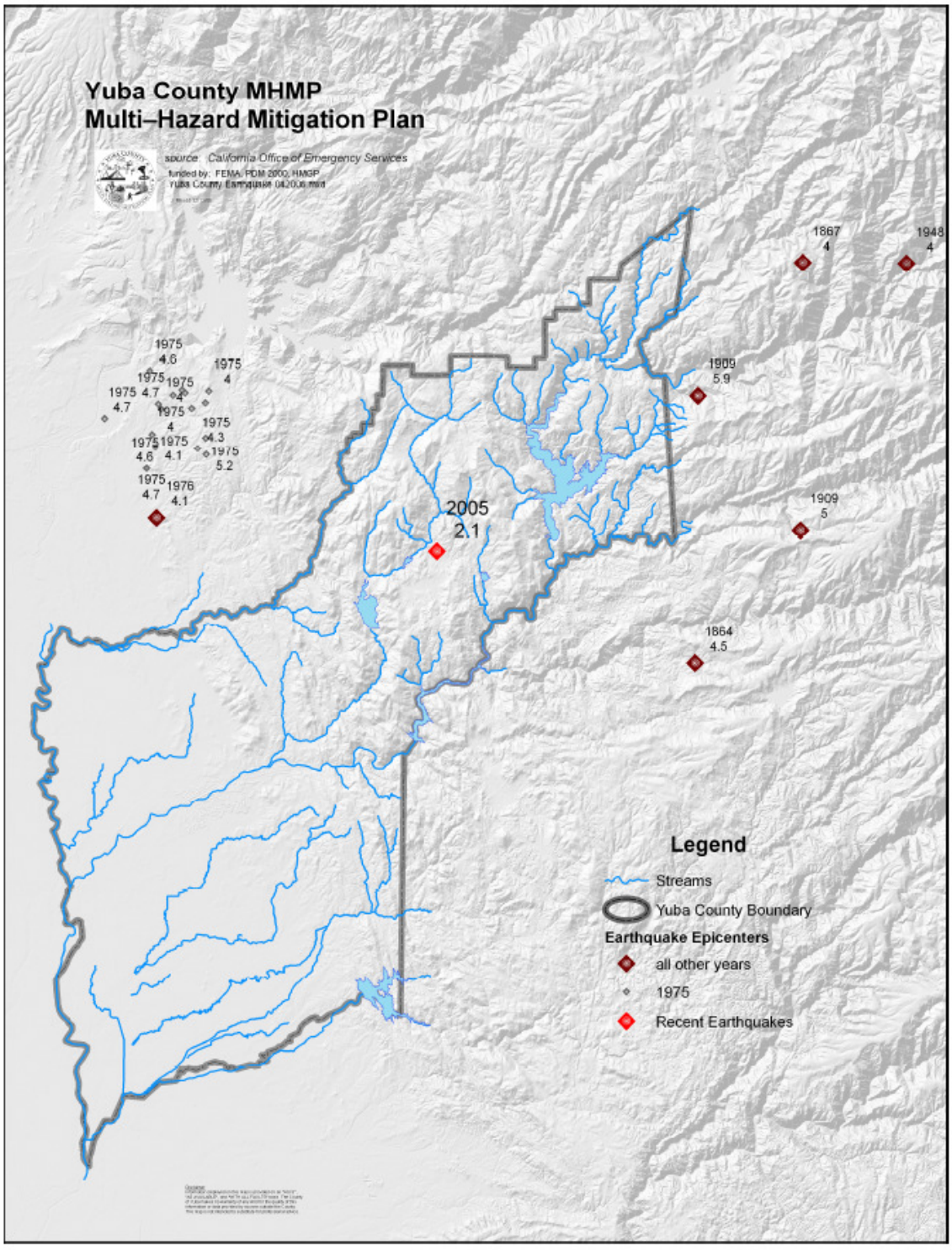
In Yuba County, damaging earthquakes are rare. **Figure B4** depicts the location of historic earthquake epicenters since 1900 in and around Yuba County. Additionally, **Figure B5** shows the declared earthquake disasters in California from 1950-2012. There have been zero earthquake declarations in Yuba County. However, earthquakes do occur in Yuba County. As recently as April 21, 2005, a 2.1 Richter magnitude earthquake occurred in the Oregon House area. In 1909, a 5.9 earthquake occurred along the Sierra–Yuba County border. More significant earthquakes have occurred outside of the county. The most recent earthquakes felt in the county occurred in the mid 1970's south of the City of Oroville in Butte County, the strongest of which was classified as a strong earthquake with a magnitude of 6.1. It has been suggested that Lake Oroville contributed to both the timing and location of the 1975 earthquake following an unprecedented seasonal fluctuation in lake levels. During the winter of 1974–1975, the lake was drawn down to its lowest level since filling to repair the intakes to the power plant. This unprecedented drawdown and subsequent refilling was followed by the earthquake sequence of 1975.

Figure B3 – 50 Year EQ Hazard Probability



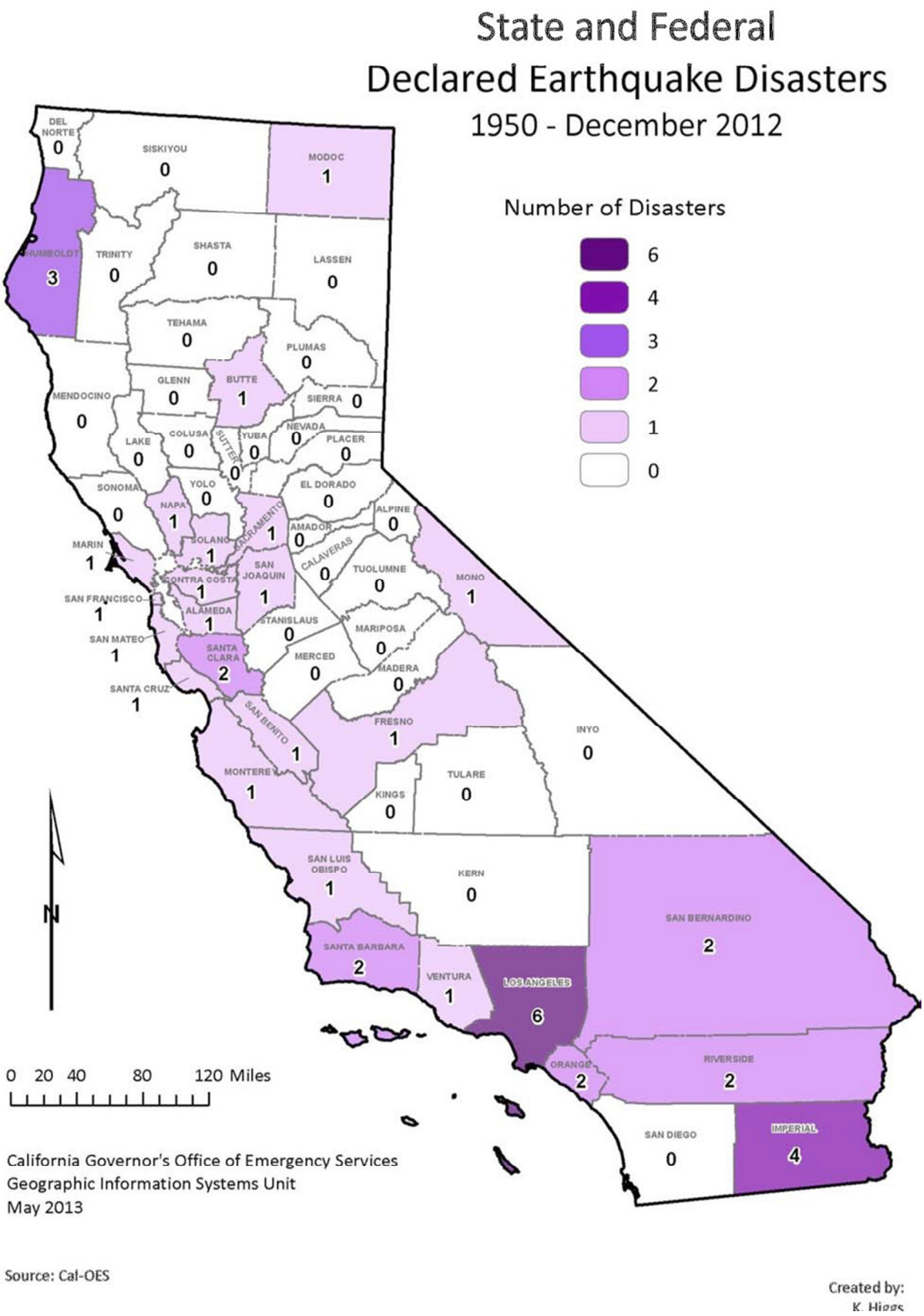
Source: 2014 Yuba County Hazard Mitigation Planning Team

Figure B4 – Historic Earthquake Epicenters Since 1900



Source: 2014 Yuba County Hazard Mitigation Planning Team

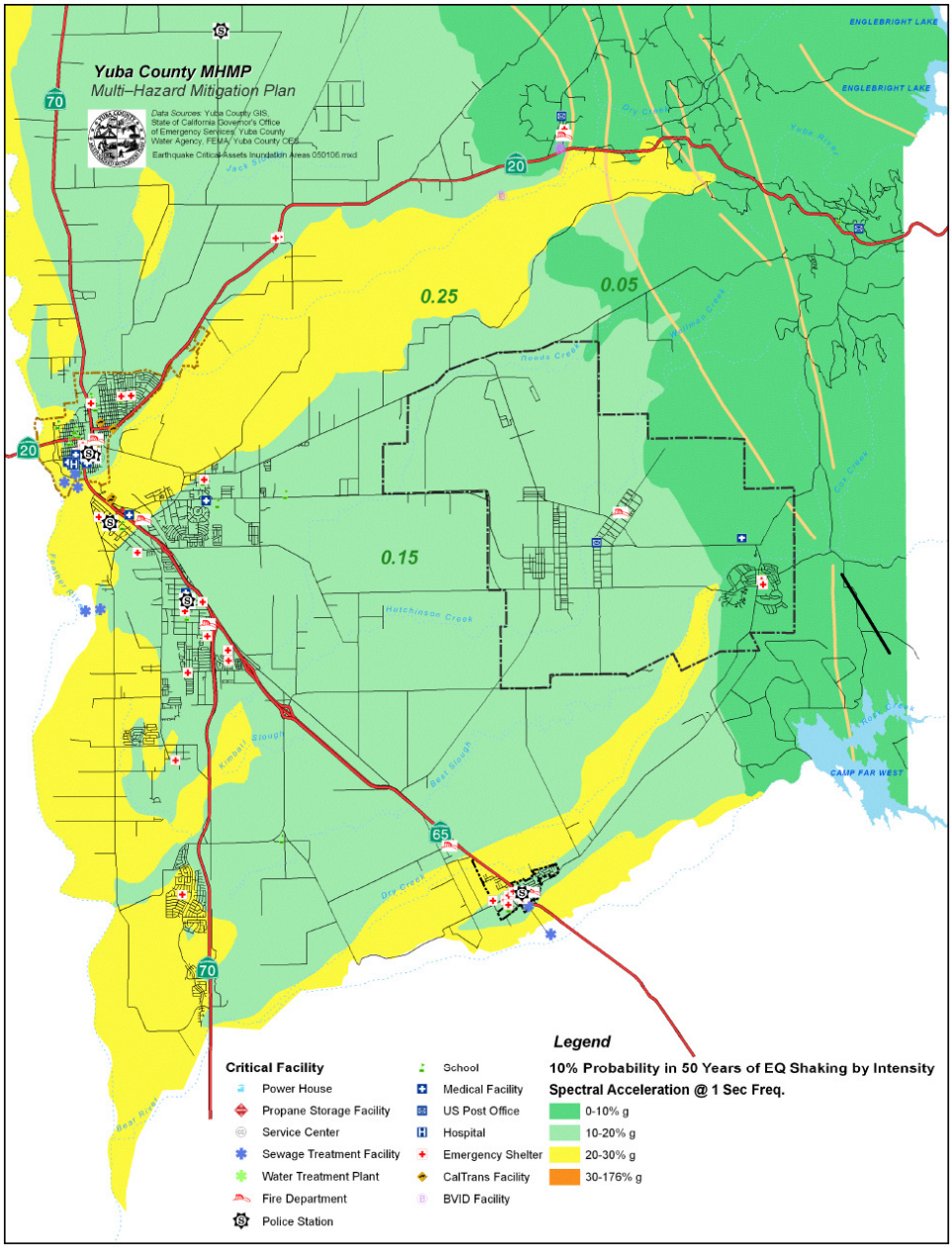
Figure B5 – Declared EQ Disasters



Probability of Future Occurrence

The threat of earthquakes exists in Yuba County, but compared to the rest of the state, the probability of strong earthquakes in the county is much less than areas near the San Andreas Fault and the eastern Sierra Nevada. Yuba County has a probability of 50 percent that it will experience an earthquake of magnitude greater than or equal to 6.01 within 500 years as shown in **Figure B6**.

Figure B6 – 10% probability in Next 50 Years



Source: 2014 Yuba County Hazard Mitigation Planning Team

Earthquakes are Occasional - Between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years in Yuba County.

Flood

According to the National Weather Service natural hazard statistics, flooding on the 30-year average is the leading cause of deaths over any other natural hazard (NOAA, 2013). In disaster mitigation, there are many ways to lessen the effects of flooding. This section reviews the river environments of Yuba County, its history of significant flooding, and the potential for future flooding.

Flooding occurs when an existing stream channel can no longer contain the water flow within its natural banks. For stream channels, the excess flow floods adjacent, normally dry, land called a floodplain. The stream channel can be any form of watercourse: stream, river, creek, canal, etc. Flooding occurs in many forms in Yuba County: riverine, urban, and flash flooding. The best known causes of flooding result from excess rainfall or snowmelt, especially for riverine or flash flooding, but other causes include dam or levee failure, or for urban flooding a major contributing factor is storm drainage system overload.

Riverine flooding occurs when water from watercourses overtops the natural banks of the watercourse to flow over the adjacent lands. Oftentimes, these lands outside of the stream banks are the locations of much urban development. Flooding also occurs from the accumulation of storm water in low–lying areas with poor drainage, either by the lack of infiltration or from an insufficient overland drainage network. This is often called urban flooding and results from a clogged or insufficient storm water drainage system where infiltration is insufficient or in flat, low–lying areas with insufficient drainage networks. Flash flooding occurs when streams exhibit a dramatic rise in water level in a short amount of time, typically less than six hours from rise to peak to recession along the length of the watershed. Flooding can also result from dam or levee failures, which will be discussed also in this section.

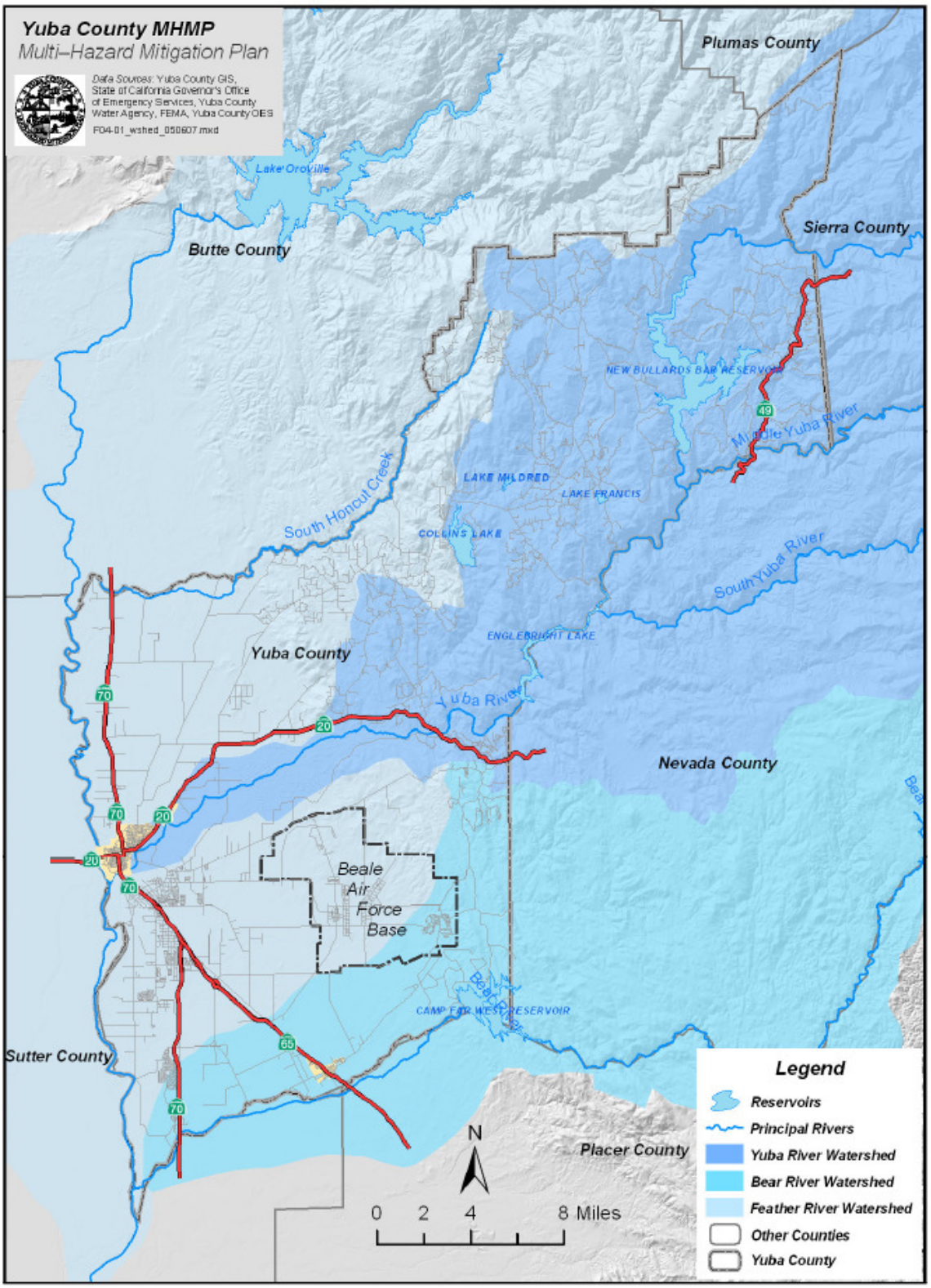
Urban flooding from storm drain overloading is typically of local concern and usually causes roads to be impassable until the water recedes. Urban flooding in Yuba County has been exacerbated by the change in the primary purpose of the internal drainage system from flood protection to wildlife habitat. This change in purpose has often delayed, increased the cost of, restricted, and in some cases stopped needed maintenance activities.

Geographic Extent

The Sacramento Valley has a long history of flooding from the rivers that drain into it. Early explorers noted that the entire lower Sacramento Valley south of the Sutter Buttes would be covered by water during the winter months (McCarthy 1997). The principal river of the Sacramento Valley, the Sacramento River, drains a watershed of 27,841 square miles and collects water from tributary rivers draining the Coast Range, Cascade Range, and the Sierra Nevada.

Yuba County exhibits a wide range of geographic features because it encompasses two major provinces: the Great Valley and Sierra Nevada. Three significant rivers border or run adjacent to the county: the Feather River, the Yuba River, and the Bear River shown in **Figure B7**.

Figure B7 - Yuba County Watershed System



Source: 2014 Yuba County Hazard Mitigation Planning Team

The Feather River originates in the Sierra Nevada at elevations near 8,000 feet. The Feather River drains an area of 6,227 square miles (including the Yuba and Bear River watersheds). It is approximately 130 miles long from its headwaters to its confluence with the Sacramento River just north of the city of Sacramento. The Feather River canyon provides the lowest elevation pass through the Sierra Nevada, allowing rail and automobile traffic. The canyon serves as the separation between the Sierra Nevada and Cascade Mountain physiographic provinces.

The Yuba River originates in the Sierra Nevada at over 8,000 feet, threading its way down hundreds of miles of canyons to join the Feather River at Marysville at an elevation of only 67 feet above sea level. It drains a 1,336–square–mile watershed only 35 miles across at its widest point.

The Bear River flows westerly from the Sierra Nevada to its confluence with the Feather River, forming the southern boundary of Yuba County. The Bear River drains a watershed of 469 square miles.

The Yuba and Feather River basins and channels continue to adjust to the effects of late nineteenth century hydraulic mining activities. Approximately 255 million cubic yards of gold–bearing material was washed into the Bear River between 1849 and 1909, raising the Bear River channel 20 feet and burying the original channel.

The Yuba River received more hydraulic mining generated sediment than the Bear River, upper Feather River, and American River combined. From 1849 through 1909, more than 600 million cubic yards of hydraulic mining debris was washed into the Yuba River raising the channel over 15 feet, burying the original channel. Between the confluence with the Feather River and River Mile 2, the Yuba River is characterized by sediment storage on high relief bars primarily of sand–sized material.

The Feather River is a wide, shallow, low sinuosity sand bed river that contains large sand waves that migrate slowly downstream under the summer low flow conditions. The Feather River has eroded through the hydraulic mining debris into the pre–mining flood plain sediments, with very little bank erosion to the riverbank or levees. The remaining debris is comprised of “slickens”, the fine materials that accompanied the initial surge of hydraulic mining sediment flow. Comprised of thinly bedded silt, clay, and fine sand deposits, “slickens” are generally low in organic content and resistant to erosion. During flood events, mining sediments typically migrate to the Feather River from the Yuba and Bear Rivers. With the end of hydraulic mining, sedimentation in the Yuba and Bear Rivers has decreased, which has caused downstream channel instability to the Feather River. Continued erosion at Shanghai Bend (River Mile 24.8) will lower the base level of the Feather River causing channel instability affecting existing infrastructure. For example, streambed degradation could undermine the Marysville–Yuba City Bridge, and cause lateral migration of the channel and instability of project levees.

New Bullards Bar, located on the North Fork of the Yuba River at a base elevation of about 1,350 feet, has a normal gross storage capacity of 966,103 acre–feet at reservoir elevation 1,956 and contains 170,000 acre–feet of flood space. Water from the New Bullards Bar Dam flows south in the North Fork of the Yuba River for approximately 2.3 miles to the confluence with the Middle Fork of the Yuba River. The Colgate Powerhouse is approximately 4.5 miles below this

confluence. The Middle and North Forks together known as the Yuba River join with the South Fork of the Yuba River approximately 4.0 miles downstream from the Colgate Powerhouse.

Englebright Dam, a reinforced concrete debris dam, is located approximately 6.6 miles below the confluence of the South Fork of the Yuba River with the Yuba River. The Narrows 2 Powerhouse is located approximately 400 feet downstream of Englebright Dam. The Harry L. Englebright Dam originally know as Upper Narrows Dam, located on the Yuba River approximately 20 miles northeast of the City of Marysville, has a crest elevation of 527 feet above MSL, rising 260 feet above the lowest foundation. It has a spillway capacity of 110,000 cfs with zero freeboard (the spillway design flood of 350,000 cfs would result in 8 feet of water over the non–overflow section), and a surface area of 815 acres. The maximum rate of controlled release from Englebright is 4,250 cfs through the Narrows 1 Power house and Narrows 2 Power house.

Oroville reservoir has a maximum flood space reservation of 750,000 acre–feet, a normal gross storage capacity of 3.538 million acre–feet, and is located on the Feather River five miles east of the City of Oroville. The spillway has two separate elements: a controlled flood control outlet and an uncontrolled emergency spillway. Water from Oroville flows approximately 4.5 miles downstream to the Thermalito Diversion Dam and Diversion Pool, then conveyed between the Thermalito Power Canal and the Hyatt Power Plant. The water diverted from the Feather River flows on to the Thermalito Forebay, an off stream reservoir with a storage capacity of 11,770 acre–feet, and then to another off stream reservoir, the Thermalito Afterbay with a storage capacity of 57,040 acre–feet. Water is released from the Thermalito Afterbay back into the Feather River.

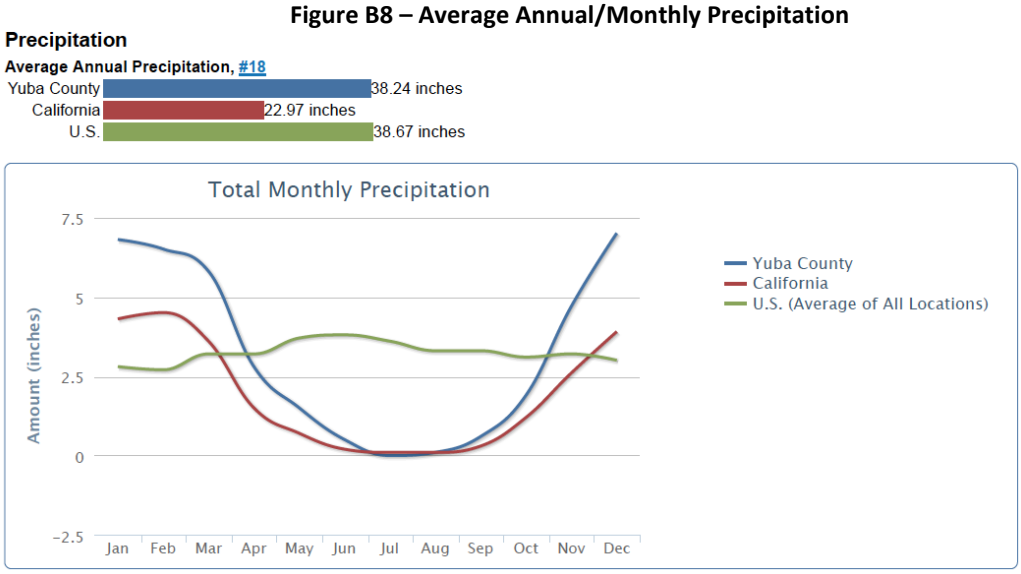
New Bullards Bar Reservoir has an objective maximum flood release of 50,000 cfs, Englebright has an unregulated release, and Oroville Reservoir has an objective maximum flood release of 150,000 cfs. The Feather River flow criterion at Marysville is 180,000 cfs except when the Feather River is experiencing high flows. (Reservoir Regulation for Flood Control, June 1972) Oroville is required to maintain flow targets at multiple downstream locations. Oroville is required to maintain flows at or below 180,000 cfs above the Yuba River confluence, 300,000 cfs below the Yuba River confluence, and 320,000 cfs below the Bear River confluence. New Bullards Bar is also required to maintain flow targets at multiple downstream locations. New Bullards Bar is required to maintain Yuba River flows at Marysville not to exceed 120,000 cfs (180,000 cfs when the Feather River is low) but limited to 50,000 cfs unless inflows during the current flood have exceeded 50,000 cfs. If inflow has exceeded 50,000 cfs, water can be released at rates up to the maximum rate of inflow; given the downstream flow criteria are met. (Reservoir Regulation for Flood Control, June 1972)

Localized flooding occurs in areas of the county generally as a result of severe winter storms. There are several geographic areas in Yuba County prone to localized flooding due to significant rainfall and change in water management practices. Floods also occur due to debris accumulation in storm drains and in flood control channels and basins. This is referred to as ponding or urban flooding . Flooding also occurs in areas of the county during periods of heavy rain when the river levels are high. High river levels can slow, stop, or in some instances reverse flows from the rivers into the tributary drainages. **The Geographic Extent of Floods in Yuba County is Extensive – 50-100% of County is affected.**

Potential Magnitude

Flooding typically results from heavy rainfall. Though Yuba County exhibits a Mediterranean climate, with dry, hot summers, heavy precipitation can occur during the wet, cool winters. Based on its diverse topography, Yuba County experiences a diverse climate. The topography of the county ranges from the low–lying Sacramento Valley just a few feet above sea level to mountainous woodlands and forests in the Sierra Nevada at elevations approaching 5,000 feet above sea level. The mountainous portions of the county experience much cooler temperatures year–round with abundant snow in the winter. Average annual precipitation is approximately 38 inches with a monthly precipitation average shown in **Figure B8**.

Figure B8 – Average Annual/Monthly Precipitation



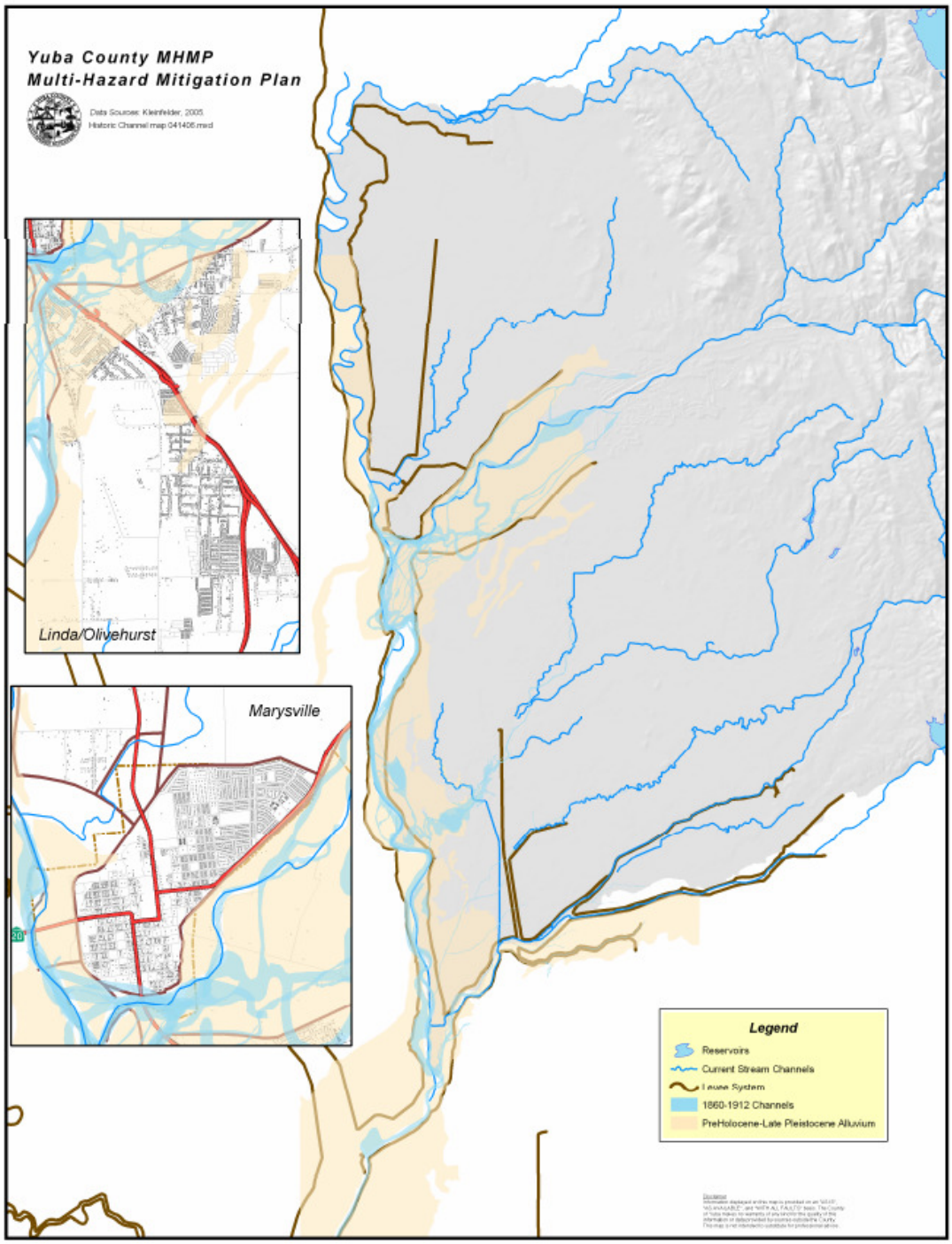
Source: USA.com

Many of the heaviest winter precipitation seasons are associated with El Niño conditions in the Pacific Ocean and storm tracks and strong winter storms repeatedly across northern California. When these storms occur in late spring and hasten snowmelt in the Sierra Nevada, flows in the areas creeks and rivers can rise dramatically. Flooding occurs when a stream exhibits a flow of water that is in excess of what can be contained by the natural stream channel. This excess often flows onto floodplains, the land directly adjacent to a stream course that, during times of high flow, are often inundated as the stream rises above its natural channel. Floodplains can change over time. Most often this results from the natural processes of river systems as a stream works to achieve equilibrium. The floodplain and watercourse of a stream can also be affected by anthropomorphic influences such as the development of land into residential or commercial structures and the resulting reduction of pervious land, resulting in increased stream flow, the construction of bridges or culverts, or the creation of levee or other impoundment structures which control the flow in the watercourse.

Figure B9 shows the ancient Pre–Holocene and Late Pleistocene Alluvium deposited approximately 10,000 years ago and the more recent river channels of approximately 150 years ago. The rivers in the Pre–Holocene and Late Pleistocene were fast-running braided courses with straight, highly pervious graveled stretches. The river channels of 150 years ago indicate a meandering river pattern, as the rivers meander back and forth in their channels. The track patterns of the rivers are apparent in **Figure B9** as the rivers forged meandering channels across

the ancient natural river channel. The vulnerability to flooding is apparent from the levee system overlying the ancient permeable river channel in places.

Figure B9 – Historic River Channels



Source: 2014 Yuba County Hazard Mitigation Planning Team

Dam Failure

Dam failures can result from a number of causes such as erosion of the face or foundation, improper site for a dam to be constructed, rapidly-rising flood waters, aging structure or design flaws and earthquakes. Seismic activity may also cause inundation by the action of a seismically-induced wave, which overtops the dam without causing dam failure. This action is referred to as a seiche. Landslides flowing into a reservoir are also a source of potential dam failure or overtopping. Major dams may be considered terrorist targets.

There are five major dams which could have significant impact on the County of Yuba in the event of a dam failure: New Bullards Bar Dam, Englebright Dam (The Narrows), Virginia Ranch Dam (Merle Collins Lake), Camp Far West Dam and Oroville Dam. Failure of these dams during a catastrophic event such as a severe earthquake is considered a very unlikely event. Due to the method of construction, they have performed well and failure is not expected to occur. The following dams are located within the Yuba County Jurisdiction boundaries:

- New Bullards Bar Dam, (latitude 39.39222, longitude–121.14) impounding the New Bullards Bar Reservoir
- Lake Francis Dam, (latitude 39.36, longitude–121.20278) impounding Lake Francis
- Los Verjeles Dam, latitude 39.36833, longitude–121.28278) impounding Lake of the Springs
- Virginia Ranch Dam, (latitude 39.32306, longitude–121.30861) impounding Collins Lake

The map in **Figure B10** – Dam Inundation in Yuba County shows the inundation areas.

The Federal Energy Regulatory Commission (FERC), as required by Federal Law, has reviewed and approved comprehensive Emergency Action Plans (EAP) for each of these dams. The EAP is intended to minimize the threat to public safety and to minimize the response time to an impending or actual sudden release of water from project dams. The EAP Plan is also designed to be used to provide emergency notification when flood water releases may present the potential for major flooding. Copies of the EAPs for these facilities are located in the County of Yuba Emergency Operations Center (EOC) and at the DWR in Sacramento.

As mandated by the National Dam Inspection Act, Public Law 92-367, the United States Army Corps of Engineers has the authority and responsibility for conducting inspections of all dams. The purpose of the inspections is to verify throughout the operating life of the project the structural integrity of the dam and the appurtenant structures, assuring protection of human life and property. Periodic inspections disclose conditions which might disrupt operation or dam safety. All new dams are constructed using the most up-to-date safety and technical guidelines and criteria. Each type of inspection has different requirements for frequency and qualifications of personnel making the inspection (FEMA, June 1979).

New Bullards Bar Dam

YCWA New Bullards Bar Dam FERC #2246; DWR # BUL

The New Bullards Bar Dam is located on the North Fork of the Yuba River, about 28 miles northeast of Marysville. The New Bullards Bar Dam is located in Yuba County, with associated structures and facilities in nearby Nevada and Sierra Counties consisting of New Bullards Bar Dam, Our House Dam, and Log Cabin Dam. The dam is located 30 miles northeast of the City of Marysville and 1.5 miles downstream from the original Bullards Bar Dam. Tunnels supply water

from the latter two dams to Bullards Bar Dam for power generation. The dam is owned and operated by the Yuba County Water Agency. New Bullards Bar Reservoir has a normal gross storage capacity of 966,103 acre–feet at reservoir elevation of 1,956.

The New Bullards Bar Dam is a Non–Corps project with Corps regulation requirements for flood control, non–Corps hydropower, irrigation, municipal and/or industrial water supply, low flow augmentation or pollution abatement, and recreation for 170,000 acre-feet of the 960,900 acre feet, and non–Corps hydro power, irrigation, municipal and/or industrial water supply, low flow augmentation or pollution abatement, and recreation for the remaining 790,900 acre-feet of the project. (USACE, July 2005) Flood control is coordinated with operations of the Oroville facility according to rules prescribed by the USACE.

This multipurpose project consists of a 645-foot high concrete arch dam with a crest length of over 2,300 feet, a reservoir with a gross capacity of 960,000 acre–feet and new power plants at the Colgate and Narrows sites. Should a breach in the dam occur, the water released would flow in a southwesterly direction toward the City of Marysville. In the event of a dam failure, the flood wave would reach Marysville approximately one hour later. The flood wave would continue to move through Linda and Olivehurst, inundating the western section of the community. It should be noted that Marysville, Linda, and Olivehurst would be totally inundated within 3 hours. The inundated area affected by a breach of the New Bullards Bar Dam is comprised of commercial, industrial, residential property, agricultural lands, schools, and a hospital.

If the New Bullards Bar Reservoir on the North Yuba River, together with Lake Oroville on the Feather River, had been in operation during the 1955–1956 floods, they likely would have prevented the loss of 40 lives and $50.5 million in damages that occurred on the Feather River.

Englebright Dam (Narrows Project)
Narrows Project FERC No. 1403; NAT. Dam No. (Englebright Dam) CA10105; DWR # ENG
Englebright Dam and associated facilities are the properties of the U.S. Corps of Engineers. Yuba County Water Agency (YCWA) and Pacific Gas and Electric (PG&E) both have licenses to operate facilities at the dam. The dam is located on the Yuba River partially within Yuba County, on the Yuba and Nevada County border. Englebright Dam normally operates as a "debris" dam. It is in place to catch silt, mud, sand and other debris to help keep it from clogging the river system. Englebright Dam is a concrete constant–angle arch dam of overflow type. The dam rises 260 feet above the lowest foundation and has a crest elevation of 527 feet above sea level.

The spillway capacity is 110,000 cfs with zero freeboard. This flow is approached approximately once every 10 years. The spillway design flood of 350,000 cfs would result in 8 feet of water over the non–overflow section. The storage capacity of Englebright Dam is 70,000 acre-feet.

Should a breach in the dam occur, the downstream current of water would flow in a southwesterly direction into the Yuba River Channel. The City of Marysville lies within the dam's inundation path. Englebright Dam is approximately 12 miles downstream of the New Bullards Bar Dam.

Oroville Facilities
FERC No. 2100; DWR # ORO

Completed in 1967, Oroville Dam is located in Butte County, storing water from the Feather River, which lies in the foothills on the northern slope of the Sierra Nevada approximately 30 miles north of Yuba County. The dam is owned and operated by the Department of Water Resources.

Oroville Dam is the highest earth fill dam in the United States. It rises 770 feet above streambed excavation and spans 5,600 feet between abutments at its crest. The 80,000,000–cubic yard embankment is made up of an inclined impervious clay core resting on a concrete core block, with appropriate transitions and rock filled shell zones on both sides. Lake Oroville is a 3.538 million acre–foot reservoir impounded behind the dam.

The spillway, located on the right abutment of the dam, has two separate elements: a controlled or gated flood control outlet, and an uncontrolled emergency spillway. The emergency spillway consists of a 1,730–foot long, concrete over–pour section with its crest set 1 foot above normal maximum storage level. Emergency spill would flow to the Feather River over natural terrain.

The Oroville Dam is a non–USACE project with USACE regulation requirements for flood control, non–USACE hydropower, irrigation, municipal and/or industrial water supply, low flow augmentation or pollution abatement, and recreation for 750,000 acre feet of the total 3,538,000 acre feet, and non–USACE hydro power, irrigation, municipal and/or industrial water supply, low flow augmentation or pollution abatement, and recreation for the remaining 2,788,000 acre feet of the project. (USACE, July 2005) Flood control is coordinated with operations of the New Bullards Bar facility according to rules prescribed by the USACE.

Should a breach in the dam occur, the downstream current of water would flow in a southerly direction. In the event of a dam failure, the flood wave would reach Marysville in approximately 8.6 hours in the main Feather River channel and approximately 24.8 hours in the flood plain.

Virginia Ranch Dam

FERC Project No. 3075; NAT Dam No. CA00842

Virginia Ranch Dam and Collins Reservoir are located in a widening area of Dry Creek approximately 12 miles northeast of the Dry Creek/Yuba River confluence in the Sierra Foothills and are approximately 18 miles northeast of Marysville in Yuba County. Dry Creek is a tributary to the Yuba River, which is in turn a tributary to the Feather River. Virginia Ranch Dam was completed in 1963 as the main feature of an irrigation system to supply water to Browns Valley. A hydroelectric power plant was added in 1983–84.

The Dam is a 142–foot high rolled earth fill embankment with a central, compacted earth core and rock outer shell. At the crest, the dam embankment is 2,800 feet long with 800 feet spanning the Dry Creek Channel and 2,000 feet constructed along a ridge to the east abutment. The spillway, located on the right abutment, is a 300–foot–long side channel ogee–shaped weir that discharges into a 42–foot wide concrete chute that terminates in a flip bucket at streambed elevation.

Should a breach in the dam occur, the water would flow south along Dry Creek inundating most of Browns Valley. A small portion of land in Yuba County would be affected. The community of Browns Valley lies within the dam's inundation path. In the event of a dam failure, the flood wave would reach Browns Valley in approximately 15 minutes, and would reach the City of

Marysville two hours later.

Camp Far West Dam

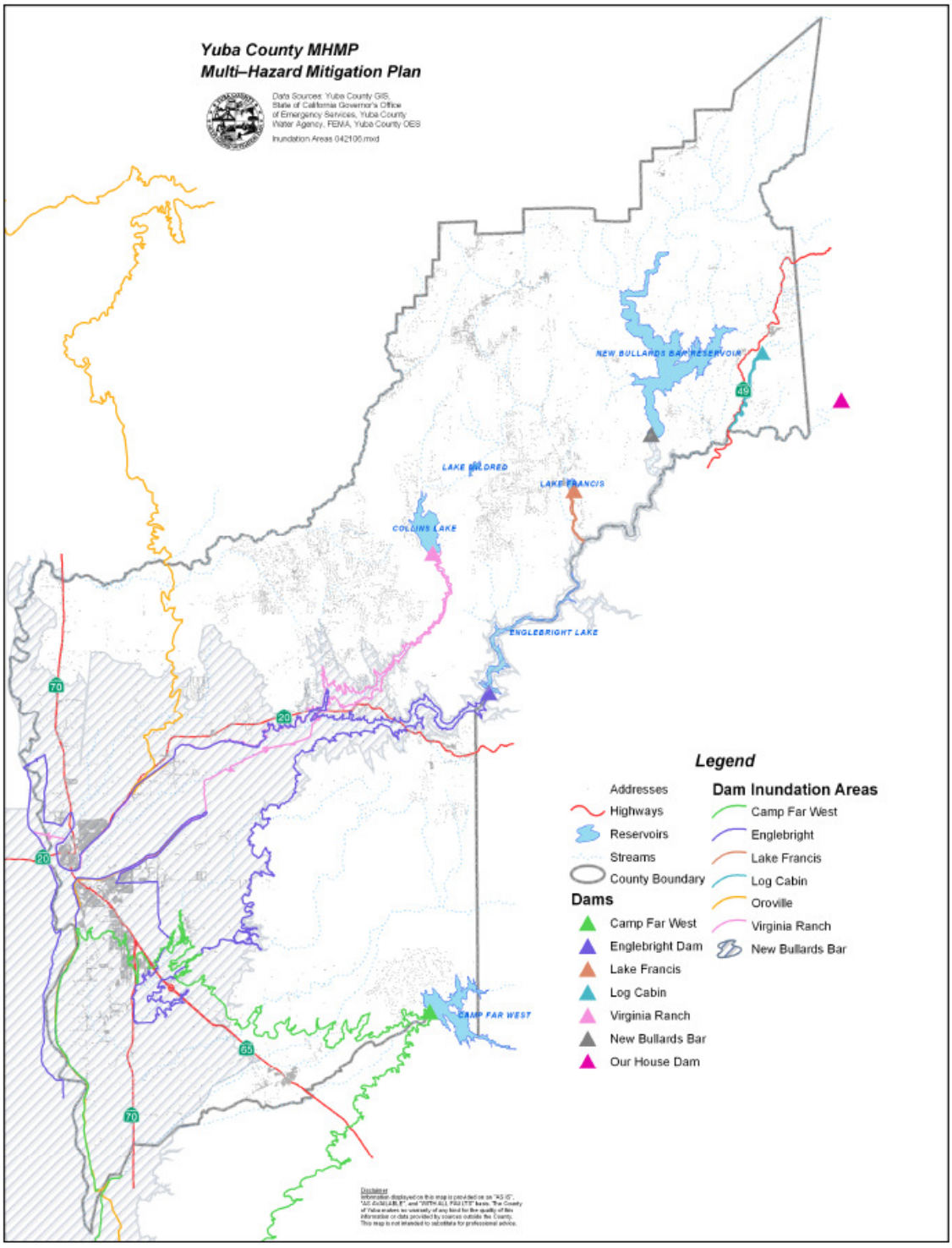
FERC No. 2997–001; DWR # CFW

Camp Far West Dam, owned and operated by the South Sutter Water District, is located near the foothill line of the Sierra Nevada on the Bear River, along the Yuba–Placer Counties boundary, approximately 15 miles southwesterly of Yuba City and Marysville.

The Camp Far West Dam project is primarily an irrigation project. The dam is a zoned earth fill structure approximately 2,070 feet long and about 180 feet high at its maximum section. A 300–foot long gated spillway is located through the north abutment with a crest elevation of 300 feet. This allows 20 feet of surcharge between the ungated crest and the top of the dam, representing storage of 47,500 acre feet.

Should a breach in the Camp Far West Dam occur, the water release would flow southwest along the Bear River to the City of Wheatland. The flood wave would reach Wheatland in approximately 25 minutes. Other downstream communities that would be affected include Sheridan, Olivehurst, and Nicolaus, however, rural and suburban development is underway in the inundation area that will affect the potential flood wave in the future.

Figure B10 – Dam Inundation Areas

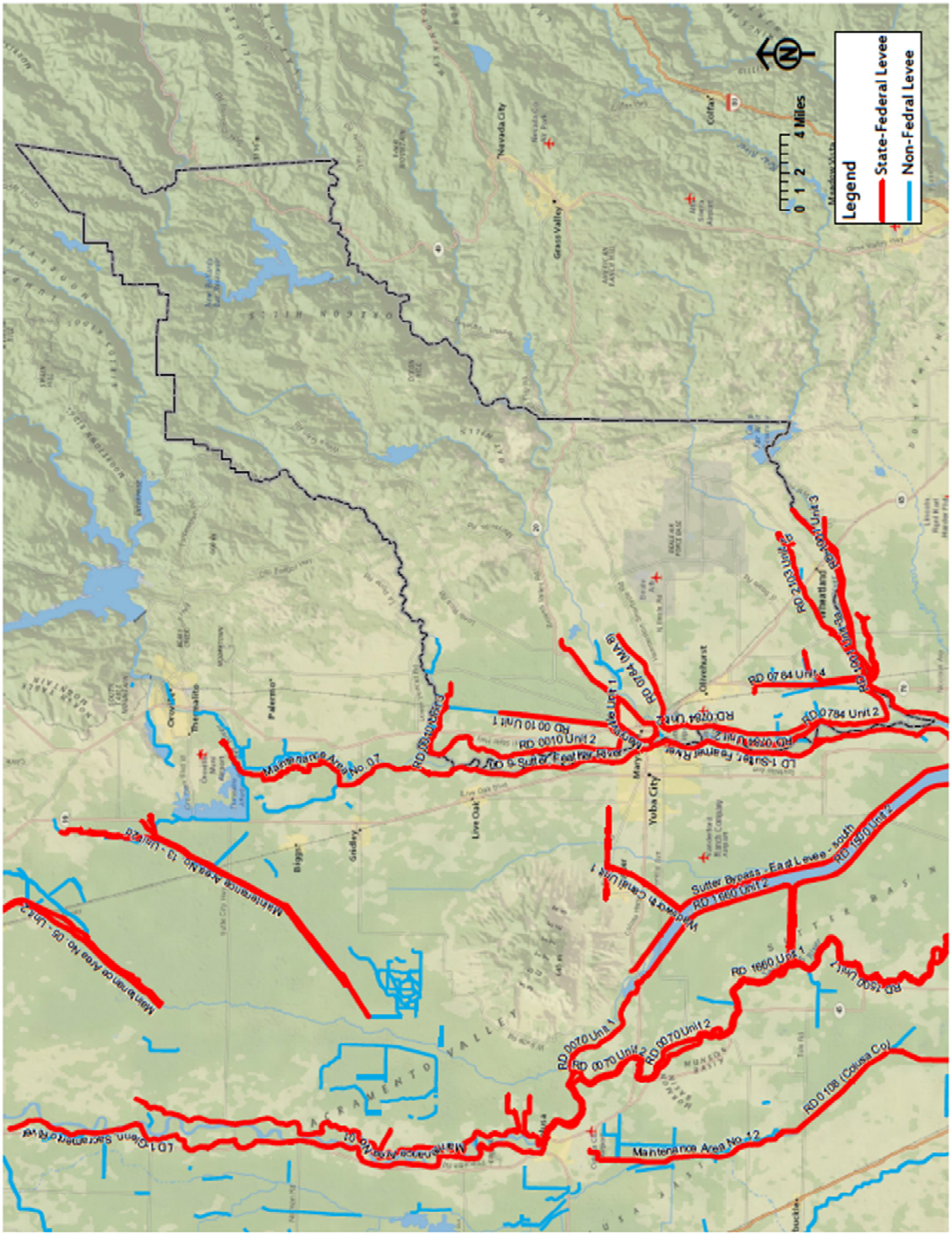


Source: 2014 Yuba County Hazard Mitigation Planning Team

Levee Failure

Most of the populated valley areas are surrounded by an extensive levee system, maintained by independent local levee districts and reclamation districts, and overseen by the U.S. Army Corps of Engineers California Department of Water Resources and the Bureau of Reclamation. The Yuba County levee system is illustrated in **Figure B11**. Levee failure, a destructive form of flooding, occurs when the structural integrity of the levee is compromised in some way. Over 88 miles of levees protect property adjacent to the Feather, Yuba, and Bear Rivers.

Figure B11 – Yuba County Levee System Map



Source: www.bepreparedyuba.org

The legendary floods of 1862 and 1867 emphasized the need to develop engineered levee systems to protect lives and property. By 1875, Marysville was surrounded by levees. Bullards Bar Dam was built between 1922 and 1924, and the Narrows Project and Englebright Reservoir were built to help control the flow of water through the foothills and the valley floor. In 1950, the Yuba River broke through its banks at Hammonton, flooding the south county. Tropical storms hit in 1955, causing a break in the levees in Yuba City resulting in widespread flooding and deaths. Much of the valley floor of Yuba County is within the flood plain designated by FEMA and by the National Flood Insurance Program. The levee system, which extends for miles in Yuba County, provides protection and transfers water to counties in southern California. There have been ten major floods on the Yuba and Feather Rivers during this century, see **Table B1 - Yuba County Disaster Declaration History 1982-present**.

Flood control channels and basins are at risk of overflowing their banks during times of heavy rainfall and reservoir water release. The DWR and the USACE are responsible for notifying Yuba County at the onset of planned water releases that can adversely impact the community. The National Weather Service (NWS) provides information and notification to Yuba County for severe weather, flooding notices and storm emergencies. The Oroville Dam facility controls the level of water in the Feather River through Yuba County, determining how severely the levees are challenged during the winter high–water season **Table B3**. While Oroville Dam flood control is coordinated with operations of the New Bullards Bar facility according to rules prescribed by the USACE, there are two standards of flood control operations for the Oroville facility prescribed by the USACE; one flood control operation plan with the completion of the Marysville Dam on the Yuba River and alternatively, an interim plan of operation prior to the completion of the Marysville Dam facility. Although the Marysville Dam has not been constructed, DWR operates the Oroville Dam facility in accordance with the post–construction Marysville Dam criteria. The coordination between the facilities is governed by flow rates of the Feather River above the Yuba River (180,000 cfs), the Feather River below the Yuba River (300,000 cfs), and the Feather River below the Bear River (320,000 cfs). In addition, releases from the Oroville facility are not to be increased more than 10,000 cfs or decreased more than 5,000 cfs in any 2 hour period. No guidance is given to the facilities with regard to the length of time the water is on the levee banks charging the permeable gravel beds that exist under the levees.

Table B3 – Oroville Release Schedule

The greater of actual or forecast inflow (cfs)	Flood control space (ac ft)	Required releases (cfs)
0-15,000	0-5,000	Power demand
0- 15,000	Greater than 5,000	Inflow
15,000- 30,000	0- 30,000	Lesser of 15,000 or maximum inflow
0- 30,000	Greater than 30,000	Maximum flood inflow
30,000- 120,000		Lesser of maximum inflow or 60,000 cfs
120,000- 175,000		Lesser of maximum inflow or 100,000 cfs
Greater than 100,000		Lesser of maximum inflow or 150,000 cfs

Source: Oroville Facilities Emergency Action Plan FERC License No. 2100, Flood Control Diagram, File No. 4–13–586, 1971)

Flood control for New Bullards Bar Dam is operated in accordance with the rules prescribed by the USACE **Table B4** In addition to the release restrictions governed by the height of the Feather River as previously discussed, the flow of the Yuba River at Marysville (not to exceed 120,000 cfs, 180,000 cfs if the Feather River is low), but limited to 50,000 cfs unless inflows during the current flood have exceeded that amount.

Table B4 – New Bullards Bar Release Schedule

New Bullards Bar Dam Water Release Schedule		
The greater of actual or forecast inflow (cfs)	**Flood control space (ac ft**	**Required releases (cfs)**
0- 50,000	0- 170,000	Power demand
0- 50,000	0- 170,000	Maximum of 50,000 cfs maximum inflow
Greater than 50,000	0- 170,000	Maximum flood inflow subject to Yuba River flow rates

Source: New Bullards Bar Reservoir North Yuba River, California Reservoir Regulation for Flood Control, 1972)

Historically, flooding does not occur through overtopping of the levee system, but rather by a levee failure or an internal drainage problem caused by a overloading of the drainage system. Backwater from the Feather River during flood stage inundates a large area along Jack Slough and Simmerly Slough north of Marysville. High stages on the Feather River and its Bear River tributary create backwater conditions that extend up the Western Pacific Interceptor Canal, into Plumas Lake, and into the Linda and Olivehurst Drains, which cause flooding in the communities of Olivehurst and Linda southeast of Marysville.

Flooding in the Plumas Lake area is caused by high stages on the Bear River restricting outflow from the Western Pacific Interceptor Canal. Ponding in Plumas Lake will cause some backwater along the Linda and Olivehurst Drains south of Sixth Avenue during the 100–year event.

The following areas are considered at risk due to localized flooding:

- Highway 70 at McGowan Parkway
- Hammonton–Smartville Road at Brophy Road
- Area off Arboga Road at Buttercup and Butterfly Lanes
- Mage Avenue in Olivehurst
- Magnolia Avenue off Highway 70
- Ramirez Road
- Iowa City Road
- Fruitland Road
- Simpson Lane

The problem areas are considered to be a hazard in their specific location and are not expected to threaten or endanger the lives of persons in the surrounding areas.

The Feather River, with Jack Slough as a tributary, has one major dam controlling its flow and managing water resources. Oroville Dam is located approximately 40 miles to the northeast of Yuba County. Oroville Dam provides substantial flood protection for the Sacramento Valley, but can not ensure protection from flooding. There are many factors that impact the effectiveness of flood protection and water management provided by Oroville Dam. As part of the California

Flood Control Project, and managed by DWR, Oroville Dam is subject to direction and management constraints placed on it by system-wide needs.

The Yuba River flow is controlled by Englebright Reservoir (the Narrows Project), and Bullards Bar Dam on the north fork of the Yuba River. The middle fork and the south fork are virtually unprotected by flood control systems. The Yuba River is contained by levees to the confluence with the Feather River immediately south of Marysville. Levees on the Yuba River constrict between the city of Marysville and the community of Linda immediately prior to the confluence of the Yuba River with the Feather River.

The combination of the Feather River and the Yuba River has continually plagued the area. The potential flooding and levee failure danger is exacerbated depending on a variety of conditions such as:

- Extreme rainfall from winter storms and tropical storms
- Dam reservoir elevation before storms occur
- Snow pack, snow melt and runoff
- Saturation of the soils on the valley floor

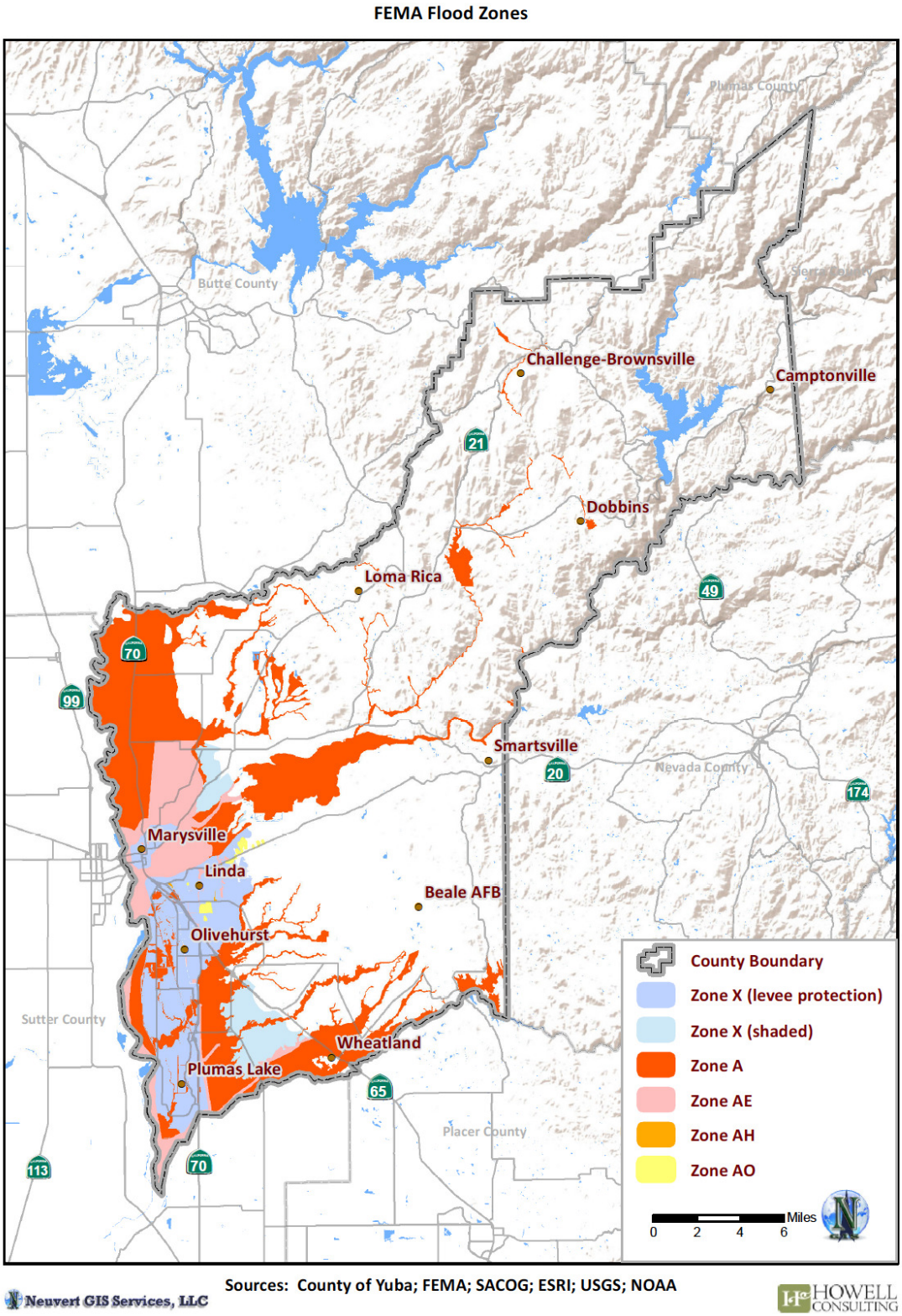
The Bear River flows westerly along the southern most boundary of Yuba County with the WPIC as a tributary to the Bear River. Camp Far West Dam is located on the Bear River approximately 8 miles northeast of the City of Wheatland. A narrow canyon lies below the dam for a distance of about a mile. Below the canyon the channel enters the “flat lands” of the Sacramento Valley. Downstream communities include Wheatland, Sheridan, Olivehurst, and Nicolaus. Most of the potential inundation area is located in a rural/agricultural zone; however, rural and suburban housing development is underway. The Bear River is a single channel strongly affected by backwater conditions generated at its confluence with the Feather River.

Factors which figure predominately in the levels of damage from floods are:

- Impact of historic river channels
- Impact of housing construction within low lying flood zones
- Impact of construction materials and practices
- Impact of length of time of high water against the levees
- Impact of wind driven aspect of the high water wave action

The map in **Figure B12** shows the FEMA Flood Zones and these are based on the FEMA FIRMs dated February 18, 2011 and **B13** shows the 100-year floodplain in Yuba County.

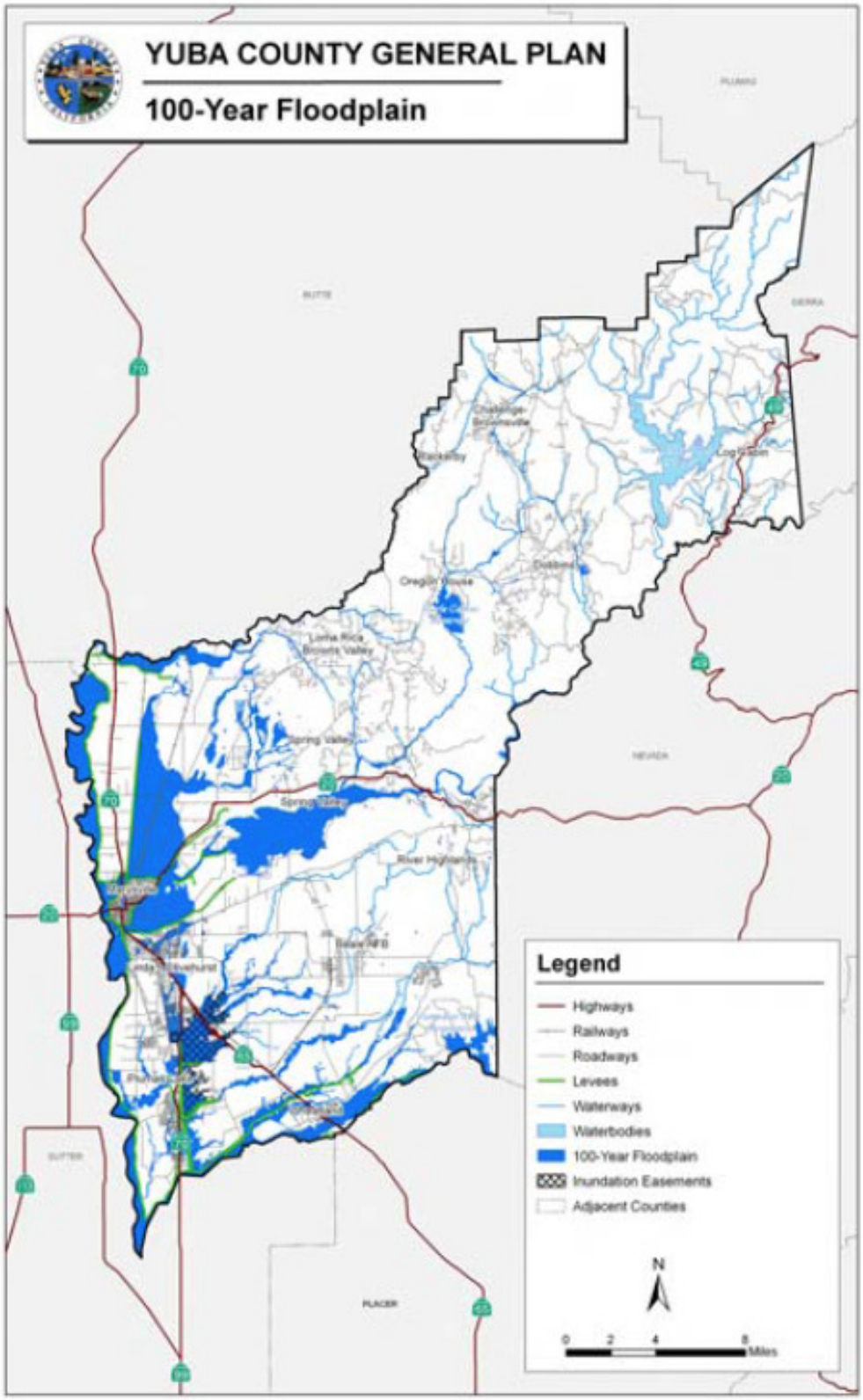
Figure B12 – Yuba County FEMA Flood Zones



Source: 2014 Yuba County Hazard Mitigation Planning Team; Howell Consulting

Source

Figure B13 – 100-year Floodplain Map



Source: Yuba County General Plan

The Potential Magnitude of Floods/Levee Failure in Yuba County is Catastrophic – More than 50% of property severely damaged, shutdown of facilities form more than 30 days and or multiple deaths.

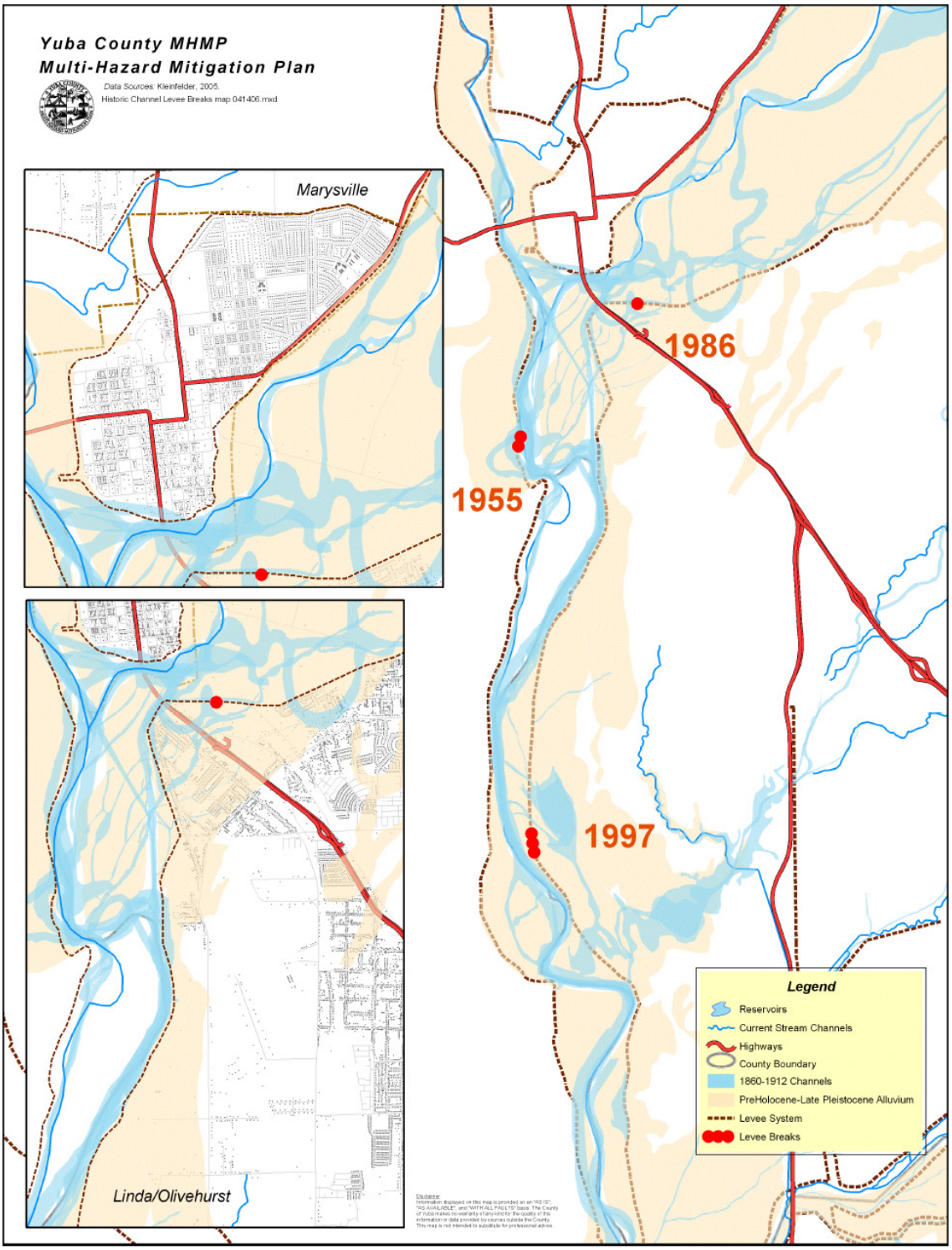
Previous Occurrences
Flooding/Levee Failure
The history of flooding in Yuba County is associated with its geographic position at the convergence of three significant river systems: the Feather River, the Yuba River, and the Bear River. The Feather River is a principal tributary to the Sacramento River, draining a watershed of 3,222 square miles in the Sierra Nevada and Sacramento Valley (FRCRM, 2005). The Yuba and Bear rivers are tributaries to the Feather, draining watersheds 1,336 and 469 square miles, respectively. As a result, Yuba County has a long history of disastrous flooding.

The legendary floods of 1862 and 1866 emphasized the need to develop systems to protect lives and property. By 1875, Marysville began to surround itself with levees. By the 1950's, the levees surrounding Marysville were among the strongest in the state. Bullards Bar Dam was built from 1922–1924, and the Narrows and Englebright Reservoir was built prior to 1945 (County of Yuba, 2004). New Bullards Bar Dam was built in the 70's to replace Bullards Bar Dam and provide additional flood control to the Yuba River.

There have been numerous major floods on the Yuba and Feather Rivers during the 20th century, six of which occurred within Yuba County. In 1950 the Yuba River broke through its banks at Hammonton and flooded 43,000 acres in southern Yuba County. Tropical storms hit in 1955 causing widespread flooding with water reaching the tops of the levees in Marysville, causing the deaths of forty people, and forcing the evacuation of over 30,000 people. The 1986 Linda flood resulted from a levee failure on the Yuba River just east of the E Street bridge (State Highway 70), resulting in the death of one person and over 95 million dollars in property damage. The communities of Linda and Olivehurst were hardest hit by the flooding, with some of these areas just now beginning to recover economically. The Peach Tree Mall, a large retail center in Linda along State Highway 70 and North Beale Road, has never recovered and is largely unused except for a large grocery store located in the south end of the mall. In 1997, a levee failed along the Feather River which resulted in over 358 million dollars in property damage with over three million dollars in County property damage. Both levee breaks occurred in the valley portion of the
county.

The map in **Figure B14** shows the past levee breaks on the river channels in Yuba County. The **Table B5** represents the previous flood events to date.

Figure B14 – Historic River Channels with Past Levee Breaks



Source: 2014 Yuba County Hazard Mitigation Planning Team

Table B5 - Previous Flood Occurrences in Yuba County

Year of Event	Inundation Areas
1805	Indian Tradition of a Great Flood, Entire Sacramento Valley
1825-1826	Indian Tradition of a Great Flood, Entire Sacramento Valley
1846-1847	Early settlers describe flooding of the Valley
1849-1850	Streets of Marysville nearly impassible
1852-1853	Marysville city recorded four flood events, the surrounding area was under water the entire season
1861	The cities of Marysville and Yuba City were under water, entire Sacramento Valley was inundated. A steamer made its way through the streets of Marysville to rescue people.
1862	In January, water rose six inches higher that in December of 1861
1866	All the low land and some of Marysville were flooded; a great deal of recently constructed levee was washed away.
1875	The greatest and most destructive flood for the City of Marysville. Despite seven miles of levee surrounding the city, some areas had ten feet of water, the valley was level with the rivers.
1879	Spring flood inundated the surrounding area but Marysville's levees held and the town experienced only muddy streets and flooded cellars.
1881	Lower Sacramento River
1890	Throughout Northern California
1907	Sacramento River Basin
1909	Nearly all the main tributaries to the Sacramento River
1937	Feather River–east bank levee failure RD 10
1940	WPIC east bank and north Bear River levee failure
1950	Yuba River broke through at Hammonton and flooded the south county
1955	Feather River backed up into WPIC, Bear River, and Dry Creek; Jack Slough flooding–Feather River 200–yr; Yuba River 140–yr
1964	Feather River Floodway–Feather River 200–yr; Yuba River 160–yr
1970	High water event
1983	High water event
1986	Linda levee break
1995	Low–lying areas in RD 784
1997	RD 784 levee break
1998	February flooding
2005–2006	Jack Slough, Simpson Lane, Reeds Creek flooding

Source: 2014 Yuba County Hazard Mitigation Planning Team

Dam Failure

In 1902, Lake Francis Dam reportedly failed due to hasty construction practices and was rebuilt in 1905. (QUAD Consultants, 1994) In 1907, a 14-foot high concrete barrier erected on the Yuba River above Marysville to trap sediment failed in a major flood and was never rebuilt (Gilbert, 1917).

Probability of Future Occurrence

Flooding/Levee Failure

Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any recurrence interval are commonly termed 100–, and 500–year floods, having 1–, and 0.2–percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long–term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year.

Low–lying areas of the county are particularly susceptible to localized flooding. **Figure B12** shows the areas of the County susceptible to flooding in any given year. The 100–year flood zone is an area that has a one percent chance of flooding in any given year and the 500– year zone is an area that has a 0.2 percent chance of flooding in any given year.

The potential for levee failure in Yuba County has decreased over the last several years. Beginning in 2004, Yuba County and Reclamation District 784 formed the Three Rivers Levee Improvement Authority (TRLIA), a Joint Powers Agency created for the sole purpose of improving the levee system in south Yuba County. TRLIA has undertaken levee repairs on the Yuba River, Feather River, Bear River, and Western Pacific Interceptor Canal. As of the date of this plan, repairs on the Yuba River, WPIC, and the newly constructed Bear River setback levee were recommended for certification by USACE as meeting 100 year level of protection. Since the 2007 mitigation planning effort, a proposed setback levee on the Feather River was completed, and other planned repairs along the Feather were also completed which resulted in certification for the entire of the levee system within RD 784. These measures will decrease the likelihood of a levee failure in South Yuba County.

With that information in mind, the Yuba County Planning Team agrees that **the Probability of Future Occurrence for Flooding/Levee Failure is Likely - Between 10 percent and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.**

Dam Failure

Due to the stringent inspection criteria and modern construction practices emphasizing dam safety and stability, it is **Unlikely - Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years** that Yuba County would experience a dam failure resulting from natural hazards.

Severe Weather

Hazard Description

Severe weather is generally any destructive weather event, but usually occurs in Yuba County as localized storms that bring heavy rain, hail, lightning, and strong winds. The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1988 to 2014; and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 275 severe weather events that occurred in Yuba County between January 1, 1950 and February 28, 2014. **Table B6** summarizes these events.

Table B6 - NCDC Summary Data for Storm Events in Yuba County*

Type	# of Events	Deaths	Injuries	Property Damage	Crop Damage
Tornado	3	0	0	25K	0.00
High Wind	36	2	3	9.03M	
Winter Storms	123	1	3	0.00	0.00
Heat	8	1	0	0.00	0.00
Freeze	5	0	0	0.00	0.00

Source: NCDC Database, 2014

***More information on Counties, Zones and Event Types...**
Storm Data are geographically categorized by County or by NWS Forecast Zone. Smaller (areal coverage) are collected by county (Tornado, Thunderstorm Winds, Flash Floods and Hail) while larger scale events are collected by forecast zone (Heat, Cold, Drought, Flood, Tropical & Winter Weather). Each event type listed below are also listed with their collection type (County or Zone). All searches are by county. For zone-based events, all zones intersecting or within a selected county will be returned from a search. The county selection list is built from the events recorded in the Storm Events Database. An unlisted county means that no records are present.

The Planning Team supplemented NCDC data with data from SHELDUS (Spatial Hazard Events and Losses Database for the United States). SHELDUS is a county-level data set for the United States that tracks 18 types of natural hazard events 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). The database includes every loss causing and/or deadly event between 1960 through 1979 and from 1995 onward. Between 1980 and 1995, SHELDUS reflects only events that caused at least one fatality or more than $50,000 in property or crop damages. 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). From 1995 to 2011 all events that were reported by the NCDC with a specific dollar amount are included in SHELDUS. SHELDUS contains information of 3 severe weather events that occurred in Yuba County between 1960 and 2011. These events are shown and summarized in **Table B7**.

Table B7 - SHELDUS Severe Weather Report for Yuba County 1960 to 2011*

Begin Date	Hazard Type	State	County	Injuries	Fatalities	Property Damage*	Crop Damage*
12/22/1982	Wind	CA	Yuba	0.21	0.06	1041666.67	104.17
1/18/1969	Severe Storm/Thunder Storm	CA	Yuba	0.17	0.78	862068.97	8620.69
12/3/1983	Severe Storm/Thunder Storm - Wind	CA	Yuba	0.94	0.25	312500.00	3125.00

Source: SHELDUS Data, 2014* Losses are not adjusted for inflation.

Geographic Extent
The NCDC and SHELDUS tables above summarize severe weather events that occurred in Yuba 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 the Planning Team recognizes these inconsistencies, they see the value this data provides in depicting the County's big picture regarding severe weather.

As previously mentioned, most all of Yuba County's state and federal disaster declarations have

been a result of severe weather and related flooding. For this plan, severe weather is discussed in the following subsections:

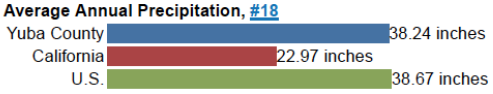
- Extreme Cold/Freeze
- Extreme Heat
- Heavy Rain, Wind, Storms (Severe Weather)
- Tornado
- Water Shortage/Drought

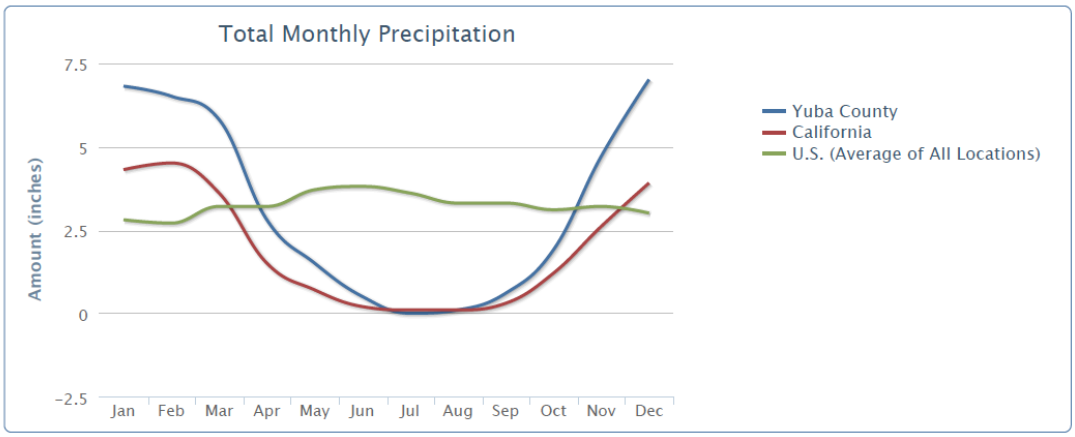
The COOP Weather Station in Yuba County identification is the following:
MARYSVILLE, CA, YUBA County, Coop ID: 45385, Elevation: 57 ft., Latitude: 39° 8' N Longitude: 121° 35' W

The following represents the record monthly climate summary from the Western Regional Climate Center. This data is taken from the COOP weather station in Marysville. **Table B8** shows the monthly climate summary data.

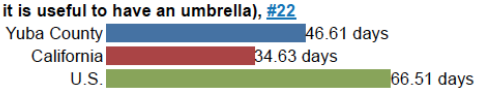
Precipitation

Average Annual Precipitation, #18





Average Number of Days with 0.1 Inch or More Precipitation in a Year (this gives an indication of the number of days in a year that it is useful to have an umbrella), #22



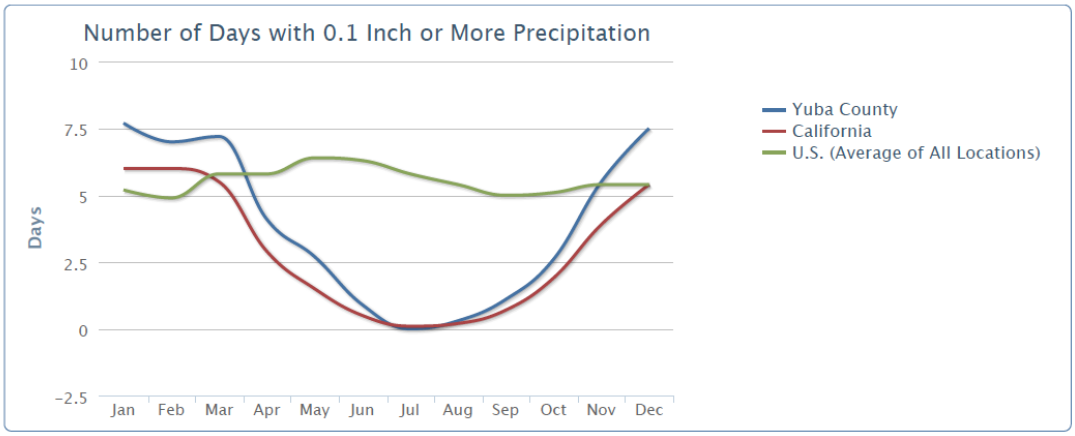


Table B8 –Monthly Climate Study

MARYSVILLE, CALIFORNIA (045385), Period of Record Monthly Climate Summary

Period of Record: 2/ 1/1897 to 10/31/2007

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	54.1	60.4	66.0	73.0	81.2	89.6	96.3	94.6	89.2	79.0	65.2	55.1	75.3
Average Min. Temperature (F)	37.7	41.3	44.0	47.6	52.7	58.1	61.3	59.3	56.2	49.9	42.2	38.0	49.0
Average Total Precipitation (in.)	4.01	3.73	2.88	1.53	0.75	0.22	0.03	0.06	0.34	1.21	2.44	3.76	20.96
Average Total Snow Fall (in.)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record. Max. Temp.: 97.7% Min. Temp.: 97.4% Precipitation: 97.8% Snowfall: 98% Snow Depth: 97.8%

The Geographic Extent of Severe Weather in Yuba County is Significant - 10-50% of County affected.

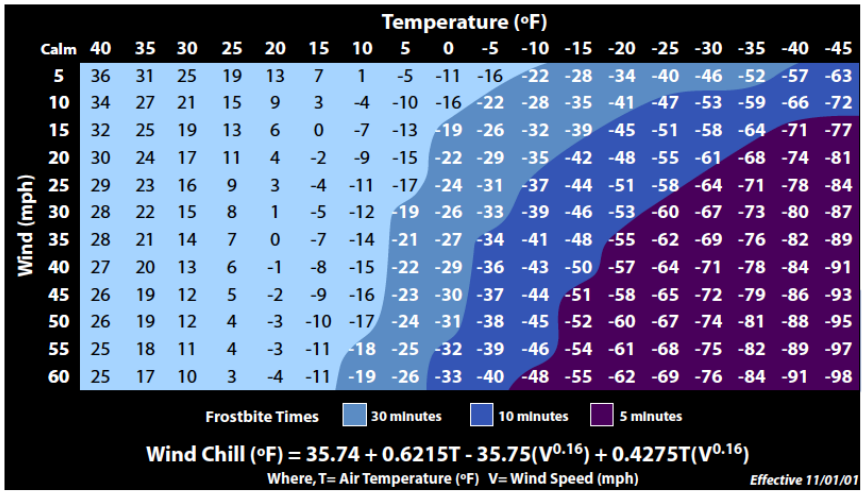
Potential Magnitude

Extreme Cold/Freeze

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

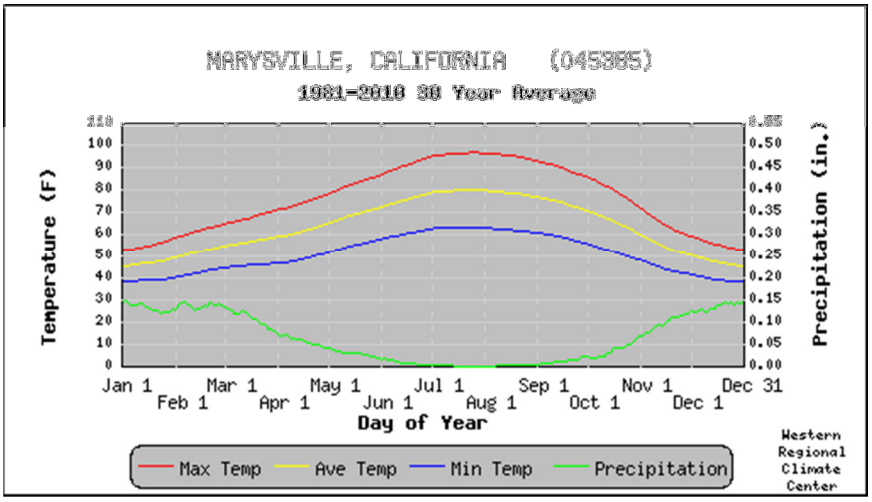
In 2001, the NWS implemented an updated Wind Chill Temperature index, located in **Figure B14**. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure B14 – Wind chill Temperature Chart



Source: National Weather Service

Figure B15 – Average Temperatures in Yuba County



Source: WRCC

In Yuba County, monthly average low temperatures in the coldest months (November through April) range from the upper 30s to the mid 40s. The lowest recorded daily extreme was 9°F on January 20, 1907. In a typical year, minimum temperatures fall below 32°F and below 0°F on 0 days. Average and temperatures are shown in **Figure B15**.

Table B9 – Record High Temperatures - Marysville

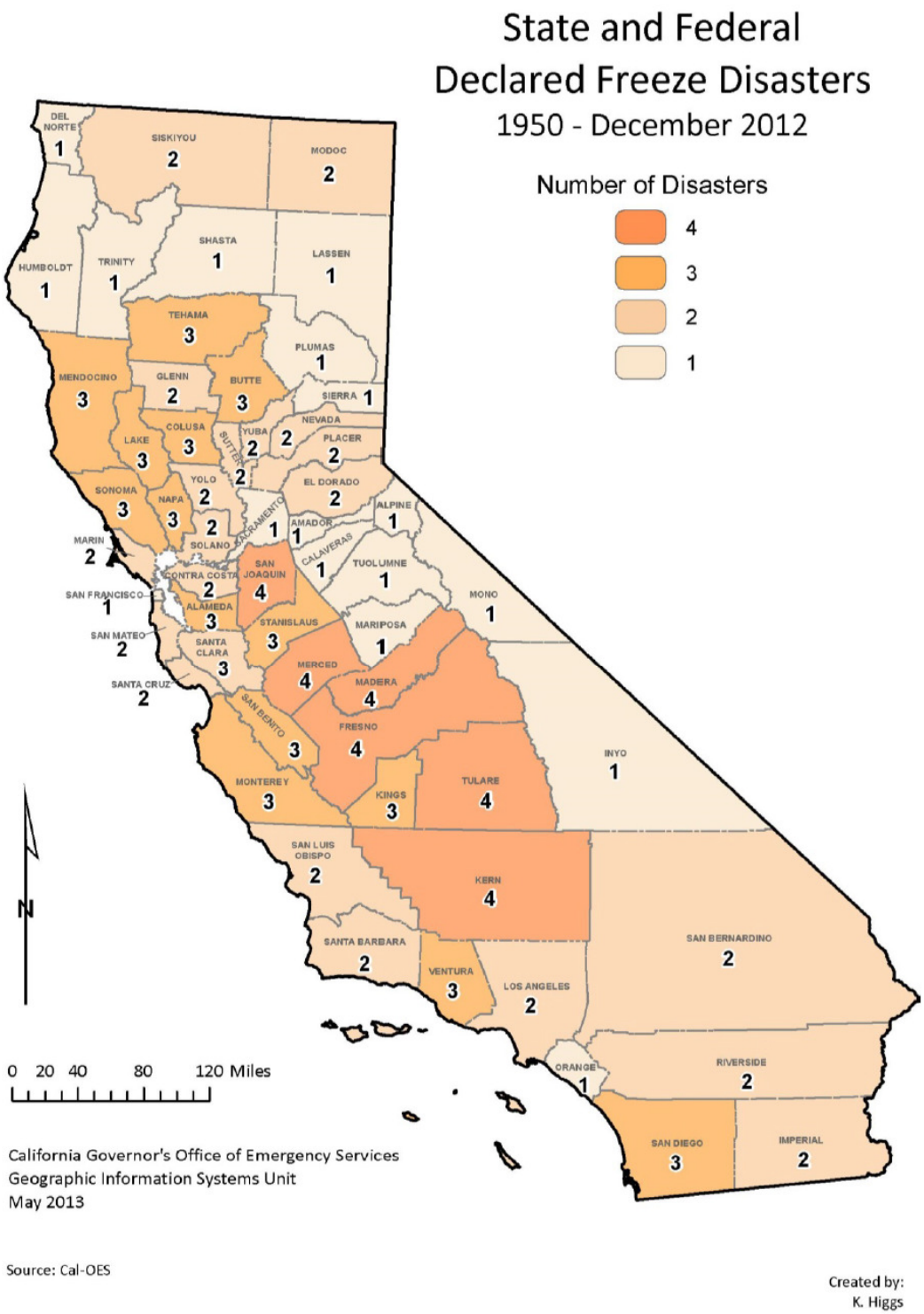
Month	Temperature	Date	Month	Temperature	Date
Jan	9°	1/20/1907	July	45°	7/2/1956
Feb	19°	2/5/1910	Aug	45°	8/30/1912
Mar	26°	3/2/1971	Sept	37°	9/15/1911
Apr	30°	4/28/1934	Oct	32°	10/17/1905
May	36°	5/7/1916	Nov	24°	11/14/1916
June	41°	6/28/1934	Dec	16°	12/10/1932

Source: NCDC

Table B9 from the NCDC shows five freeze events in Yuba County from 1950 to date. SHELDUS shows zero Freeze events.

Although freezes are infrequent, a freeze can severely affect agriculture in Yuba County. **Figure B16** shows disaster declarations due to freeze in the State. The greatest concentrations are in the Central Valley of California. There were 2 disaster declarations for Yuba County for freeze.

Figure B16 – Freeze Disasters in California



Source: 2013 SHMP

Extreme Heat

Table B10 and Table B11 show the Heat Index (HI) as a function of heat and relative humidity. The Heat Index describes how hot the heat-humidity combination makes the air feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the Heat Index rises, so do health risks. Specifically:

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

Table B10 - Air Temperature and Relative Humidity

	The Heat Index												
Air Temp (° F)	Relative Humidity												
	40	45	50	55	60	65	70	75	80	85	90	95	100
110 °	136	143	152										
105°	123	129	135	141	148								
100°	111	115	119	124	129	135	141	147					
95°	101	104	107	110	114	117	122	126	131	136	141		
90°	92	94	96	98	100	103	106	109	112	115	119	127	132
85°	84	85	86	88	89	91	93	95	97	99	102	104	107
80°	80	80	81	81	82	82	83	84	84	85	86	86	87
Exposure to full sunshine can increase Heat Index values by up to 15° F.													

Source: National Weather Service

The National Weather Service (NWS) initiates its Heat Index Program Alert procedures when the high temperature is expected to exceed 105° to 110° (depending on local climate) for at least two consecutive days.

Table B11 – Heat Index

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

Source: National Weather Service

Heat exhaustion occurs when the body is dehydrated resulting in an imbalance of electrolytes. Symptoms include headache, nausea, dizziness, cool and clammy skin, pale face, cramps, weakness, and profuse perspiration. First aid involves moving to a cooler spot and drinking water with a small amount of salt added (one teaspoon per quart). Without intervention, heat exhaustion can lead to collapse and heatstroke.

Heatstroke occurs when perspiration cannot occur and the body overheats. Symptoms include headache, nausea, face feeling flushed, hot and dry skin, no perspiration, body temperature over 101°F, chills, and rapid pulse. First aid involves cooling the person immediately; moving to shade or indoors; wrapping the person in a cool, wet sheet; and getting medical assistance. Without intervention, heatstroke can lead to confusion, coma, and death.

Heat emergencies are often slow to develop. It could take a number of days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations.

Heat waves do not cause damage or elicit the immediate response that floods, fires, earthquakes, and other disasters do. They have, however, claimed many lives in comparison with other disasters. For example, the 1989 Loma Prieta Earthquake resulted in 63 deaths while the 1992 Northridge Earthquake was responsible for the loss of 55 lives. The catastrophic 2003 Southern California Firestorms resulted in 24 deaths. However, according to the 2007 SHMP, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave is said to have resulted in 946 deaths. The 2007 SHMP states that the July 2006 heat wave in California caused the deaths of at least 136 people over a 13-day period (6 deaths were still under investigation in 2007). Another source, the Spatial Hazard Events and Loss Data for the United States (SHELDUS), estimates that approximately 47 heat events occurred in California between the years 1960 and 2008. These events were responsible for 325 injuries and 121 deaths. Adjusted to 2008 dollars, SHELDUS reports that severe heat events in California caused roughly $1.8 million in property damage and $531.7 million in crop damage.

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that “over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined.” Despite this history, however, not a single heat emergency was formally proclaimed at the state level or declared as a federal disaster between 1960 and 2008. Though no formal explanation exists for this seeming contradiction, scholars have written about the exclusion of heat events as declared disasters. For example, Eric Klinenberg, author of an account of a heat wave which killed 739 people in the City of Chicago in July 1995, suggests that the hidden nature of social vulnerability combined with the inconspicuous nature of heat events (unlike earthquakes, floods, wildfires, tornados, etc.) prevent them from being declared as legitimate disasters. Further, although heat events can have a devastating effect on agriculture, heat-caused property damage over the last 48 years has been relatively small. **Table B12** shows the heat events from 1960 to 2014.

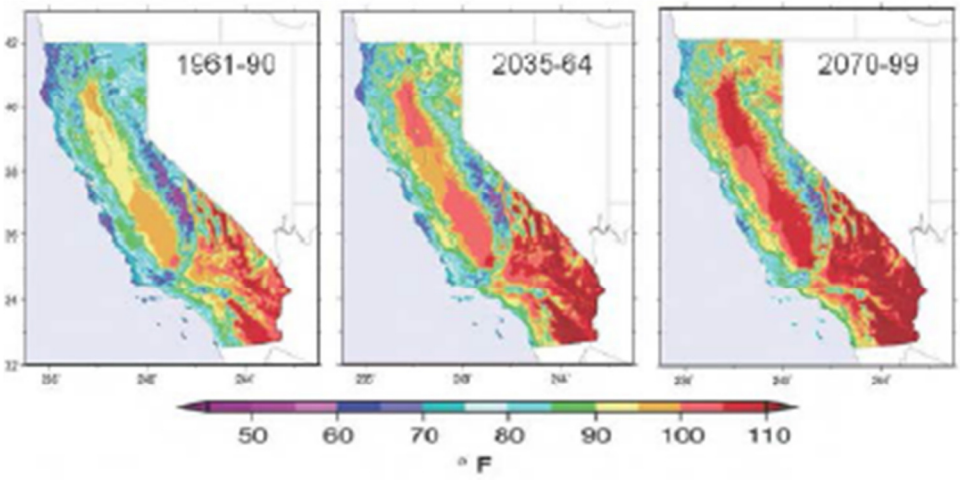
Table B12 – SHELDUS Heat Events in Yuba County

Begin Date	Hazard Type	State	County	Injuries	Fatalities	Property Damage*	Crop Damage*
6/13/1961	Heat	CA	Yuba	0.00	0.00	0.00	14705.88
8/13/1992	Heat	CA	Yuba	1.03	0.00	0.00	0.00
Total				1.03	0.00	0.00	14705.88

Source: SHELDUS

According to the CAS, California is getting warmer, leading to increasing frequency, intensity, and duration of heat waves, and increased mortality. **Figure B17** illustrates the statewide temperature increase trend.

Figure B17 - California Historical and Projected Temperature, 1961-2099



Source: Dan Cayan; California Climate Adaptation Strategy, 2013 SHMP

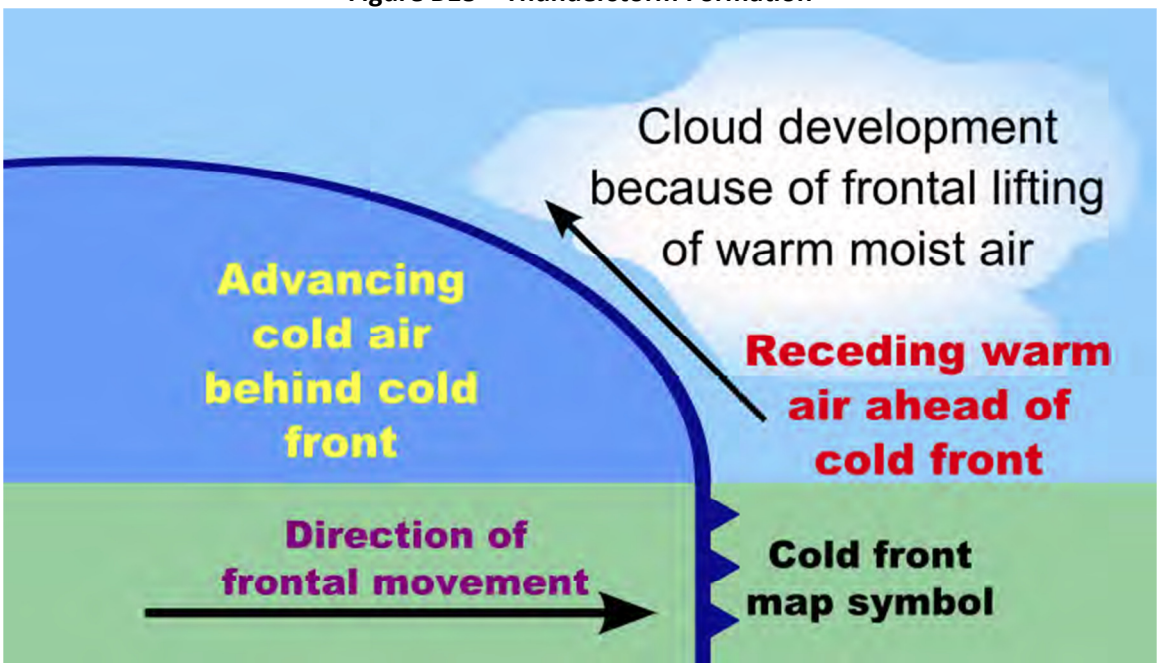
Severe Weather and Winter Storms

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

Heavy Rain and Thunderstorms

Thunderstorms result from the rapid upward movement of warm, moist air, see **Figure B18**. They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, its cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

Figure B18 – Thunderstorm Formation



Source: NASA.

Hail

Hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hail is sometimes associated with severe storms within Yuba County. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops. The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. **Table B13** indicates the hailstone measurements utilized by the National Weather Service.

Table B13 - Hailstone Measurements

Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

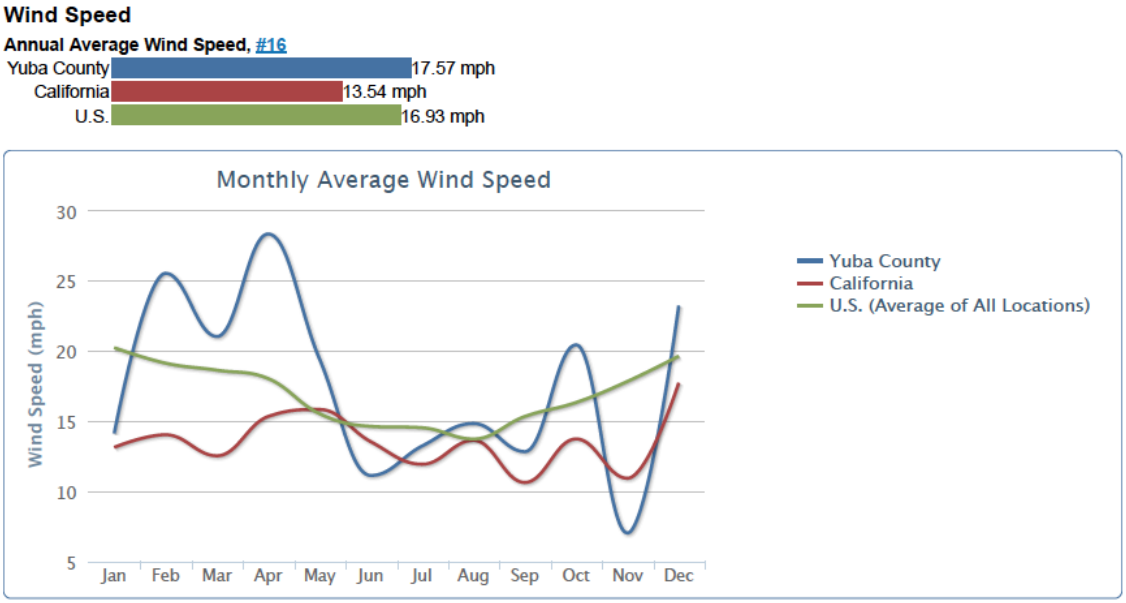
Winds

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.

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

Figure B19 depicts the average wind speed in Yuba County. It is also important to note that there were 36 high wind events in the county resulting in more than $9 million dollars of property damage. Tornadoes (see Tornado) and funnel clouds can also occur during these types of storms.

Figure B19 – Average Wind speed

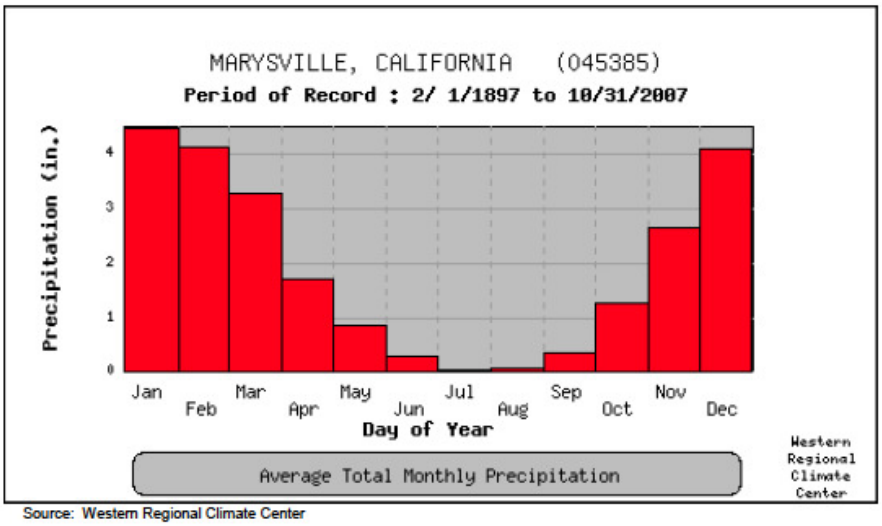


Heavy rains and severe storms occur in the county primarily during the late fall, winter, and spring (i.e., November through April). Damaging winds often accompany winter storm systems moving through the area.

According to the Planning Team, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems continues to be an important issue. In addition to the flooding that

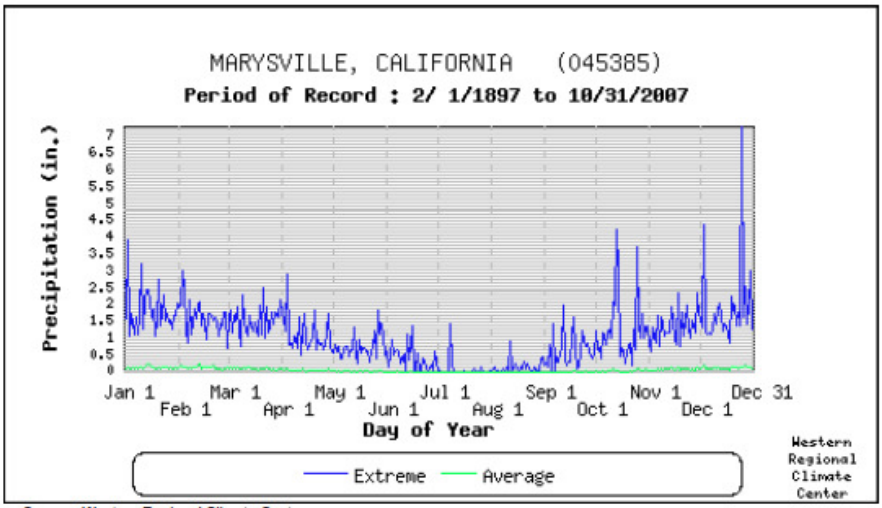
often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees. Information from the closest weather station is summarized below and in **Figures B20 -B21**.

Figure B20 – Average Monthly Precipitation



Source: Western Regional Climate Center

Figure B21 – Precipitation Extremes



Source: Western Regional Climate Center

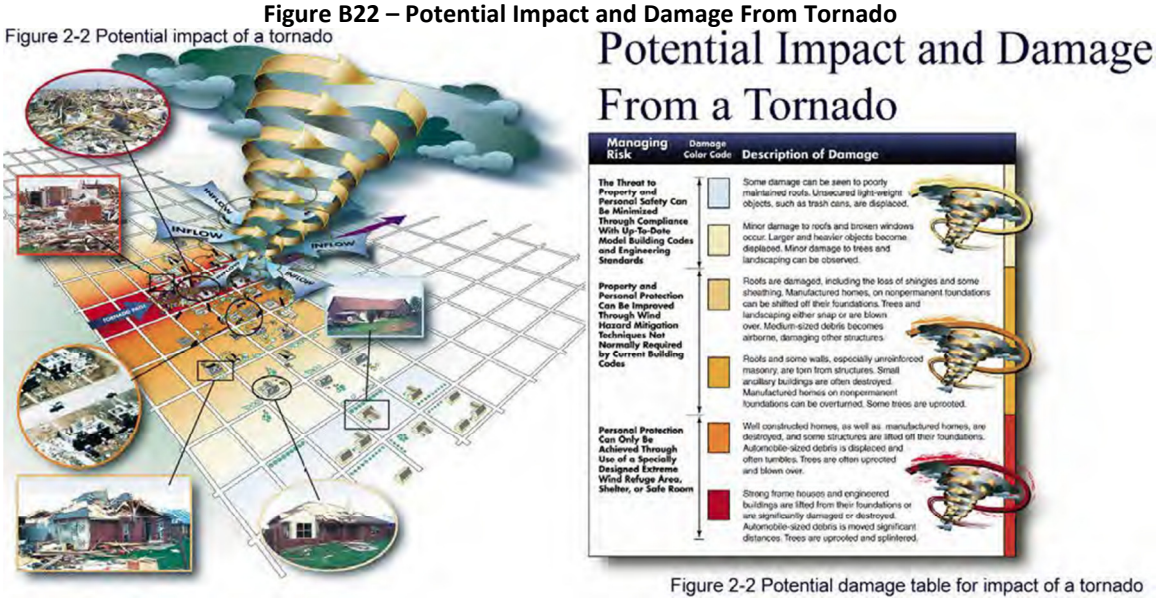
Average annual precipitation at the Marysville Station is 23.19 inches per year. The highest recorded annual precipitation is 46.26 inches in 1983. The lowest recorded annual precipitation was 7.41 inches in 1976. Average monthly precipitation totals for this station are shown in **Figure B20**. Precipitation extremes for this station are shown in **Figure B21**.

Based on NCDC, SHELDUS data and Planning Team information, heavy rain, hail, and thunderstorm wind incidents over a 51-year period (1960-2011) equates to a severe storm event at least every year Severe weather, is a well-documented seasonal occurrence that will continue to occur annually in Yuba County.

Tornado

Tornadoes are another severe weather hazard that can affect Yuba County, primarily during the rainy season in the late fall and early spring. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300 mile wide hurricanes. **Figure B22** illustrates the potential impact and damage from a tornado.

Figure B22 – Potential Impact and Damage From Tornado



Source: FEMA

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Both the original Fujita scale and the Enhanced Fujita scale can be found on the NOAA Storm Prediction Center website.

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

According to the National Weather Service Sacramento Office, compared to the area east of the Rocky Mountains, tornado occurrence over the western United States is much less frequent. However, climatological studies reveal certain sub regions throughout the west where there is a significant increase in tornado occurrence. Two of the regions are in California: the Los Angeles

area, and the Central Valley of California comprising the Sacramento and San Joaquin Valleys. Comparative climatological studies show that most California tornadoes are relatively weak (F0 or F1 intensity) and have relatively short path lengths, with median values 0.62 miles long and 43 yards wide compared to 4 miles long and 170 yards for Iowa tornadoes. Also, the vast majority of California tornadoes occur during the cool season and primarily between 1 PM and 3 PM local time.

During the rainy season, Yuba County is prone to relatively strong thunderstorms, sometimes accompanied by funnel clouds and tornadoes. While tornadoes do occur occasionally, most often they are of F0 or F1 intensity. Documented incidents of both funnel clouds and tornadoes in Yuba County from the NCDC Storm Events Database are listed in **Table B14**.

Table B14 – NCDC Tornado Data in Yuba County

Type	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
F1 Tornado	Yuba County	12/17/92	0	0	25K	0.00
F1 Tornado	Marysville Airport	10/22/12	0	0	0.00	0.00
F0 Tornado	Browns Valley	10/22/12	0	0	0.00	0.00
Funnel Cloud	Wheatland	2/21/2005	0	0	0.00	0.00

Source: NCDC

Three tornadoes and one funnel cloud occurred in Yuba County over 26 years (1988-2014) which equates to one tornado every 4 years, on average, and a 25 percent chance of a tornado occurring in any given year. But of these, none were greater than an EF1. Historical tornado activity within Yuba County indicates that the area can occasionally experience the formation of funnel clouds and low intensity tornadoes during adverse weather conditions, especially during the winter months. The actual risk and vulnerability to the County is dependent on the nature and location of any given tornado.

Previous Occurrences

As documented in the section on Severe Weather above there have been many instances of severe weather with in Yuba County. The previous occurrences of Severe Weather are noted in **Table B14,** NCDC Summary Data for Storm Events in Yuba County, **Table B7,** SHELDUS Severe Weather Report for Yuba County 1960 to 2011 and in **Table B1** Yuba County Disaster Declaration History 1950-present.

Probability of Future Occurrence

The probability of future severe weather events in Yuba County is Highly Likely: Near 100 percent chance of occurrence next year or happens every year.

Water Shortage and Drought

Water Shortage

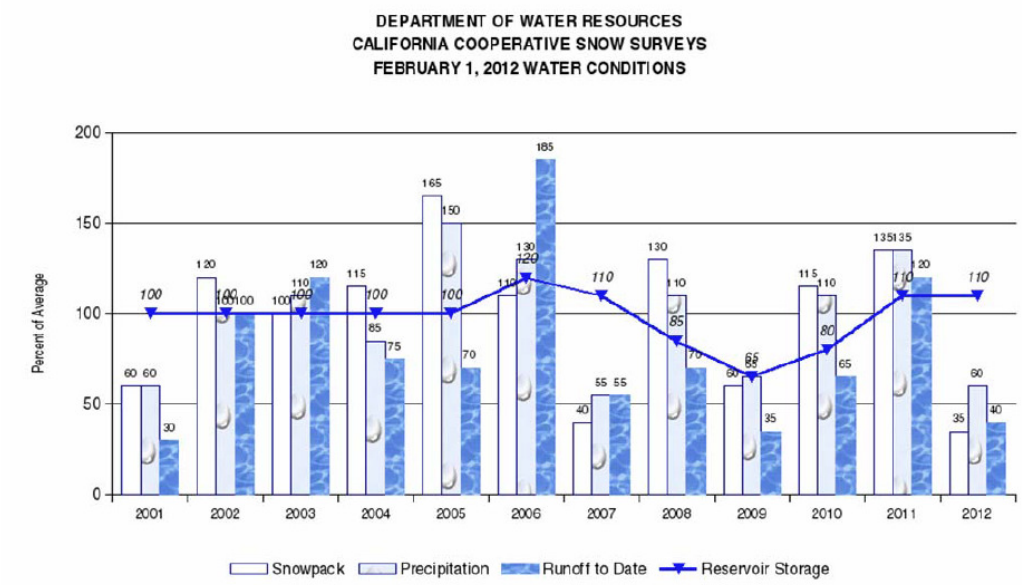
Northern Sacramento Valley counties, including Yuba County, generally have sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past

century. Many other areas of the State, however, also place demands on these water resources during severe drought. For example, Northern California agencies, including those from Yuba County were major participants of the Governor's Drought Water Bank of 1991, 1992, and 1994.

Tracking Water Conditions

The Chart in **Figure B22** illustrates several indicators commonly used to evaluate water conditions in California. The percent of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 1996 and 2007. The chart illustrates the cyclical nature of weather patterns in California. Snow pack and precipitation increased between 1996 and 1997, began decreasing in 1998, and began to show signs of recovery in 2002, increased in 2005, and decreased sharply in 2007.

Figure B22 – DWR Snow Survey Data



Source: DWR website

Drought

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Water Districts normally require at least a 10 year planning horizon to implement a multiagency improvement project to mitigate the effects of a drought and water supply shortage. **Figure B23** shows the extent of drought in Yuba County.

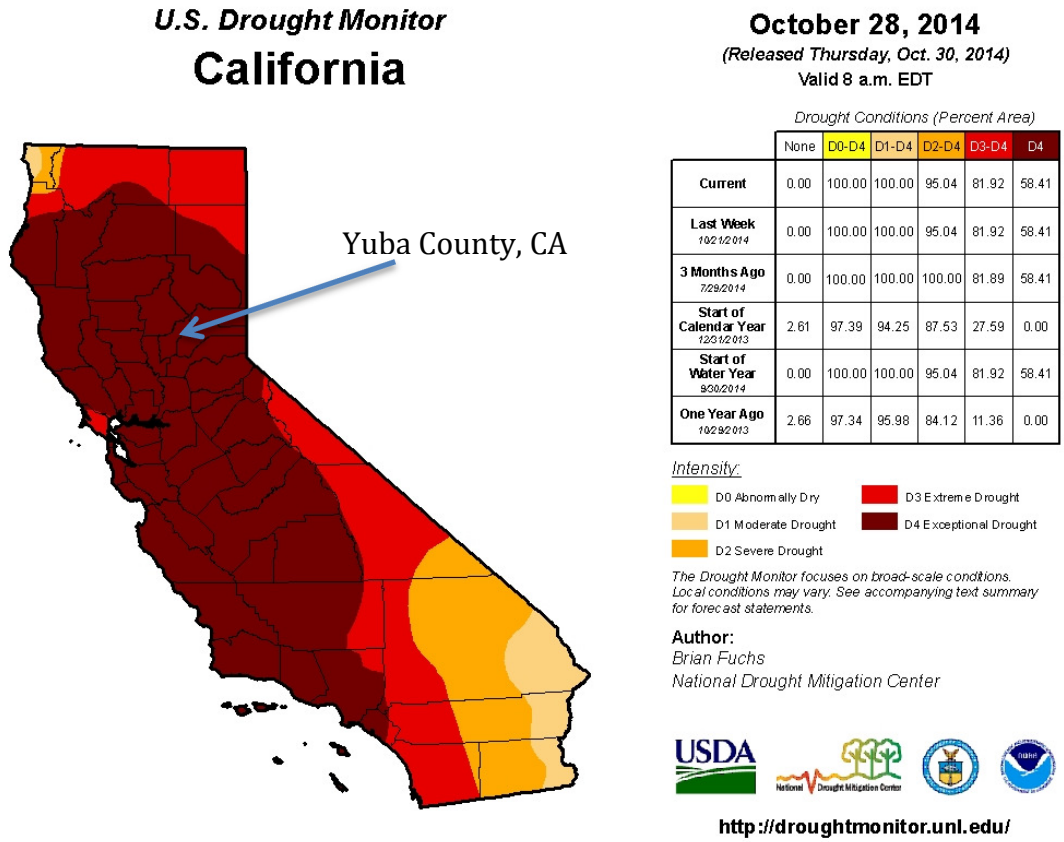
Drought is a complex issue involving many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **Meteorological drought** is usually defined by a period of below average water supply.
- **Agricultural drought** occurs when there is an inadequate water supply to meet the

needs of the state's crops and other agricultural operations such as livestock.

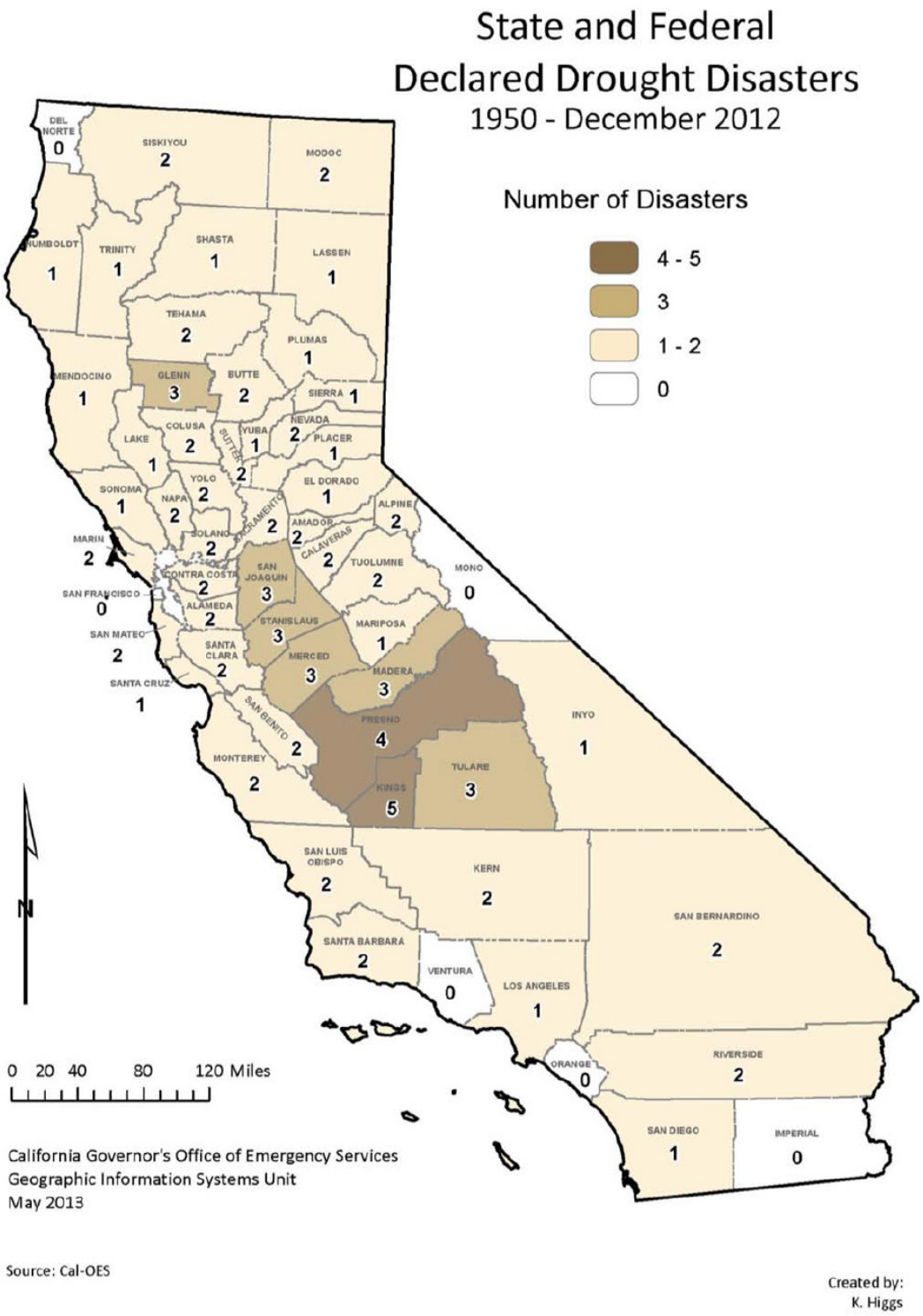
- **Hydrological drought** is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- **Socioeconomic drought** occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

Figure B23 – Yuba County Drought Extent



Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the drought conditions in California and in Yuba County can be found in **Figure B24.**

Figure B24 – State and Federal Declared Droughts



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

One dry year does not normally constitute a drought in California. California's extensive

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

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

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

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

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

Previous Occurrences

Many people consider drought and associated water shortages to be random events; however, it is a normal, recurrent, and insidious climatic event. Although it has many different definitions, a drought usually originates from a cumulative deficiency of precipitation over a season or more. Drought is not solely a physical phenomenon; it affects society's water supply and water demand associated with agricultural, urban, and environmental uses.

Because of the minimal data available for hydrologic conditions prior to 1900, it is difficult to determine prior drought occurrences. However, scientists have used various other methods to document severe droughts in early California history. Scientific evidence shows the reoccurrence of drought throughout history and confirms the possibility for a future drought. For example, trees appear to have grown 6000 years ago in areas now submerged under Lake Tahoe, suggesting a drier climate. Other tree ring dating studies suggest a sustained drought during the mid-1500s. Another early drought indicator is the presence and disappearance of civilization. For example, the Anasazi civilization flourished (in what is called the Medieval Warm Period from 900-1300) when monsoonal rains supported its irrigations systems. In contrast, the Anasazi culture declined and disappeared during the Little Ice Age (1300-1800), which is attributed in part to drought conditions that made irrigated agriculture infeasible. Given the limited knowledge of the fairly recent past, it is difficult to understand the full ramifications of drought conditions.

According to the State of California Hazard Mitigation Plan, Yuba County has experienced one drought that resulted in a state disaster declaration in 1991.

According to the National Oceanic and Atmospheric Administration (NOAA), the region containing the Yuba county Jurisdictions is not undergoing long–term drought conditions. The USDA has issued the following disaster declaration due to drought is shown in **Table B15**.

Table B15 – Yuba County Declared Drought Disasters

Yuba County Declared Drought Disasters			
Disaster Title	**Type/Agency**	**Loss/Cause**	**Date**
Agricultural Disaster	Drought Secretarial, SBA, USDA		2001,2002,2004, 2005
Agricultural Disaster	Severe Weather–Rain, Chill, Heat Secretarial, SBA		Aug.–Sept. 2003 Aug.–Oct. 2005
Agricultural Disaster	Severe Weather–Low humidity, high temperatures; Secretarial, SBA		March–October 2003, March 2004
Agriculture Disaster	Severe Weather–High temperatures, low humidity, strong winds; Secretarial, SBA		March 2005

Source: 2014 Yuba County Hazard Mitigation Planning Team

Currently, the State of California is in another multi-year drought, this includes Yuba County.

Probability of Future Occurrences

Historical drought data for the Yuba County and region indicate there has been 1 significant multi-year droughts in the last 101 years but there have been other. Based on this data,

droughts are **Occasional -** Between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Water shortages occur during these times of drought, although to varying degrees, making water shortages occasional as well. Drought and water supply have not been significant issues in Yuba County in years past due to the extensive surface and groundwater supplies in the region; however future demands of the County and the region, including the demands of their agricultural industry, make this hazard an ongoing concern to Yuba County.

Wildfire

Hazard Description

Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions, when combined with high winds and periods of drought, increase the potential for wildfire. Fires also occur in areas where development has expanded into rural areas. In this wildland-urban interface, fires can result in major losses of property and structures.

Wildfire and urban wildfire are an ongoing concern for Yuba County. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions when combined with high winds and years of drought increase the potential for a wildfire to occur. Urban wildfires often occur in those areas where development has expanded into the rural areas. A fire along this urban/rural interface can result in major losses of property and structures. Generally, there are four major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, weather, and human actions.

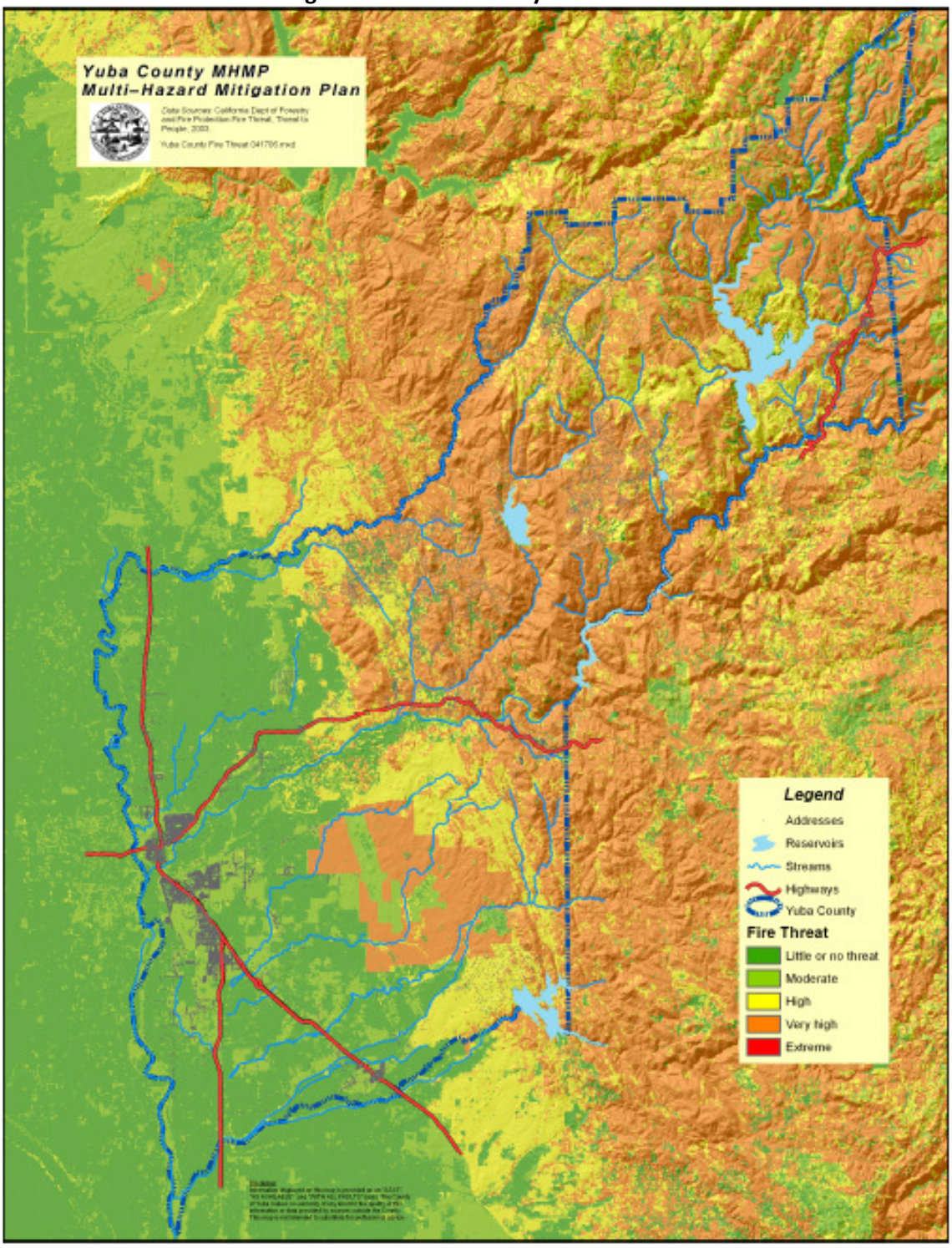
- Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are man-made structures, 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.
- An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- Weather 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 the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread, and the more intense it will be. Winds can be significant at times in Yuba County. Lightning also ignites wildfires, often in difficult-to reach terrain for firefighters. Also of concern, during periods of drought, the threat of wildfire increases.
- Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes, and are often the result of arson or careless acts such as the disposal of cigarettes, use of equipment or debris burning. Recreation areas that are located in high

fire hazard areas also result in increased human activity that can increase the potential for wildfires to occur.

Geographic Extent

Wildland fire is an ongoing concern for Yuba County. The **Geographic Extent of Wildfire in Yuba County is Significant - 10-50% of County affected.** Generally, the fire season extends from June through October of each year during the hot, dry months. Fire conditions arise from a combination of high temperatures, an accumulation of vegetation, low humidity, and high winds. Within the County, the eastern areas are the primary concern when considering the wildland fire hazard, with their limited access, steep terrain and remote location. In other areas, large concentrations of highly flammable brush located in flat open spaces are also quite susceptible to wildland fire. Also at risk are the "river bottoms" or those areas along the Yuba, Feather and Bear Rivers within the levee system, since much of the area inside these levees are left in a natural state, allowing combustible fuels to accumulate over long periods of time. Refer to the Yuba County Fire Threat map in **Figure B25**.

Figure B25 - Yuba County Fire Threat



Source: 2014 Yuba County Hazard Mitigation Planning Team

Potential Magnitude

The Wildland Urban Interface (WUI) defines the community development into the foothills and mountainous areas of California. The WUI describes those communities that are mixed in with grass, brush and timbered covered lands (wildland). These are areas where wildland fire once burned only vegetation but now burns homes as well. The WUI for Yuba County consists of communities at risk as well as the area around the communities that pose a fire threat.

There are two types of WUI environments. The first is the true urban interface where development abruptly meets wildland. The second WUI environment is referred to as the wildland urban intermix. Wildland urban intermix communities are rural, low density communities where homes are intermixed in wildland areas. Wildland urban intermix communities are difficult to defend because they are sprawling communities over a large geographical area with wild fuels throughout. This profile makes access, structure protection, and fire control difficult as fire can freely run through the community.

WUI fires are the most damaging. WUI fires occur where the natural and urban development intersect. Even relatively small acreage fires may result in disastrous damages. WUI fires occur where the natural forested landscape and urban-built environment meet or intermix. The damages are primarily reported as damage to infrastructure, built environment, loss of socio-economic values and injuries to people.

The pattern of increased damages is directly related to increased urban spread into historical forested areas that have wildfire as part of the natural ecosystem. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern now burns developed areas. WUI fires can occur where there is a distinct boundary between the built and natural areas or where development or infrastructure has encroached or is intermixed in the natural area. WUI fires may include fires that occur in remote areas that have critical infrastructure easements through them, including electrical transmission towers, railroads, water reservoirs, communications relay sites or other infrastructure assets. Human impact on wildland areas has made it much more difficult to protect life and property during a wildland fire. This home construction has created a new fuel load within the wildland and shifted firefighting tactics to life safety and structure protection.

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

According to the California Department of Forestry and Fire Protection (Cal Fire), the agency responsible for fighting wildland fires in Yuba County, about 48 percent of the County is classified as “Very High Fire Hazard Severity”, 15 percent is “High Fire Hazard Severity”, seven percent is “Moderate Fire Hazard Severity”, with the remaining 30 percent “Little to No Fire Hazard Severity” as shown in **Figure B26**.

While all of California is subject to some degree of fire hazard, there are specific features that make some areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain,

weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), influence how people construct buildings and protect property to reduce risk associated with wildland fires. The maps were last updated in the mid-1980s and early 1990s. They are currently being updated to incorporate improved fire science, data and mapping techniques.

The Fire Hazard Severity Zones identify fire hazard, not fire risk. "Hazard" is based on the physical conditions that give a likelihood that an area will burn over a 30 to 50-year period without considering modifications such as fuel reduction efforts. "Risk" is the potential damage a fire can do to the area under existing conditions, including any modifications such as defensible space, irrigation and sprinklers, and ignition resistant building construction which can reduce fire risk. Risk considers the susceptibility of what is being protected. Fire Hazard Severity Zone maps are intended to be used for:

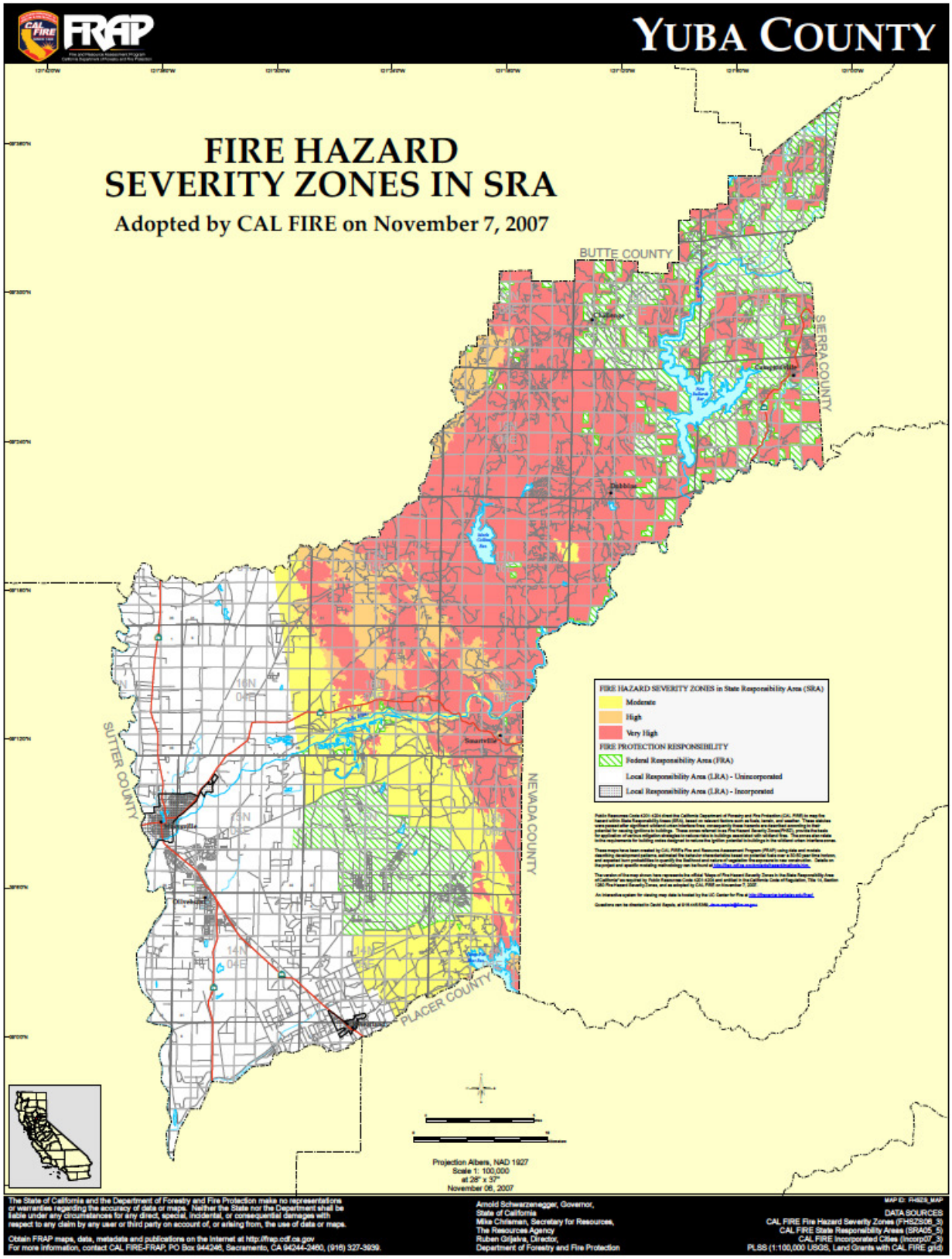
- Implementing wildland-urban interface building standards for new construction
- Natural hazard real estate disclosure at time of sale
- 100-foot defensible space clearance requirements around buildings
- Property development standards such as road widths, water supply and signage
- Considered in city and county general plans

Water Resources

During fire season, access to water is limited in many areas for fighting fires that may occur in the Fire Protection Districts. The Fire Protection Districts do, however, have written agreements with the Yuba County Water District, Browns Valley Water District, Yuba County Water Agency, and Thousand Trails Resort, to use water from their irrigation systems and lakes for fire fighting and suppression. To meet the Fire Protection Districts' primary responsibility for fighting structure fires, water is pumped into tenders from irrigation ditches and Collins Lake.

When necessary for larger or wildland fires, water can also be pumped from Lake Mildred and New Bullards Bar Reservoir. Water from Lake Mildred, Collins Lake, Lake Francis and New Bullards Bar Reservoir can be accessed through aerial pickup. In addition, there is a hook–up station at the base of Lake Francis Dam however, vehicle access is limited. There are also 48 water storage tanks within the northern portion of the County that are used to fight fires. These tanks, strategically placed within the region to provide quick access to fire response units, range in capacity from 2,500 to 10,000 gallons and are refilled with water from local irrigation canals and ditches. In addition, there are many privately–owned tanks on residences across the region that are refilled from well water or springs.

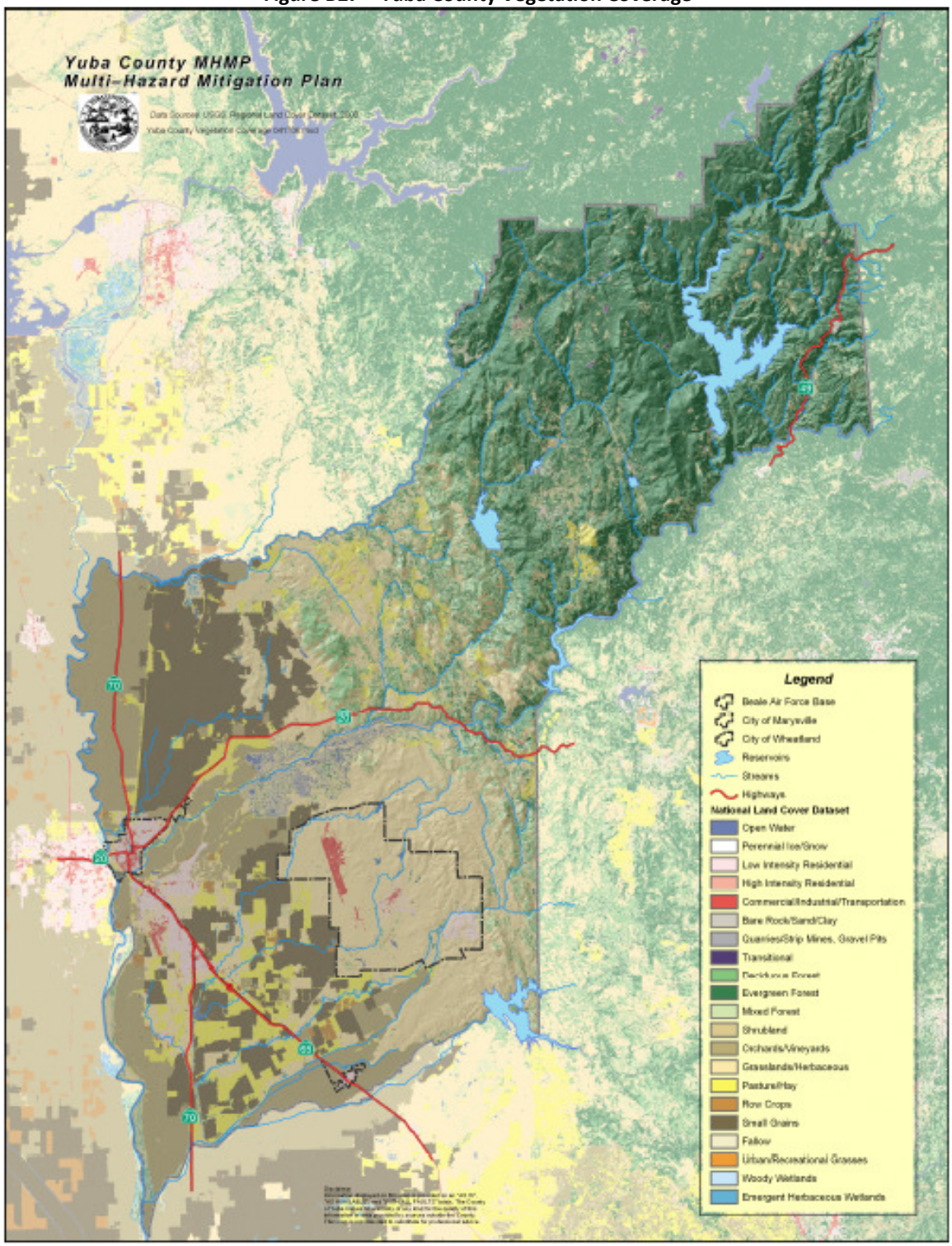
Figure B26 – Yuba County Fire Severity Zones SRA



Source: Cal Fire

The areas of heavy vegetation in the County shown in **Figure B27** illustrate the impact that coniferous forests have on the fire hazard in the foothill areas of the jurisdiction. The Yuba Fire Safe Council has been at the forefront of a combined effort to reduce the risk of wildfire in the foothills of Yuba County together with the Fire Protection Districts.

Figure B27 – Yuba County Vegetation Coverage



Previous Occurrences

As noted in the 2007 Hazard mitigation Plan, the County of Yuba has documented approximately 103 wildland fires since 1909. Eight of the fires were considered major with the two most recent wildland fires, the Williams Fire in 1997 and the Pendola Fire in 1999.

- The **Williams Fire** occurred in the community of Dobbins-Oregon House burning over 5,743 acres and destroyed over 417 building structures and hundreds of vehicles with damages totaling nearly $20 million dollars.
- The **Pendola Fire** burned over 11,725 acres, destroying 123 buildings and vehicles with nearly $3 million in damages.

A history of fires over 100 acres in the county is presented in the map in **Figure B28**. This figure is based on Cal Fire's fire history data showing the vast area that has burned in the foothills since 1900. As development occurs in the rural foothill regions, wild fire will continue to be a high hazard due to limited resources and remote access to areas served by rural fire agencies providing service in the foothill regions of the County.

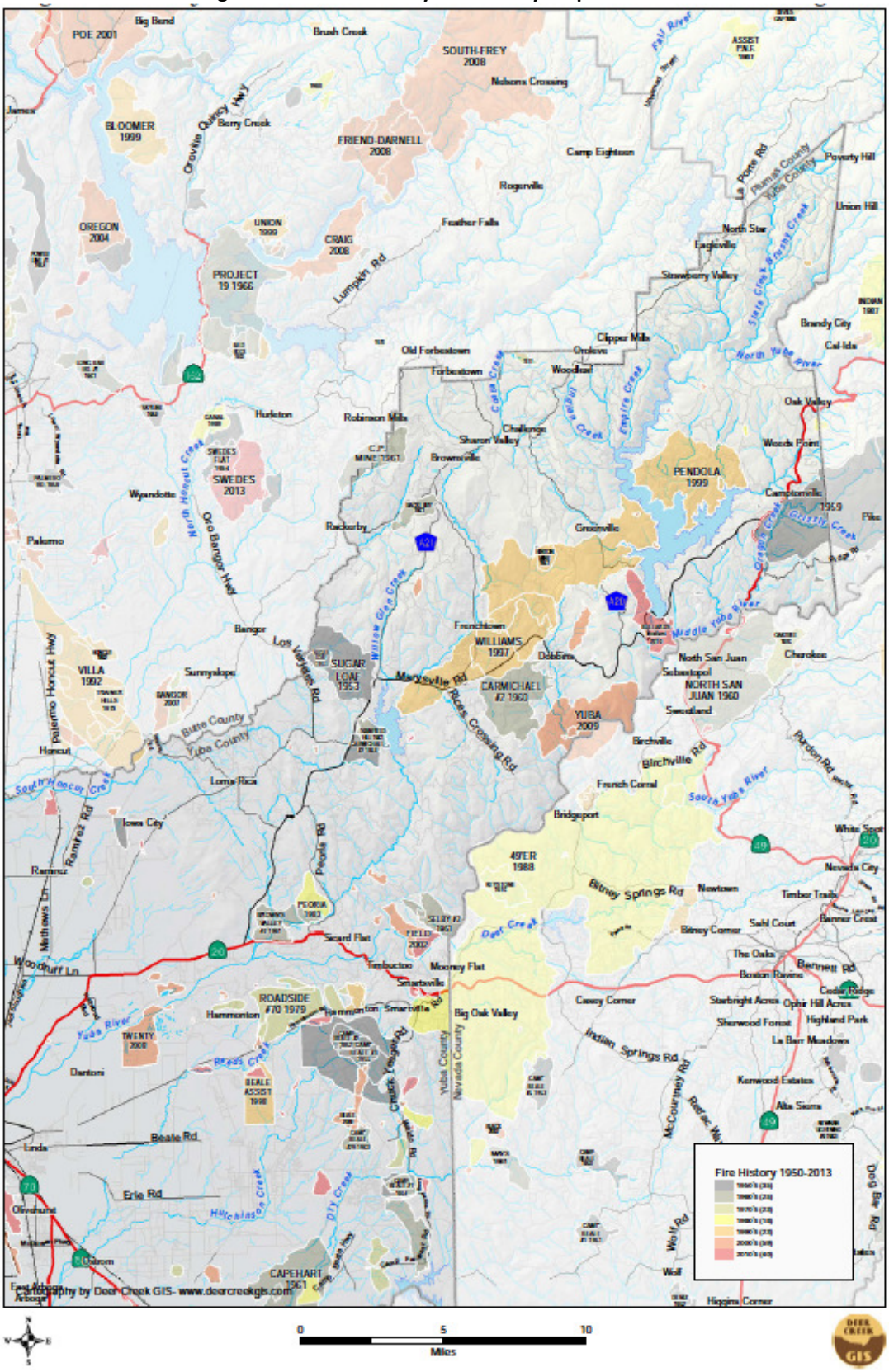
Other significant recent Wildland Fires since the last plan update are included in **Table B16**:

Table B16 - Previous Fires Since 2007 in Yuba County

Year/Fire Date	Name of Fire	Acres Burned	Structures Damaged/ Destroyed	Fatalities
2012	none	0	0	0
2011	none	0	0	0
2010 – 8/27/10	Bullard	1,307	0	0
2009 – 8/14/09	Yuba	3,891	0	0
2008 – 6/21/08	Yuba River Complex	4,254	0	0
2007 – 8/22/07	80	88	0	0
2006 – 8/16/2006	Marysville	442	0	0

Source: Cal Fire; 2014 Yuba County Hazard Mitigation Planning Team

Figure B28 - Yuba County Fire History Map–1900 to Present



Source: Yuba County CWPP, July 2014

Probability of Future Occurrence

The probability of future occurrences of wildfire is **Likely - Between 10 percent and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less**. From June to October of each year, Yuba County faces a wildfire threat. Fires will continue to occur on an almost annual basis in the area. The threat of wildfire and potential losses constantly increase as human development and population increase in the wildland urban interface area in the County. This results in a likely rating of future occurrence.

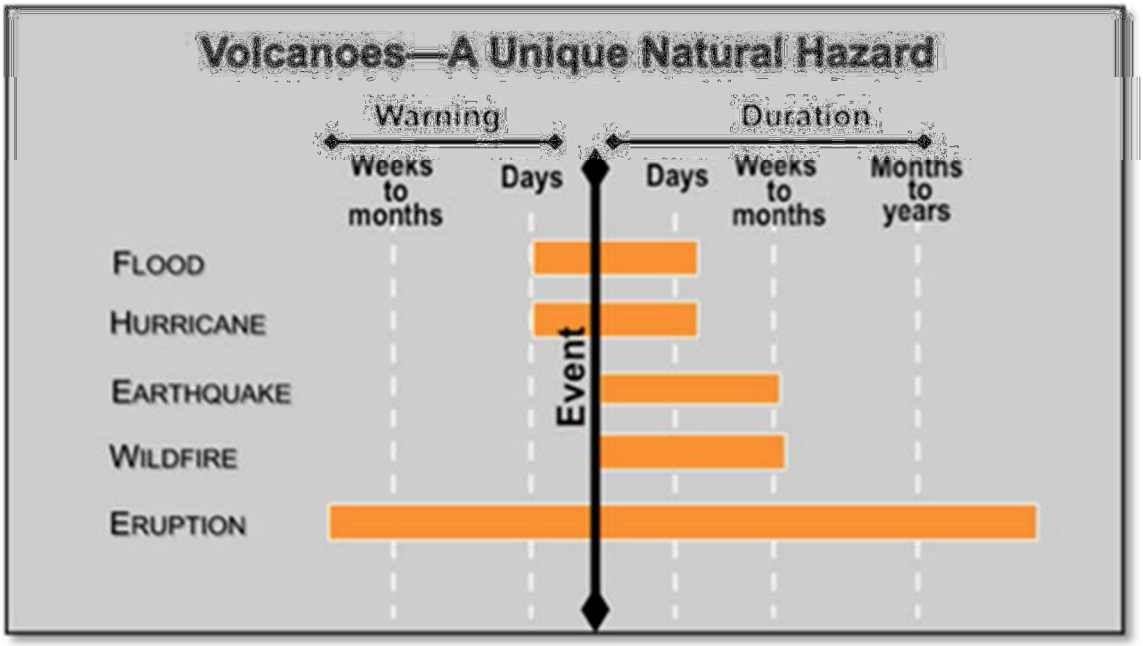
Volcano

Hazard Description/ Geographic Extent

The California State Hazard Mitigation Plan identifies volcanoes as one of the hazards that can adversely impact the State. However, there have been few losses in California from volcanic eruptions. Of the approximately 20 volcanoes in the State, only a few are active and pose a threat. Of these, Lassen Peak is the closest to Sutter County. The Long Valley area is considered to be an active volcanic region of California and includes features such as the Mono-Inyo Craters, Long Valley Caldera, and numerous active and potential faults. **Figure B30** shows volcanoes in or near California and the location of the Lassen Peak and the Long Valley area relative to Yuba County. **The Geographic Extent of the Volcano hazard in Yuba County is Extensive - 50-100% of County affected.**

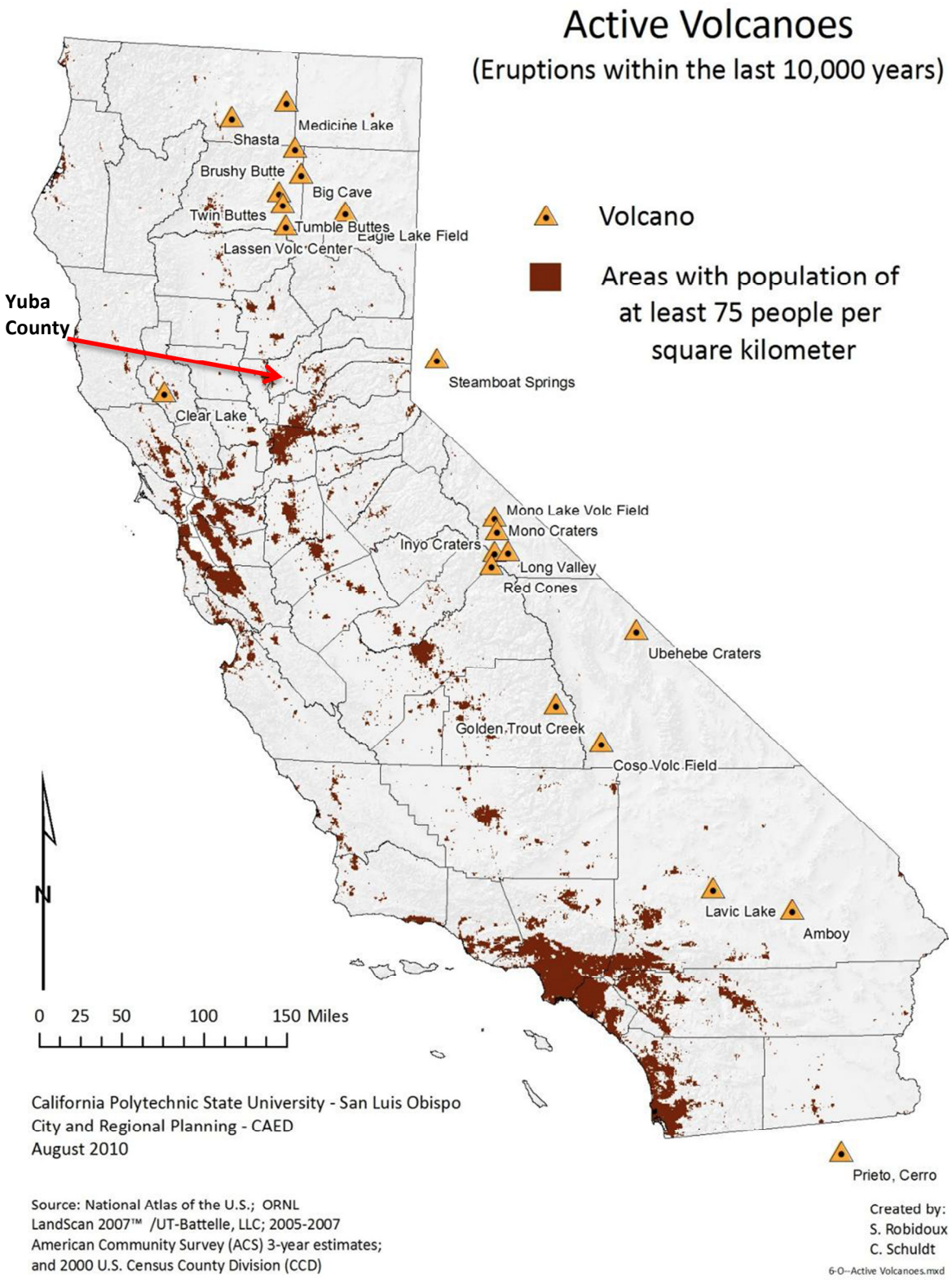
Unlike most other natural disasters, volcanic eruptions are usually preceded by weeks to months of precursory unrest, which manifests as ground deformation, earthquake swarms, and gas emissions. By monitoring the signals of unrest, scientists can make accurate eruption forecasts. As shown in **Figure B29**, volcanic eruptions typically last longer than other types of natural hazard events. This longer duration can tax emergency response and recovery efforts.

Figure B29 - Schematic Representation of Natural Disaster Timelines, Emphasizing the Unique Build-Up and Duration Times of Volcanic Disasters



Source: 2013 SHMP

Figure B30 - Active Volcanoes in or near California



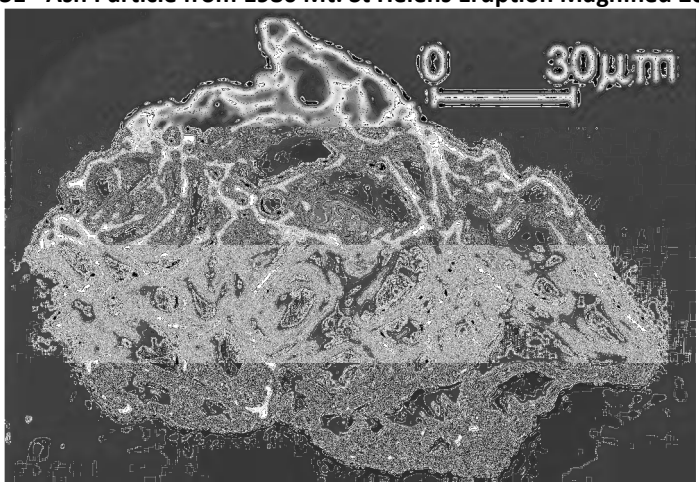
Source: 2010 SHMP

Potential Magnitude

Steam blasts commonly produce large pits or craters. Explosive eruptions, which may create fiery flows of hot ash (pyroclastic flows), are usually followed by the pushing up of a lava dome. Some less violent eruptions only produce lava flows.

Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away and cause problems for aviation. The USGS notes specific characteristics of volcanic ash. Volcanic ash is composed of small jagged pieces of rocks, minerals, and volcanic glass the size of sand and silt, as shown in **Figure B31**. Very small ash particles can be less than 0.001 millimeters across. Volcanic ash is not the product of combustion, like the soft fluffy material created by burning wood, leaves, or paper. Volcanic ash is hard, does not dissolve in water, is extremely abrasive and mildly corrosive, and conducts electricity when wet.

Figure B31 - Ash Particle from 1980 Mt. St Helens Eruption Magnified 200 Times



Source: USGS

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

Table B17 represents the volcano hazard types, characteristics and impacts.

Table B17 - Volcano Hazard Types, Characteristics and Impacts

Hazard Profile	Characteristics	Impact
High speed lava avalanches or surges produced by high-energy explosive eruptions or steam blasts (pyroclastic flow)	Sudden eruption of hot (400-1300°F), gas-pressurized flows of ash and lava fragments that rush outward from the volcano with great force at ground speeds greater than 50 miles per hour (mph). Flows typically follow valleys but can overtop ridges and travel 30 miles or more from the volcano.	These high-speed flows travel much too fast for people to outrun, and are thus a main cause of eruption-related fatalities. Flows knock down, shatter, bury, or carry away nearly all objects and structures. Extreme temperatures burn forests, crops, buildings, furnishings, and vehicles.
Slow speed lava flows produced by a low-energy, effusive eruptions	Gradual inundation by lava from sustained low-level eruptions moving at speeds of less than 30 mph. Lava may pile up near the vent in thick mounds (lava dome), or move across the landscape for many kilometers as fluid rivers of molten rock.	Everything in the path of slow speed lava flows will be knocked down, buried, or burned. The flows generally travel slowly enough that people, possessions, and transportable infrastructure can be moved out of the way. They often ignite wildfires, and areas inundated by flows can be buried by 10 feet or more of hardened rock, making it impossible to rebuild or repair structures.
Volcanically produced **debris flows** (lahars)	Slurry-like floods of volcanic ash, rock, and water that look like wet concrete. Debris flows gain momentum during travel by eroding and entraining soil and loose rock debris from channels. Large debris flows may carry boulders 30 feet across and travel through valleys and stream channels at speeds of 20-40 mph. Debris flows can be hot, with temperatures close to boiling. They occur during an eruption by melting snow or ice, or after an eruption by re-mobilization of loose volcanic deposits during intense rainfall.	Most debris flows travel much too fast for people to outrun, and are thus a main cause of eruption-related fatalities. Debris flows can destroy buildings, bridges, and bury vast areas with deposits of mud and rock up to 160 ft thick as far as 65 miles from the volcano.
Volcanically produced **flood**s	Floods of surface water produced by sudden melting of snow/ice, and/or diversion of water by blocked drainages or breached embankments.	Impacts are similar to non-volcanic floods, but the onset is usually sudden.
Fine ash fall from high-energy explosive eruptions	Fine fragments of lava, sand size and smaller, deposited from drifting ash clouds. Impact zone may be many tens to a few hundreds of miles from the	Although generally non-lethal, fine ash fall is the most widespread and disruptive volcanic hazard. People exposed to fine ash commonly experience

Hazard Profile	Characteristics	Impact
	volcano.	various eye, nose, and throat symptoms. Short-term exposures are not known to pose a significant health hazard. Long-term health effects have not been demonstrated conclusively. Ash deposited downwind of the volcano covers everything like a snowfall, but also infiltrates cracks and openings in machinery, buildings, and electronics. Falling ash can obscure sunlight, reducing visibility to zero; and when wet, can make paved surfaces slippery and impassable. Fine ash is abrasive, damaging surfaces and moving parts of machinery, vehicles, and aircraft. Life-threatening and costly damage can occur to aircraft that fly through fine ash clouds. Newly fallen volcanic ash may result in short-term physical and chemical changes in water quality. Close to the volcano, heavy ash fall may cause roofs to collapse, waste water systems to clog, and power systems to shut down. In agricultural areas, fine ash can damage crops, and sicken livestock. Re-suspension of ash by human activity and wind cause continuing disruption to daily life.
Coarse air fall from low-energy effusive eruptions (scoria, tephra, pyroclast, pumice)	Ballistic ejection of coarse, hot fragments of lava from the volcanic vent. Impact zones usually constrained to the flanks of the volcano. Fragments usually softball size or smaller.	The impact of coarse air fall is limited to the immediate area of the volcanic vent. Structures may be damaged by accumulation of falling lava fragments or burnt by their high heat. Wildfires may be ignited.

Source: 2013 SHMP

The Potential Magnitude of a damaging volcano to Yuba County is **Negligible - Less than 10 percent of property affected and severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid.**

Previous Occurrences

In historic times there are no records of significant ash falls, explosive effects, lava flows or mud flows in Yuba County. Further, impending volcanic eruptions generally give numerous advance warning signs and thus it is usually possible to evacuate residents in areas subject to volcanic hazards.

The Lassen region has been volcanically active for more than 3 million years. The Lassen "volcanic center" began to erupt about 600,000 years ago. From 600,000 to 400,000 years ago, eruptions built a large volcano. Later, this volcano became inactive and was mostly eroded away, leaving remnants that include Brokeoff Mountain, Mount Conard, Mount Diller, and Diamond Peak. Subsequent eruptions in the Lassen volcanic center have formed more than 30 steep-sided lava domes (the Lassen dome field). The most recently active parts of the volcanic center are Lassen Peak and other young domes formed in the past 50,000 years.

The most recent eruptive activity occurred at Lassen Peak in 1914-1917, **Figure B32**. This eruptive episode began on May 30, 1914, when a small phreatic eruption occurred at a new vent near the summit of the peak. More than 150 explosions of various sizes occurred during the following year. By mid-May 1915 (see picture above), the eruption changed in character; lava appeared in the summit crater and subsequently flowed about 100 meters over the west and probably over the east crater walls. Disruption of the sticky lava on the upper east side of Lassen Peak on May 19 resulted in an avalanche of hot rock onto a snowfield. A lahar was generated that reached more than 18 kilometers down Lost Creek. On May 22, an explosive eruption produced a pyroclastic flow that devastated an area as far as 4 miles northeast of the summit. The eruption also generated lahars that traveled more than 12 miles down Lost Creek and floods that went down Hat Creek. A vertical eruption column resulting from the pyroclastic eruption rose to an altitude of more than 5 miles above the vent and deposited a lobe of pumiceous tephra that can be traced as far as 18 miles to the east-northeast The fall of fine ash was reported as far away as Elko Nevada, more than 300 miles east of Lassen Peak. Intermittent eruptions of variable intensity continued until about the middle of 1917. The picture above shows the 1915 eruption of Lassen Peak as seen in Red Bluff, CA.

The Cascade Range volcanic chain has a long history of geologic activity that includes both earthquakes and volcanic eruptions. Volcanoes in the Cascade Range volcanic chain have erupted often over the past 40,000 years. As shown in **Figure B33**, over the past 4,000 years, small to moderate eruptions have occurred at various sites along the Cascade Range volcanic chain at intervals ranging from 20 to 1,000 years.

Figure B32 - May 1915 Eruption of Lassen Peak

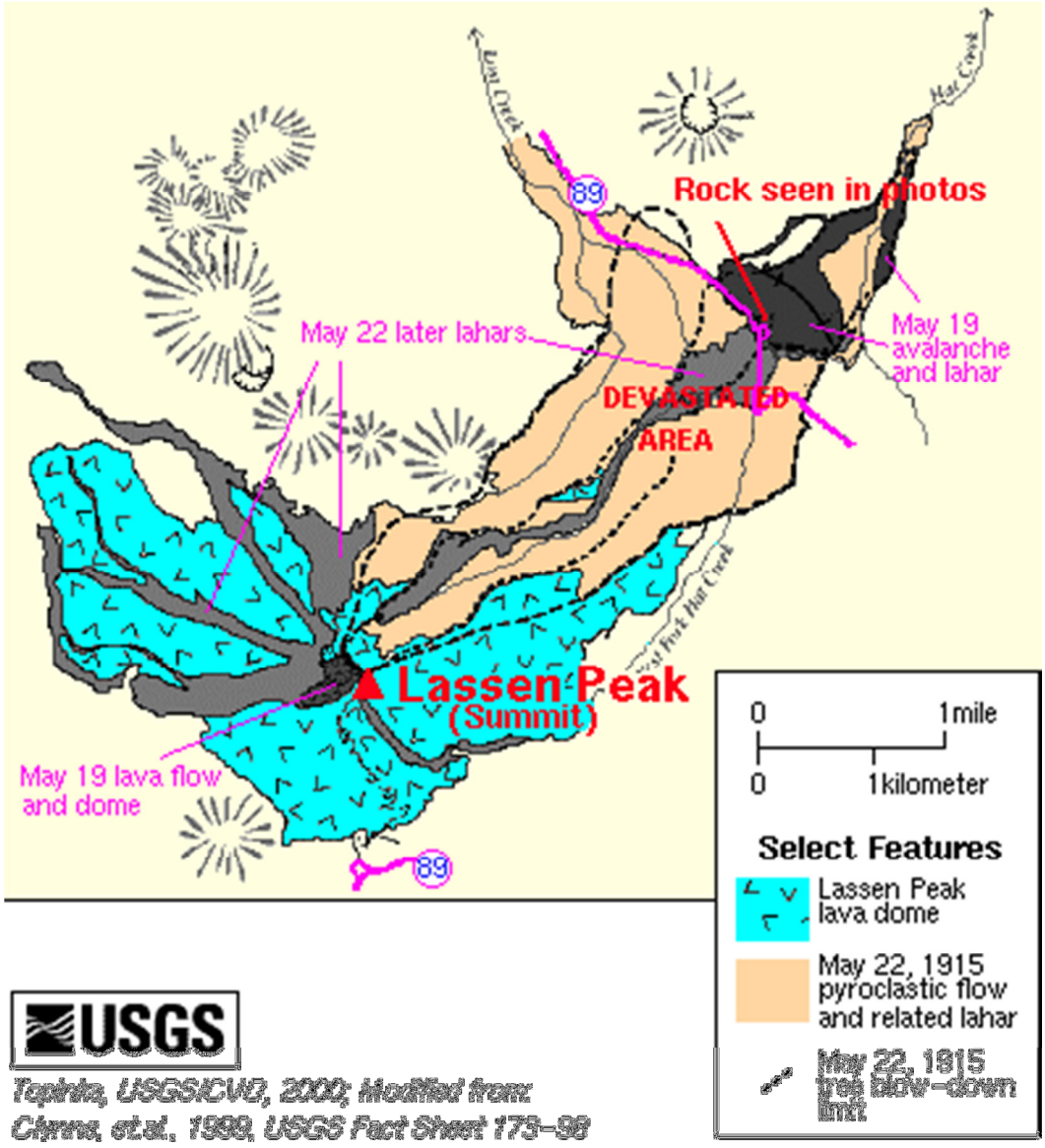
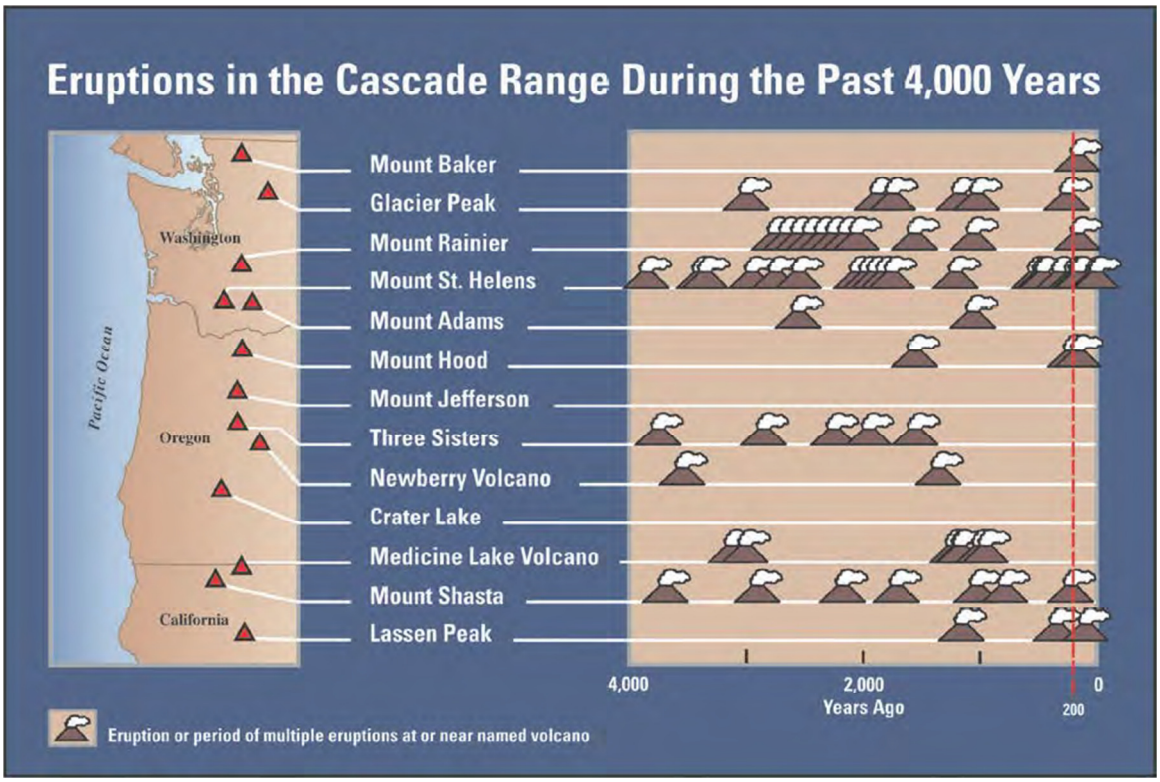


Figure B33 - Volcanic Activity in the Cascade Range Volcano Chain in the Past 4,000 Years



Source: USGS

Probability of Future Occurrence

According to the U.S. Geological Survey, 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 Lassen area tend to erupt infrequently, and may be inactive for periods lasting centuries or even millennia. The most recent eruptions in the Lassen area were the relatively small events that occurred at Lassen Peak between 1914 and 1917. The most recent large eruption produced Chaos Crags 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 Chaos Crags eruption was the one that built Lassen Peak 27,000 years.

It is Unlikely - Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years that a damaging volcano will affect Yuba County.

Significance of Hazards

Descriptor
Low: Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
Medium: Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. The potential of occurrence may be the same as the high ranking, but the potential damage is more isolated and less costly than a more widespread disaster.
High: Widespread potential impact. This ranking carries the highest threat to the general population and/or built environment. Hazards in this category may have already occurred in the past.

Summary of Hazards

Table B18 below summarizes the results of the hazard profiles and assigns a level of overall planning significance (see definitions above) to each hazard of low, medium, or high. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, and economic damage. This assessment was used by the Planning Team to prioritize those hazards of greatest significance to the operational area; thus enabling the County to focus resources where they are most needed. Those hazards that occur infrequently or have little or no impact on the operational area were determined to be of low significance.

Table B18 Priority Natural Hazards (Significance) in Yuba County

Hazard	Probability of Future Occurrence	Significance/Priority Hazard
Earthquake	Occasional	Medium
Flood	Likely	High
Severe Weather	Highly Likely	High
Wildfire	Likely	Medium
Volcano	Unlikely	Low

Source: Planning Team; Hazard Profiles

B.3. Vulnerability Assessment

§201.6(c)(2)(ii) [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.

§201.6(c)(2)(ii)(A) (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

§201.6(c)(2)(ii)(B) (B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.

§201.6(c)(2)(ii)(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Methodology

The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to natural hazards. The vulnerability assessment for this plan followed the methodology described in the FEMA 386-2, *Understanding Your Risks–Identifying Hazards and Estimating Losses* (2012).

The vulnerability assessment was conducted based on the best available data and the significance of the hazard. Data to support the vulnerability assessment was collected from the following sources:

- County and jurisdictional GIS data (hazards, base layers, and other government data)
- Statewide GIS datasets compiled by Cal OES to support mitigation planning
- FEMA's HAZUS loss estimation software
- Written descriptions of assets and risks provided by participating jurisdictions
- Existing plans and reports
- Personal interviews with jurisdictional representatives and other stakeholders

The vulnerability assessment first describes the assets at risk in Yuba County, including the total exposure of people and property; critical facilities and infrastructure; natural, cultural, and historic resources; and economic assets.

Assets at Risk

This section assesses the population, structures, critical facilities and infrastructure, and other important assets in Yuba County at risk to natural hazards.

The following data from the Yuba County Assessor's office is based on the secured roll data for 2014. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a transfer of the property occurs. As a result, the overall value information is most likely low and does not reflect current market value of properties within the County.

Table B19 shows the total population, number of structures, and assessed value of improvements to parcels by jurisdiction. Land values have been purposely excluded because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value. The greatest exposure of people and property are concentrated in the unincorporated areas, though significant population and structures are in the incorporated cities of the county.

Table B19 - Total Exposure to Hazards

Jurisdiction	Exposed Population	Buildings	
		Number	Value
Yuba County Unincorporated Areas	55,768	24,170	$2,348,331,683.00
City of Marysville	12,465	3,606	$471,880,611.00
City of Wheatland	3,922	1,198	$164,002,401.00
Yuba County Water Agency	55,768	24,170	$2,348,331,683.00

Source: Yuba County GIS, Assessor Roll

Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS loss estimation software uses the following three categories of critical assets (Essential Facilities, High Potential Loss Facilities and Transportation and Lifelines). Essential facilities are those that if damaged would have devastating impacts on disaster response and/or recovery. High potential loss facilities are those that would have a high loss or impact on the community. Transportation and lifeline facilities are a third category of critical assets.

The Yuba County Office of Emergency Services maintains a listing of Critical Facilities in Yuba County and the list is categorized according to FEMA's critical facility definition. Additionally, the Community Profiles list the Critical Facilities specific to that jurisdiction. **Table B20** shows the Essential Facilities in Yuba County.

Essential Facilities	High Potential Loss Facilities	Transportation and Lifelines
• Hospitals and other Medical Facilities • Police Stations • Fire Stations • Emergency Operation Centers	• Power Plants • Dams/levees • Military installations • Hazardous Material Sites • Schools • Shelters • Day Care Centers • Nursing Homes • Main Government Buildings	• Highways, Bridges and Tunnels • Railroads and Facilities • Bus Facilities • Airports • Water Treatment Facilities • Natural Gas Facilities and Pipelines • Oil Facilities and Pipelines

Table B20 - County-owned Critical Facilities in Yuba County

Name of Asset	Asset Description	Size of Building (sq. ft)	Replacement Value ($)	Contents Value ($)
Public Works	Roads		144,057,382	
	County Primary Roads (120 miles)			
	County Secondary Roads (465 miles)			
	gravel roads (102 miles)			
	paved roads (398 miles)			
	Bridges (92)		14,189,485	
	Equipment		102,986	
Social Services	Equipment			480,515
General Fund	Structures and Improvements		18,691,191	
	Yuba County Library			
	Yuba Sutter Juvenile hall			
	North Annex			
	South Annex (FRAQMD)			
	Victim Witness			
	Olivehurst Sheriff Substation			
	Animal Control			
	Airport Mgmt–Industrial Development			
	Public Works Corp Yard (Valley)			
	Public Works Corp Yard (Hills)			
	West Linda Sheriff Substation			
	Yuba County Courthouse			
	Yuba County Government Center			
	Yuba County One Stop			
	Feather River Center			
	Brownsville Sheriff Substation		rented	
	Rented Barn		rented	
	District 10 Sheriff Substation		rented	
	Equipment			552,803
Health Services	Equipment			57,521
Child Support Services	Equipment			56,710
Public Safety	Equipment			138,460
Automotive Services	Equipment		552,067	
Sheriff auto service	Equipment		128,340	

Yuba County Courthouse
The Yuba County Courthouse is located at 215 5th Street in downtown Marysville.

Services Provided;

Sheriff's Department
Sheriff's Dispatch Center
Jail
Probation
District Attorneys Offices
Yuba County Public Safety Communications Center
Information Technology's Law Enforcement Data Center
Superior Court Information Technology Data Center
Superior Court Divisions
Grand Jury

Number of employees: 300

Replacement Value: $41,404,050.00

Contents Value: $2,907,692.00

Yuba County Government Center
The Yuba County Government Center is located at 915 8th Street in downtown Marysville.

Services Provided;

Agriculture Weight & Measures
Auditor Controller
Treasurer
Community Development
Community Housing
Clerk Recorder / Elections
Board of Supervisors
Administrative Services
Buildings and Grounds
Print Shop
Information Technology
Personnel
County Counsel
County Administrators Office
Emergency Services
Public Works

Number of employees: 300

Replacement Value: $11,713,495.00

Contents Value: $2,000,000.00

Feather River Center
The Yuba County Social Services Offices are located at 6000 Lindhurst Ave outside Downtown Marysville known as Feather River Center

Services Provided;

Child Support Services
Child Protective Services
Social Services Administration
Social Services Case Management Divisions
Health & Medical Services Departments
Public Guardian
Sheriff Department Sub Station
Information Technology

Number of employees: 475

Replacement Value: Rented

Contents Value: $2,544,134.00

HAZUS General Description of the Region
The geographical size of the region is 642.99 square miles and contains 12 census tracts. There are over 20,000 households in the region which has a total population of 60,219 people (2002 Census Bureau data). There are an estimated 23,000 buildings in the region with a total building replacement value (excluding contents) of 3,593 (millions of dollars). Approximately 94.00 % of the buildings (and 79.00% of the building value) are associated with residential housing. The replacement value of the transportation and utility lifeline systems is estimated to be 1,336 and 314 (millions of dollars), respectively.

HAZUS Building Inventory
Hazus estimates that there are 23,000 buildings in the region which have an aggregate total replacement value of 3,593 (millions of dollars). In terms of building construction types found in the region, wood frame construction makes up 77% of the building inventory. The remaining

percentage is distributed between the other general building types.

HAZUS Critical Facility Inventory
Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites. For essential facilities, there are 1 hospitals in the region with a total bed capacity of 109 beds. There are 40 schools, 10 fire stations, 3 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 14 dams identified within the region. Of these, 4 of the dams are classified as 'high hazard'. The inventory also includes 4 hazardous material sites, 0 military installations and 0 nuclear power plants.

HAZUS Transportation and Lifeline Inventory
Within Hazus, the lifeline inventory **Table B21 and B22** is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 1,650.00 (millions of dollars). This inventory includes over 211 kilometers of highways, 96 bridges, 6,428 kilometers of pipes.

Table B21 – HAZUS Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	96	155.20
	Segments	43	907.90
	Tunnels	0	0.00
		Subtotal	**1,063.10**
Railways	Bridges	9	0.90
	Facilities	0	0.00
	Segments	48	85.60
	Tunnels	0	0.00
		Subtotal	**86.50**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	2	2.60
		Subtotal	**2.60**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	3	32.00
	Runways	4	151.90
		Subtotal	**183.80**
		Total	**1,336.00**

Table B22 – HAZUS Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	64.30
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**64.30**
Waste Water	Distribution Lines	NA	38.60
	Facilities	4	314.40
	Pipelines	0	0.00
		Subtotal	**352.90**
Natural Gas	Distribution Lines	NA	25.70
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**25.70**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	0	0.00
		Subtotal	**0.00**
Communication	Facilities	1	0.10
		Subtotal	**0.10**
		Total	**443.00**

More detailed information on damage and impact to the community as well as the overall summary of the community's vulnerability including the participating jurisdictions is located later in this section of the plan.

Natural, Historical and Cultural Resources

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

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Natural Resources

Agricultural Lands Yuba County contains about 643 square miles of land, of which roughly 55% (over 228,000 acres) is agricultural land. Most of Yuba County's agricultural land (about 143,000 acres) is grazing land. The next largest category of agricultural land is "prime" farmland (farmland with the most productive soils), at nearly 42,000 acres. Prime farmland is land that has the best combination of physical, chemical, and other characteristics to produce economically sustained high yields.

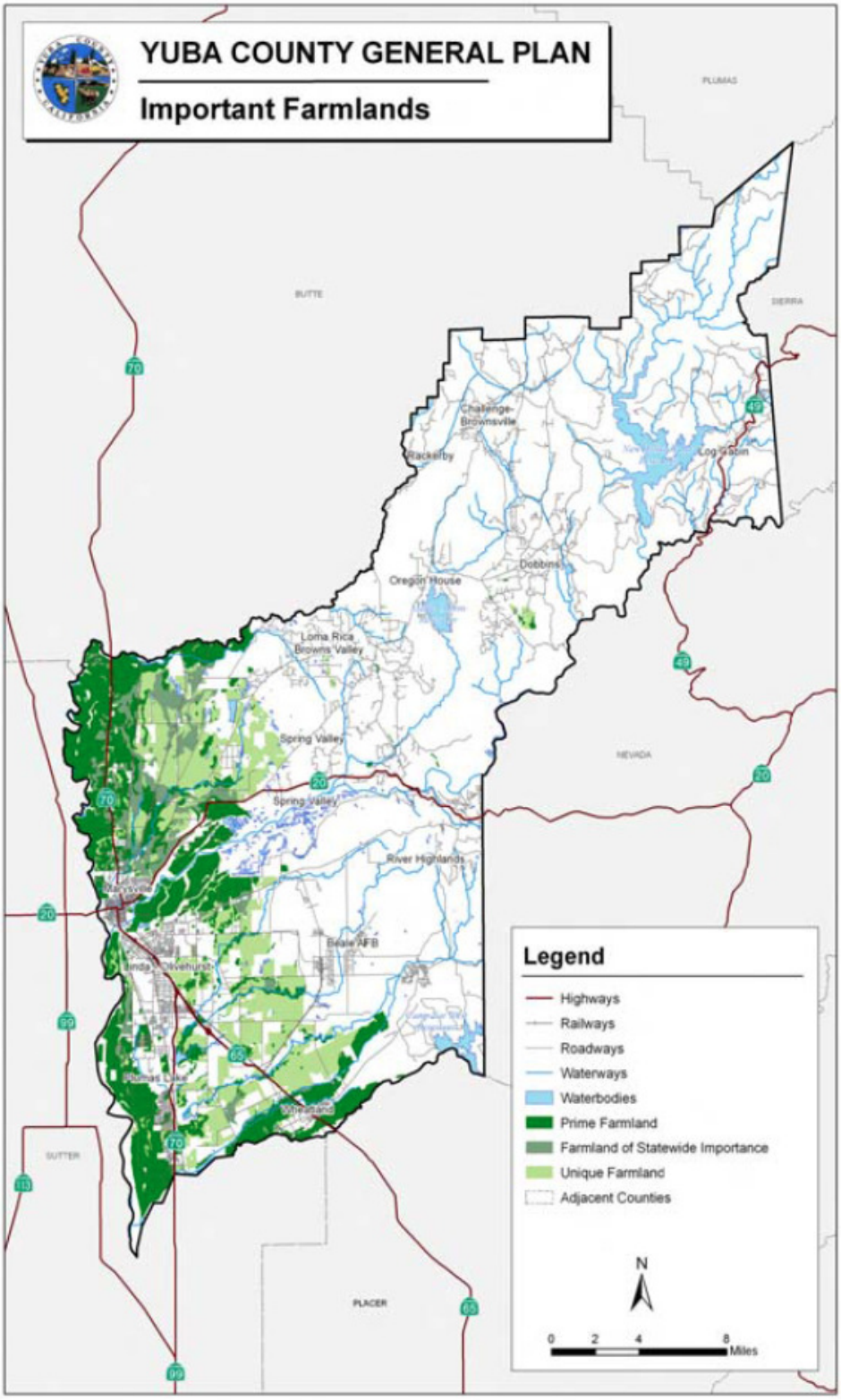
Other important categories of agricultural lands include farmland of statewide importance (over 11,000 acres) and unique farmland (over 32,000 acres). Farmlands of statewide importance are those containing soils critical to agricultural production, even if they are not as productive as prime farmland. Unique farmlands are those suited to the production of specific high value crops such as, citrus, tree nuts, vine crops, and olives. **Figure B34** shows Yuba County's important farmland.

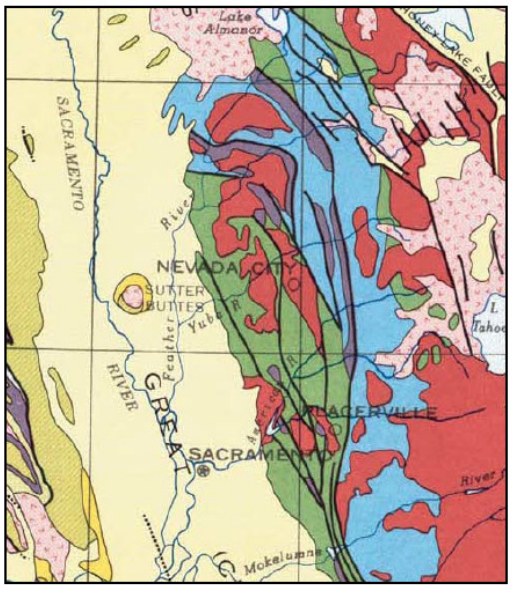
Land Type	Acres	%
Urban and Built-up Land	13,080.65	3.18
Grazing Land	142,706.44	34.66
Prime Farmland	41,986.71	10.20
Farmland of Statewide Importance	11,017.93	2.68
Unique Farmland	32,367.10	7.86
Water	6,628.39	1.61
Other Land	163,971.23	39.82
TOTAL	**411,758.44**	**100.00**
LAND IN AGRICULTURE	**228,078.17**	**55%**

Water Resources

Yuba County has abundant water resources owing to its topography and location in the Sacramento Valley, where several rivers flow and/or converge. Major rivers in or near Yuba County include the Yuba, Feather, Bear, and Sacramento rivers. Many smaller water courses also cross Yuba County. Rivers and streams flow from the Sierra Nevada Foothills and Mountains north and east of Yuba County. The Sacramento River, while not in Yuba County, drains Yuba County's rivers and streams and flows near the Yuba-Sutter county boundary where the Feather River flows into the Sacramento River.

Figure B34 - Yuba County Important Farmland





Mineral Resources

Yuba County's mineral resources vary by topography and location. Most of the minerals within the lower foothills and valley basin portion of Yuba County are related to sedimentary rock and gravel deposits, particularly within and near river basins (yellows in the map to the left). In higher elevations in northeast Yuba County, minerals are associated with ancient volcanic and metamorphic activities (red areas) and metamorphosed sedimentary rocks (green). Important minerals include sand, gravel, gold, silica, granite and other stones, and clay.

Other minerals present in Yuba County include molybdenum, silver, copper, manganese, arsenic, zinc, tungsten, chromium, iron, limestone, and asbestos.

Sand and gravel are the most common minerals extracted. In addition, gold, silver, stone, clay, and silica are extracted in commercial quantities in Yuba County. Asbestos, a naturally occurring mineral, but also a potential health risk, occurs in a few locations along Yuba County's border with Butte and Plumas counties.

Biological Resources

Yuba County is home to a wide variety of native species of plants, animals, and natural habitats that support these species. The map in **Figure B35** shows natural resources. These include meadows, nonnative grasslands, oak woodlands, coniferous forests, foothill and mountain hardwood forests, chaparral, freshwater wetlands and bogs, vernal pools, other riparian habitats, and natural habitats associated with various lakes in the County (lacustrine habitats). Many sensitive plant and animal species reside in the various natural areas of Yuba County, including rodents, birds (including waterfowl), frogs, snakes, insects, fish, deer, and several plant species.

Most of the land containing natural habitats in Yuba County is located in the foothill and mountain regions, as much of valley and other low lying areas of the County have been used for agriculture or are developed. Even so, there are still significant natural habitats remaining in the valley. In addition, changing agricultural practices have become an increasingly important tool to protect or re-create natural habitats while still permitting viable agriculture. Prominent examples include the flooding of rice fields in the winter to provide habitat for migratory birds and preserving riparian habitats along natural watercourses and canals in areas used for agriculture.

Yuba County contains several wildlife and refuge areas, including the Spenceville Wildlife Management and Recreation Area, the Marysville Wildlife Area, the Feather River Wildlife Area, the Daugherty Hills Wildlife Area, the Bobelaine Audubon Sanctuary, fish access areas managed by the California Department of Fish and Game, and the Sierra Foothill Research Center operated by the University of California Extension.

Early stages of planning are underway to identify important natural communities/habitats, individual species of plants and animals in the valley portion of Yuba and Sutter counties, protection strategies, and various types of development projects and other activities that could be covered under a comprehensive plan (Natural Community Conservation Plan/Habitat Conservation Plan for Sutter and Yuba counties) to protect and restore important habitat areas.

Historical Resources

National Register of Historic Places: There are eight historical properties on the National Register of Historic Places that are in Yuba County. Eight additional sites have been determined eligible for the National Register.

The eight Yuba County properties on the National Register are:

Bok Kai Temple, Marysville
Hart Building, Marysville
Oregon Creek Covered Bridge, North San Juan vicinity
[illegible]
[illegible]
[illegible]
Woodleaf Hotel, Woodleaf
Johnson Ranch and Burtis Hotel Sites, Wheatland vicinity

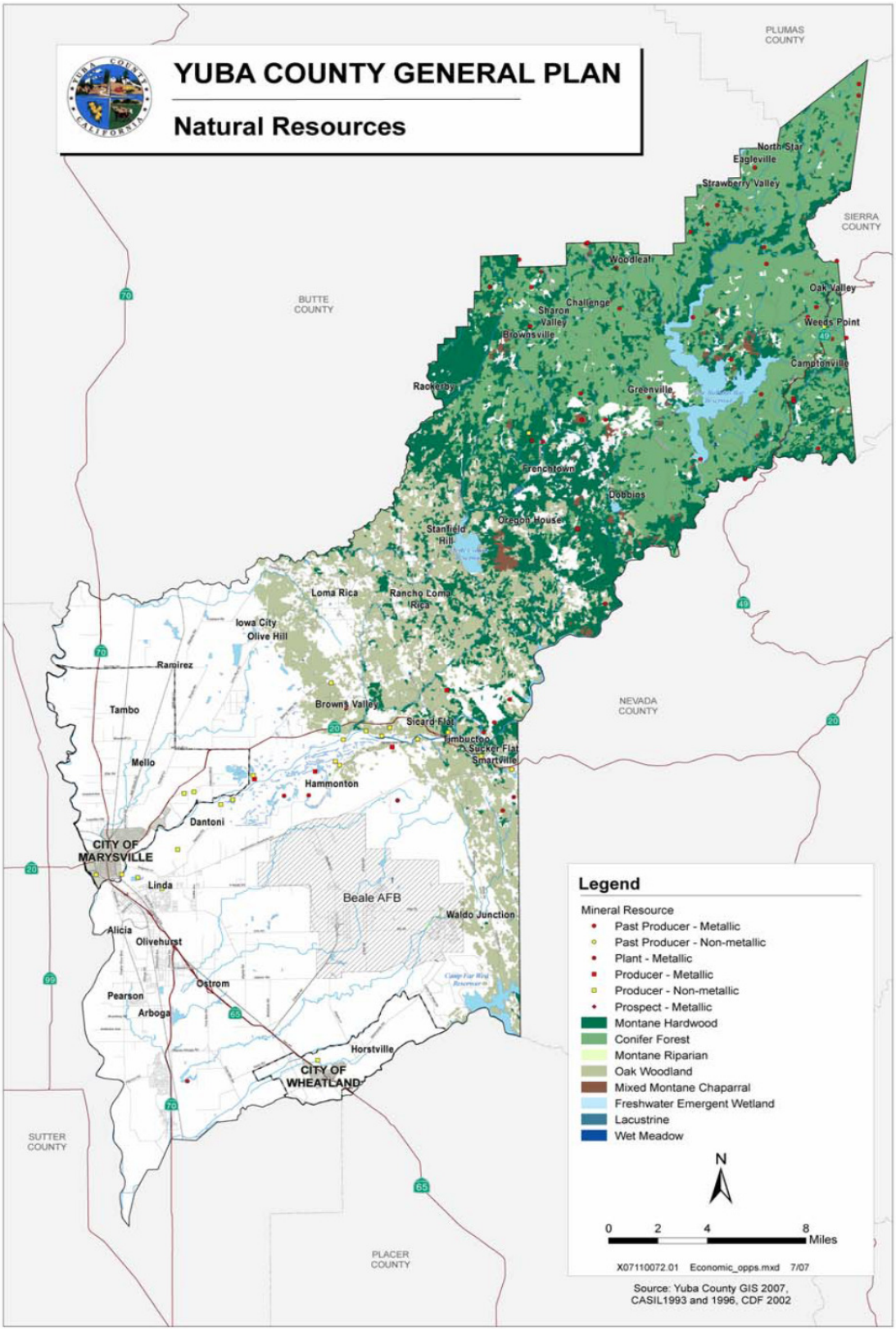
State Historic Landmarks: Yuba County has six California Historic Landmarks, including:

Timbuctoo, one mile west of Smartville
Community of Smartville
[illegible]
[illegible]
[illegible]
Temporary Detention Camps for Japanese Americans–Marysville Assembly Center, Yuba County Fairgrounds, Marysville

California Points of Historic Interest: There are 12 such properties in Yuba County, including:

Bok Kai Temple
Falck House, Woodleaf
Woodleaf Hotel
Marysville Cemetery
Johnson's Crossing
Camp Far West Cemetery
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

Figure B35 – Natural Resources



Cultural Resources

Most of what is presently known about the human prehistory of the valley portions of Yuba County is inferred form archaeological excavations of shell mounds in the Central Valley, Delta and San Francisco Bay regions. These excavations indicate what appears to be three distinct cultural periods, known to archaeologists as the Early, Middle, and Late horizons, spanning approximately the last 4,500 years (Beardsley 1948; Moratto 1984). It is likely that permanent year-round occupation of the valley floor in Yuba County began no earlier than in the Early horizon. The prehistory of the valley, foothill, and mountain regions of Yuba County culminated in the Nisenan Indian culture (County of Yuba 1994)

Spanish explorers were the first Europeans to visit Yuba County. White settlement of the area around Marysville began around 1841, when John Sutter established a huge domain consisting of Mexican land grants that included much of what is now Yuba County. John C. Fremont's famous expedition explored Yuba County in 1846 (Hoover et al. 1990). Yuba County was among the 27 original California counties established in 1850. The town of Marysville was laid out in 1850 and soon became the head of navigation on the Feather River and an important commercial center for the northern mines, resulting in phenomenal growth. The City of Wheatland also arose from a Mexican land grant, starting in 1844. In 1849, the United States government established Camp Far West about four miles east of Wheatland, however, the post was abandoned in 1852 and is now under the waters of the Camp Far West Reservoir (Hoover et al. 1990).

Many of the small rural communities of Yuba County, including Smartsville, Dobbins, Brownsville, Browns Valley, and Camptonville, had their beginnings as gold mining camps. It is believed by some historians that Jonas Spect was the first person to find gold in Yuba County in June 1848 at a place later called Rose's Bar on the Yuba River.

Climate Change

A balance of naturally occurring greenhouse gases (GHGs) in the earth's atmosphere is responsible for maintaining a habitable climate. Emissions from human activities, such as electrical production, motor vehicle use, and some forms of agriculture are elevating the concentrations of greenhouse gases in the atmosphere, and have led to increasing instability in the earth's climate. This is known as climate change.

The County's General Plan establishes the land use pattern that will accommodate the residents, businesses, and attendant infrastructure planned Yuba County. Decisions about the location of commercial, residential and civic buildings, roads and transit systems, water supply, building design, natural resources, open space, agriculture, and energy infrastructure determine the level of GHG emissions in the County.

Yuba County has undertaken several actions to date to reduce greenhouse gases as related to County operations and programs:

- Climate Change Working Group. Yuba County has created a climate change team through the County Administrator's Office and has organized a climate change working group that includes the cities and various districts, to coordinate countywide climate change efforts.
- Cool Counties. The County has committed to the Cool Counties Climate Stabilization

Declaration, a pledge to reduce greenhouse gas emissions from County operations by 80 percent by 2050.

- California Climate Action Registry. The County has prepared a baseline audit energy usage associated with County operations. This baseline will be used to measure energy usage over time. Through the registry the County will use a common GHG emission reporting system and will receive credit for reductions in emissions.
- Increasing Energy Efficiency. The County has taken steps to increase the energy efficiency of county operations including replacement of incandescent lights with compact fluorescent bulbs, retrofit of infrastructure in County buildings, installation of computerized climate control in all major county buildings, installation of cogeneration capacity at the Monroe Detention Facility, development of a building closure program to retire less energy-efficient buildings, and a countywide appliance replacement program for Energy Star appliances. The County has a goal of ten percent annual reduction in energy usage through 2013.
- Full-Scale Landfill Bioreactor. The County recovers methane gas, a potent greenhouse gas, from the Central Landfill to generate electricity.
- LEED. The County has adopted Leadership in Energy and Environmental Design (LEED) standards for new county buildings.
- Recycling. All County buildings recycle paper, cardboard, cans, bottles, fluorescent tubes, oil, computers, rigid plastics, agricultural plastics, PVC pipe, toner cartridges, cell phones, batteries, and electronic waste. The County has a goal of 50 percent recycling of all sorted material at the landfill. The County also has a Construction and Demolition Recycling Ordinance that requires diversion and recycling of construction and demolition debris.
- Transportation and Fleet Vehicles. The County has installed charging stations for electric vehicles and uses electric vehicles for commuting between local facilities.
- Personnel Training. County staff attends classes on the California Environmental Quality Act (CEQA) and on climate change issues.
- Tree Planting. The County operates a small nursery that provides tree planting for County facilities.
- Research. The County is involved in a variety of research projects related to energy conservation and control of GHG emissions.

The County also requires energy efficient project design and landscaping design as a part of the development review process.

Economic Assets

Yuba County's estimated population of 72,615 as of January 1, 2012, is an increase over 2011 data of 0.4 percent. The largest city within the county, Marysville, is the county seat and one of California's most historic cities; its history as a community dates back to California's Gold Rush era. Much of Yuba-Sutter's agricultural, recreational, educational and industrial activities are located in Yuba County. The population in Yuba County is projected to reach 84,520 by the year 2020, an increase of 17.1 percent. Yuba County's population is projected to increase nearly 134 percent by 2060 as shown in **Table B23.**

Table B23 – Annual Population Changes County/City

Location	January 1, 2012	January 1, 2013	Change
Yuba County	72,642	73,439	1.1%
City of Marysville	12,108	12,250	1.2%
City of Wheatland	3,470	3,493	0.7%
Unincorporated	57,064	57,696	1.1%

Age

In comparing the Yuba-Sutter region's age characteristics with that of the state5, it is apparent that the region's population has a somewhat larger percentage of youth (ages 19 and under), and a slightly higher percentage of elderly (ages 65 and older). The region's percentage of young adults (ages 20 to 34) is similar to the state's; however, its middle-aged adults (ages 35 to 59) measure slightly lower than the state's.

Gender

According to the 2010 Census, the Yuba-Sutter region's population is 50.1 percent male and 49.9 percent female; very close to that of the state and nation.

Race

The 2010 Census reported the racial makeup of the region was 54 percent white, 10.9 percent Asian, 2.3 percent African American, 1.3 percent American Indian and Alaska Native, 0.3 percent Pacific Islander, 0.2 percent from other races, and 3.8 percent from two or more races. The Hispanic or Latino population of any race was 27.1 percent.

Employment

According to the Sutter-Yuba Economic Development Corporation Economic and Demographic Information Report the Top Employers in Yuba County are noted in **Figure B36**.

Figure B36 – Top Employers

Yuba County

Employer	Number of Employees
Beale Air Force Base	6,954
Fremont-Rideout Health Group (included in Sutter County)	
Marysville Joint Unified School District	1,000
Yuba County	775
Caltrans	700
Walmart Supercenter	400
Bishop's Pumpkin Farm	385
Yuba County Office of Education	208
Wheatland Elementary School District	200
Plumas Lake Elementary School District	150
US Post Office	145
Recology Yuba-Sutter	120
Marysville Care & Rehabilitation Center	110
Appeal Democrat	78

Figure B27 - Income and Poverty Level Status

	2000 Census						2008-2012 Estimates					
		Income			Population Below Poverty Level			Income a/			Population Below Poverty Level	
	Population	Median Household	Median Family	Per Capita	All	Families	Population	Median Household	Median Family	Per Capita	All	Families
United States	281,421,906	$ 41,994	$ 50,046	$ 21,587	12.4%	9.2%	309,138,711	$ 53,046	$ 64,585	$ 28,051	14.9%	10.9%
California	33,871,648	$ 47,493	$ 53,025	$ 22,711	14.2%	10.6%	37,325,068	$ 61,400	$ 69,883	$ 29,551	15.3%	11.5%
Yuba County	**60,219**	**$ 30,460**	**$ 34,103**	**$ 14,124**	**20.8%**	**16.3%**	**72,244**	**$ 46,641**	**$ 53,152**	**$ 20,016**	**20.6%**	**15.1%**
City of Marysville	12,268	$ 28,494	$ 33,474	$ 15,315	18.9%	15.2%	12,178	$ 34,351	$ 40,074	$ 18,793	26.4%	21.8%
City of Wheatland	2,275	$ 34,861	$ 39,375	$ 14,889	19.8%	15.8%	3,442	$ 60,909	$ 65,750	$ 22,407	16.6%	13.2%
Beale AFB, CDP	5,115	$ 33,944	$ 34,667	$ 12,069	6.7%	5.7%	1,581	$ 41,917	$ 41,625	$ 15,954	7.3%	9.5%
Camptonville, CDP	not available						116	$ 21,667	$ 46,042	$ 16,189	18.1%	d/
Challenge-Brownsville, CDP	1,069	$ 27,037	$ 36,607	$ 14,917	16.9%	16.2%	1,449	$ 52,500	$ 47,043	$ 21,441	25.9%	12.2%
Dobbins, CDP	not available						258	$ 37,162	$ 75,069	$ 25,697	11.6%	d/
East Yuba-Beale AFB, CCD	not available						4,829	$ 51,725	$ 53,825	$ 20,968	15.0%	12.9%
Linda, CCD	13,826	not available					17,593	$ 37,785	$ 42,234	$ 14,351	26.2%	21.3%
Linda, CDP	13,474	$ 22,753	$ 24,925	$ 9,826	37.6%	32.6%	17,901	$ 37,364	$ 42,234	$ 14,644	26.4%	21.6%
Loma Rica, CDP	2,075	$ 46,797	$ 52,250	$ 27,240	11.2%	6.7%	2,565	$ 72,924	$ 81,741	$ 27,522	8.7%	1.9%
Marysville Northeast, CCD	not available						6,616	$ 73,136	$ 80,854	$ 33,675	9.3%	6.3%
Marysville, CCD	12,597	not available					12,436	$ 34,733	$ 41,007	$ 19,192	25.9%	21.2%
Olivehurst, CCD	12,016	not available					21,832	$ 53,255	$ 55,100	$ 19,382	17.9%	12.3%
Olivehurst, CDP	11,061	$ 29,854	$ 32,072	$ 12,020	18.3%	13.3%	14,245	$ 42,565	$ 44,126	$ 15,008	22.5%	15.4%
Plumas Lake, CDP	not available						6,141	$ 82,083	$ 81,505	$ 27,313	6.8%	4.9%
Smartsville, CDP	not available						228	$ 42,083	$ 26,458	$ 16,957	44.3%	44.3%
Wheatland, CCD	3,151	not available					4,201	$ 60,682	$ 64,848	$ 22,971	17.4%	12.7%
Yuba Foothills, CCD	4,583	not available					4,737	$ 46,087	$ 53,940	$ 23,481	21.9%	9.6%

Source: Sutter-Yuba Economic Development Corporation

Unemployment

From 1992 to 2012 the annual average unemployment rate for the Yuba-Sutter region was at a high of 19.4 percent in 2010 and dropped as low as 8.8 percent in 2000; the recent economy has ushered in a current jobless rate of 16.9 percent for March 2013. Income and poverty level status are shown in **Figure B37.**

Yuba-Sutter's is a service-based economy. In the 10-year period from 2002 to 2012, private service-providing jobs increased by 900 or 4.1 percent largely in educational and health services; government service-providing jobs decreased by 300 or 2.8 percent. Goods-producing jobs experienced a net loss of 1,800 jobs or 33.3 percent. In the 10-year period natural resources, mining and construction experienced a net loss of 800 jobs or 34.8 percent; manufacturing lost 900 jobs or 30 percent.

Future Development Trends

As part of the planning process, the Planning Team looked at changes in growth and development and examined these changes in the context of hazard areas and how the changes in growth and development affect loss estimates and vulnerability.

Yuba County has been steadily growing over the last several decades. Long-term forecasts by the California Department of Finance project population growth in Yuba County continuing through 2060, adding 134% to the 2010 county population by the year 2060. The population projections are for the County as a whole and are shown in **Table B24**.

Table B24 - Population Projections in Yuba County 2010 to 2060

Jurisdiction	2010 Population	2060 Population	2010-2060 Growth	Change
Yuba County	72,155	168,685	+96,530	133.8%

Below are numbers and construction cost of new residential buildings in 2012, housing occupancy estimates for 2008-2012 and nonresidential construction valuation for 200-2010.

Numbers and Construction Costs of New Residential Buildings as of 2012

	Number of Reported Buildings a/						Total Construction Costs					Average Construction Cost per Single-Family Unit
	Single Family	Two Family	Three and Four Family	Five or More Family	Total Bldgs.	Total Units	Single Family	Two Family	Three and Four Family	Five or More Family	Total	
Yuba County	**78**	**0**	**0**	**0**	**78**	**78**	**$ 11,555,513**	**$ -**	**$ -**	**$ -**	**$ 11,555,513**	**$ 148,148**
Marysville	1	0	0	0	1	1	$ 67,500	$ -	$ -	$ -	$ 67,500	$ 67,500
Wheatland	0	0	0	0	0	0	$ -	$ -	$ -	$ -	$ -	$ -
Unincorporated	77	0	0	0	77	77	$ 11,488,013	$ -	$ -	$ -	$ 11,488,013	$ 149,195

Housing Occupancy 2008-2012 Estimates

	Housing Units				Occupied Housing Units						
			Vacancy Rate					Avg. Household Size of			
	Total	Vacant	Home-owner	Rental	Total	Owner-Occupied	Renter-Occupied	Owner-Occupied	Renter-Occupied	Median Value	Median Rent
Yuba County	**27,670**	**3,537**	**4.6%**	**6.9%**	**24,133**	**59.9%**	**40.1%**	**2.86**	**3.05**	**$ 180,700**	**$ 870**
City of Marysville	4,994	462	5.1%	6.3%	4,532	42.9%	57.1%	2.36	2.69	$ 145,400	$ 860
City of Wheatland	1,271	93	6.0%	2.7%	1,178	60.1%	39.9%	3.06	2.69	$ 173,300	$ 782
Beale Air Force Base	898	506	0.0%	0.0%	392	1.0%	99.0%	2.50	3.50	-	$ 1,407
Camptonville	69	5	0.0%	0.0%	64	43.8%	56.3%	2.14	1.56	$ 104,200	$ 1,042
Challenge-Brownsville	781	205	16.2%	12.4%	576	62.2%	37.8%	2.53	2.49	$ 198,600	$ 798
Dobbins	118	0	0.0%	0.0%	118	77.1%	22.9%	2.38	1.52	$ 187,500	-
Linda	6,315	684	5.4%	9.6%	5,631	48.0%	52.0%	3.09	3.25	$ 150,700	$ 832
Loma Rica	1,097	169	0.0%	0.0%	928	92.9%	7.1%	2.69	3.67	$ 296,400	$ 1,250
Olivehurst	4,626	351	4.4%	8.1%	4,275	65.9%	34.1%	3.32	3.32	$ 152,400	$ 798
Smartsville	105	25	0.0%	0.0%	80	36.3%	63.8%	2.52	2.92	$ 142,700	$ 1,723

Total Nonresidential Construction Valuation Authorized by Building Permits 2000-2010

	California	Sutter	Yuba
2010	$ 11,199,763	**$ 25,432**	**$ 3,691**
2009	$ 10,866,268	**$ 13,814**	**$ 4,963**
2008	$ 19,211,616	**$ 27,402**	**$ 7,790**
2007	$ 22,541,853	**$ 29,203**	**$ 16,076**
2006	$ 21,108,621	**$ 52,951**	**$ 17,581**
2005	$ 18,265,533	**$ 80,076**	**$ 11,591**
2004	$ 15,689,373	**$ 55,580**	**$ 18,868**
2003	$ 13,914,939	**$ 29,416**	**$ 17,261**
2002	$ 14,529,112	**$ 20,130**	**$ 25,048**
2001	$ 16,753,287	**$ 33,766**	**$ 11,562**
2000	$ 18,624,958	**$ 47,530**	**$ 13,523**

B.3. Estimating Potential Losses

The Planning Team ranked the significance of identified hazards for each jurisdiction. Significance is measured in general, qualitative terms and is a summary of the potential impact of the hazard based on the geographical area affected, history of past occurrences, potential magnitude, probability of the event, and damage and casualty potential. Significance is classified as the following:

High: Widespread potential impact. This ranking carries the highest threat to the general population and/or built environment. Hazards in this category may have already occurred in the past.

Medium: Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. The potential of occurrence may be the same as the high ranking, but the potential damage is more isolated and less costly than a more widespread disaster.

Low: Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

This section assesses vulnerability to those specific hazards ranked of medium or high significance. The Planning Team identified three hazards within the entire county area where specific geographical hazards are defined: Earthquake, Flood, and Wildfire. Critical facilities and other assets in these areas were assessed and are described. The vulnerability to other medium to high significance hazards that do not have specific mapped areas, such severe weather is discussed in more general terms at the end of this section. The planning significance of different hazards depends upon their location in the county.

It is also important to be aware that hazard events that happen outside of the county boundaries also can have direct and indirect impacts to Yuba County. For instance, dam failures, volcanic eruptions and wildfires in watersheds outside the county that drain into it can result in flooding and other impacts related to watershed health. An earthquake or flood as far away as the San Francisco Bay Region could disrupt the county from issues such as power outages, water supply, and even mass influxes of populations evacuating those areas.

Earthquake Vulnerability Assessment

Probability of Future Occurrences:	Occasional
Vulnerability:	Medium

Earthquake vulnerability is based primarily upon population and the built environment. To mitigate this hazard, building codes in California have been steadily improved over the past 80 years as understanding of seismic shaking has improved. Current California building codes include provisions for considering the potential shaking from earthquakes, including stronger shaking near faults and amplification by soft soils. The building code has been the main mitigation tool for seismic shaking in most buildings, although hospitals, schools, and other critical facilities are subject to additional mitigation measures (Cal OES Hazard Mitigation Plan 2010).

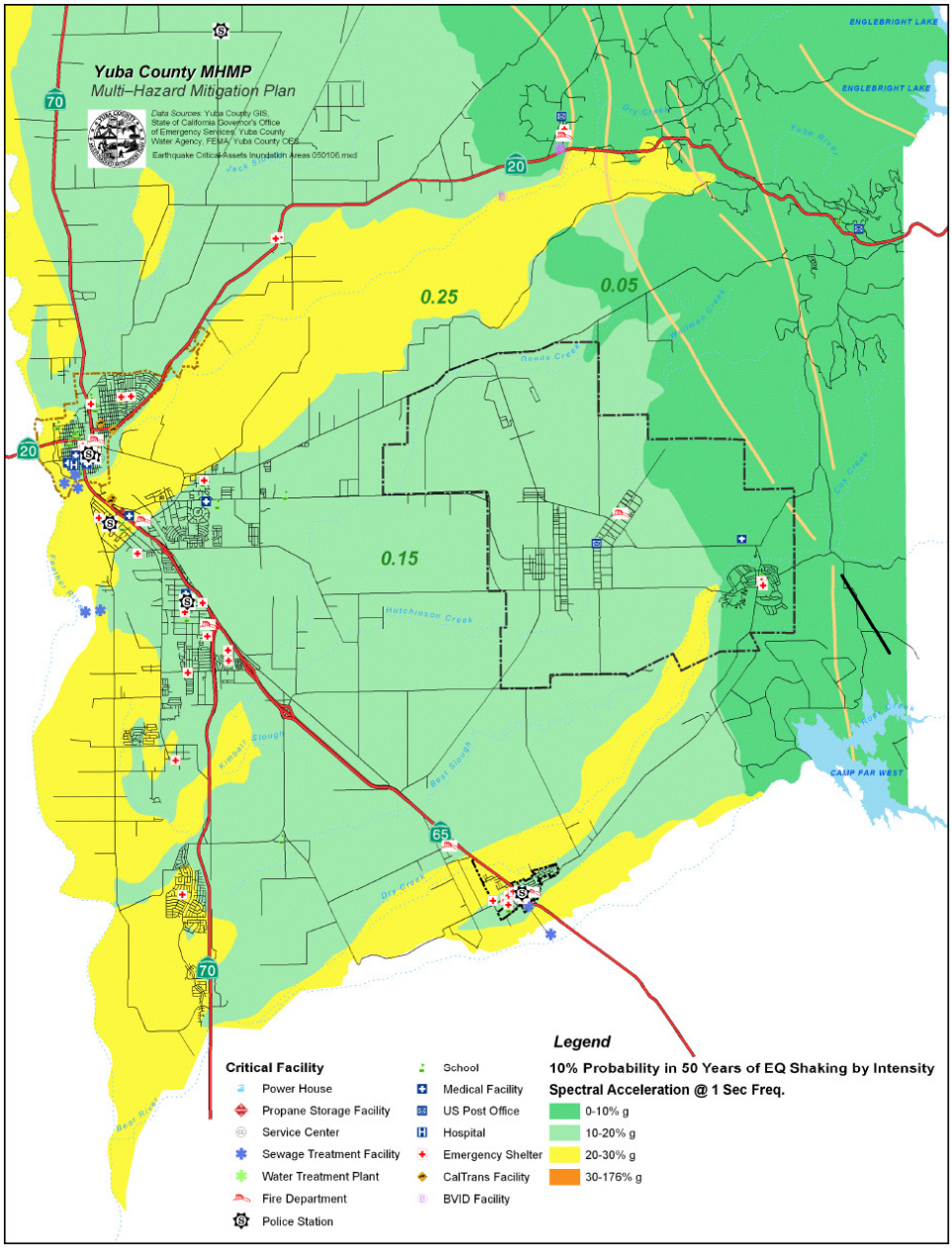
Earthquakes are generally low probability, high–consequence events; although they may occur only once in the lifetime of a particular asset, they can have devastating effects. Moderate earthquakes occur more frequently than major earthquakes. Nevertheless, a moderate earthquake can cause serious damage to unreinforced buildings (i.e., unreinforced masonry buildings, buildings constructed without seismic requirements, or buildings designed to obsolete standards), building contents, and non–structural systems, and can cause serious disruption in building operations.

Major earthquakes can cause catastrophic damage, including collapse and massive loss of life.

While damage from an earthquake usually does not occur until the magnitude reaches 4 or 5, with a magnitude of 4.0, some of Yuba County jurisdiction's critical facilities are vulnerable to an earthquake of a magnitude of 5.0 and all are vulnerable to an earthquake of a magnitude of 6.0.

The close-up of the area and critical facilities in Yuba County most vulnerable to shaking in an earthquake hazard event is shown in **Figure B38**. The most vulnerable critical assets, shown in yellow, are located upon river sedimentary soils and may become unstable, or if saturated may liquefy in the event of an earthquake of magnitude 5.0 or greater.

Figure B38 – Vulnerable Critical Assets



Source: 2014 Yuba County Hazard Mitigation Planning Team

HAZUS Modeling For Yuba County
The HAZUS modeling conducted to illustrate estimated potential losses to Yuba County demonstrated the vulnerability of the county and it's participating jurisdictions. The HAZUS scenario uses a 5.0 and 6.0 magnitude to define the earthquake parameters used for the earthquake loss estimate. This data was the best available data at the time of the development of this planning document.

Using the 5.0 scenario, HAZUS estimates that about 331 buildings will be at least moderately damaged. This is over 1.00 % of the buildings in the region. There are an estimated 0 (zero) buildings that will be damaged beyond repair.

Essential Facility Damage
Before the earthquake, the region had 109 hospital beds available for use. On the day of the earthquake, the model estimates that only 88 hospital beds (82.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 90.00% of the beds will be back in service. By 30 days, 98.00% will be operational.

Fire Following Earthquake
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation
Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris. The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 56.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 120 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Economic Loss
The total economic loss estimated for the earthquake is 23.18 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 15.55 (millions of dollars); 15 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 64 % of the total loss.

A moderate earthquake can cause serious damage to unreinforced buildings (i.e., unreinforced masonry buildings, buildings constructed without seismic requirements, or buildings designed to obsolete standards), building contents, and non–structural systems, and can cause serious disruption in building operations.

According to the U.S. Geological Survey, factors that affect the potential damage to structures and systems as a result of severe ground shaking include epicenter location and depth, the proximity to fault, the direction of rupture, magnitude, existing soil and geologic conditions, and structure type. Newer structures are more resistant to ground shaking than older structures because of improved building codes.

Manufactured housing is very susceptible to damage because the foundation systems are rarely braced for seismic activity. Seventeen percent of the County housing is manufactured housing which is susceptible to damage due to the nature of their foundation systems. The California Code of Regulations requires tie down installations in all parts of the state within and outside of parks unless the unit is on a permanent foundation system. Existing construction, connections, and installations of MH units made before the effective date of the requirements may continue in use so long as they were in compliance with requirements in effect at the date of their installation and are not found to be substandard.

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region.

Summary of Potential Impacts

According to the HAZUS model, Yuba County is susceptible to some earthquake losses in the millions of dollars. The overall impact of earthquakes to Yuba County includes:

- Potential for injury and loss of life
- Widespread structural damage, particularly in manufactured housing
- Loss of water, power, roads, phones, and transportation, which can be particularly dangerous for those with certain medical conditions
- Power loss complicating response and recovery efforts
- Business interruption losses
- Agricultural impacts such as field disturbances and damage to irrigation systems
- Damage to oil and gas facilities and pipelines

As previously discussed, shaking is the dominant and most widespread cause of future damage from earthquakes within the Yuba County jurisdictions. Future development within the County

subject to earthquake risk must be designed for higher force resistance where they are located on soils susceptible to shaking. The areas of higher intensity shaking occur in the County along the Feather, Yuba, and Bear Rivers in sedimentary deposits. Populations exposed to higher shaking intensities will be the west side of Marysville, the north side of Wheatland and Linda, and the southern portion of the Plumas Lake development. Future development in these areas will not increase the likelihood of earthquake shaking, however the population affected by earthquake shaking will increase. The larger impacted population within the County will require more substations supplying critical services.

Flood Vulnerability Assessment

Probability of Future Occurrences:	**Likely**
Vulnerability:	**High**

The impact of damage resulting from the flooding hazard, as mentioned, can be extremely variable. Nevertheless, most damage results from rising water that inundates residences and buildings, damage to infrastructure and critical facilities, and loss of ingress and egress by the population in the affected areas and the inability of the jurisdictions emergency response capabilities. Damage from flooding can range from minimal, where the damage to an individual home can be on the order of a few thousand dollars to the complete loss of a building or loss of life from the inability to evacuate from the rising floodwaters.

Depending on the type of flooding and the ability to access the affected areas, the flood hazard event can range from hours to several days or weeks (flooding from standing water/levee break). The long-term effects of floods can span months to decades. Roughly 1/3 of the county's population resides in the 500-year floodplain. Accordingly, the vulnerability to the population from a flood resulting from levee failure is extremely high. In addition, numerous critical facilities, structures, infrastructure, and resources/assets are vulnerable. The disastrous floods of 1986 and 1997 are recent reminders of the perilous situation that the county is exposed to. These floods, which occurred from levee failures on the Yuba and Feather Rivers, respectively, flooded large areas south of Marysville in the Linda and Olivehurst communities. There are also extremely vulnerable populations in the City of Marysville, City of Wheatland and Reclamation District 10 areas that are protected, even surrounded, by levees.

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

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

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

The following discusses in more detail the population, critical facilities and infrastructure, and assets that are exposed to the threat of flooding/levee failure. **Figure B39** shows the critical facilities and residences that are located within the 100–year and 500–year flood zones. Critical facilities exposed to the flood risk include:

Critical Facilities Located in the 100-Year Flood Zone:

- City of Marysville: Sewage Treatment Ponds (2)
- City of Wheatland: Wastewater Lift Station
- Marysville Joint Unified School District: Linda Elementary School
- Olivehurst VFW Hall Emergency Shelter
- Peach Tree Clinic
- Browns Valley Irrigation District: Dam, Fish Screen, Pump Station

Critical Facilities Located in the 500-Year Flood Zone:

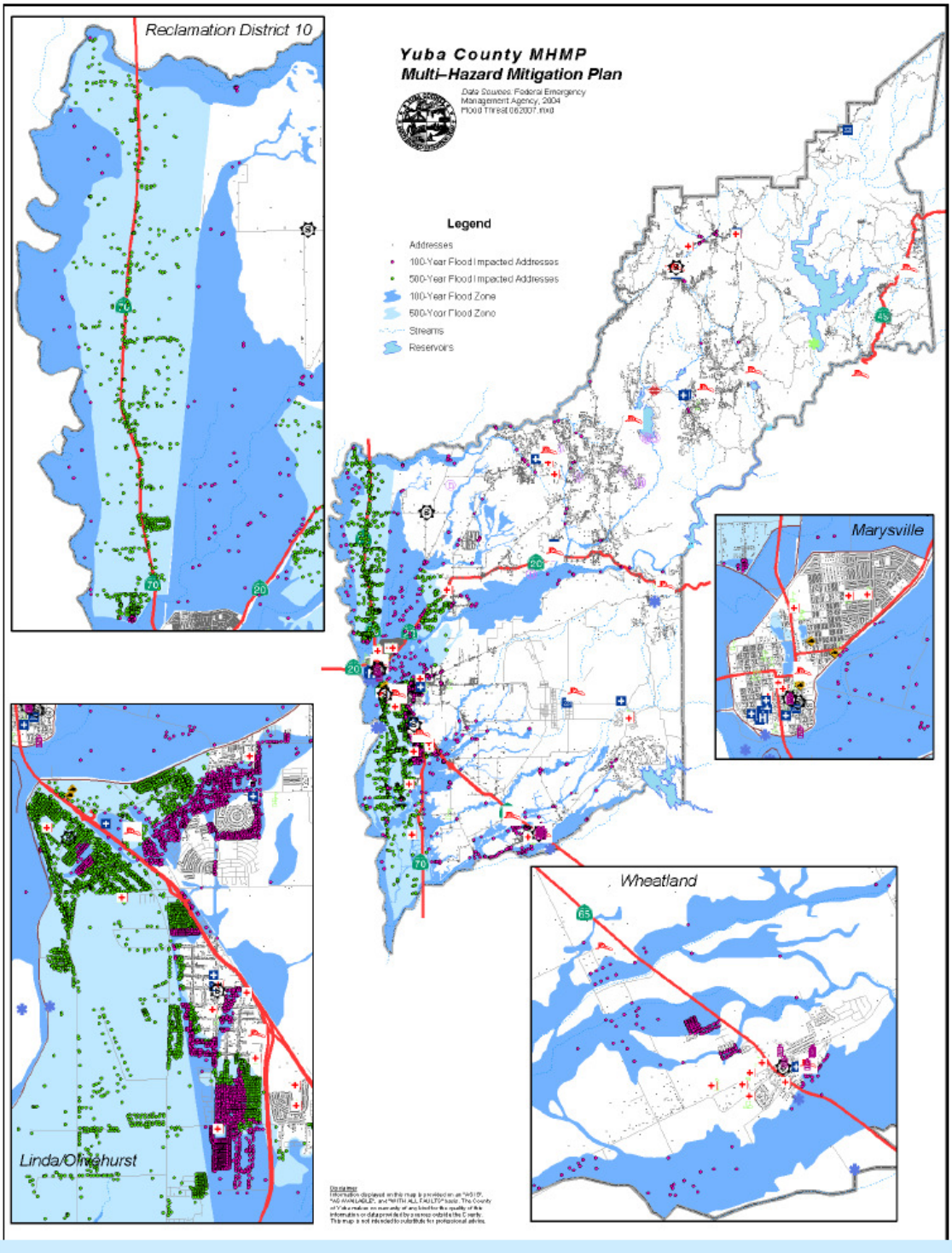
- Yuba County: West Linda Sheriff Sub Station
- Linda Fire Protection District: Linda Fire Station #1
- Linda County Water Agency: Sewage Treatment Plant

- Yuba County Office of Education: Goldfield School
- Plumas Lake School District: Rio Del Oro School
- Marysville Joint Unified School District:
    - Cedar Lane Elementary School
    - Olivehurst Elementary School
    - Alicia Intermediate School
    - Arboga Elementary School
- New Life Christian Schools
- Cal Trans: Marysville Maintenance Station; Equipment Shop 3

Many historic and cultural resources are located in the mapped flood zones, most notably, the Marysville historic district.

Health hazards and property damage may occur at residential dwellings and businesses in the affected areas if proper flood clean–up actions are not conducted immediately. Contamination due to flooded sewage systems will pose a risk to health and safety of persons in the affected areas. The continued impedance of floodway maintenance from governmental regulators that often delay, increase the cost of, restrict, and in some cases stop, will continue to place Yuba County residents at risk to flooding from internal drainage as well as from levee failure. Without improvements in flood management, growth in some portions of the County where potential flooding is deep, including the Plumas Lake area, would be limited.

Figure B39 – Critical Facility Losses



Source: 2014 Yuba County Hazard Mitigation Planning Team

Flood Losses

Based on FEMA guidance, contents value is estimated at 50 percent of the improved value. Estimated losses assume that a flood is unlikely to cause total destruction. Losses are related to a variety of factors, including flood depth, flood velocity, building type and construction. Using FEMA's recommendations, average damage is estimated to be 20 percent of the total building value.

The loss estimates for this assessment should be used for flood risk mitigation, emergency preparedness, and response and recovery only. Uncertainties are inherent in any loss estimation methodology and losses will vary depending on the magnitude of the flood event. Other limitations may include incomplete or inaccurate inventories of the built environment. The assessed values, for example, are well below the actual market values; thus, the actual value of assets at risk may be significantly higher than those included therein. Also, this loss estimation assumes no mitigation and does not account for buildings that may have been elevated above the 1% annual chance event according to local floodplain management regulations. The number of structures includes residential, commercial and agricultural structures in each of the areas.

Yuba County Flood Loss Estimates Yuba County by Jurisdiction; 100-Year Flood

Jurisdiction	# of Structures	Structure Value	Est. Contents Value	Total Value	Loss Estimate
Unincorporated Yuba County	8,401	$309,675,422	$154,837,711	$464,513,133	$929,027
Wheatland	840	$119,659,210	$59,829,605	$179,488,815	$358,978
Marysville	54	$27,914,120	13,957,060	$41,871,180	$8,374,236
YCWA	8,401	$309,675,422	$154,837,711	$464,513,133	$929,027

Source: Yuba County GIS, Yuba County Assessor Tax Roll, Jurisdictional Planning Teams

Yuba County Flood Loss Estimates Yuba County by Jurisdiction; Zone X Protected by Levee

Jurisdiction	# of Structures	Structure Value	Est. Contents Value	Total Value	Loss Estimate
Unincorporated Yuba County	13,282	$1,414,300,463	$707,150,232	$2,121,450,695	$4,242,902
Wheatland	0	0	0	0	0
Marysville	3,572	$461,800,476	$230,900,238	$692,700,714	$1,385,401
YCWA	13,282	$1,414,300,463	$707,150,232	$2,121,450,695	$4,242,902

Source: Yuba County GIS, Yuba County Assessor Tax Roll, Jurisdictional Planning Teams

Yuba County Flood Loss Estimates Yuba County by Jurisdiction; 500-Year Flood

Jurisdiction	# of Structures	Structure Value	Est. Contents Value	Total Value	Loss Estimate
Unincorporated Yuba County	406	$45,974,515	$22,987,258	$68,961,773	$137,924
Wheatland	0	0	0	0	0
Marysville	1	$2,210	$1,105	$3,315	$6.63
YCWA	406	$45,974,515	$22,987,258	$68,961,773	$137,924

Source: Yuba County GIS, Yuba County Assessor Tax Roll, Jurisdictional Planning Teams

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

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

Additional growth in or around the cities of Marysville and Wheatland could contribute to increased flooding in the county. However, Yuba County together with TRILIA has developed a flood control projects to address this potential for increased flooding.

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

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

According to the Yuba County Emergency Manager, of the 5 dams with a potential to impact the County, New Bullards Bar poses the greatest threat should a failure occur. These 5 dams are New Bullards Bar Dam, Englebright Dam (The Narrows), Virginia Ranch Dam (Merle Collins Lake), Camp Far West Dam and Oroville Dam and their inundation areas are shown on **Figure B-10**. The failure of any of these dams would flood downstream areas and would result in loss of life and property. According to the EOP, a catastrophic failure of any of these dams would have a significant impact on Yuba County. Complete devastation could occur in and along the river bottoms and up the banks several hundred feet above normal river levels at a point from the dams themselves down river to near the ocean where the rivers widen. Water levels could be many times higher than those recorded in the worst floods. The potential magnitude of a dam failure depends on the time of year and the base flow in the river when the failure occurs. During the winter months when the river flows are higher, the impact to the area would be much greater and evacuation times much less.

Where and how to build is generally addressed in local floodplain ordinances. These ordinances should be reviewed and updated as development in new areas is considered. Master planning will be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. These developments can bring the revenue needed to solve existing flooding problems by constructing ecologically sensitive water conveyance areas with peak flow detention.

One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. California's 2007 flood legislation (Senate Bill 5) directly linked system-wide flood management planning to local land use planning, requiring local jurisdictions to demonstrate an urban level of flood protection before approving new development in urban and urbanizing areas. "Urban level of flood protection" means the level of protection necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year (California Government Code Section 65007). DWR is developing criteria to guide local jurisdiction compliance with the new requirements. In addition to developing criteria to help local jurisdictions in their land use planning, DWR is preparing criteria for use in the design of levees protecting urban and urbanizing areas. DWR is also working with local partners to develop guidance related to nonurban flood protection levels.

These standards are under development and will become effective over the next several years as ongoing technical studies are performed. Once these standards become effective, cities and counties within the Sacramento-San Joaquin Valley cannot enter into development agreements or issue a permit to construct a new structure in areas located within a flood hazard zone unless the following is established:

- Find that existing facilities protect urban and urbanizing areas to a 1-in 200 chance of flooding in any given year or the FEMA standard of flood protection in non-urbanized areas, or
- Find that the local flood management agency has made adequate progress on the construction of the flood protection system to provide the required level of protection, or
- Impose conditions on the development agreement that will provide the required level of protection.

California Department of Water Resources (DWR) is currently developing technical information to assist cities and counties with their compliance with these new requirements.
In addition, another way to reduce flooding issues in areas of existing and future development is to clear vegetation from natural and man-made drains that are critical to flood protection. Both native and invasive species can clog drains, and reduce flows of floodwaters, which slow that natural drainage process and can exacerbate flooding.

Future residential and commercial development in flood-prone areas of Yuba County is controlled through the County's Community Development Department. Specific plans for development have been developed for East Linda, Olivehurst, and Plumas Lake, areas that have been prone to flooding and resulted from levee breaks within the last 27 years. More than 13,000 new housing units are approved for development in potential flood prone areas of the County.

Mitigation measures such as constructing above the base flood elevation will provide some protection to new development. The TRLIA and DWR have been working hard to improve the condition of the levees that protect Yuba County's existing and future residents and businesses.

Without continued infrastructure development, future residential and commercial development will impact the evacuation routes when a flood hazard occurs. Without the mitigation of the comprised levee system, future residential development will place new county residents at increased risk to flood and levee failure hazard.

Summary of Potential Impacts

Most of the flooding in Yuba County Flooding can be characterized as riverine, possible levee failure, stream and waterway overflow and urban drainage events. These types of flooding often result in property damage, road washouts, and transportation disruptions. Other general impacts of these events may include the following:

- Injury and loss of life
- Commercial and residential structural damage
- Disruption of and damage to public infrastructure
- Health hazards associated with mold and mildew
- Damage to roads/bridges resulting in loss of mobility
- Significant economic impact (jobs, sales, tax revenue) to the community
- Negative impact on commercial and residential property values
- Long dewatering period
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Severe Weather Vulnerability Assessment

Probability of Future Occurrences:	**Highly Likely**
Vulnerability:	**High**

According to historical hazard data, severe weather is an annual occurrence in Yuba County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain, thunderstorms, wind, extreme temperatures and even tornadoes are frequent severe weather occurrences in the County. Lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses, infrastructure damage that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in previous sections.

Summary of Potential Impacts

As discussed the results of severe weather can produce other hazards, which can result in property damage, road washouts, and transportation disruptions. Other impacts of these events may include the following:

- Potential for injury and loss of life
- Commercial and residential structural damage

- Loss of water, power, roads, phones, and transportation, which can be particularly dangerous for those with certain medical conditions
- Economic impacts (jobs, sales, tax revenue) due to loss of commercial structures
- Decline in commercial and residential property values

Drought impacts may be directly related to managed water supplies for urban and agricultural purposes, or linked to unmanaged water supplies (precipitation) that support in-stream values, non-irrigated agriculture, or forest health. Public safety impacts related to managed water supplies deal with the lack of water for basic domestic purposes, for maintaining required distribution system pressures in public water systems, or for maintaining distribution system fire flows. These public safety impacts have historically been experienced by the state's smallest water systems in rural areas, not by large urban water agencies. Wildfire dominates the category of public safety impacts associated with unmanaged water supplies.

The risk of impacts increases with the duration of sustained dry conditions. Impacts are normally felt earliest by those relying on unmanaged water supplies, such as agricultural businesses carrying out dryland grazing or non-irrigated crop production. In contrast, most large urban water agencies can manage three to four years of dry conditions without significant impacts to their customers because they have the resources to invest in providing a high level of water supply reliability.

The risks of impacts that Californians might experience in association with a three- to four-year dry period, for example, could be categorized as:

- Health and safety and economic: catastrophic wildfires..
- Health and safety: drinking water supply impacts to small water systems (and private well owners) on unreliable fractured rock groundwater sources in rural areas.
- Environmental: continued land subsidence, affecting water supply and flood protection facilities.
- Economic: loss of rangeland carrying capacity and minimal water allocations to some agricultural water users.

Wildfire Vulnerability Assessment

Probability of Future Occurrences:	**Likely**
Vulnerability:	**Medium**

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

To assess the property at risk in very high fire threat areas, Yuba County used Cal Fire's fire threat data and the County's GIS parcel layer linked to the Assessor's data to determine the vulnerability. The tables following show the results of this analysis by structure number and value for each jurisdiction. Only in the unincorporated areas and the Yuba County Water Agency in the eastern part of the county are there structures located in very high fire threat areas.

Parcel Count and Structure Value Vulnerability within Very High Fire Threat Zones

Fire Severity Zone	# of Structures	Structure Value	Est. Contents Value	Total Value	Loss Estimate
Unincorporated Yuba County	5,837	$503,017,585	$251,508,793	$754,526,378	$1,509,053
Marysville	N/A	N/A	N/A	N/A	N/A
Wheatland	N/A	N/A	N/A	N/A	N/A
YCWA	5,837	$503,017,585	$251,508,793	$754,526,378	$1,509,053

Source: Cal Fire, Yuba County GIS, Yuba County Assessor Tax Roll

Parcel Count and Structure Value Vulnerability within High Fire Threat Zones

Fire Severity Zone	# of Structures	Structure Value	Est. Contents Value	Total Value	Loss Estimate
Unincorporated Yuba County	1,820	$145,495,963	$72,747,982	$218,243,945	$43,648,789
Marysville	N/A	N/A	N/A	N/A	N/A
Wheatland	N/A	N/A	N/A	N/A	N/A
YCWA	1,820	$145,495,963	$72,747,982	$218,243,945	$43,648,789

Source: Cal Fire, Yuba County GIS, Yuba County Assessor Tax Roll

Parcel Count and Structure Value Vulnerability within Moderate Fire Threat Zones

Fire Severity Zone	# of Structures	Structure Value	Est. Contents Value	Total Value	Loss Estimate
Unincorporated Yuba County	2,880	$431,855,851	$215,927,926	$647,783,777	$1,295,568
Marysville	N/A	N/A	N/A	N/A	N/A
Wheatland	97	$18,755,357	$9,377,679	$28,133,036	$56,266
YCWA	2,880	$431,855,851	$215,927,926	$647,783,777	$1,295,568

Source: Cal Fire, Yuba County GIS, Yuba County Assessor Tax Roll

Summary of Potential Impacts

The overall potential impacts from wildfire include:

- Potential for injury and loss of life
- Commercial and residential structural damage
- Impacts to water quality and watershed health
- Impacts to natural resource habitats and other resources, such as agriculture
- Loss of water, power, roads, phones, and transportation
- Significant economic impacts (jobs, sales, tax revenue) with the loss of commercial structures
- Decline in commercial and residential property values

B.4. Repetitive Loss and Severe Repetitive Loss Properties

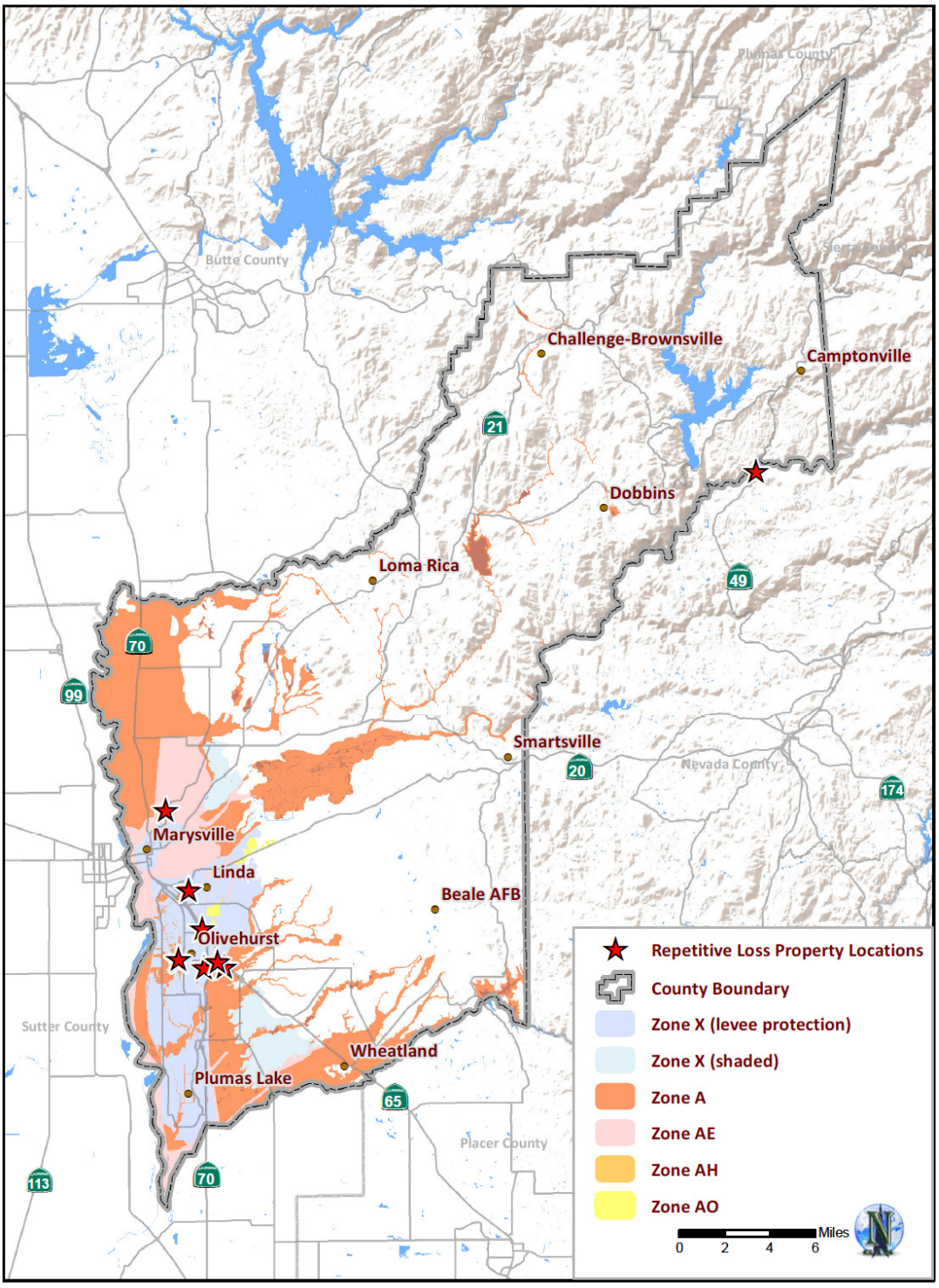
§201.6(c)(2)(ii) [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description

shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.

According to Yuba County records there are a total of **21** properties Repetitive Loss Properties in Yuba County including the cities and of these properties countywide, all are residential. These are shown in **B-40 Repetitive Loss Properties**.

B-40 Repetitive Loss Properties

Repetitive Loss Property Locations - 2013



Sources: County of Yuba; FEMA; SACOG; ESRI; USGS; NOAA

Neuvert GIS Services, LLC

HOWELL CONSULTING

Source: Yuba County Hazard Mitigation Planning Team

Element C: Mitigation Strategy

Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

Identification & Prioritization of Mitigation Actions

Mitigation actions that address the goals and objectives developed in the previous plan were identified, evaluated, and prioritized. These actions form the core of the mitigation plan. Jurisdictions conducted a capabilities assessment, reviewing existing local plans, policies, and regulations for any other capabilities relevant to hazard mitigation planning. An analysis of their capability to carry out these implementation measures with an eye toward hazard and loss prevention was conducted.

The capabilities assessment required an inventory of each jurisdiction's legal, administrative, fiscal and technical capacities to support hazard mitigation planning. After completion of the capabilities assessment, each jurisdiction evaluated and prioritized their proposed mitigations. Each jurisdiction considered the social, technical, administrative, political, legal, economic, and environmental opportunities and constraints of implementing a particular mitigation action. This step resulted in a list of acceptable and realistic actions that address the hazards identified in each jurisdiction.

A full suite of goals, objectives and action items for each jurisdiction is presented in this Plan. Each jurisdiction then identified and prioritized actions with the highest short to medium term priorities. An implementation, schedule, funding source and coordinating individual or agency is identified for each prioritized action item.

Constraints to Strategy Implementation

The Planning Team considered a list of issues existing in Yuba County that can be considered constraints to mitigation planning strategy implementation: (from the perspective of the participating Planning Team members).

- Legal constraints (lawful prohibition, voter rejection)
- Community perception, preference, and resistance
- Economic constraint (fee based agencies may be restrained from participating in the planning process due to lack of funds to pay for their involvement.)
- Budgetary and funding constraints
- Staffing constraints
- Land ownership constraints
- State and federal influences or restrictions
- Sensitivity of information needed to complete the Plan.
- Building code restrictions
- Cultural demands, barriers, and expectations

- Interpretation of law (court decisions)
- Identified conflicts with organizational policy or strategic vision

Element C.1. Existing Authorities, Policies, Programs and Resources

Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

Yuba County and its participating jurisdictions have an Emergency Operations Plan, a General Plan, which includes a Health and Safety Element and an Emergency Services Ordinance that clearly defines roles and responsibilities in accordance with state and federal guidelines. The County CAO and participating jurisdictions noted in this document serve as the Directors of Emergency Services for their respective areas by law and ordinance. The Board of Supervisors, City Councils or Yuba County Water Agency Board of Directors serves as the administering agency and the promulgation authority for all plans, policies and procedures within Yuba County and its member jurisdictions. The County and participating jurisdictions recognizes the enhanced Hazard Mitigation Plan of the State of California, the California Emergency Services Act, and the appropriate Federal Regulations including 44 CFR 201. Yuba County is subject to the State of California Uniformed Building Code (UBC), which dictates standards on all current and future construction within Yuba County.

Yuba OA Hazard Mitigation Plan Planning Team

The core membership of the Planning Team assembled to coordinate plan revision will constitute the Yuba Operational Area Hazard Mitigation Planning Team as it relates to future mitigation coordination. The Hazard Mitigation Planning Team will periodically meet and review the mitigation recommendations and strategies identified within this plan.

- This Planning Team will support the recommendations adopted by each jurisdiction for implementation and coordination on a state and regional basis.
- Each jurisdiction will review and adopt, as necessary, the work of the Hazard Mitigation Planning Team on an annual basis.
- The Planning Team will review the quarterly progress reports on the implementation of the adopted hazard mitigation strategies brought forth by participating local government entities within the Yuba Operational Area.
- As required under prevailing state and federal requirements, this plan will be reviewed and updated on a five-year cycle. The strategies may be updated based on changing priorities and relieved constraints as identified below.

Hazard Mitigation Planning Team Process

The Yuba Operational Area Hazard Mitigation Planning Committee will meet on an annual basis to review the progress made on the identified local hazard mitigation strategies. The Planning Team will also seek input on future hazard mitigation programs and strategies from the local hazard mitigation Planning Team or representative from each of the participating jurisdictions.

- Contact and work with each Hazard Mitigation Strategy's Lead Agency for an annual progress report on funding and implementation of the program recommended.

- Receive an annual report from each jurisdiction on the status of the strategies adopted and implemented.
- Meet annually, with each political subdivision, to identify new hazard mitigation strategies to be pursued on a state and regional basis, and review the progress and implementation of those programs already identified.
- Meet annually to review the progress of the Hazard Mitigation program and bring forth community input on new strategies.
- Coordinate with and support the efforts of the Yuba County Office of Emergency Services to promote and identify resources and grant money for implementation of recommended hazard mitigation Strategies within local jurisdictions and participating public agencies.

Local Hazard Mitigation Planning Team

Each participating local jurisdiction will establish a mechanism for the development and implementation of jurisdictional mitigation projects, as identified within this plan and associated locally-specific supporting documents. As deemed necessary and appropriate, participating jurisdictions will organize local mitigation Planning Teams or other groups to facilitate and administer internal activities.

Typically, the local Planning Team may consist of representatives from any of the following agencies or groups:

- Administrative departments and offices
- Public works departments
- Community planning and development departments
- Facility management agencies
- Fire departments
- Finance departments
- Public utility/water agencies
- Business development agencies
- Community service/public service agencies

When constituted and organized, local hazard mitigation Planning Teams or entities may perform the following mitigation functions to meet local goals and objectives:

- Continue to review and assess local hazard mitigation needs and capacities in conjunction with this plan and other supporting documents and information
- Revise key local mitigation data and information
- Receive and process supplemental and supporting hazard mitigation reference information and guidance as released by the state and/or FEMA
- Provide guidance to local emergency management in the integration of adopted risk information and adjustments to local mitigation activities
- Provide local hazard mitigation information and guidance to resident populations, inquiring organizations, vendors, and other interested parties
- Provide information and guidance to the local governing body relative to hazard mitigation issues, needs, gaps, and project activities

Element C.2 Participation in the NFIP

§201.6(c)(3)(ii): [The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

The county has worked with FEMA in three broad areas of the NFIP (**Table C1 - Community Participation in the NFIP**) such as actively working with FEMA to revise floodplain identification, working with local governments to manage development in the floodplain and as part of the Emergency Management and NFIP public education process and the encouragement of residents to purchase flood insurance. Yuba County has assisted in public education programs to encourage all residents to purchase flood insurance under the NFIP program as part of their personal preparedness programs.

In 2011, FEMA completed their Digital Flood Insurance Rate Map (DFIRM) conversion and updated a number of flood zone areas using 2005 levee certification criteria. In 2007, the California Department of Water Resources completed their Awareness Floodplain Mapping of Yuba County to identify all pertinent flood hazard areas that are not mapped under FEMA's program, which provides an additional resource for identifying special flood hazard areas within the County. Yuba County maintains a floodplain management program based on these maps, and implemented through the County's Flood Plain Ordinance (Chapter 10.30 of the Yuba County Code of Ordinances). The purpose of this ordinance is to prevent development in FEMA designated flood prone areas, or to ensure that development in those areas can avoid or withstand flooding without increasing flood risk elsewhere.

Flood prevention and control in community districts and urban fringe areas are most effectively deterred by structural means such as curbs, gutters and storm drainage systems. In more rural and less developed agriculture and open space areas, more passive measures are relied upon such as high crowns on roadway pavement to divert floodwaters onto adjacent properties that are more suited to accommodate the diverted drainage.

Table C1 - Community Participation in the NFIP in Yuba County

Jurisdiction	Date Joined	Current Effective Map Date
Yuba County	09/06/1977	02/18/2011
City of Wheatland	05/02/1975	02/18/2011
City of Marysville	11/02/1973	02/18/2011

Source: NFIP Community Status Book, 2012;

Yuba County's Flood Management Program

Yuba County has participated in the NFIP since 1977. Since then, the County has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

Yuba County has participated in CRS since 2003. The CRS program is designed to recognize floodplain management activities that go above and beyond the NFIP's minimum requirements. CRS is designed to reward a community for implementing public information, mapping, regulatory, loss reduction and/or flood preparedness activities. On a scale of 10 to 1, Yuba County is currently ranked Class 6 community, which gives a 20% premium discount to individuals in the Yuba County Special Flood Hazard Area (SFHA), and a 10% discount to policyholders outside the SFHA.

The activities credited by the CRS provide direct benefits to Yuba County and its residents, including:

- Enhanced public safety
- Reduction in damage to property and public infrastructure
- Avoidance of economic disruption and losses
- Reduction of human suffering
- Protection of the environment

Contained in **Table C2** is the NFIP policy and claims statistics for Yuba County as of July 2014. The NFIP claims statistics are historical back to January 1, 1978 when NFIP started collecting this data.

Table C2 NFIP Policy and Claims Statistics

Community	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
Marysville	36	25	0	11	$446,645
Wheatland	1	0	0	1	$0.00
Unincorporated Areas (including YCWA areas)	255	184	0	71	$7,788,074

Source: Yuba County CRS Coordinator, NFIP Program

The **City of Marysville** participates in the NFIP by the adoption of Title 20 Floodplain Management of the City of Marysville Municipal Code. An emphasis in future planning and mitigation actions will be placed on continued compliance with the National Flood Insurance Program.

The **City of Wheatland** participates in the NFIP by the adoption of Chapter 15.20 Floodplain Management of the City of Wheatland Municipal Code. An emphasis in future planning and mitigation actions will be placed on continued compliance with the National Flood Insurance Program.

Yuba County together with the participating jurisdictions of Wheatland and the Yuba County Water Agency will continue to comply with the NFIP requirements and maintain current adopted and enforced floodplain management standards. The jurisdictions will continue regulation of new construction in special flood hazard areas. This has been accomplished through the planning and permit process and the refining of floodplain mapping with FEMA. This partnership with FEMA has resulted in better identification of floodplain areas and floodplain management activities.

Element C.3 Mitigation Goals

§201.6(c)(3)(i) [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The Planning Team developed goals and objectives to provide direction for reducing hazard-related losses in Yuba County. These were based upon the results of the risk assessment and a review of community goals from other state and local plans. The Planning Team reviewed goals from the following plans to ensure their mitigation strategy was integrated with existing plans and policies:

- State of California Multi-Hazard Mitigation Plan, 2010; 2013 Draft
- California Fire Plan, 2010
- Nevada Yuba Placer Unit Fire Management Plan
- CWPP, Yuba County 2014 Draft
- Yuba County Emergency Operations Plan, 2008
- Yuba County General Plan, 2030

Through a brainstorming process at their third meeting, the Planning Team identified a variety of possible goals and then came to a consensus on goals and objectives. Following the development of goals, the Planning Team identified specific objectives to achieve each goal. Goals and objectives are listed below, and are consistent with the 2007 planning effort:

Goals

1. Prevent personal injury, loss of life, and damage to property and the environment from natural hazards;
2. Promote public awareness and understanding of natural and the risk they present to quality of life and the economy;
3. Enhance the ability of Yuba County and stakeholders to respond to the effects of hazards on people, property, and the environment;
4. Continue to support partnerships with private and public sector agencies, businesses, and organizations to further comprehensive planning and implementation of mitigation measures;
5. Encourage individual responsibility from Yuba County residents for their exposure to natural hazards and the risk they present to life, property, and the environment; and
6. Continue the hazard mitigation planning process in support of the Disaster Mitigation Act 2000 by:

    - Organizing and Identifying Resources
    - Assessing Risks and Vulnerabilities
    - Identifying Hazard Mitigation Measures
    - Updating Mitigation Plans

Objectives

1. Plan for emergency response and coordination to prevent personal injury, loss of life, and damage to property and the environment from natural hazards by:

    - Protect life, property, and the environment before disasters occur

- Enforce existing local, state and federal codes and regulations
- Implementation of hazard mitigation programs and strategies

2. Enhance and protect County assets and support of identification of resources to address hazards, improve capabilities for emergency response and recovery by:

- Enhance and improve County emergency response and recovery plans to all emergency situations
- Secure and protect all critical assets and identify resources
- Continue coordination between the County of Yuba and all Stakeholders to collaborate in mitigation planning and strategies

3. Provide Public Education to encourage awareness and participation in disaster prevention and effective hazard mitigation strategies by:

- Mitigation outreach to the public and schools featuring exemplary projects, fire prevention, and emergency preparedness
- Encourage participation in the National Flood Insurance Program
- Emergency planning to ensure road access for emergency vehicles remain clear and free of vegetation
- Ensure that all lifeline infrastructure are able to withstand hazard events or have contingency plans to quickly recover after a disaster
- Develop disaster preparedness program among the general public and businesses to address evacuations, preparedness and protection

4. Identify hazard mitigation projects through collaboration with the public and private sector stakeholders by:

- Fire prevention/flood mitigation program
- Roads and public hazard mitigation projects to protect lives and property
- Ensure road access for emergency vehicles remain clear and free of obstruction
- Ensure that all lifeline infrastructure are able to withstand hazard events or have contingency plans to quickly recover after a disaster
- Provide emergency access and egress for the community for all hazards

Element C.4 Mitigation Actions and Projects

§201.6(c)(3)(ii): [The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

§201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

In order to identify and select mitigation actions to support the mitigation goals, each hazard was identified in Element B. Only those hazards that were determined to be a priority hazard

(medium or high significance) were considered in the development of hazard-specific mitigation actions. These priority hazards (in alphabetical order) are:

1. Earthquake
2. Flood
3. Severe Weather
4. Wildfire
5. All-Hazards

The Planning Team eliminated the hazards identified below from further consideration in the development of mitigation actions because the risk of a hazard event in the County is unlikely or nonexistent, the vulnerability of the County is low, or capabilities are already in place to mitigate negative impacts. The eliminated hazards are:

- Volcano

South County vegetation management mitigation.

It is important to note, however, that all the hazards addressed in this plan are included in the countywide multi-hazard public awareness mitigation action as well as in other multi-hazard, emergency management actions.

The Planning Team developed **25** mitigation actions, which are listed in **Table C3**. At their meeting, the Planning Team came to consensus on the person and department responsible for completing a mitigation action worksheet for the county/participating jurisdictions for each identified mitigation action. The worksheet includes information on the background issues, possible alternatives, responsible office, cost estimate, benefits, potential funding, and ideas for implementation for each action.

Full descriptions of each mitigation action for this 2014 MHMP including jurisdictions involved in projects, responsible parties, cost estimates etc. are provided in more detail in each Jurisdictional Annex and a summary is provided in Table C3 on the following page.

Table C3 - 2014 Mitigation Projects

Project #	Mitigation Action	Links to Goals	Hazards Addressed	Yuba County	YCWA	Marysville	Wheatland	Address Current/Future Development	CRS Category	Status
All Hazards (5)										
1	Public Education and Awareness Program	1,2,3,4,5,6	EQ, Flood, Severe Weather, Wildfire	X	X	X	X	Yes	Public Information	New
2	Geographic Information Systems Mapping Project	1,2,3,4,5,6	EQ, Flood, Severe Weather, Wildfire	X	X	X	X	Yes	Public Information	Continued from 2007
3	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1,2,3,4,5,6	EQ, Flood, Severe Weather, Wildfire	X	X	X	X	Yes	Preventative	New
4	Implementation of CRS Activities	1,2,3,4,5,6	EQ, Flood, Severe Weather, Wildfire	X	X	X	X	Yes	Preventative Property Protection Natural Resource Protection Emergency Services Structural Projects Public Information	Continued activity but not documented in 2007 Plan
Earthquake (1)										
5	Non-structural Earthquake Mitigation Outreach	1,2,3,4,5,6	EQ	X	X	X	X	Yes	Public Information	New
6	Unreinforced Masonry Inventory Project	1,3,4,6	EQ	X	X	X	X	Yes	Public Information Emergency Services	New

Project #	Mitigation Action	Links to Goals	Hazards Addressed	Yuba County	YCWA	Marysville	Wheatland	Address Current/Future Development	CRS Category	Status
Flood (2)										
7	Improvements to Emergency Access Roads (South County)	1,3	Flood	X	X		X	Yes	Structural Projects	Continued from 2007
8	Road Elevation Project (Plumas-Arboga Road)	1,3	Flood	X				Yes	Structural Projects	Continued from 2007
9	Drainage Capacity Increase (Feather River Blvd & Hwy 70)	1,3	Flood	X				Yes	Structural Projects	Continued from 2007
10	Hazard Specific Flood Annex	1,2,3,4,5,6	Flood	X	X	X	X	Yes	Public Information Emergency Services	Continued from 2007
11	Drainage Capacity Increase (Linda & Woodruff Lane/Ellis Road)	1,3	Flood	X				Yes	Structural Projects	Continued from 2007
12	Toe Drain Increase in Depth (Feather River)	1,3	Flood	X				Yes	Structural Projects	Continued from 2007
13	Prevent Seepage along Bear River (Fill Blanket)	1,3	Flood	X				Yes	Structural Projects Natural Resource Protection	Continued from 2007
14	Bear River Levee Reconstruction (Various Locations)	1,3	Flood	X			X	Yes	Structural Projects	Continued from 2007
15	WPIC Levee Reconstruction	1,3	Flood	X			X	Yes	Structural Projects	Continued from 2007
16	Yuba River Levee Berms	1,3	Flood	X			X	Yes	Structural Projects	Continued from 2007
17	Bingham Interceptor	1,3	Flood	X			X	Yes	Structural Projects	Continued from 2007
18	Flood fight	1,2,3,4,5,6	Flood	X	X	X	X	Yes	Emergency	Continued

Project #	Mitigation Action	Links to Goals	Hazards Addressed	Yuba County	YCWA	Marysville	Wheatland	Address Current/Future Development	CRS Category	Status
	Preparedness Training from DWR								Services Public Information	from 2007
19	Elevate Pump Motors (#'s 1. 4 & 9)	1,3	Flood	X				Yes	Emergency Services Structural Projects	Continued from 2007
20	S. Dry Creek Levee Improvements near N. Bear River	1,2,3,4,5,6	Flood	X			X	Yes	Structural Projects	Continued from 2007
21	200-year Flood Protection	1,2,3,4,5,6	Flood	X	X	X	X	Yes	Structural Property Protection	New
22	Regional Drainage Facility	1,2,3,4,5,6	Flood	X	X		X	Yes	Property Protection Structural Natural Resource Protection	New
Severe Weather (3)										
23	Winter Weather Preparedness Campaign	1,2,3,4,5,6	Severe Weather	X	X	X	X	Yes	Public Information	New
Wildfire (4)										
24	Fuel Reduction projects Various locations	1,2,3,4,5,6	Wildfire	X	X	X	X	Yes	Emergency Services	Continued from 2007
25	Hydrant System on Willow Glen Road	1,3	Wildfire	X		X		Yes	Emergency Services Structural Projects	Continued from 2007

Source: 2014 Yuba County Hazard Mitigation Planning Team, 2007 MHMP

Element C.5. Mitigation Strategy Action Plan

§201.6(c)(3)(iii) [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. §201.6(c)(3)(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

The Planning Team analyzed a list of potential structural and nonstructural mitigation alternatives identified based upon the risk assessment, existing capabilities, and identified goals and objectives. Each committee member was provided with the STAPLEE prioritization criteria recommended by FEMA. STAPLEE stands for: social, technical, administrative, political, legal, economic, and environmental, which are the factors that should be considered when assessing mitigation measures. Through a collaborative group process, the Planning Team used STAPLEE to identify the specific mitigation actions from among the alternatives that are most likely to be implemented and effective.

This process of identification and analysis of mitigation alternatives allowed the Planning Team to come to consensus and to prioritize recommended mitigation actions with a high, medium or low ranking **(shown on each action within the jurisdictional annexes)**. The Disaster Mitigation Act regulations state that benefit-cost review is the primary method by which mitigation projects should be prioritized. In the state ranking, benefit cost review is one of ten criteria, and although the overall priority of the criteria is not stated, benefit-cost review is listed last. Recognizing the federal regulatory requirement to prioritize by benefit-cost and the need for any publicly funded project to be cost-effective, the Planning Team decided to pursue implementation according to when and where damages occur, available funding, political will, jurisdictional priority, and priorities identified in the California State Hazard Mitigation Plan. Cost effectiveness will be considered in additional detail when seeking FEMA mitigation grant funding for eligible projects identified in this plan.

Element C.6. Project Implementation

§201.6(c)(4)(ii) [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.

Yuba County currently utilizes comprehensive land use planning, capital improvement planning, and building codes to guide and control development in the County. After Yuba County officially adopts this updated plan, these existing mechanisms will have hazard mitigation strategies integrated into them. Specifically, one of the goals in the plan directs County and local governments to protect life and property from natural disasters. The County Planning Department has and will continue to conduct periodic reviews of the County's comprehensive plans and land use policies, analyze any plan amendments, and provide technical assistance to other local municipalities in implementing these requirements. Additionally, the County used the 2007 plan to integrate the risk assessment findings into the 2012 Emergency Operations Plan update. In 2009, the County used the 2007 hazard mitigation plan to update the Safety Element of the 2030 General Plan.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other county/city/agency plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. As described in this plan's capability assessment, the County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- County/City/Agency General and Master plans (Yuba County, City of Marysville, Wheatland and YCWA)
- County/City/Agency Emergency Operations Plans (Yuba County, City of Marysville, Wheatland and YCWA)
- County/City/Agency Codes and ordinances (Yuba County, City of Marysville, Wheatland and YCWA)
- Flood/storm water management/master plans (Yuba County, City of Marysville, Wheatland and YCWA)
- Community Wildfire Protection plans (Yuba County, City of Marysville, Wheatland and YCWA)
- Capital improvement plans and budgets (Yuba County, City of Marysville, Wheatland and YCWA)
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes (Yuba County, City of Marysville, Wheatland and YCWA)
- Other plans, regulations, and practices with a mitigation focus (Yuba County, City of Marysville, Wheatland and YCWA)

Planning Team members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc., as appropriate. Implementation and incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas (Yuba County, City of Marysville, Wheatland and YCWA)
- Attending other planning/program meetings (Yuba County, City of Marysville, Wheatland and YCWA)
- Participating in other planning processes (Yuba County, City of Marysville, Wheatland and YCWA)
- Monitoring community budget meetings for other community program opportunities (Yuba County, City of Marysville, Wheatland and YCWA)

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community. A few examples of incorporation of the Local Hazard Mitigation Plan into existing planning mechanisms include:

1. As recommended by Assembly Bill 2140, each community (Yuba County, City of Marysville, Wheatland and YCWA) should adopt (by reference or incorporation) this MHMP into the Safety Element of their General Plans. Evidence of adoption (by formal, certified resolution) shall be provided to Cal OES and FEMA. The following used the previous MHMP and integrated those findings into the Safety Elements of their General Plans:

    - Yuba County
    - City of Wheatland

The Yuba County Water Agency integrated the previous MHMP into many of their regulatory capabilities as noted in their Community Profile Annex.

The City of Marysville did not integrate the MHMP into their General Plan but will during this planning process.

Following the formal approval of this 2015 LHMP the Yuba County Office of Emergency Management will work with the Cities of Marysville and Wheatland, as well as the Yuba County Water Agency to integrate the elements of this plan into each of the General Plans and other regulatory planning processes through formal integration such as a resolution and/or through the General Plan update process.

2. Integration of flood actions identified in this mitigation strategy with the actions and implementation priorities established in existing Flood Management Programs (Yuba County, City of Marysville, Wheatland and YCWA)

3. Using the risk assessment information to update the hazards section in the (Yuba County, City of Marysville, Wheatland and YCWA) Emergency Operations Plans.

The risk assessment information was used as part of the Hazards Sections of the Emergency Operations Plans and each plan calls out the use of the MHMP specifically. These Emergency Operations Plans are currently being updated and will use this MHMP as a foundation for the revised Hazards Section in the Emergency Operations Plans for the following jurisdictions throughout the next update cycle:

- Yuba County
- City of Marysville
- City of Wheatland
- Yuba County Water Agency

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

Element D: Plan Review, Evaluation and Implementation

§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

Element D.1 Changes in Development

§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

Situated near the rapidly growing regions of Sacramento and the Bay Area, Yuba County has experienced and will continue to experience tremendous pressures for added residential, commercial and industrial development. The access provided by the Sacramento International Airport and major highways, have created constant growth pressures in the county.

Yuba County at the time of the 2007 plan was in a period where many plans were being developed and executed to expand in the areas of residential housing, commercial and retail establishments. Since that time, the populations have increased, many new residential, commercial and retail developments were constructed and occupied. During the economic downturn, those same developments were either vacant and or foreclosed upon. Now, due to development changes and future development plans for the participating jurisdictions, the mitigation strategies contained in the 2007 plan were updated and revised to reflect what was happening countywide with development, current and projected population increases, risk, vacant structures and climate change. Also, due to the changes in development the mitigation efforts needed to be updated to align with the goals and objectives noted in this planning update.

Despite the growth spurt and then the market downturn the net result was slow growth for Yuba County. This plan was revised reflecting this process and anticipating a continued slow growth pattern which induces changes to our planning approach.

Please refer to the Jurisdictional Annexes for more information on Changes in Development.

Element D.2 Progress in Local Mitigation Efforts

§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

This plan has been created as a living document with input from the population and professionals within Yuba County. The 2007 Hazard Mitigation Plan has already proven useful in the revision of the Public Health and Safety Element of the 2030 General Plan.

Table D1 provides a snapshot of the progress made in local mitigation efforts. Each mitigation action in the 2007 effort describes whether the action was completed or not and why, whether the action was no longer relevant or if the action is included as part of the 2014 planning effort.

Table D1 – Summary/Status of 2007 Actions

Summary and Status of 2007 Mitigation Actions					
Project Name	**Complete**	**Ongoing**	**Not Started**	**2014 Project**	**Mitigation Action Outcome/ Comments**
Special Needs Emergency Services Projects	X			No	Unknown if project will continue, Emergency management based planning
Develop Regional ID System	X			No	Not continued, unknown status of project
Emergency Communications System	X	X		No	Emergency Response Project
Improvements to Emergency Access Roads		X		Yes	Not fully completed; continued
Geographic Information Systems Mapping Project	X	X		Yes	Partially completed need to continue
Update Local Flood Ordinances	X			No	Ongoing regular business
Flood Animal Evacuation Planning	X			No	Unknown if project will continue, Emergency management based planning
Various Countywide Flood Control Projects (Levees)	X	X	X	Yes	Many projects completed from 2007 plan; continued projects started or not completed due to lack of available funds
Road Elevation Project (Plumas-Arboga Road)			X	Yes	Not completed due to lack of available funds
Drainage Capacity Increase (Feather River Blvd @ Hwy 70)		X		Yes	Not fully completed, more time needed to finish
Drainage Capacity Increase (Linda &		X		Yes	Not fully completed, more

Summary and Status of 2007 Mitigation Actions					
Project Name	**Complete**	**Ongoing**	**Not Started**	**2014 Project**	**Mitigation Action Outcome/ Comments**
Woodruff Lane/Ellis Road)					time needed to finish
Flood Guidance		X		Yes	Not fully completed, more time needed to finish
Toe Drain Increase (Feather River)		X		Yes	Not fully completed, more time needed to finish
Bear River Fill Blanket		X		Yes	Not fully completed, more time and funds needed to finish
Bear River Levee Reconstruction (Various Locations)		X		Yes	Not fully completed, more time and funds needed to finish
WPIC Levee Reconstruction		X		Yes	Not fully completed, more time and funds needed to finish
Yuba River South Levee Berms		X		Yes	Not fully completed, more time and funds needed to finish
Bingham Interceptor		X		Yes	Not fully completed, more time and funds needed to finish
Flood fight Preparedness Training from DWR	X	X		Yes	Need more training sessions due to new staffing
Elevate Pump Motors (#1; 4 & 9)	X	X		Yes	Partially completed project; Completed pump elevation of Pump (# 2; 3 & 6)
S. Dry Creek Levee Improvements			X	Yes	Not completed due to lack of available funds
200-year Flood Protection	X	X	X	Yes	Not completed due to lack of available

Summary and Status of 2007 Mitigation Actions					
Project Name	**Complete**	**Ongoing**	**Not Started**	**2014 Project**	**Mitigation Action Outcome/ Comments**
Various Levees in Yuba County					funds
Regional Drainage Facility		X	X	Yes	Not completed due to lack of available funds
Fuel Reduction (Various Projects)	X	X	X	Yes	Not fully completed of all locations due to lack of available funds
Countywide Fire Planner Staff Position			X	No	Lack of available funds to support staff position
Evacuation Planning Exercise	X			No	Unknown if project will continue, Emergency management based planning
Water Tanks	X			No	Not completed due to lack of available funds
Hydrant System on Glen Road		X		Yes	Not completed due to lack of available funds
Yuba County Courthouse Structural Evaluation	X			No	Not completed due to lack of available funds

Source: 2014 Yuba County Hazard Mitigation Planning Team

Element D.3 Changes in Priorities

§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

The overall priorities in Yuba County and the participating jurisdictions in this plan update have changed since the 2007 Mitigation Plan. Several actions were completed and new projects were added to coincide with the changes in priorities, progress in local mitigation efforts and changes in development.

Politically the county has maintained a financially conservative nature in expending available funds and its overall desire to stay true to itself in remaining focused Flood Protection. With the lack of disasters and the decline of available funding, the mitigation strategies needed to be revised and or continued to fit the overall county priorities and be developed so that most could be started or accomplished for this next 5-year plan cycle.

Element E: Plan Adoption

Requirement §201.6(c)(5) [The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council).

Element E.1 Formal Adoption Documentation

Requirement §201.6(c)(5) [The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council).

Yuba County, the City of Marysville, Wheatland and the Yuba County Water Agency plan to submit this revised plan to the Yuba County BOS and their respective jurisdictional boards or City Council upon successful completion of state and federal review. Yuba County wishes to receive approval pending adoption in order to minimize cost to the county. The plan will be submitted to the Board as a regularly scheduled agenda item with room for additional public and departmental comment. Our approach to this final element is due to the need to remain cost effective in the planning process. By receiving state and federal approval of the plan prior to going to the Board, we are able to go to the board on a single date to finalize promulgation of this document. The plan will be in its final format, notification of the public will only have to be done once and copies of the resolution adopting this plan, the relevant section of the minutes of the BOS meeting and roster of attendees of this meeting will be included in this plan. The resolution will be inserted before the table of contents. As part of the agenda report the basic requirements for the plan, the scope of the document and the need to revise every five years will be clearly stated. The Yuba County OES staff will be prepared to give an overview of the plan and be prepared to answer any questions related to the document development process and its contents.

Element E.2 Yuba County Operational Area Multi-jurisdictional Local Hazard Mitigation Plan

This plan is for Yuba County, the Cities of Marysville, Wheatland, and the Yuba County Water Agency, therefore there are four (4) required resolutions. The Yuba County Board of Supervisors (1) City of Marysville City Council and City of Wheatland City Council (2) and the Yuba County Water Agency Board (1).

References

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10. Origins and Development: A Chronology of Disasters in California, California Governor's Office of Emergency Services
11. City-Data.com website
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16. Federal Emergency Management Agency, How To Guide #1, Getting Starting: Building Support for Mitigation Planning
17. Federal Emergency Management Agency, How-To Guide #2, Understanding Your Risks: Identifying Hazards and Estimating Losses
18. Federal Emergency Management Agency, How-To Guide #3, Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies
19. Federal Emergency Management Agency, How-To Guide #4, Bringing the Plan To Life: Implementing the Hazard Mitigation Plan
20. Federal Emergency Management Agency, How-To Guide #5, Using Benefit-Cost Review in Mitigation Planning
21. Federal Emergency Management Agency, How-To Guide #6, Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning
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23. Federal Emergency Management Agency, How-To Guide #8, Multi-Jurisdictional Mitigation Planning
24. Federal Emergency Management Agency, How-To Guide #9, Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects
25. California Emergency Management Agency, Disaster Recovery and Mitigation Handbook
26. California Emergency Management Agency, Tools for Preparing your LHMP, 2012
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32. Spatial Hazards Events and Losses Database of the United States website
33. California Department of Forestry and Fire Protection website
34. National Register of Historic Places
35. Nevada-Yuba-Placer Unit website

36. California Fire Plan, 2010
37. Nation Climate Data Center website