YUBA COUNTY WATER AGENCY

Multi-Hazard Mitigation Plan

Photo by Gary Rose

Bullards Bar Reservoir

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The Yuba County Water Agency (YCWA) Hazard Mitigation Planning Committee acknowledges the many people who contributed to the development of this Multi-Hazard Mitigation Plan (MHMP) to prevent losses and reduce the potential impacts of disasters and hazards in Yuba County. The MHMP is a local hazard mitigation plan that was developed for the Agency to meet the federal and state requirements of the Disaster Mitigation Act of 2000, and will be included in the County Plan.

This project and Plan was prepared as part of the Yuba County Multi-Hazard Mitigation Project funded by the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program, Disaster Mitigation Grant (HMGP-PDM) awarded to the County of Yuba in July 2004. We wish to acknowledge the support and participation received from state and federal agencies provided for the development of the MHMP Plan and Project.

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California Department of Water Resources (DWR)
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Dobbins/Oregon House Fire Protection District
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Three Rivers Levee Improvement Authority

Executive Summary

In 1959, the Yuba County Water Agency was created primarily to address two major issues, the need for additional flood protection and for improved water supply to the valley farmers. Over time, YCWA developed many concepts and new projects to address water related needs in Yuba County. Some of these projects have been in partnership with FEMA for disaster recovery and mitigation of future problems. Thus one strong theme in YCWA's history is the mitigation of problems facing the county. The development of this Multi-Hazard Mitigation Plan further supports this historic theme of mitigating local water resource problems as YCWA addresses issues as we move into the future.

YCWA is a stand alone government entity, created by the state legislature and codified in the California Water Code. Authorized activities include flood protection improvement, beneficial use of water, power generation, recreation, and fisheries enhancement. The YCWA Board of Directors consists of seven elected board members of which five are the Yuba County Board of Supervisors with the two additional members elected to the Agency by the Yuba County voters.

In the 1960's YCWA's Yuba River Development project was designed and constructed. The Project consists of New Bullards Bar Dam and Reservoir, two diversion dams, a series of tunnels and two major hydroelectric powerhouses. Funding for the Project was primarily provided through a power purchase contract with Pacific Gas and Electric Company (PG& E) and the United State Army Corps of Engineers (Corps). The Corps provided funding of 170,000 acre-feet of dedicated flood storage space in New Bullards Bar Reservoir, to help mitigate the historic flooding in the region. The region continues to have a significant flood threat since New Bullards Bar reservoir is located on the North Yuba and there is no other dedicated flood storage space on the South or Middle Yuba Rivers.

In February of 1986, Yuba County suffered a devastating flood where 5,000 homes and businesses were damaged by flood waters breaking through south bank Yuba River levee by Linda. Flood lawsuit damages for this flood were recently settled for $450 million. To help prevent future flooding in the county, YCWA initiated the Corps Yuba Basin levee improvement in 1988. This project was formulated to improve the level of protection to 200 years for the populated area of southern Yuba County in the Reclamation District 784 territory and 300 year level of protection for the City of Marysville. Improved levees are the source of the improved flood protection and the Yuba Basin Feasibility Study is due to be completed by the Corps in 2008. YCWA has provided the entire local share funding for this project. Also, YCWA provided the local share of funding for levee improvements constructed in the late 1990's and early 2000's for the federal and state Systems Evaluation levee improvement project.

In January of 1997, Yuba County suffered another devastating flood when the east Feather River levee broke due to high flood waters and flooded the southern portion of the RD 784 in the Arboga area. Unfortunately, the section of levee that broke was a section of levee that was scheduled for construction improvements in 1996 that were postponed to 1997. This flood resulted in the loss of three lives and flood damages that were legally settled for approximately $50 million.

After the 1997 flood, YCWA commissioned a $1 million dollar study to identify additional flood protection improvements for protecting Yuba County residents and the region. This effort and other issues led to the creation of the Yuba Feather Flood protection act portion of the Costa Machado Water Act of 2000 providing $90 million in state bond funds for flood protection improvements. The original plan for this money was to make system flood protection improvements such as improved efficiency of the New Bullards Bar dedicated flood storage space and levee setbacks. In May of 2003, a draft DWR flood plain mapping study indicated that the levees were far weaker than previously identified in the Yuba Basin Feasibility study. This

resulted in moving from system improvements to levee improvements to mitigate the weaker than expected levees.

While YCWA continues to work with the Corps to develop a project to improve the levees protecting the City of Marysville, the Yuba Basin project will assist in local entity in constructing advanced improvements. This local entity is a Joint Powers Agreement organization between Reclamation District 784 and Yuba County. To date approximately one half of a $300 plus million project to improve RD 784 levees has been constructed. This is advanced work on the Corps' Yuba Basin project and it is being primarily funded by local and state bond funds. Funding is also being provided by a FEMA grant for improvements on the Olivehurst Detention Basin project which has been constructed.

YCWA flood protection future efforts include continuing to pursue levee improvements through the Yuba Basin project, to support TRLIA in their efforts to improve the RD 784 levees, to continue supporting other efforts of additional levee improvements in Yuba County, to continue our Forecast Based Operations project to improve the effectiveness of flood control operations out of Oroville and New Bullards Bar reservoirs, to support levee certification effort to FEMA criteria and then to seek funding to improve the system improvement projects.

The second driver for creating YCWA was to supply surface water to agricultural lands in the valley to mitigate groundwater over drafting created by deep well pumping. The last surface water supply project is due to be constructed in 2006. Surface water irrigation has caused significant in-lieu groundwater recharge resulting in as much as 100 feet of water table increase. This is especially important because of the tighter water supplies due to increased usage from growth, and increased environmental water needs through higher in-stream flow requirements. The groundwater supplies will be needed to supply local and state wide water needs during drought periods. [note may need to move this paragraph]

This document contains:

- Yuba County Water Agency Hazard Vulnerability Study summary;
- Prioritization of Yuba County Water Agency Hazards;
- Hazard Mitigation Strategy Goals and Objectives;
- Proposed strategies and actions as recommended by the Hazard Mitigation Planning Committee to reduce short- and long-term vulnerability to the identified hazards;
- Coordination with local interest groups and citizens;
- Methods of implementing, monitoring, evaluating, and updating the Hazard Mitigation Plan;
- The establishment of a Hazard Mitigation Planning Committee to assist in the further development, prioritization and implementation of the recommended Hazard Mitigation strategies.

The Yuba County Water Agency Hazard Mitigation Plan is a living document and is subject to change as the program evolves.

This document also provides a framework for identification of coordination of hazard mitigation strategies developed with other plans; especially those developed by State and other local agencies and those plans developed in order to file for Federal disaster assistance, as required by the Robert T. Stafford Disaster Relief and Emergency Services Act (P.L. 93-288), and amended by the Disaster Mitigation Act of 2000 (P.L. 106-390).

Acronyms

Acronym	Definition
af	Acre-feet
BFPP	Buffer Zone Protection Program
CALFED	CALFED Bay-Delta Program
CalTrans	California Department of Transportation
CARB	California Air Resources Board
CDF	Cal Fire
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	Cubic feet per second
CGS	California Geological Survey
CI/KR	Critical Infrastructure and Key Resource
CUPA	Certified Unified Program Agency
CVP	Central Valley Project
DFG	California Department of Fish and Game
DFIRM	Digital Flood Insurance Rate Map
DHS	Department of Homeland Security
DMA 2000	The Disaster Mitigation Act of 2000
DOACT	Dobbins-Oregon House Action Committee
DOHFPD	Dobbins-Oregon House Fire Protection District
DSOD	California Division of Safety of Dams
DWR	California Department of Water Resources
EAP	Emergency Action Plan
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ENSO	El Nino-Southern Oscillation
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EWA	Environmental Water Account
F-CO	Forecast-Coordinated Operations
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FRAQMD	Feather River Air Management Quality District
GIS	Geographic Information Systems
HAZMAT	Hazardous Materials
HMGP	Hazard Mitigation Grant Program
HAZUS	Hazards-US
HMP	Hazard Mitigation Plan
HVA	Hazard Vulnerability Analysis
IRWMP	Integrated Regional Water Management Plan
ISO	Integrated Systems Operations
kWh	Kilowatt Hours
MCE	Maximum Credible Earthquake
msl	Mean Sea Level
MW	megawatts
NBB	New Bullards Bar
NDSP	National Dam Safety Program
NEPA	National Environmental Policy Act
NID	Nevada Irrigation District
NOAA	National Oceanic and Atmospheric Administration

OES	Office of Emergency Services
OHS	Office of Homeland Security
PAVE PAWS	PAVE Phased Array Warning System
PDSI	Palmer Drought Severity Index
PDM	Pre-Disaster Mitigation
PFMA	Probable Failure Mode Analysis
PGA	Peak Ground Acceleration
PG&E	Pacific Gas & Electric Company
PIR	Problem Identification Report
RD	Reclamation District
SACOG	Sacramento Area Council of Governments
SFWP	South Feather Water and Power
SPI	Standard Precipitation Index
SPRR	Southern Pacific Railroad
SWRCB	State Water Resources Control Board
SSIDD	South Sutter Irrigation District Diversion Dam
SWCRB	State Water Resources Control Board
SWP	State Water Project
TRLIA	Three Rivers Levee Improvement Authority
USACE	United States Army Corps of Engineers
USDA	Untied States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
WPIC	Western Pacific Interceptor Canal
YCWA	Yuba County Water Agency
YWPFSC	Yuba Watershed Protection & Fire Safe Council

1 Introduction to the Jurisdiction

The Yuba County Water Agency is an independent government organization, separate in powers and authorities from the County of Yuba.

The history of the Yuba County Water Agency and its Yuba River Development Project is the story of people overcoming engineering, financial and political obstacles that would have deterred most. They were visionaries who had the courage, tenacity, ingenuity, and perseverance to stay the course regardless of the long odds or the obstacles. They overcame them all in order to harness a river that had time and again destroyed lives, homes and crops. For over 100 years, the people of Yuba County braced for battle against the river which provided them with the essence of their agricultural economy, but which also in high water years loomed as an enemy that would destroy their industry, wipe out their homes and take their lives.

Before the great flood of 1955, the state had started planning its California Water Project which would build Oroville Dam on the Feather River. But there was no project in State or Federal planning that would control the Yuba River. In the wake of the 1950 flood that had raced through Linda and Olivehurst, south of the Yuba River, there had been men at work in Yuba County on a water program that would control the Yuba River against disastrous floods and develop water resources for farmers who were pushing their wells ever deeper into dwindling underground reservoirs. The population of Yuba County had been growing steadily since World War II and the flood of 1950 emphasized the danger to lives as more suburban home sites developed. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

Arising out of State legislation in response to the terrible flood of 1955, the Yuba County Water Agency (YCWA) was created by an act of the California State Legislature in 1959 (The Yuba County Water Agency Act, Section 84 of the California Water Code). As part of the realization of Governor Edmund G. (Pat) Brown's dream, the California Water Project, YCWA was created for the control of flood and storm waters in the agency's jurisdiction and from stream sources outside its jurisdiction. Shown in Figure 1–1, The YCWA jurisdiction included all territory lying within the exterior boundary of Yuba County and all territory contiguous to but outside the boundaries which becomes or is included within a member unit (Stats.1959 c. 788, p.2780 §1).

The YCWA became a reality in the fall of 1959 and started a long, arduous, and stormy campaign that was not to reach a climax for almost seven years. To enable the YCWA to carry out their mission of flood control, the YCWA was granted the power to control the flood and storm waters of the agency in addition to the flood and storm waters of streams that have their sources outside of the agency, which flow into the agency, as well as to conserve such waters for the beneficial purposes of the Agency (YCWA Act).

Located on the North Yuba River, the New Bullards Bar Dam and Reservoir is the centerpiece of YCWA's projects. Although Yuba County voters approved the $185 million in revenue bonds needed to fund the project, the Federal Power Commission required agreements with the U.S. Forest Service, California Department of Fish and Game, the U.S. Bureau of

Image 1-1 New Bullards Bar Dam

Reclamation, and the State of California as a condition of the project's construction license for the tallest concrete dam in California. By the end of 1969, at a cost of $108,987,237, the New Bullards Bar Dam project neared completion with water being stored in the new reservoir. With a surface area of 4,790 acres the project was to be used for flood control, irrigation, water storage, power generation, recreation, and fish enhancement. Surrounded by 55 miles of shoreline, the New Bullards Bar Reservoir has recreation facilities which include camp sites and boat launch facilities. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

Image 1-2 New Colgate Powerhouse

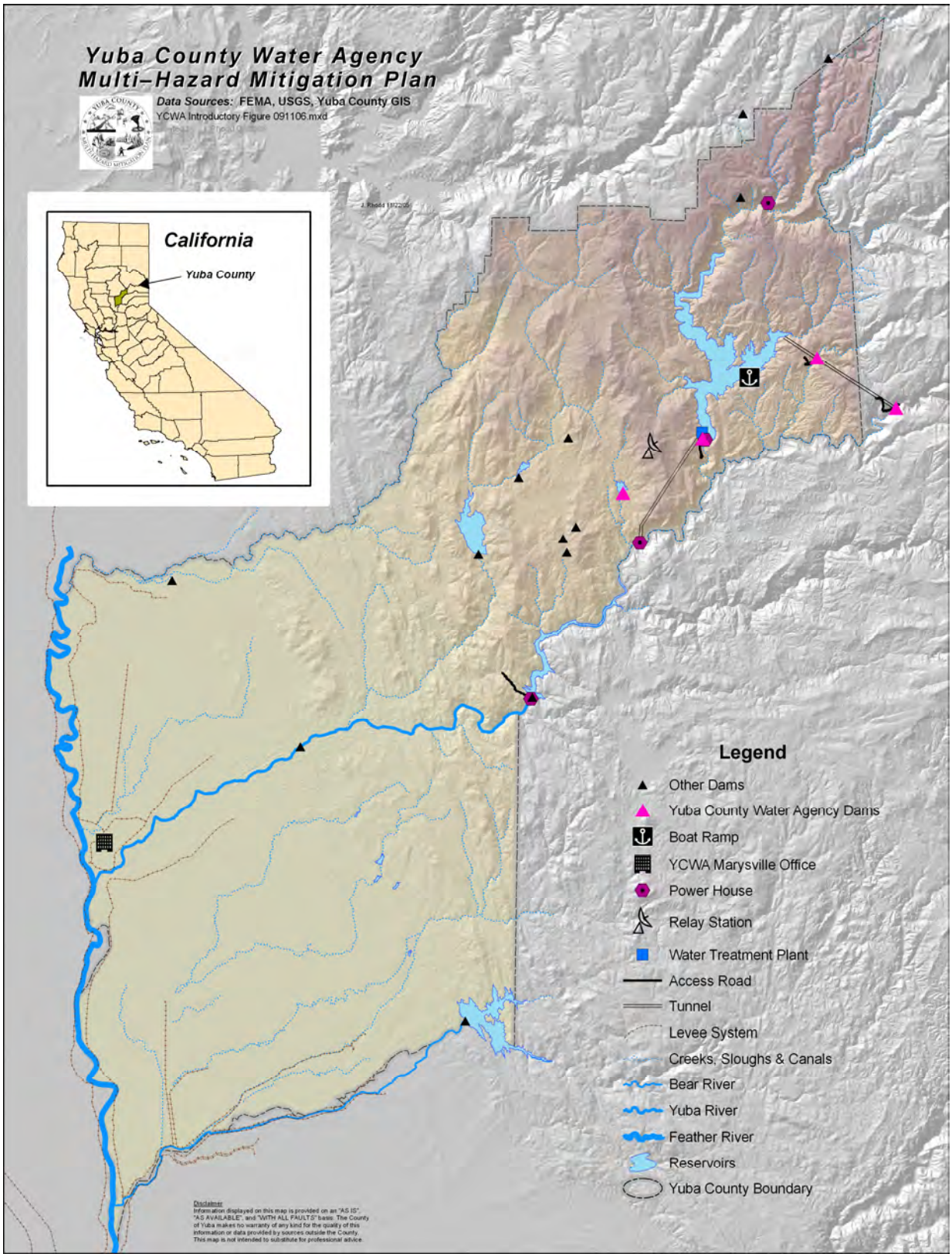
The New Colgate Powerhouse is fed by water which drops 1,300 feet from behind New Bullards Bar Dam through the Colgate Power Tunnel and was constructed at a cost of $20,053,125, was ready for test trials in early 1970. The Colgate Power Plant produces more energy than any hydroelectric plant in the PG&E system with two of the largest turbines of their kind ever built. The two Powerhouse units, whose capacity is 315,000 kilowatts, run at 212,000 horsepower each, and generate a combined yearly average of 1,314 gigawatt hours of electricity. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

Water is diverted from the middle fork of the Yuba River to the New Bullards Bar Reservoir via the Our House Dam and the Log Cabin Dam. Completed at a cost of $6,451,040, the 89 foot concrete Our House Dam functions as a diversion dam as it diverts water through the Lohman Ridge Tunnel from the middle fork of the Yuba River to Oregon Creek and the Log Cabin Dam. Completed at a cost of $2,763,370, the 57 foot high concrete Log Cabin Dam located on Oregon Creek, receives waters diverted from the Our House Dam then in turn diverts water 6,100 feet through the Camptonville Tunnel to the New Bullards Bar Reservoir. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

The final element of the original YCWA project is the New Narrows Power Plant located at the base of the USACE operated Englebright Dam. This power plant has been in service since 1970 and has a 46.75 megawatt capacity. The turbine operates at 70,000 horsepower and generates a yearly average of 248.4 gigawatt hours of electricity. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

On June 30, 1970 the Yuba County Water Agency became the owner and operator of the $180 million Yuba River Development. Since that time the YCWA has added two power plants (Fish Release Power Plant and Deadwood Creek Power House) and a number of canals and other water conveyance facilities. The Agency is responsible for managing fish flows on the Yuba River; it operates a fish screen at the Daguerre Point diversion dam; sells wholesale water to seven water and irrigation districts; and has a small treatment facility, the Cottage Creek Water Treatment facility, to provide potable water to United States Forest Service Housing and campers at New Bullards Bar Reservoir. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

Figure 1–1 Yuba County Water Agency



1.1 Purpose

The Yuba County Water Agency was created pursuant to an act of the California legislature in 1959. Among its powers is the "…power to control the flood an storm waters of the agency and the flood and storm waters that flow into the agency, and to conserve such waters for the beneficial and useful purpose of said agency…"
(*West's Water Code Appendix section 84-4.2*)

YCWA is empowered to "make water available for any present or future beneficial use or uses of lands or inhabitants in the agency; develop and sell at bus bar at wholesale rates hydroelectric power in connection with its projects; control and conserve flood and storm waters; store, conserve, reclaim and import water; sell right to use of falling water" (The Yuba County Water Agency Act, Section 84 of the California Water Code). Accordingly, YCWA can sell water to entities authorized to purvey water to its customers, but cannot directly sell water to individuals. As part of its project development, YCWA delivers hydroelectric power to PG&E under a cooperative agreement. This hydroelectric power helps to repay the debts encumbered during the development of its projects.

The Agency was formed for the purpose of creating and managing the Yuba River Development Project. Many of the assets owned and operated by the Agency were constructed, purchased, or upgraded as a result of the project. The entire project, including interest, engineering, legal, right of way, purchase of PG&E facilities, and other costs totaled $180,200,000. The construction costs totaled $142,891,459, the single largest construction contract ever let in the United States.

1.2 History of the Jurisdiction

YCWA was developed out of a need for flood control on the Yuba River. As early as 1919 the state had been developing a statewide water development plan that would deliver northern California water to southern California. By the 1930's, this became the foundation of the State Water Plan, passed by an act of the State of California legislature called the Central Valley Act of 1933, later called the Central Valley Project. As a result of the depression of the 1930's, the Federal government took over the implementation of the Central Valley Project and operates these facilities today. The State Water Project was developed in the 1940's as part of a massive undertaking to fully develop California's water resources for future water needs across the state. Part of this California Water Plan was the Feather River Project, first presented in 1951 and revised in 1955 that would develop Oroville Dam and related facilities on the Feather River as well as aqueducts in the Central Valley (http://www.publicaffairs.water.ca.gov/swp/-history_swp.cfm, accessed 12/29/2005).

The Yuba River was not included in State and Federal water planning. In 1950, the Yuba River flooded Linda and Olivehurst and emphasized the need for flood control on the Yuba River. In 1951 the Yuba County Board of Supervisors created the Yuba County Water Resources Board. This Board was limited in what it could accomplish, and there was need for an agency that could effectively implement a Yuba River flood control project. For several years there was considerable debate in the community over how to govern the future water agency. On June 1, 1959, Governor Edmund G. Brown signed a bill creating YCWA. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

The Yuba River Project (the Project) was estimated to cost $185 million dollars in 1961. The Project was designed to develop sufficient hydroelectric power to repay bonds taken out to finance the Project (thereby eliminating any tax burden on County residents), financial assistance from the Federal government based on the Project's flood control benefits, and State contribution based on recreational and fish habitat enhancement. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

When the ballots were counted on May 16, 1961, Yuba County voters had approved, by an 11-1 margin, the $185 million in revenue bonds needed to fund the project. This was almost three times the total county assessment at that time. But still the Agency faced some complex political maneuvers that had to be carried out despite its lack of political muscle at either the state or federal level. The Federal Power Commission required a construction license. This license required: an agreement with the U.S. Forest Service, which controls Plumas and Tahoe Forests on the Yuba watershed, to insure protection of the forest lands; a recreation plan acceptable to the Forest Service; a Fire Control Plan; a negotiated agreement with the California Department of Fish and Game that would provide fish protection and enhancement; and an agreement with the U. S. Bureau of Reclamation and the State of California for future downstream development. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

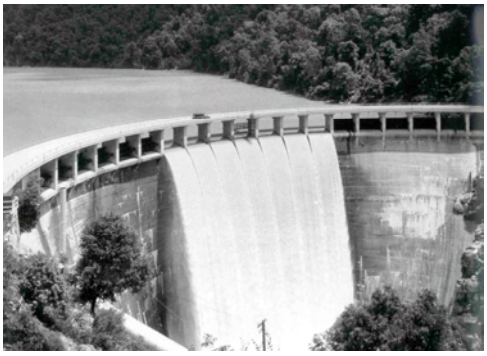


Image 1-3 Old Bullards Bar Dam

The Agency plowed forward with successful appeals for a Federal cash contribution from Congress in recognition of flood control benefits and authorization from the State Legislature for carrying out recreation and fish enhancement through a grant under the Davis-Grunsky Act. Meanwhile, it faced the problem of finding financing for final design of the Project and preparation of plans for construction bids. This was partly accomplished through a $400,000 loan from the Federal Community Facilities Administration with repayment obligated only if the project became a reality. Finally, there were the complicated negotiations with Pacific Gas & Electric Co. for a 50-year contract for sale of power that would finance the revenue bonds and acquire the existing power generating plants that PG&E had long been operating at the old Bullards Bar Dam and downstream at Colgate. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

Upon finding that the bidding contractor was willing to negotiate a contract, Agency officials obtained the cooperation of the Governor in a special call to the Legislature and, as interest rates continued to climb, were granted legislative authority to execute a negotiated contract with the bidder for the largest single public works contract ever awarded in California. After intensive negotiation, involving concessions on the part of the Agency, as well as concessions by the Contractor and PG&E, it was found that there was still an enclosable gap between costs and revenues amounting to $8,710,000. Interest rates continued to climb, with each 1/8 percent representing almost $4 million less cash available for construction, all the while power values were declining. The impasse was solved by a novel and unprecedented arrangement, under which the contractor, the engineer and PG&E agreed jointly to purchase sufficient Series B subordinate lien revenue bonds to close the actual fund gap at completion of construction. These bonds mature after retirement of Series A Bonds in 50 years. The Series A Bonds were sold to a single bidder May 24, 1966, - Blyth & Co. and Smith-Barney Inc. of San Francisco. It appears in retrospect that there were only a very few days when market conditions were such that this issue could have been absorbed. On June 1, 1966, the money and bonds were delivered, and a unique construction project was under way. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

A contract was signed with the successful bidder for the construction work, Perini-Yuba Associates, with the stipulation that the Project would be operational four years and one month from the starting date. Principal components of the Project included the New Bullards Bar Dam, tunnels to deliver water from the reservoir down to the New Colgate Powerhouse, and the New Narrows Powerhouse at the Corps of Engineers' Englebright Dam. In January 1969, a storm hit that produced a historic runoff on the river. Engineers had foreseen such an event and had required the center block of the dam be left lower to handle the Yuba. The waterfall that spilled

over that center block was spectacular; even in its unfinished state the new dam had kept the Yuba from turning deadly and destructive. By the end of 1969 the project was moving toward completion. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

In early 1970 the New Colgate Powerhouse, which contained two of the largest turbines of their kind ever built, was ready for trial tests to produce electricity. The 1300-foot drop of water from behind New Bullards Bar Dam boosted the force of the water at each turbine to the equivalent of 212,000 horsepower. But within a month it was shut down when a crack was discovered in the 47-ton stainless steel runner on the number two unit. Men worked 24 hours a day at Colgate to grind out the crack in the runner while experts from Switzerland and Germany hurried across the Atlantic to figure out a solution to the problem. The repair was made within three weeks and was back in service as good as new. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

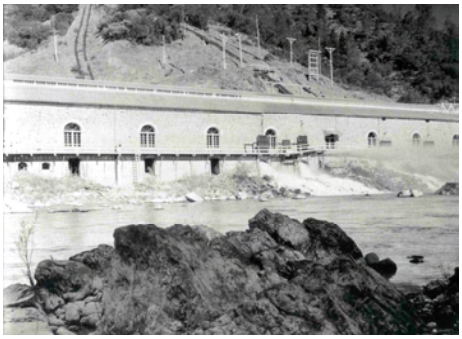


Image 1-4 Old Colgate Powerhouse

The New Narrows Powerhouse, which began producing electricity in February, 1970, also had problems. A ten-inch long strap of steel broke loose and tore up the stator and pole windings and set fire to the generator. The generator was taken back to Japan by ship where was rebuilt and returned to the Project for installation and power generation by May 10, 1970. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

After a score of years of frustration and disappointment, determination and perseverance prevailed, and on June 30, 1970 the Yuba County Water Agency became the owner and operator of the $180 million Yuba River development. Since that time the YCWA has added two power plants and a number of canals and other water conveyance facilities. The Agency is responsible for managing fish flows on the Yuba River; it operates a fish ladder; sells wholesale water to seven water and irrigation districts; and has a small treatment facility, the Cottage Creek Water Treatment facility, to provide potable water to United States Forest Service Housing and campers at New Bullards Bar Reservoir. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

One additional power plant, completed at a cost of $396,117, the Fish Release Power Plant is located at the base of New Bullards Bar Dam. In operation since 1986, the Fish Release Power Plant averages 1.3 gigawatt hours of electricity annually with a 200 horsepower, 150 kilowatt capacity turbine. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

Deadwood Creek Powerhouse was purchased by YCWA in 1993 for $800,000 and improved at a total project cost of $1,487,085. The Deadwood Creek Powerhouse, in operation since 1993, has a capacity of 1.95 megawatts and generates an average 5.1 gigawatt hours of electricity annually. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

The Yuba County Water Agency headquartered in the City of Marysville, adjacent to Ellis Lake has purchased land at 13th and F streets in Marysville. The new location in the City of Marysville will house a larger Agency owned facility to be completed in 2007. (http://www.ycwa.com/hist.htm, accessed 12/29/2005)

1.3 Controlling Documents and Regulatory Oversight

Though the Yuba County Water Agency is an independent, stand-alone organization, it and its Yuba River Development Project are subject to numerous contract, agreements, licenses, permits, and regulatory oversight from a wide range of organizations. The controlling documents of the Yuba County Water Agency are discussed below

1.3.1 The Yuba County Water Agency Act (Section 84 of the California Water Code Appendix)

The Yuba County Water Agency Act's provisions are set forth by the California Legislature. Though the primary purpose for creation of the Agency was the construction of the Yuba River Development Project, the YCWA Act grants broad powers pertaining to water development and its control. The Act allows the Agency to develop and promote the beneficial use and regulation of the water resources of Yuba County and the streams flowing into Yuba County. The Act provides for the development of water control facilities, for flood control, hydroelectric generation, water supply, fisheries enhancement, and related recreation. Below are relevant section of Section 84 of the California Water Code Appendix. The complete Yuba County Water Agency Act can be found in Appendix A

Section 84-1 Creation; name; territory
A district hereinafter called an agency is hereby created for the purpose of accomplishing a function of statewide importance. Said agency shall be known as the Yuba County Water Agency and shall include all territory lying within the exterior boundaries of the County of Yuba, and shall also include territory contiguous to but outside said boundaries which becomes or is included within a member unit as hereinafter defined.

Section 84.3.4 Eminent Domain
The agency shall have the power to eminent domain to acquire within of without the agency any property necessary for carrying out the powers and purposes of the agency, except that the agency shall not have to power to acquire by condemnation publicly owned property, nor property owned by private irrigation companies, held or used for the development, storage, or distribution of water for public use, unless provision is made to furnish substitute facilities for the use of such public agency or private irrigation company.

In lieu of compensation and damages for the taking or damaging of any public utility facility which must be replaced by the public utility to provide service to the public equivalent to that provided by the facility taken or damaged, the agency shall pay to the public utility owning such a facility its actual cost incurred to replace in kind the facility so taken or damaged, less proper deductions for depreciation together with its actual cost incurred to rearrange or rehabilitate the facilities of such public utility not taken or damaged but required to be rearranged or rehabilitated by reason of such taking or damaging.

No action in eminent domain to acquire property or interests therein outside the boundaries of the County of Yuba shall be commenced unless the board of supervisors of each affected county has consented to such acquisition by resolution.

Section 84-3.7 Contracts for water services
The agency shall have power to enter into contracts with any private company formed and existing exclusively to provide water service within Yuba County whenever such contract appears to the board to be in the public interest.

Section 84-4 Availability of water supply; necessary acts
The agency shall have the power as limited in this act to do any and every lawful act necessary in order that sufficient water may be available for any present or future beneficial use or uses of the land or inhabitants within the agency, including, but not limited to irrigation, domestic, fire protection, municipal, commercial, industrial, recreational, and all other beneficial uses and purposes.

Section 84-4.1 Hydroelectric power; development; sale
The agency shall have the power to develop hydroelectric power to the extent that such power can be developed in connection with the construction and operation of its projects, and to enter

into contracts for the sale thereof for a term not to exceed 50 years, and to pledge the revenue there from for the payment of principal and interest on revenue bonds. Such power may be marketed at the bus bar and at wholesale rates to any public or private agency, or both, engaged in the sale of electrical power at retail.

Section 84-4.2 Flood control; conservation
The agency shall have the power to control the flood and storm waters of the agency and the flood and storm waters of streams that have their sources outside of the agency, which streams and floodwaters flow into the agency, and to conserve such waters for beneficial and useful purposes of said agency by spreading, storing, retaining and causing to percolate into the soil within or without said agency, or to save or conserve in any manner all or any of such waters and protect form damage from flood or storm waters the watercourses, watersheds, public highways, life and property in said agency, and the watercourses outside of the agency of streams flowing into the agency.

Section 84-4.3 Storage of water; conservation and reclamation; actions involving use of waters or water rights

The agency shall have the power to store water in surface or underground reservoirs within our outside of the agency for the common benefit of the agency; to conserve and reclaim water for present and future use within the agency; top appropriate and acquire water and water rights, and import water into the agency and to conserve and utilize, within or outside of the agency, water for any purpose useful to the agency; to commence, maintain, intervene in, defend or compromise, in the name of the agency in behalf of the landowners therein, or otherwise, and to assume the costs and expenses of any action or proceeding involving or affecting the ownership or use of waters or water rights, within our without the agency, used or useful for any purpose of the agency or of the common benefit to any land situate therein or involving the wasteful use of water therein, or to prevent the interference with or diminution of, or to declare rights in that natural flow of any stream or surface or subterranean supply of waters used or useful for any purpose of the agency or of common benefit to the land within the agency or to its inhabitants, or to prevent unlawful exportation of water from said agency, or to prevent contamination, pollution or otherwise rendering unfit for beneficial use the surface or subsurface water used in said agency, and to commence, maintain and defend actions and proceedings to prevent any such interference with such waters as may endanger or damage the inhabitants, lands , or use of water in, or flowing into, the agency; except that the agency shall have no power to intervene or take part in, or to pay the costs or expenses of, actions or controversies between the owners of lands or water rights which do not affect the interest of the agency.

1.3.2 Yuba County Water Agency Power Purchase Contract

The Yuba County Water Agency entered into a power purchase contract with Pacific Gas and Electric Company (PG&E) on May 13, 1966. This contract, for a term of 50 years, sets forth what will be built, how it will be operated, and how the Project and its operating costs will be paid for. In the contract, it states that PG&E has full rights to all power generated by the Colgate Powerhouse. In exchange, PG&E provides funding for repayment of the bonds that funded YCWA's creation, as well as all operations and maintenance costs. The contract appears in Document 1-1. For the full contract, including appendices, see Appendix A.

Document 1-1 - Yuba County Water Agency Power Purchase Contract

YUBA COUNTY WATER AGENCY
POWER PURCHASE CONTRACT

THIS CONTRACT made this 13th day of May, 1966, by and between PACIFIC GAS AND ELECTRIC COMPANY, hereinafter referred to as "Pacific", and YUBA COUNTY WATER AGENCY, hereinafter referred to as "Yuba",

WITNESSETH THAT:

1. This contract includes Appendix A, Definitions; Appendix B, Requirements and General Specifications for Power Production Features of Yuba River Development; Appendix C, Operation and Maintenance Requirements; Appendix D, Storage Criteria; and Appendix E, Exhibits. For clearness, words or phrases defined in Appendix A, other than proper names, are italicized in the text.

2. Yuba shall construct at its own risk and expense, and shall be the sole owner (under Federal Power Commission License) of, the *project*. Yuba shall design, construct, purchase and install all structures, equipment and facilities to meet the requirements and specifications of Appendix B. The *project* shall be substantially equal in quality and design of materials, and in equipment and facilities provided, to those which Pacific has installed in its hydroelectric projects during the past 10 years on the Feather, Stanislaus, Kings, McCloud and Pit rivers. Pacific shall make available to Yuba for inspection, at Pacific's San Francisco office, plans and specifications of said plants of Pacific, and Yuba may inspect any of such plants.

Yuba shall submit to Pacific from time to time, and as soon as possible, the plans and specifications of all portions of the *project*. Pacific shall have the right to inspect all work performed by or for Yuba in constructing elements of the *project*. Neither approval of, nor failure by Pacific to approve, any plans or specifications, or inspection of any work hereunder, shall relieve Yuba of the responsibility of meeting the requirements and general specifications set forth herein and in Appendix B, nor shall Pacific be responsible for strength, details of design, adequacy or capability of any structure, facility or work.

Yuba desires to purchase Pacific's Bullards Bar Project and Colgate Power Project. In order that Yuba may proceed with the construction of the *project*, Yuba and Pacific shall diligently prosecute an application with the Public Utilities Commission of the State of California for authorization for Pacific to sell, convey and assign to Yuba, under terms and conditions to be agreed upon in a separate contract, Bullards Bar Project, portions of Colgate Power Project, and all necessary water rights relating thereto. Thereafter, Yuba shall, prior to *full operation date*, as specified in said separate contract, cease operating, and Pacific shall disconnect electrically, Colgate Power Project.

3. Yuba shall acquire and, to the extent that it can do so with money available from payments made by Pacific pursuant to paragraph 9(b) and from money available in the funds as provided in Part V of Appendix C, maintain ownership of all lands, easements, flowage rights, water rights, Federal and State licenses and permits, and all other rights and privileges necessary for the foregoing purposes and for the operation and maintenance of Yuba's *project* works and facilities in accordance with Appendix C.

4. (a) On and after the *full operation date*, Yuba, to the extent it can do so with money available from payments made by Pacific pursuant to paragraph 9(b) and from money available in the funds provided in Part V of Appendix C, (1) shall operate and maintain the *project*, (2) shall carry third-party bodily injury and property damage liability insurance, and property insurance, on the *project* substantially in accordance with the practice followed by Pacific with respect to its hydroelectric projects under Federal Power Commission License, (3) if required by Pacific, shall carry on the *project* use and occupancy insurance and mechanical breakdown insurance, (4) shall replace structures, facilities and equipment of the *project* whenever they are not capable of reliably or economically performing the service for which they were designed, and (5) shall operate Colgate 60 KV Switchyard and such switching and control facilities as Pacific or its contractors may install from time to time at the power plants of the *project*.

(b) Prior to the *full operation date*, Yuba, in the same manner as provided in paragraph 4(a) and to the extent it can do so with money available in the Early Operation Fund as provided in Appendix C-V, shall operate, maintain, carry insurance on, and make replacements to, the accepted operable portions of the *project*, and, while owned and operated by Yuba, Colgate Power Plant.

5. Pacific shall construct, own, operate and maintain at its own risk and expense transmission lines required to receive the power generated by each power plant of the *project* into Pacific's transmission network. Pacific shall acquire all lands, easements, Federal and State permits and all other rights and privileges necessary to carry out its obligations under this paragraph.

6. Yuba shall schedule the date of first delivery of power from each power plant of the *project* and notify Pacific thereof in writing 24 months in advance of the scheduled date for each such plant, and promptly shall inform Pacific of any changes in such dates. Pacific shall complete transmission lines to and be ready to receive power from each power plant when it is ready

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to generate power, or the scheduled date as designated in said notice, whichever date is later.

7. (a) Yuba shall sell and deliver to Pacific during the term of this contract all the electric capacity of and energy generated by the power plants of the *project*, except that required for *project power plant use* and that energy delivered pursuant to Appendix C-2B. In addition, Yuba shall sell and deliver to Pacific all of the electric energy, not required for power plant use, generated by Colgate Power Project, while said project is owned and operated by Yuba. Such energy from Colgate Power Project shall be generated in accordance with schedules to be agreed upon by Yuba and Pacific.

(b) Delivery of power and energy to Pacific shall be at the bus bar of Yuba's power plants, except for such power and energy as Pacific may hereafter request to be delivered to it at generator voltage, in which case the necessary facilities shall be provided by Yuba at Pacific's expense. The term "bus bar" shall for the purpose of this contract be defined as the high tension disconnect switches of each such plant.

(c) Energy deliveries to Pacific under (a) above shall be metered at the low voltage side of the transformers and the meter readings shall be adjusted for losses to the high voltage side of the transformers.

8. Prior to the *full operation date*, Pacific shall pay Yuba each month $0.0027 per kilowatt-hour for energy delivered during the preceding month to Pacific from Colgate Power Project while said project is owned and operated by Yuba, and from *project* power plants, in excess of energy delivered pursuant to Appendix C-2B.

9. Following the *full operation date* and until termination of this contract, Pacific shall pay Yuba for all power and energy delivered hereunder, (a) at the semiannual rate of $3,850,000, and, in addition, (b) at the monthly rate of $25,000.

10. Payments under paragraph 9(a) shall be due and payable each July 15 and January 15 for the semiannual periods ending on the last day of the next succeeding August and February, respectively. The first and last payments shall be prorated according to the ratio of the number of days for which payment is to be made to the number of days in the semiannual period for which payment otherwise would be due. In the event the *full operation date* occurs after July 15 but before September 1, or after January 15 but before March 1, of any year, the payment for the semiannual period in which said date occurs shall be made promptly after confirmation of the *full operation date*. Payments under paragraph 9(b) for each month shall be due and payable on the fifteenth day of the following month. Payments under paragraph 8 shall be due and payable each month within 15 days after receipt of an invoice therefor.

11. (a) Subject to the provisions of paragraphs 16 and 17, Pacific's obligation under paragraph 9 shall not be dependent upon all or any part of the *project* continuing to be capable of operation, nor shall its obligation under paragraph 9 be dependent upon the ability of Pacific to take energy produced by or made available from the *project;* **provided,** Yuba shall be responsible for any loss of generation to the extent Yuba is insured under a use and occupancy form of policy and Pacific may reduce its payments under paragraph 9(b) to the extent proceeds from such use and occupancy insurance are deposited into the Operation and Maintenance Fund pursuant to Appendix C-9D(f). This paragraph, however, shall not be deemed to relieve Yuba of any of its obligations under this contract.

(b) Pacific may offset against any amounts due from it to Yuba under this contract any amounts due to Pacific from Yuba by reason of this contract or any breach thereof, except that no offset shall be applied by Pacific against the payments due from it to Yuba under the provisions of paragraph 9(a).

12. Yuba shall defend its lands, easements, and water rights necessary or useful to the operation of the *project*, and shall not voluntarily convey, transfer or in any manner encumber or diminish any of such rights or any Federal and State licenses and permits, or any other rights and privileges necessary or useful to the operation of the *project*, without the written consent of Pacific.

13. (a) Consistent with Yuba's use for *project* purposes, Yuba shall permit all roads, lands, rights of way and road structures owned or controlled by it for *project* purposes to be used by Pacific, without additional cost or expense, for construction, installation, operation and maintenance of any works or facilities of Pacific now in existence or hereafter constructed or installed.

(b) Consistent with Pacific's use for its own purposes, Pacific shall permit use by Yuba of Pacific's roads, road structures, and rights of way without cost or expense for the purpose of constructing, maintaining and operating facilities of the *project*.

Amended 9/30/69
See "Early Completion" Agreement

(c) Yuba hereby grants Pacific a license to construct, install, operate, maintain, replace and repair, upon properties of the *project*, facilities of Pacific, including but not limited to facilities for transmission, transformation and distribution of electric power and for switching and control, as are necessary and desirable for the purpose of this contract. Said license shall remain in effect during the term of this contract and shall expire coincidentally therewith. Any facilities so installed by Pacific pursuant hereto shall be and remain the property of Pacific, notwithstanding that the same may have been affixed to the premises, and Pacific shall have a reasonable time after it ceases to purchase power from the *project* in which to remove its facilities so installed. In addition, at any time prior to termination of this contract, at Pacific's request Yuba shall grant Pacific, without any additional payment to Yuba, a permanent easement or right of way for constructing, installing, operating, maintaining, replacing and repairing any facilities so constructed or installed or to be constructed or installed.

14. Yuba shall indemnify Pacific, its officers, agents and employees against all loss, damage, expense and liability to third persons for injury to or death of person or injury to property, proximately caused by Yuba's construction, ownership, operation or maintenance of, or by failure of, any of Yuba's works or facilities used in con-

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nection with the *project*. Yuba shall, on Pacific's request, defend any suit asserting a claim covered by this indemnity. Yuba shall pay any costs that may be incurred by Pacific in enforcing this indemnity.

Pacific shall indemnify Yuba, its officers, agents and employees against all loss, damage, expense and liability to third persons for injury to or death of person or injury to property, proximately caused by Pacific's construction, ownership, operation or maintenance of, or by failure of, any of Pacific's works or facilities used in connection with the *project* or installed pursuant to this contract. Pacific shall, on Yuba's request, defend any suit asserting a claim covered by this indemnity. Pacific shall pay any costs that may be incurred by Yuba in enforcing this indemnity.

15. This contract shall be effective upon due execution by the parties hereto.

16. Yuba intends to finance construction of the *project* by moneys received from the issue and sale of *project bonds* and by use of moneys from Federal and State grants and loans, and Yuba shall proceed diligently with all necessary action to complete such financing; **provided,** that Yuba shall not be required to accept or agree to any conditions or obligations in connection with any such financing which it deems unreasonably burdensome. If Yuba shall not have completed such financing on terms satisfactory to it and awarded *project* construction contracts prior to June 30, 1966, this contract shall thereupon terminate and neither party shall have any further obligation to the other hereunder or be liable to the other by reason of any expenses incurred or obligations undertaken for the performance by it of this contract or for any damages suffered as a result of the termination of this contract.

Upon issuance and sale of the initial issue of *project bonds* (Series A Bonds) and execution of contracts for construction of the *project*, Yuba shall furnish Pacific with a certificate to that effect. Such certificate shall be binding and conclusive upon Yuba and thereafter there shall be no termination of Yuba's obligations under this contract by reason of any provisions of this paragraph.

17. Except as provided in paragraph 16, this contract shall remain in effect so long as Yuba holds a license under the Federal Power Act and other necessary rights for the *project* permitting full performance by it of this contract, but not beyond April 30, 2016. Termination of this contract as a result of the loss by Yuba of such rights necessary for the full performance of this contract with respect to the *project* shall not affect obligations of either party accrued hereunder prior to such termination, but no further obligation shall accrue subsequent to the date of such termination and final payments as of the date of termination shall be prorated as may be appropriate.

18. No voluntary assignment of this contract, except for security purposes in connection with Yuba's financing of the *project*, shall be effective without the written consent of Pacific.

19. Any dispute that may arise hereunder between Yuba and Pacific shall, upon the written request of either party to the other, be submitted to and decided by arbitration. Each of the parties shall, within 30 days after giving or receiving such written notice, appoint one arbitrator. If either party fails to appoint an arbitrator within such time, he shall be appointed by a Superior Court of the State of California in accordance with the California Code of Civil Procedure. At any time that either arbitrator concludes they cannot agree, the two arbitrators shall appoint a third arbitrator or, if they cannot agree upon a third arbitrator, he shall be appointed by said Superior Court in accordance with said Code. A decision by two of the arbitrators shall be binding on the parties. If a decision has not been reached within 90 days after appointment of the third arbitrator, on written notice by either party to the other, the arbitrators' authority shall terminate and either party may submit the matter to an appropriate court for decision.

Each party shall bear the expenses and fees of the arbitrator appointed by it and its own expenses involved in the arbitration. The expenses and fees of the third arbitrator and all other expenses of arbitration shall be borne equally by Pacific and Yuba.

20. Pacific shall cooperate with Yuba in the operation of Narrows 1 Power Plant, and in the operation of Colgate Power Project and Bullards Bar Project while Pacific owns said projects, in order to accommodate the construction and completion of the *project*. Yuba shall provide adequate access to Pacific for maintenance and operation of Pacific's facilities. Yuba shall notify Pacific in writing at least 90 days in advance of the date or dates when Yuba believes operation of said power plants will be affected by such construction. Yuba shall compensate Pacific for interference with Pacific's power plants as provided in Appendix C-2B.

21. After *full operation date* Yuba shall not voluntarily exercise its *project* water rights in any way, form or manner which would interfere with the flow available for use under Pacific's water rights associated with its Narrows 1 Power Plant. Prior to *full operation date* the flow available for use through Narrows 1 Power Plant shall be decreased only to the extent necessary for the construction of the intake for Narrows 2 Power Plant and for initial filling of the new Bullards Bar Reservoir, unless otherwise agreed, and Yuba shall compensate Pacific therefor as provided in Appendix C-2B. It is expressly understood this paragraph is not intended to nor shall it create a new or additional water right for the existing Narrows 1 Power Plant, it being the sole purpose of this paragraph to acknowledge and protect Pacific's present water rights associated with the existing Narrows 1 Power Plant.

22. The parties specifically understand and agree that in their negotiations they have taken into full account the provisions of Section 10(f) of the Federal Power Act relating to upstream benefits. They agree that such benefits are of the essence of this agreement and that the considerations forming a part of this agreement take into full account and include those benefits provided by Pacific to Yuba and those benefits provided by Yuba to Pacific, by reason of their respective facilities now existing or to be built pursuant to this contract, or by replacement, im-

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provement or enlargement of Pacific's Narrows 1 Power Plant, and that neither party during the term of this contract is entitled to any further consideration with respect to such benefits. In the event that, by reason of any requirement of the Federal Power Commission or other governmental authority having jurisdiction so to do, either party is required to pay the other for benefits provided by reason of such facilities, the amounts to be paid by Pacific to Yuba under this contract shall be increased by the amount of any such benefit payment Pacific receives from Yuba or decreased by the amount of any such benefit payment Yuba receives from Pacific.

23. No replacement, improvement or enlargement of Pacific's Narrows 1 Power Plant shall result in any increase in Pacific's payments under this contract.

24. Except as otherwise provided herein, the payments to be made under this contract do not cover or take into account benefits that may be received by either party hereto as a result of the development of an undeveloped head, or the development of additional storage or water supply, and compensation for any such benefits shall be subject to agreement of the parties.

25. In the event that Marysville Reservoir is constructed, Yuba shall, at its own cost and expense and without using moneys available to it from payments made by Pacific under this contract or from funds established pursuant to Appendix C-V, (1) protect Narrows 2 Power Plant from damage or interference when the water surface in said reservoir exceeds *elevation* 345 measured at Marysville Dam, and (2) compensate Pacific for any loss of capacity or energy resulting at Narrows 2 Power Plant when the normal water surface in said reservoir exceeds *elevation* 340.

IN WITNESS WHEREOF, on the date first above written the parties hereto have subscribed this agreement by their officers thereunto duly authorized.

YUBA COUNTY WATER AGENCY

By KARL A. COZAD
Chairman of the Board of Directors

and

(Seal) By BEN ROSE
Secretary of the Board of Directors

PACIFIC GAS AND ELECTRIC COMPANY

By S. L. SIBLEY
President

and

(Seal) By E. E. MANHARD
Secretary

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1.3.3 Federal Energy Regulatory Commission (FERC) Licenses

The Federal Power Act of 1918 authorized the Federal Power Commission to license electrical generating facilities within the borders of the United States. The Yuba County Water Agency acquired a license for a period of 50 years effective May 1, 1966 for the Yuba River Project No. 2246.

The Federal Power Commission was replaced by the Federal Energy Regulatory Commission (FERC) in 1977. YCWA acquired a 50 year license for its Deadwood Creek Project No. 6780 effective September 28, 1988.

FERC requires a project to be re-licensed after a period of fifty years to allow interested parties, stakeholders, governmental issues, recreation issues, and water supply issues for a second term license of thirty years. The re-licensing process is a five to eight year process with defined milestones that FERC requires the owner to meet. Currently the typical project license costs approximately $3 to $6 million. The Yuba River is a large and complex project that may cost form $20-$0 million to re-license in the Agency's re-licensing schedule of 2008 to 2016.

The Deadwood Project will not start the re-licensing process until 2033, and to predict a cost is not practical at this time.

Recent re-licensing of similar projects demonstrates that the Agency will successfully re-license its projects, since there are minimal non-compliance issues, and the Agency is recognized as a good steward of the projects and environment.

For the FERC license for project no. 2246, see Appendix A

1.3.4 Other Regulatory Requirements

- California Department of Fish and Game 1600 Permit
- United States Fish and Wildlife Service National Marine Fishery Service Section 7 Biological Opinion
- State Water Resources Control Board 401 Permit
- State Water Resources Control Board d-1644 Interim Flow Schedule – sets forth a schedule of minimum fish flows for the project
- Army Corps of Engineers 404 Permit
- United States Forest Service Agreement – authorizes the use of Forest Service lands for the project and stipulates the recreation facilities that are to be constructed and how they will operate
- Water Rights – YCWA holds 12 water rights of varying priorities, some of which were established in 1914, when the regulation of water rights was started by the State. The water rights set forth the amount and location of water that can be diverted or stored, at what time of year, and for what purpose it can be used.
- State Division of Safety of Dams – issues permits for each of the agency's dams that fall under its jurisdiction. DSOD provides twice a year inspection of the dams and continuous safety oversight.

Image 1-5 Recreation Facilities at New Bullards Bar Reservoir

The Agency applies for and obtains permits from these organizations on a regular basis to maintain and construct improvements on the Yuba river Project. The permits dictate environmental requirements to allow the construction of the permitted projects

The Agency by its act cannot sell water to individuals, but can only wholesale water to entities authorized to purvey water. YCWA currently has seven water service agreements with five irrigation districts and two water companies of which three were pre-existing river diverters.

1.4 Plan Adoption and Supporting Documentation

The Yuba County Water Agency in accordance with FEMA recommended guidelines, will adopt the YCWA Multi-Hazard Mitigation Plan following FEMA and State OES review and comment. The comments provided by FEMA and the State will be incorporated into the YCWA Plan prior to formal adoption.

1.5 Governing Board

The Yuba County Water Agency governing board consists of the five members of the Yuba County Board of Supervisors and two at large members – one elected from north of the Yuba River and one south of the Yuba River. Current board members are:

Tib Belza	Director
Mary Jane Griego	Chairman (2006)
Dan Logue	Director
Sid Muck	Director
John Nicoletti	Director
Don Schrader	Chairman (2004, 2005, 2007)
Hal Stocker	Director

2006 Board Committees and members are as follows:

Projection Operation and Development Committee
Tib Belza, Don Schrader, Mary Jane Griego

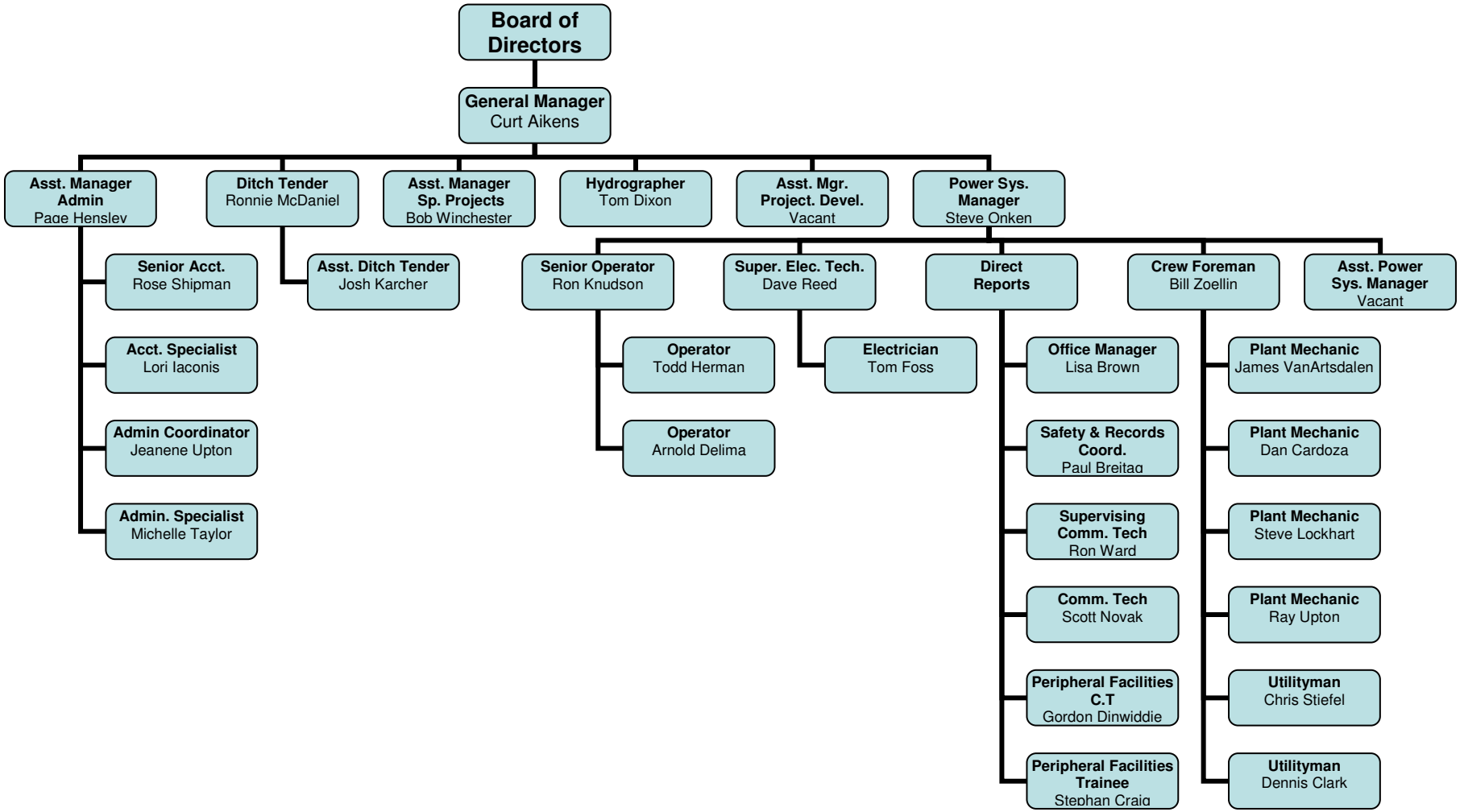
Administration, Budget and Personnel Committee
John Nicoletti, Dan Logue, Mary Jane Griego

Marina and Recreation Committee
John Nicoletti, Dan Logue, Hal Stocker

South County Water Development
Don Schrader, John Nicoletti, Dan Logue

1.6 Administrative Structure

Figure 1–2 YCWA Organization Chart



1.7 Demographics

Census 2000

The YCWA service area encompasses all of Yuba County, which has a population of 60,219 people according to the 2000 Census (U.S. Census 2000). There are 22,636 housing units and 14,805 families in the County. Yuba County covers an area of 643.73 square miles with 630.69 square miles as land area and 13.04 square miles as water in lakes and reservoirs. This results in a population density of 95.5 people per square mile (U.S. Census 2000). Due to recent development in the County, especially in the area west of State Highway 70 and south of Marysville, Yuba County has been growing in population at the average rate of 4.3 percent per year from 2000 to 2003 (Yuba Co. Econ. Dev., 2005). The current population, as estimated by the Yuba County Economic Development Department, is 62,800 (Yuba Co. Econ. Dev., 2005).

Census 2005 American Community Survey

The U.S. Census Bureau undertakes a nationwide survey of American communities to provide demographic information every year by selecting a random sample from its file of housing unit addresses. An address has approximately one chance in 480 of being selected in any month. No address will be selected more often than once every five years. The American Community Survey has made the following estimates for Yuba County in 2005:

Figure 1–3 Yuba County 2005 Demographics

General Demographic Characteristice: 2005	Estimate	Percent
Total Population	**65,818**	
Median age (years)	30.40	
18 years and over	45,457	69.1%
65 years and over	6,688	10.2%
Race alone or in combination with one or more races		
White	50,681	77.0%
Black	2,177	3.3%
American Indian and Alaska Native	7,914	12.0%
Asian	1,790	2.7%
Native Hawaiian and Other Pacific Islander	N	
Some other race	10,083	15.3%
Total Household	**22,632**	
Households with one or more 65 years +	5,202	23.0%
Average household size	2.91	

Yuba County is located in northern California approximately 40 miles north of Sacramento, the state capital. Considered the gateway to the historic Mother Lode, Yuba County is only two hours away from San Francisco to the west and Lake Tahoe to the east. Its boundaries stretch from the foothills of the Sierra Nevada to the banks of the Yuba River. Yuba County contains two incorporated cities; Marysville, the county seat, and Wheatland; along with 14 unincorporated communities.

1.8 Geography, Demographics, and History

This section introduces the geography, demographics, and history of the YCWA jurisdiction and Yuba County. A review of the climate is also included, as well as local natural and man-made hazard events and mitigation projects.

1.8.1 Geography

Yuba County is located in the northern Sacramento Valley, approximately 40 miles north of California's State Capital, Sacramento. 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 acres of which 13 square miles (2.03%) are water and 631 square miles are land. (Census 2000)

The County has a varied geography, which includes the confluence of the Feather and Bear Rivers, wooded mountains, streams, lakes, and agriculture croplands that vary from orchards to vineyards to rice fields. Elevations range from 20 feet above sea level in southwest corner of the county to nearly 4,820 feet in northern Yuba County.

Image 1-6 The Yuba River at Englebright Dam

The most important geographic feature for the Yuba County Water Agency is the Yuba River. YCWA was created for developing the Yuba River for flood control, water supply, power generation, and other issues. The Yuba begins as three rivers: North, Middle, and South. It begins at the crest of the Sierra Nevada Mountains, 8,000 ft above sea level and journeys through hundreds of miles of canyons in just 48 hours to join the Feather River at a confluence that stands 67 ft above sea level. In total they gather water from 1,357 square miles of watershed, which is never more than 35 miles wide at one point. Jagged, rocky ridges separate the rivers for much of their journey.

Agreements with local, state, and federal agencies determine how much of the water will stay in the river's natural channels and how much will be diverted for a variety of beneficial uses. Through YCWA, Nevada Irrigation District (NID), and South Feather Water & Power (SFWP) tunnels and canals, Yuba River water is taken to the Feather, Bear, and American Rivers to provide water to Member Units that have both water rights and water service contracts.

The North Yuba starts its trek to the valley below at Yuba Pass (elevation 6,701 feet) near State Highway 49 in Sierra County. The river journeys in tandem with the highway as far as Downieville, where it leaves the road and flows westward to the New Bullards Bar Reservoir.

The Middle Yuba is born from snow runoff and rainwater gathered at Jackson Meadows Reservoir in Sierra County. It meanders and roars, depending on the season of the year, through narrow, steep canyons until it gets to the 75-foot-high Our House Dam, southwest of

Camptonville. How much water can be diverted by YCWA is spelled out in agreements with FERC and DFG. Emerging from the 3.8-mile-long tunnel, Middle Yuba water flows into Oregon Creek where it travels a short distance to Long Cabin Dam. Just upstream from the 55 foot high dam, Middle Yuba and Oregon Creek water is diverted unto a 1.2 mile long tunnel that carries it to New Bullards Bar Reservoir where it joins water from the North Yuba. At the New Bullards Bar Dam, water is released into a 4.7 mile long tunnel that carries it to turbines that generate electricity at the New Colgate Powerhouse.

Almost a million acre–feet of water from the North and Middle Yuba River and Oregon Creek are stored behind the 64 story high, 2323 ft. long New Bullards Bar Dan, which is located at the south end of a 16 mile long reservoir. In addition to providing much needed flood control, the reservoir is a prime recreation area and stores water for crop irrigation and energy generation, and influences downstream river temperature for fishery enhancement.

The South Yuba comes to life at 9,000 feet in Placer County near Castle Peak and Donner Lake. As you drive east or west on Interstate 80 between Emigrant Pass and Donner Pass, you can catch glimpses of this pristine waterway on its journey to Englebright Reservoir and the main stem of the Yuba River many miles away. Dozens of creeks large and small flow into the South Yuba as it moves downhill through Placer and Nevada Counties to Yuba County near the old town site of Bridgeport. A few miles from Bridgeport the North Yuba joins the South and Middle forks and flows into Englebright Reservoir at a location 3.3 miles downstream from the New Colgate power house.

Image 1-7 Convergence of the South and North Yuba Rivers

1.8.2 Topography

Yuba County is situated in the Sacramento Valley and on the western slope of the Sierra Nevada Mountains. The rich valleys of the Yuba, Bear, and Feather rivers, afford fertile soil for the production of cereals, fruits, nuts, and vegetables. The foothills, which form the transition from the valley floor to the mountains, furnish abundant space for the production and maintenance of livestock.

The County is bounded on the northwest by Butte County, separated by Honcut Creek; on the east by Sierra and Nevada Counties, separated partly by the Yuba River and its forks; on the south by Placer and Sutter Counties, separated partly by the Bear River; and on the west by Sutter County, separated by the Feather River. Its greatest length is from northeast to southwest. There are no peaks of note that exist within the County.

The western part of the Sierra Nevada Mountain Range in Yuba County is drained south and west into the deeply entrenched Yuba River. The area is a complex of round smooth ridge tops, steep mountain sides, and very steep canyons. Elevation increases from about 1,900 feet to about 4,825 feet.

The Sierra Nevada Mountain Range in east Yuba County is also drained west and south by numerous intermittent and perennial streams into the Feather River. These streams often bisect

the ridges that are oriented northwest to south east. Elevation in the Sierra Nevada Range increases from about 200 feet near the valley floor to about 1,900 feet.

The change in elevation across Yuba County allows for a wide diversity of habitats, which includes Riparian Forest, California Prairie, Blue Oak–Digger Pine Forest, Sierra Yellow Pine Forest, Sierra Montane Forest, and Vernal Pools. Many of these natural habitats have been greatly modified, as a result from changes caused by human settlement. A more detailed description of the habitat includes; Non–native grassland, Riparian Woodland, Great Valley Oak Riparian Forest, Great Valley Cottonwood Riparian Forest, Chaparral, Foothill Woodland, Digger Pine–Oak Woodland, Westside Ponderosa Pine Forest, Darlingtonia Seep, and Northern Hardpan Vernal Pool. (*source: QUAD, 1994*)

1.8.3 Soil

Water is readily available in the Sacramento Valley floor, at a depth of 20 feet in some locals, and the soil is deep black alluvial, well adapted for the production of grains, vegetables, and fruits. Further from the river, extending up the slope of the foothills, the shallow soils are red. The "Red Lands" are not as productive as the valley floor; although wheat yields of up to 2.6 tons per acre can be obtained. (*source: Yuba County Agriculture Commission, 2005*) The Foothills themselves are quite rocky in places and are principally utilized for grazing, with vineyards and orchards growing in the valleys. At the very highest elevations in the County ranches take advantage of the lower, more level reaches to produce cattle and native hays.

1.8.4 Weather

Yuba County has a climate that is characterized by hot dry summers and cool moist winters in the valley and lower foothills and by warm dry summers and cold, wet winters in the upper foothills and in the mountains. The Coast Range to the west diverts the direct flow of marine air from the Pacific Ocean. The Sierra Nevada Mountain Range to the east shields the county from the cold continental winter climate to the east.

Precipitation increases with elevation in Yuba County. The total annual precipitation is 21.04 at Marysville, in the western 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. During the winter, snow occurs between 2,000 to 5,000 feet MSL and occasional thick fog in the valley. Moderate amounts of snow are reported nearly every winter at elevations as low as 2,000' (www.wrcc.dri.edu 2005). The 'Dobbins 1 S' weather station reported an average of 3.4 inches of snow for the period 1970 through 2005 (*source: www.wrcc.dri.edu, 2005*)

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 deflects the westerly winds coming through the Carquinez Straits northward. Occasionally, strong northerly winds occur. Late in the winter and early in the spring these winds bring cold dry weather. These same winds in the late spring and summer cause pronounced heat waves and cause a severe fire hazard especially in the foothills. In the upper foothills and in the mountains, the direction of the winds conforms nearer the free-flowing westerly winds over northern California.

The average mid–afternoon relative humidity is about 46 percent in Marysville, is higher at night, and is approximately 83 percent at dawn. In the valley the relative humidity averages less than 20 percent on hot summer afternoons and occasionally drops to less than 10 percent when the north wind blows. In the summer, nighttime humidity range from approximately 50 percent to 60 percent, while in the winter, humidity range from the 60 to 70 percent during the day to nearly 90

percent at night. The relative humidity in the mountains are roughly 10 percent higher than in the valley. (*source: Lytle, 1992*)

During the winter at times of low wind speeds, cold air drainage from the surrounding uplands and the relatively moist, warm soil cause fog to form in the valley and the lower foothills. These foggy periods can last several days to several weeks.

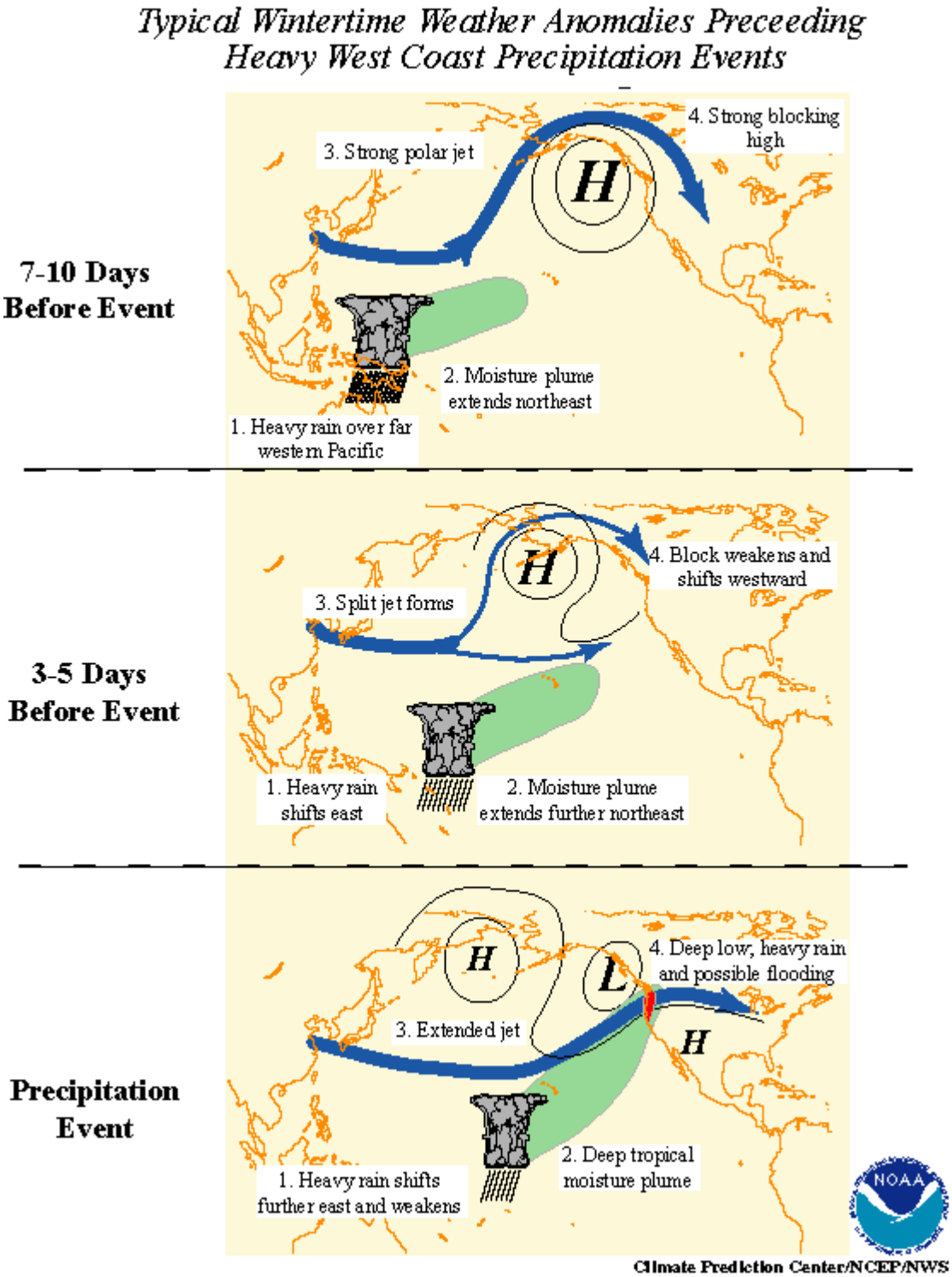
The climate in Yuba County is considered Mediterranean and cycles through a cool rainy winter season and a dry summer season (*source: Ritter 2005*). Summers are hot and dry with highs in the upper 90s and lows in the low 60s. Winters are cool and wet, with most of the year's rain falling from late October through early April; highs are in the mid 50s and lows in the upper 20s. While the higher County elevations receive snow, snowfall is rare at the lower elevations. At Marysville, the greatest snow depth at any one time during the period of record and the heaviest 1-day snowfall on record were 1 inch on December 13, 1972. (*source: Soil Survey of Yuba County, California, 1998)* . An interesting historical aside; in December 1873, snow fell to a depth of one foot on the streets of Marysville. (*source: Thompson & West, 1879; transcribed by Hahn & Sedler, 2003*).

The foothills community of Dobbins, 'Dobbins 1S' weather station has recorded an average low of 32.9 degrees in December and an average high of 92.0 degrees in August (*source: Western Regional Climate Center, wrcc@dri.edu, 2005*),

A climatic condition that occasionally occurs during the wet winters in northern California is called the Pineapple Express. This condition occasionally occurs as a result of a combination of three climatic conditions: 1) abundance of tropical moisture in the equatorial Pacific Ocean, 2) a southward-plunging jet stream below a high pressure ridge in the Gulf of Alaska and 3) neutral to weak El Niño conditions in the Pacific Ocean (Figure 1–4) (source: NOAA 2005). The accompanying illustration shows the conditions that combine to create this heavy precipitation in California. Depending on the configuration of the jet stream and pressure ridges, the Pineapple Express can affect California, Oregon, Washington, and the Canadian province of British Columbia (NOAA 2005). The warm, tropical moisture associated with the Pineapple Express can exacerbate the threat of flooding by melting the winter snow pack. The Pineapple Express was responsible for very heavy rainfall in 1986 and 1997 when broken levees resulted in disastrous flooding in the towns of Linda, Olivehurst, and Arboga (*source: McCarthy 1997*). During the 1997 Pineapple Express, almost 40 inches of rain fell in the Feather River basin in eight days (McCarthy 1997).

Image 1-8 Narrows II Power House during High Water Period 1997

Figure 1–4 Typical Winter Weather Anomolies



1.8.5 Areas of Historic or Environmental Significance

Yuba County has a number of recreational opportunities with Bullard's Bar dam and reservoir, Collins Lake, Camp Far West, numerous hunting clubs, and over 25,000 acres of national forest lands.

The YCWA service area includes many areas of historic interest. Most of these are located within the City of Marysville, where much of the downtown region has been identified by the National Register of Historic Places as historic landmarks. Many of the historic sites within the service area of the Agency are in areas that could be susceptible to flooding.

Environmental Areas of Significance
The Yuba County Water Agency complies with the Environmental Protection Act and California Environmental Quality Act in all of its actions. When appropriate, YCWA uses Environmental Impact Reports and Environmental Impact Statements.

The **Feather River** flows south for 67 miles from Oroville Reservoir and empties into the Sacramento River near Verona. Flows in the Feather River are controlled primarily by Oroville Reservoir which stores 3.5 million acre–feet of water. A minimum flow of 600 cfs is maintained in the 8–mile low–flow section of the Feather River between the Fish Barrier Dam and the Thermalito Afterbay Outlet. A minimum flow of approximately 1,700 is maintained in the 59–mile high–flow section of the Feather River below the Thermalito Afterbay Outlet. Average flows in the Feather River during July and August are 7,600 cfs during wet years, 5,750 cfs during above–normal years, 4,7100 cfs during below–normal years, 4,050 cfs during dry years, and 2,950 cfs during critically dry years (*source: HDR, 2006*). Constituents of concern for the Feather River, according to the Clean Water Act Section 303(d) list, include diazinon, Group A pesticides, mercury, and unknown toxicity. Potential sources of these constituents include agriculture, urban runoff, storm sewers, resource extraction, and other unknown sources. (*source: HDR, 2006*)

The **Sacramento River**, which originates in the Cascade and Siskiyou Mountains of northern California and terminates in the Delta, is the largest river in California. Flows in the Sacramento River are controlled primarily by Reclamation's operation of Shasta Reservoir. In addition, release flows from both Oroville and Shasta reservoirs are coordinated by DWR and Reclamation, to meet water supply and environmental needs downstream and in the Delta. Flows on the Sacramento River at Keswick in July and August average approximately 12,500 cfs during wet years, 9,200 cfs during above–normal years, 7,600 cfs during below–normal years, 7,300 cfs during dry years, and 6,100 cfs during critically dry years. NMFS requires that Reclamation maintain a minimum release from Keswick Dam of 3,250 cfs from October 1 to March 31. No additional specific flow requirements have been identified for fish in the lower Sacramento River. (*source: HDR, 2006*)

Sacramento River water quality monitoring studies indicate that the river's water is generally of high quality. Concentrations of some trace elements (particularly copper and zinc) frequently approach limits established by regulatory agencies while other metals such as lead, cadmium, mercury, and silver also may approach these limits.

The **Yuba River** is the most significant geographic feature in the County. Beginning as three rivers; North, Middle, and South Forks, the Yuba River gathers water from 1,357 square miles of watershed of the western Sierra Nevada slope. Never wider than 35 miles at any point, the watershed separates the forks with jagged rocky ridges for much of their distance. Both the upper and lower watersheds (above and below Englebright Dam, respectively) have been developed extensively for water supply, hydroelectric power production, and flood control. Operators of upper watershed projects include PG&E, Nevada Irrigation District, and South Feather Water and Power Agency. Local, State, and Federal agreements determine how much

of the water will stay in the River's natural channels and how much can be diverted for other uses. Entities such as Nevada Irrigation District, South Feather Water and Power Agency, PG&E, and individual water rights holders divert water from the Yuba River for their needs before the water ever reaches the Yuba County Water Agency (YCWA) facilities. (*source: HDR, 2006*)

The North Yuba River originates in the Yuba Pass (elevation 6,701 feet) near State Highway 49 in Sierra County. The North Yuba follows the State Highway as far as Deweyville before flowing westward into the New Bullards Bar Reservoir.

The Middle Yuba River begins with snow runoff and rainwater gathered at Jackson Meadows Reservoir in Sierra County. The Middle Yuba flows through steep narrow canyons to the Our House Dam. Located southwest of Camptonville near the Sierra/Nevada County line the Our House Dam is 75 feet high. (*source: www.ycwa.com/watjrn.htm*)

Yuba Groundwater Sub basin lies entirely within the Sacramento Valley groundwater basin, within the political boundary of Yuba County. The sub basin extends from the Sierra Nevada foothills on the east to the Feather River on the west. The southern boundary is the Bear River and the northern boundary is Honcut Creek. The Yuba County groundwater sub basin encompasses an area of approximately 270 square miles.

The groundwater sub basin area is bounded on the east by the relatively impermeable rocks of the Sierra Nevada Mountain Range. These same rocks and younger consolidated rocks extend beneath the sub basin at a gradually increasing depth toward the Feather River and beyond to the trough of the Sacramento Valley. Fresh groundwater is stored in this wedge–shaped body of alluvial material to depths of 1,000 feet. Beneath these alluvial deposits are consolidated rocks that may contain saline water and are effectively nonwater–bearing.

The Yuba County groundwater sub basin is the current primary source of drinking water and surface water is the primary source of irrigation water in the Yuba River Basin. Historically, groundwater was also a primary source of irrigation water. Signs of overdraft of the groundwater sub basin were apparent by the 1980s. As a result of the overdraft trends, actions were taken to replace groundwater with surface water for irrigation purposes. Subsequent to the development of the Yuba River Operating Program, deliveries of surface water began with the completion of the initial phase of the South Yuba Canal in 1983. Extension of the canal continues to this day with increasing areas of the South Yuba sub basin receiving surface water with a concomitant reduction in groundwater use. Groundwater storage has recovered to the extent that current groundwater storage in the South Yuba sub basin is nearing the levels of the pre–development era.

The change in elevation across Yuba County allows for a wide diversity of habitats, which includes Riparian Forest, California Prairie, Blue Oak–Digger Pine Forest, Sierra Yellow Pine Forest, Sierra Montane Forest, and Vernal Pools. Many of these natural habitats have been greatly modified, as a result from changes caused by human settlement. A more detailed description of the habitat includes; Non–native grassland, Riparian Woodland, Great Valley Oak Riparian Forest, Great Valley Cottonwood Riparian Forest, Chaparral, Foothill Woodland, Digger Pine–Oak Woodland, Westside Ponderosa Pine Forest, Darlingtonia Seep, and Northern Hardpan Vernal Pool. (*source: QUAD, 1994*)

Non–native Grassland consists of a dense to sparse cover of annual grasses with flowering culms, often associated with numerous species of showy–flowered, native annual wildflowers, especially in years of favorable rainfall. With few exceptions, the plants are dead through the summer–fall dry season, persisting as seeds. This vegetation type occurs in the valley and foothills of the county, on fine–textured, usually clay soils, moist or even waterlogged during the winter rainy season and very dry during the summer and fall. (*source: QUAD, 1994*)

Riparian Woodland occurs as narrow strips of dense brush and trees along the water courses and around localized drainage basins. The dominant riparian trees are willow ,white alder, western sycamore, Fremont cottonwood, California laurel, Big–leaf maple, and western dogwood. Prominent as understory and vinelike plants are poison oak, California wild grape, wild blackberry, and elderberry . This association has been greatly disrupted by developments along various watercourses. (*source: QUAD, 1994*)

Great Valley Oak Riparian Forest is a broad-leafed, winter deciduous, closed canopy riparian forest. Stands of this forest rarely reach canopy heights of 100 feet. The dominant canopy species is Valley oak . Under stories include scattered Oregon ash, Hinds walnut and California sycamore as well as young Valley oak. Climbing vines are often conspicuous and quickly invade open spaces in the canopy. These vines are often dense in the shady under story. Valley oak riparian forests are restricted to the highest parts of the flood plain or high above the active portions of river channels where they are less subject to physical disturbances from flooding, but still receive annual inputs of alluvial and subsurface irrigation.

Great Valley Cottonwood Riparian Forest is a dense, broad-leafed, winter deciduous riparian forest dominated by Fremont cottonwood and Gooding's willow. Under stories are dense with abundant vegetative reproduction. Scattered seedlings and saplings of shade–tolerant species such as California box elder also known as ash leaf maple or Oregon Ash may be found, but frequent flooding prevents their reaching into the canopy. These sites are inundated yearly during spring, resulting in annual inputs of nutrients, soil, and new germination sites. This vegetation community was formerly extensive along the major low–gradient streams through the Central Valley, but is now reduced to scattered, isolated remnants or young stands because of flood control, water diversion, agricultural development, and urban expansion. (*source: QUAD, 1994*)

Great Valley Mixed Riparian Forest is a winter deciduous riparian forest where canopies are relatively dense and closed. A diverse number of tree species is apparent in this forest and may include box elder, Hinds walnut, California sycamore, Fremont cottonwood, Gooding willow, and Pacific willow. The shrubs of this forest are typically shade tolerant and include species such as button brush and Oregon ash. (*source: QUAD, 1994*)

These riparian forests are typical of low–gradient streams of the Great Valley, usually below 1,000 feet elevation. Formerly extensive, much of these forests have been cleared for urban development, flood control, and agriculture. (*source: QUAD, 1994*) These riparian habitats are considered to be among the most productive wildlife habitats in California and typically support the most diverse wildlife habitats. In addition to providing important nesting and foraging habitat, riparian habitats function as wildlife movement corridors. Riparian habitat has been designated by the California Department of Fish and Game (DFG) as a habitat of special concern in California because of its limited abundance and high value to wildlife. (*source: USACE, 2005*)

Chaparral or woodland is an association of tall, evergreen, woody shrubs which dominate many regions that are open and dry or in various stages of a post–burn succession. Although characterized as a brush land, chaparral formations are often interspersed with grasses and scattered trees and thus integrate with the other vegetation communities. The chaparral community is often composed of locally dominant species of shrubs along with an admixture of many other species. The dominant shrubs of typical communities are toy on , several manzanita , California lilac, bitter cherry, California scrub oak, redbud, yerba, and mountain mahogany. Chaparral formation occur most prominently on the slopes adjacent to canyons, ridge surfaces, valley sides, and in areas which have been cleared, heavily logged, or recently burned.

Foothill Woodland dominates ridge surfaces to elevations of 1,300 feet. The primary floral elements of this woodland are blue oak, interior live oak , and digger pine . Above 1,500 feet these species give way to canyon live oak, tanbark oak, and black oak . Several species of

shrubs provide an under story to this open woodland. Prominent in this community are manzanita, California lilac, yerba sancta poison oak and several members of the rose family. (e.g. the genera *Prunus, Rubus, and Rosa*).

Digger Pine–Oak Woodland is a mixture of digger pine and blue oak . Pure stands of either tree do occur, but mixed stands are more common. Pines usually tower over the oaks in undisturbed stands. Under stories usually are dominated by introduced annuals. This vegetation type occurs on well–drained sites, in rocky or exposed sites along ridges or canyons with poor or shallow soils.

Westside Ponderosa Pine Forest occurs as a broad transitional zone between the foothill woodland and higher mixed coniferous associations. It is usually a closed forest dominated by Ponderosa pine. The closely related Jeffrey pine occurs locally on drier sites and serves as a specific indicator of ultra basic and serpentine rock outcroppings. The Ponderosa pine zone has been the most heavily logged of all the communities in Yuba County. This practice has allowed the encroachment of other woody species into areas formerly covered by pines. The Ponderosa and Jeffrey pines are found locally intermixed with incense–cedar Douglas–fir, white fir, sugar pine, black oak and several additional hardwood species including big leaf maple, western dogwood, and California laurel.

Darlington Seep (Bog) is similar to the *Sphagnum* Bog, being dominated by dense low–growing, herbaceous perennials, and low shrubs. The growing season extends from spring through fall in low–elevation, coastal localities, but is limited to summer at high elevations. Most flowering occurs early in the growing season. Typically found in cold, highly acid, permanently waterlogged soils that are low in nutrients, bogs are often associated with ultra basic soils in the Klamath Ranges, less so in the Sierra Nevada. Peat tends to accumulate without decomposing completely. Characteristic plant species include sedges. Lawson cypress, (the only native California pitcher plant, a herbaceous perennial which grows to approximately 0.6 meters high), dew plant, Labrador tea lily, grass of Parnassus, butterwort, western azalea, California cone–flower. Found in the northern Sierra Nevada at elevation ranges from 4,000 to 6,000 feet. The California Department of Fish and Game Natural Diversity Data Base (NDDB) has labeled this community as one with high inventory priority.

Northern Hardpan Vernal Pools are ephemeral wetlands that occur when winter and spring rains fill the depressions in hog wallow or mound areas. Several sensitive plant species occur in association with the northern hardpan vernal pool community: Hoover's spurge , Federal–Candidate Category 1; State–Rare), Green's, Federal –Candidate Category 1; State–Rare), and Federal–Category 1; State Endangered).

Several small crustaceans are also dependant upon this type of habitat. There are four fairy shrimp and a vernal pool tadpole shrimp that are currently proposed for federal listing. If listed, these species would benefit from all protections granted by the Endangered Species Act. These species are: the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, California linderiella, and the vernal pool tadpole shrimp . The vernal pool fairy shrimp, the California linderiella, and the vernal pool tadpole shrimp were observed in the Yuba River Basin project area within Yuba County.

These pools, as well as other wetlands are subject to the jurisdiction of the USACE pursuant to Section 404 of the Clean Water Act. Developers and private owners are responsible for complying with Section 404 of the Clean Water Act and all relevant mitigation requirements.

Image 1-9 The Yuba River and Surrounding Agriculture and Developed Land

Agriculture includes major crops and cover types such as orchard crops and field crops. The orchard crops in the county include walnuts and prunes among others, and field crops include rice.

Developed Land occurs within Marysville and within the communities of Linda and Olivehurst, south of the Yuba River. There are also recent housing additions further south in the Plumas Lake area. Much of the County jurisdiction includes scattered rural housing. Developed areas typically lack vegetation cover. Where vegetation does exist it ranges from sparse cover of weedy vegetation to horticultural plantings.

Water Resources and Quality in Yuba County are good to excellent, and has improved in recent decades due to control of hydraulic and dredge mining operations and the establishment of minimum in stream flows, except for local degradation as streams pass through urban or agricultural areas. Agriculture is the largest water user in the County jurisdiction, and surface water is generally used for agriculture purposes. In the Yuba and Feather Rivers, variations in overall water quality are usually correlated with fluctuations in flow rates throughout the year. During heavy storm runoff in the winter and spring, the turbidity and debris levels in the rivers are high. In the spring and early summer, the water quality is affected by agricultural drainage and natural runoff. During periods of low flows, specifically the late summer–early fall, water quality decreases due to higher water temperatures and concentrations of pollutants. (*source: USACE, 2005*)

Surface water quality in the County jurisdiction is dependent primarily upon the amount of flow and the amount of pollutants discharged into the water from urban and agricultural areas. Creation of impervious ground surfaces through construction of pavements and buildings leads to excessive surface runoff during storms where natural ground surfaces had previously acted to absorb or slow this runoff. In urban areas, pollutants from motor vehicles, including petroleum hydrocarbons, glycol (from radiator coolants and anti–freezes), and dissolved heavy metals such as lead and zinc from automotive batteries, are often deposited on pavements. Storm water runoff picks up these pollutants, and without proper controls, carries them into streams and lakes. Agricultural runoff is also discharged into the streams and rivers. Pollutants such as pesticides, fertilizer residues, and other hazardous substances from agricultural lands contribute to surface water quality problems in the County. Irrigation ditches are found throughout the County. They are used to convey agricultural water and generally have poor water quality due to high temperatures and high nutrient loads. (*source: USACE, 2005*)

Due to the availability of surface water in the County, ground–water levels have stayed fairly constant since monitoring began in the 1940s. Ground–water for urban uses is provided by a number of water service companies to most of Yuba County including the city of Marysville. The quality of the ground–water supplies is generally good although the possibility exists for contamination from pesticides, fertilizer residues, and hazardous materials such as heavy metals.

Excess runoff from the Williams and Pendola fires continue to have an impact on water quality of the Yuba River watershed. Soil rill and sheet erosion from these two and other burn sites in the steep foothill ecosystems create increased turbidity and ammonia levels post fire. Debris from the Pendola Fire continues to cause YCWA problems, as evidenced by the 2006 winter storm event, which saw millions of dollars in damage and cleanup resulting from debris washing into the New Bullards Bar Reservoir.

Air Quality is directly related to the amount of pollutants released into the atmosphere and the atmosphere's ability to transport and dilute the pollutants. The most important determinants of air pollution transport are wind, atmospheric stability, topographic features, and isolation. Two types of inversions in the air basin have a significant effect on the air quality, both regional and locally. The first type of inversion occurs during the late spring and early fall, a layer of warm air overlays a layer of cooler air from the San Francisco Bay/Delta. The other type of inversion occurs during the winter when the sun heats the upper layers of air, trapping the lower cooler air, which has been cooled by contact with the cooler surfaces during the night. Both types of inversion layers trap air pollutants near the earth's surface and prevent them from being dispersed.

Yuba County lies within the Sacramento Valley Air Basin which is bound by the Cascade Range on the north, the Sierra Nevada on the east, and the Coastal and Diablo Range in the west. The County is approximately 75 miles from the Carquinez Strait, a sea–level gap between the Coast and Diablo Ranges. Air enters the air basin through the strait and moves across the Delta, bringing with it pollutants from the San Francisco Bay area. Pollutants can be inhibited from dispersing by the inversion effect.

The primary sources of pollutants in Yuba County are vehicular emissions and agricultural activities such as the burning of crop residues and plowing of fields. Light industry and aircraft emissions from Beale AFB also contribute to reduced air quality in the region. Due to inversions and topographic features, pollutant concentrations in the County are typically highest during the summer, although localized pollution "hot spots" near emission sources may occur during winter.

The Feather River Air Quality Management District (FRAQMD) has the primary responsibility for monitoring the arraignment and maintenance of Yuba County with respect to Federal and State standards. The County is included in the federally delineated Sacramento Valley Air Basin. The FRAQMD is also subject to regulations and attainment goals and standards of the Sacramento Valley Air Basin and the California and U.S. Environmental Protection Agencies (EPA). The standards of the State and Federal Clean Air Acts are enforced by the California and U.S. EPAs respectively. (*source: USACE, 2005*)

The U.S. EPA and the California Air Resources Board (CARB) have each established ambient air quality standards for a variety of pollutants. Most standards have been set to protect public health. However, for some pollutants, standards are based on other values such as protecting crops and other materials and avoiding nuisance conditions. (*source: USACE, 2005*)

Fisheries include species found in the lower Feather River, lower Yuba River, lower Bear River, and the WPIC. These water bodies, tributaries to the Sacramento River, provide important habitat for native anadromous and resident Central Valley fish. Fish found in these waters include species that are listed or are candidates for listing under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Anadromous species include Chinook salmon (both the Central Valley fall–run and the Central Valley spring–run), Central Valley Steelhead, American shad, striped bass, green and white sturgeon, and Pacific lamprey. Juvenile winter–run Chinook salmon nay also periodically move into the Feather River from the Sacramento River downstream.

The Yuba River is unique among California's large anadromous fish streams as it is managed as a Chinook salmon and steelhead trout stream. The cessation of hydraulic and dredge mining and

the establishment of instream flows has improved the water quality in recent decades. Dissolved oxygen concentrations, total dissolved solids, PH, hardness, alkalinity, and turbidity are well within acceptable or preferred ranges for salmon and other key freshwater biota. The lower 24 miles of the river, extending from its confluence with the Feather River upstream to Englebright Dam, contains excellent spawning gravels. Hatchery facilities as supplementation of reared stock are not needed, as with many of California's valley rivers.

The Bear River is the second largest tributary of the Feather River. Historically, the Bear River experienced high winter flows and low summer flows. Flows are now primarily regulated by storage reservoir releases and diversions. Camp Far West Reservoir is the largest storage reservoir on the Bear River and the South Sutter Irrigation District Diversion Dam (SSIDD), the largest diversion on the Bear River, is the upstream limit of anadromous fish migration in the Bear River. Minimum flow releases are 25 cfs in the spring and 10 cfs during the remainder of the year. Flows in the Bear River below the SSIDD range from 0 to 40 cfs from June to December. Flows during wet years are similar to unimpeded flows, averaging 2,500 to 5,200 cfs in the winter. Summer flows are 30 to 50 percent less that the unimpaired flows. (*source: USACE, 2005*)

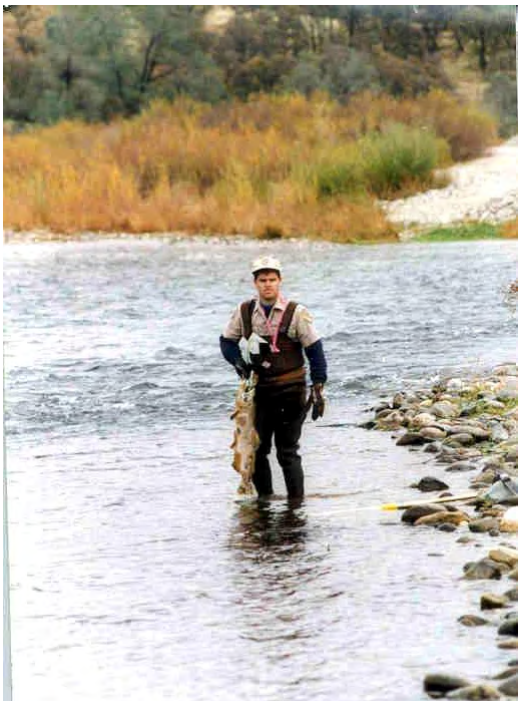


Image 1-10 Fish Survey along the Yuba River

Anadromous fish have access to 15 miles of the Bear River below the SSIDD, but the habitat is of limited quality from the inadequate stream flow. As a result, there are not self–sustaining populations of salmon in the Bear River. However, during heavy rain events, when there is sufficient spillage at the SSIDD, salmon and steelhead do migrate up and spawn in the lower Bear River (*source: USACE, 2005*).

Reeds and Hutchinson Creeks merge and flow into the WPIC, which is directly connected to the Bear River approximately three miles upstream from its confluence with the Feather River. The WPIC is used as a storm water retention basin during high–flow events. Many of the same fish species that use the Bear River can also be found in the WPIC.

The Feather, Yuba, and Bear rivers support thee species that are federally listed as threatened: Central Valley steelhead, Central Valley spring–run Chinook salmon (also state listed as threatened), and Green Sturgeon. These rivers also support one Federal candidate species, Central Valley fall/late–run Chinook salmon, and four federal and state species of concern: hardhead, California roach, Sacramento split tail, and pacific lamprey. Juvenile winter–run Chinook salmon may also periodically move into these rivers from the Sacramento River.

Threatened and endangered species

The native vegetation associations support a variety of wildlife communities with species and subspecies indigenous to valley communities. The conversion of native plant communities to intensive agricultural and urban land uses has resulted is significant reduction in native vegetation and the wildlife habitat it provides. As a result of this conversion, several species of both plants and animals have either been extirpated from the County, or their populations have declined significantly. As a result, the California Department of Fish and Game and/or the United States Fish and Wildlife Service have listed many of these species as rare, threatened, or endangered.

In addition, several species are currently considered candidates for state or federal listing, requiring further biological study to make proper designations. Yuba County has the following special–status wildlife and plant species that occur or have the potential to occur within the jurisdiction:

- Cooper's hawk
- Northern harrier,
- Swainson's hawk,
- Tri-colored blackbird,
- Western burrowing owl,
- White–tailed kites,
- Bald eagle,
- California black rail,
- Western yellow–billed cuckoo,
- Long–eared owl,
- Bank swallow,
- Grasshopper swallow,
- Giant garter snake,
- Northwestern pond turtle,
- California red–legged frog,
- Foothill yellow–legged frog,
- Valley elderberry longhorn beetle,
- Sacramento Valley tiger beetle,
- Conservancy fairy shrimp,
- Vernal pool tadpole shrimp,
- Vernal pool fairy shrimp,
- California linderiella,
- Hartweg's folden sunburst,
- Laynes's ragwort,
- Sticky pyrrocoma,
- Dwarf downingia,
- Legenere,
- Quincy lupine,
- Veiny monardella,
- Grandegee's clarkia,
- Ahart's dwarf rush,
- Butte County fritillary.

In the Upper Yuba river basin, the Agency, in cooperation with the United States Forest Service, has developed plans to protect known threatened species like the Bald Eagle, California Red-Legged Frog, and Gos Hawk

The presence of endangered species sometimes affects the agencies efforts to mitigate hazards. When an endangered species is identified as having habitat within an area identified for mitigation projects, the effects to the habitat must also be mitigated, or the project it self may have to be abandoned. The Lower Yuba River Accord is an example of the Agency's including mitigation concerns in its flood control planning.

Annually, wood debris is captures and stored on New Bullards Bar Reservoir until October each year when it is piled and burned. This work requires proper timing so as not to affect the wintering Bald Eagles. It also requires red-legged frog fences to be constructed around all wood piles so that the frogs cannot enter and be destroyed in the burning process.

Critical habitat impacts options for pre-disaster mitigation strategies by reducing the options available for mitigation strategies in addition to the increased cost incurred by the impacted district through purchasing exchange habitat to relocate endangered and threatened species.

Issues involving endangered species have played a major role in flood control along the Lower Yuba River. The Yuba River Development Project was implemented with the anticipation of a second dam, the Marysville Dam, being constructed and adding an additional 240,000 af of dedicated flood storage. Despite a USACE study and congressional authority, the dam is unlikely to be constructed because of the effect it would have on endangered spring run salmon and steelhead.

1.8.6 Major Economic, Industrial, Agricultural and Business Activities

The Water Agency's primary source of revenue comes from the generation of electricity. YCWA contracts with Pacific Gas and Electric Company for the electricity generated by New Colgate and New Narrows Powerhouses. Per the terms of the contract, which expires in 2016, YCWA receives $7.7 million annually to repay the original bond issue, plus over $5-15 million annually for all operations and maintenance costs for the YCWA power project. The Agency also generates electricity at Deadwood Creek Powerhouse, on the North Yuba River, and Fish Release Power Station, located at the base of New Bullard Bar Dam. The power generated by these facilities generates approximately $300,000 annually. (http://www.ycwa.com/hist.htm, accessed 12/29/2005) (Yuba County Water Agency Audited Financial Statements, 2004, 2005, 2006).

Image 1-11 New Colgate Powerhouse

The Agency sells wholesale water to seven water service districts in Yuba County. YCWA also sells over 151,000 acre feet of water to local farmers, accounting for approximately $400,000 annually. In years where there is a water shortage, YCWA will sell water to the State of California (Yuba County Water Agency Audited Financial Statements, 2004, 2005, 2006).

YCWA owns the New Bullards Bar Reservoir and its surrounding campgrounds and recreational facilities. These facilities operate at a loss to the Agency and do not account for significant income.

1.8.6.1 Areas of Growth within the County

With a July 2004 population of 64,631, Yuba County is ranked 30th in the state of California. Yuba County has experienced a 12.93% increase from the 2000 population levels, a 3.2% annual

growth rate (Census 2000). Sacramento Area Council of Governments (SACOG) is predicting Yuba County to experience an annual growth rate of 2.88% over the next 5 years (SACOG 2005).

Sacramento Area Council of Governments (SACOG) has estimated from California Department of Finance's Demographic Research Unit estimates for the population growth in the unincorporated areas of the County. SACOG has estimated that the population in the unincorporated areas of the County will increase 3.36 percent annually from 2005 to 2010, while the incorporated areas of the County will increase 1.86 percent annually over the same time period. The number of households has been estimated by SACOG to increase 3.67 percent annually from 2005 to 2010 in the County's unincorporated areas contrasted with an annual increase of 1.65 percent for in County's incorporated areas. Finally the number jobs has been estimated to increase 6.15 percent annually from 2005 to 2010 in the County's unincorporated areas compared with 3.36 percent in the County's incorporated areas.

1.8.7 History and Impact of Natural and Technological Hazards

As previously mentioned, the Yuba River is the most significant geographic feature in the county. As such, much of the early development of the county centered on gold mining on the river beginning in the 1850's. Following is a brief history of the Yuba County Water Agency and the impact of development and natural hazard events.

Beginning in 1848 – The Gold Rush, primarily hydraulic mining (1854), caused the destruction of entire mountainsides in the Yuba's watershed. Mining debris flowed downstream into the Yuba, Feather and Sacramento Rivers, raising riverbeds and destroying miles of salmon and steelhead habitat. It is currently estimated that approximately 684 million cubic yards of gravel and other hydraulic mining debris (over three times the volume of earth excavated for the Panama Canal) were deposited in the Yuba River and downstream rivers by storm flood flows.

Prior to the 1850s – Rivers overflowed their river banks inundating the surrounding countryside forming an inland sea which took months to drain away when the rains ended.

1850 – Arkansas Act enacted by federal government to grant states all swamp and overflow lands within their borders, on the condition that these lands be drained and reclaimed.

1861 – A Board of Reclamation Commissioners established to oversee the reclamation process. Plans were drawn to ensure that all levees would be constructed along natural drainage lines.

1868 – Green Act is passed by the State Legislature freeing the reclamation process of all controls. Property owners could throw up levees along any alignment they chose, even along the rectangular pattern of property lines. Drainage system of the valley became fragmented with levees that crossed sloughs and other natural drainages, choking channels and producing new ponds. The first levees were three feet high as the river overflowed its banks in thin sheets.

Late 1860s – the Legislature began to authorize the formation of levee and reclamation districts which could raise revenues to pay for the works through taxation of the land protected.

1870s –many thousands of acres along the Feather, Yuba, and Bear Rivers were buried so deeply by mining debris that whole orchards, houses, and barns were swallowed up. The bed of the Yuba between Marysville and the mountains spread to a two–mile width. The beds of the Yuba and Feather Rivers at Marysville eventually rose 20 feet making them higher than the city streets.

1875 – As the elevation of the Yuba River channel rose from hydraulic mining debris, the City of Marysville and other communities began to construct levees to protect their residents from flooding.

1880 – The first plan for flood control in the Sacramento Valley was developed by State Engineer William Hammond Hall who called for constricting the rivers within strong levees to induce currents that would scour out the beds and wash the mining debris down into the bay. In addition Hall warned that even the highest levees could never hold the giant floods which occasionally struck the valley. Hall argued for the construction of weirs and drain ways to allow excess water to flow out and pond in basins beside the rivers.

1880 – The Drainage Act of 1880 was launched to provide valley–wide flood control through a systematic survey of the river system. The objective of the act was to erect an integrated system of levees which would constrict the rivers within narrow channels, create a heavy and concentrated flow to induce the rivers to scour out their own beds and carry the mining debris down to the bay for deposit. As the Drainage Act relied upon statewide taxation pressure was brought to bear upon the Legislature that the Sacramento Valley should solve its own problems.

1881 – The California Supreme Court threw out the Drainage Act as an unconstitutional assumption by the state of an essentially private concern.

1884 – The federal Circuit Court in the case of *Woodruff v. North Bloomfield, et. al.* issued a perpetual injunction against the discharging of hydraulic mining debris into California's rivers. In one of the nation's first environmentally–conscious judicial decisions, an entire industry was closed down.

1892 –Congress created the California Debris Commission, composed of Army Corps of Engineers officers, to clear the rivers of mining debris and restore a navigable channel.

1894 –The office of Commissioner of Public Works was established by the State of California. The office proposed the flood flow of the Sacramento be divided by constructing a leveed bypass channel; the Yolo and Sutter bypasses.

1902 – The Rivers and Harbors Act of June 13, 1902 approved the Yuba River Training Walls. See Section 3.5.2 for further detail.

1905 – The peak of the hydraulic mining debris wave finally passed the city of Marysville and moved down the Feather River.

1906 – The California Debris Commission, a division of the U.S Army Corps of Engineers, constructed Daguerra Point Dam to control mining debris. Fish ladders were installed to allow salmon and steelhead to pass upstream. The debris behind Daguerra reaches over a mile upstream. This small dam also serves as a diversion for six local water districts.

1907 – Lands of Reclamation District 784 including Linda and Olivehurst were flooded from a break in the Feather River levee. (*source: von Geldern Engineering Company, 1986)*

1911 – The Reclamation Board was created by the California Legislature to cooperate with the USACE in implementing a master plan for flood control in the Sacramento Valley with the power to regulate all private levee–building. The Reclamation Board's flood management authority extends throughout the Sacramento River and San Joaquin River drainage areas.

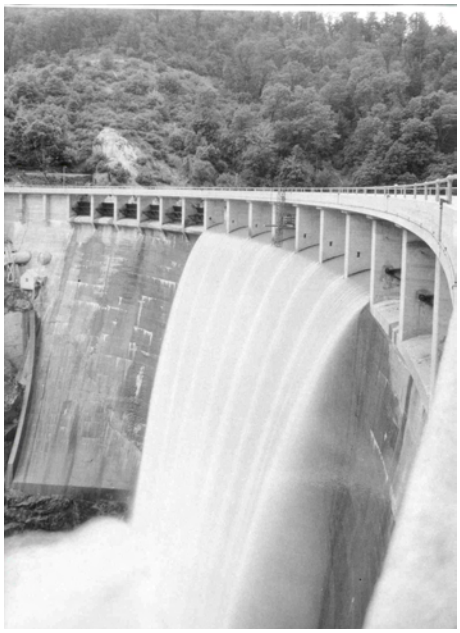


Image 1-12 Old Bullards Bar Dam

1922-1924 – Old Bullards Bar Dam is built by Pacific Gas & Electric Company.

1928 – Under the Flood Control Act of 1928, the federal government assumed most of the costs of the Sacramento Flood Control Project from the post WWI farm price slump, the inability of the levee construction bonds to be paid off, and widespread bankruptcy.

1930s – United States Bureau of Reclamation took on the construction and management of the Central Valley Project and launched the era of high dams, easing the flood control burden, and allowed an enhanced inflow of federal funds that moved the Sacramento Flood Control Project toward completion.

1937 – Lands of Reclamation District 784 including Linda and Olivehurst were flooded from a break in the Feather River levee. (*source: von Geldern Engineering Company, 1986)*

1941 – The U.S. Corps of Engineer completed Englebright Dam to allow hydraulic mining to restart. Englebright was constructed without fish ladders, and completely blocked all upstream fish passage.

1944 – Largely in place, the Sacramento Flood Control Project included 980 miles of levees; 7 weirs or control structures; 3 drainage pumping plants; 438 miles of channels and canals; 7 bypasses, 95 miles in length, encompassing an area of 101,000 acres; 5 low–water check dams; 31 bridges; 50 miles of collecting canals and seepage ditches; 91 gauging stations; and 8 automatic shortwave radio water stage transmitters.

1950 – Heavy November rains caused extensive flooding in the Sacramento Basin. Flood flows on the Yuba River from the rising stages of the second and largest storm peak broke through the dredger tailings of the Yuba Goldfields in the vicinity of Hammonton, upstream of the SRFCP levees. Flood waters from the Yuba River inundated large areas thought adequately protected from flood flows by the downstream project reaches. The communities of Hammonton, Linda, Olivehurst, Arboga, and over 40,000 acres of agricultural land, including RD 784 were swamped by the overflow. The peak flow in the Yuba River was approximately 107,000 cfs, approximately 40,000 cfs escaped through the Goldfields breach. Damages occurred to residential property, commercial and industrial property, public utilities, and agricultural properties. No lives were lost. However, approximately 8,000 people were evacuated from the area. (*source: MBK, 2006*)

1950 – November rains caused a Bear River breach

1950 – As a result of the 1950 flood that raced through Linda and Olivehurst, Yuba County initiated a water program to control the Yuba River against disastrous floods and to develop water resources for farmers affected by dwindling underground reservoirs. The population of Yuba and Sutter Counties had been growing steadily since World War II. The flood of 1950 emphasized the danger to lives as more suburban home sites developed.

1951 – Yuba County Board of Supervisors created the Yuba County Water Resources Board, which looked at ways to control the Yuba River. Before the great flood of 1955, the State had started planning its California Water Project which would build Oroville Dam on the Feather River. But no project existed in State or Federal planning to control the Yuba River.

1955 – The "Christmas Day Flood" from the west side levee breach on the Feather River killed 40 people, caused the mandatory evacuation of over 30,000 and devastated the region's economy.

Image 1-13 1955 Flood Yuba City

1959 – In response to the 1955 flood, the State Legislature authorized formation of the Yuba County Water Agency. The Agency's primary purposes are flood control protection, irrigation, recreation, hydropower generation and protection of the lower Yuba River's fishery.

January 1961 – A feasibility study report was filed outlining Yuba River Development that would cost approximately $185 million, covering dam construction, engineering, property acquisitions, legal activities, financing and other phases of a complete water program. See Section 3.5.2 for further detail.

By the end of 1969 – the project moved toward completion. New Bullards Bar Dam was completed and water was being stored in the new reservoir.

1970 – The New Colgate Powerhouse, which contained two of the largest Pelton wheels of their kind ever built, was ready for trial tests to produce electricity. The 1,300 foot drop of water from behind New Bullards Bar Dam boosted the force of the water at each turbine to the equivalent of 212,000 horsepower. The New Narrows Powerhouse began producing electricity in February 1970.

The Agency completed the Yuba River Development Project, including New Bullards Bar Dam and Reservoir. Construction of Oroville Dam and New Bullards Dam completed two of the three flood control dams on the Yuba and Feather Rivers identified in the 1960's Corps flood control plan. The third dam, Lake Marysville, was authorized by Congress but never built, so nearly 60% of the planned flood storage space on the Yuba River was never built.

- Department of Fish and Game records confirm an increase in the lower Yuba River's salmon and steelhead since construction of New Bullards Bar Reservoir. Chinook salmon runs now average 16,000 adult fish each year. The lower Yuba also has one of California's only wild, native steelhead runs, estimated at 2,000 adult fish per year.
- New Bullards Bar Reservoir enabled the Agency to provide irrigation supplies to seven local water districts: Brophy, Browns Valley, Cordua, Dry Creek, Hallwood, Ramirez, and South Yuba. It also will provide a water supply to Wheatland Water District in the future.

1972 – The USACE Sacramento District, "Bear River Feasibility Report for Water Resources Development" was released. See Section 3.5.2 for further detail.

1986 – A major flood occurred in Linda on February 20 due to a levee breach on the Yuba River, during the greatest ten day flow ever recorded. The levee was breached while the river was well below design level and flooded the communities of Linda and Olivehurst and thousands of acres of agricultural land in RD 784 taking several lives and causing millions of dollars of damage.

Heavy rainfalls in mid February caused saturation in the soils of the Central Sierra watersheds, resulting in extensive flooding of low lying areas and record high flows. The Feather River at Oroville had the largest inflow of record, 266,000 cfs inflow into Lake Oroville on February 17, 1986. The flow down stream at the town of Oroville was 150,000 cfs. The peak stage on the Yuba River near Marysville was 85.92. The peak flow for the February 1986 storm was estimated to be 120,000 cfs. The Yuba River had reached a crest of 13 feet above ground level on the landside of the levee 24 hours prior and then receded two feet before the levee broke.

The levee break was in the south or left bank levee of the Yuba River a short distance upstream from the confluence of the Feather River. There was a backwater effect at this location as a result of the combined flows of the Feather and Yuba Rivers.

The flood water first flowed into the relatively small area between the two railroad embankments where it formed a pond that reached from the Linda Levee to Olivehurst. Because the few roadway underpasses and other openings in the railroad embankments restricted flow, the flood water rose until outflow through these openings equaled inflow from the break. This resulted in increased water depth in the area between the two railroad embankments which includes the Peach Tree Mall commercial area and Olivehurst. Water flowed northeasterly through the Southern Pacific embankment by way of the North Beale Road underpass and a bridged open cut in the embankment. Water flowed southwesterly though the Western Pacific embankment by way of the Feather River Boulevard underpass and the Earl Road underpass. Drainage culverts passing though the embankments were insignificant in the early period of the flood.

The area northeast of the Western Pacific Railroad embankment was flooded to a greater extent and had deeper flood waters than the area to the southwest of the railroad embankment. The flood was limited northeast of the Southern Pacific Railroad embankment, including the eastern portion of Linda north of North Beale Road by the low Hammonton–Smartville Road embankment and to the south by the rising ground to the east. By noon of the day after the breach, the water in this area was approximately the same elevation as the area between the railroad embankments with a depth approaching four feet.

The water that flowed southwesterly through the Western Pacific embankment flooded the western portion of Linda and continued south toward the lower elevation portion of the district. The flood waters flowed with high velocity through the two underpasses in the Western Pacific embankment until the breach was closed. Flood waters northeast of the Western Pacific Railroad, including the east portion of Linda, were roughly five feet higher than flood waters on the southwesterly side of the Western Pacific Railroad embankment.

Although most of the district was flooded, some land in the north of the District had drained before the flood waters inundated the south end of the District. Within five to six hours after the breach, Linda and parts of Olivehurst were flooded. As the flood waters moved southward over agricultural land, large lakes formed in low lying areas and where the roadway and other embankments acted as barriers.

By February 22, southerly flowing flood waters had ponded against the Algodon Canal levee causing flooding in Plumas Lake and other areas that would not otherwise have been

flooded. On February 26, over objections by landowners south of the canal, RD 784 officials cut a 12 foot side break in the Algodon levee. 14,000 acre–feet of flood waters flowed through the cut and into the orchard land at the south end of the district where it was trapped on the landside of the Bear and Feather River levees forming a large lake.

1986 – To address widespread levee failures in the Sacramento Valley, local, state and federal agencies turn to strengthening levees throughout the region.

- To finance the local cost share for these improvements, the Yuba County Water Agency relied on water transfer revenue. While transfers do not occur annually, the Agency, from 1988 through today, transferred water to State and Federal agencies, including CALFED's Environmental Water Account, for fish and wildlife purposes, and to cities and farms statewide.
- Frequent flooding, combined with a lack of adequate flood control protection, continued to suppress economic development, further limiting Yuba County's economy. The County currently has one of the highest unemployment rates in California.

1986 – MHM Incorporated, "Hallwood Drainage Study, Community of Hallwood" was released. See Section 3.5.2 for further detail.

1987 – The Kleinfelder, Geotechnical Engineering Report Marysville Levee Evaluation was released. See Section 3.5.2 for further detail.

1989 – Ebasco Services, Inc, "Limited Reconnaissance Flood Project Study of Yuba River Basin" was released. See Section 3.5.2 for further detail.

1990 – USACE Sacramento District, "Yuba River Basin Investigation, California, Reconnaissance Report" was released. See Section 3.5.2 for further detail.

1991 – Despite increased salmon runs, the California Department of Fish and Game proposed new, much higher, instream flows to attempt to further enhance fishery conditions in the lower Yuba River. To achieve these flows, the State would have to reallocate water from the Agency's use. The State Water Resources Control Board held hearings in 1992 and 2000.

- During the critically-dry year of 1991, the Agency transferred approximately 28% of the total water supplies received by the State's Emergency Drought Water Bank, which created a net benefit of $91 million to California's economy, according to a Department of Water Resources study.

1992 – MHM Incorporated "Revised South Yuba Drainage Master Plan (SYDMP), community of Olivehurst and East Linda, Yuba County, California" was released. See Section 3.5.2 for further detail.

1993 – USACE Sacramento District "Marysville/Yuba City Area (Phase II) Design Memorandum (DM)" was released. See Section 3.5.2 for further detail.

1996 – USACE Sacramento District "Mid–Valley Area (Phase III) Design Memorandum (DM)" was released. See Section 3.5.2 for further detail.

Image 1-14 1997 Levee Break

1997 – The "New Year's Day" Arboga flood from a levee breach on the Feather River kills 3 people, causes hundreds of millions of dollars in damage, and requires one of the largest evacuations in State history. Over 38 American Red Cross shelters are established in the Yuba-Sutter area, as over 100,000 are forced to flee.

Members of Congress, the State Legislature and Northern California residents, whose lives were upended by the flood, call for new dams and stronger levees. The Yuba County Water Agency focused on a long-term plan to strengthen the region's levees and improve flood water retention modifications to New Bullards Bar.

1997 – MHM Incorporated "Clark Lateral and Clark Slough, Community of Olivehurst – Hazard Mitigation Grant Program, Yuba County, California" was released. See Section 3.5.2 for further detail.

1997 –The Williams Fire strikes the Yuba County foothills. 5,743 acres are burned I the area near the communities of Dobbins and Oregon House. $19,066,237 in reported damage is caused by the fire.

1998 – Flood Control Study Group "Report on Phase I, Program Definition for Supplemental Flood Control on the Yuba River" prepared for YCWA was released. See Section 3.5.2 for further detail.

1998 – USACE "Yuba River Basin Investigation, California, Final Feasibility Report and Appendixes" was released. See Section 3.5.2 for further detail.

1998 – MHM Incorporated "South Olivehurst Detention Basin and Storm Water Pumping Station, Community of Olivehurst – Hazard Mitigation Grant Program, Yuba County, California" was released. See Section 3.5.2 for further detail.

1999 – California Reclamation Board and USACE "Sacramento–San Joaquin Basins comprehensive Study, Phase I Documentation Report" was released. See Section 3.5.2 for further detail.

1999 – The Pendola Fire burns 11,725 acres in the Yuba County foothills, including the area surrounding New Bullards Bar Reservoir. $2,686,190 in damage is reported after the fire, however debris from the fire continues to affect the Yuba County Water Agency, who annually must clear debris that washes into New Bullards Bar Reservoir.

1999 – A State Water Resource Board grant to the Yuba Watershed Protection and FireSafe Council to fund the reduction of fuel load along 12 miles of county roads, US Forest Service mastication and burn of approximately 160 acres in the Camptonville area, fuel reduction on private land around the communities of Camptonville and Brownsville, and two fire education meetings.

2001 – Flood Control Study Team "Report on Phase II, formulation and Analyses of Alternatives for Supplemental Flood Control Program on the Yuba River" was released. See Section 3.5.2 for further detail.

2001 – The State Water Resources Control Board issues Decision 1644, which required the YCWA to relinquish hundreds of thousands of acre-feet of water for higher fishery flows in the lower Yuba River. This regulatory action would prevent the YCWA from participation in water transfers, depriving the community of the revenues it has relied on for the local costs of flood control projects.

2002 – Mead & Hunt "Reclamation District No. 784, Drainage Master Plan, Yuba County, California" was released. See Section 3.5.2 for further detail.

2003 – YCWA Flood Control Study Team "Report of Feasibility of Yuba–Feather Supplemental Flood Control Project" was released. See Section 3.5.2 for further detail.

2003 – YCWA "Basis of Design for Tailwater Depression at New Colgate Powerhouse" was released. See Section 3.5.2 for further detail.

2003 – After the Yuba County Superior Court remanded the decision back to the State Board, directing it to reconsider pertinent new information, the State Board reissued essentially the same decision (renamed Revised Decision 1644). For the first 5 years, the decision required essentially the instream flows proposed by the Agency, but ignored the YCWA's request to retain control for transfer purposes over the additional water that would be needed to maintain these flows. In 2006, RD 1644 would require significantly higher instream flows, which would completely eliminate the YCWA's ability to make future water transfers and would reduce water supplies for local water users.

After RD 1644 was issued, the Agency initiated the "Yuba River Accord Process". The process, with science-based, collaborative discussions with environmental and fishing groups, state and federal agencies, its member water districts, and others developed a comprehensive proposal to protect the lower Yuba's salmon and steelhead while a source of revenue for flood-control projects was preserved.

Since RD 1644 was issued, the Agency has initiated science-based, collaborative discussions with environmental and fishing groups, state and federal agencies, its member water districts and others on a comprehensive proposal to protect the lower Yuba's salmon and steelhead while preserving a source of revenue for desperately needed flood-control projects. This is known as the "Yuba River Accord Process."

2004 – Kleinfelder Engineering "Problem Identification Report (PIR), Yuba River Left Bank Levee, Highway 70 to SPRR, (Approximately PLM 0.32 to 0.91), Reclamation district 784, Yuba county, California" was issued. This report led to the construction of Phase I of the TRLIA Program. See Section 3.5.2 for further detail.

2004 – YCWA Flood Control Team "Report of Feasibility of RD 784 Supplemental Flood Control Improvements of the Yuba–Feather Supplemental Flood Control Project" was developed. See Section 3.5.2 for further detail.

2005 – USACE "Lower Feather River Floodplain Mapping Study" was released. See Section 3.5.2 for further detail.

2005 – Kleinfelder Engineering "Problem Identification Report (PIR), Yuba River Left Bank Levee SPRR to Simpson Lane (Approx PLM 0.9 to 2.2), Reclamation District 784" was released. Design for remediation of this levee reach was initiated January 2006, an

invitation of bids was issued June 2006, and construction scheduled for August through October 2006 as initial Phase 4 work of the TRLIA Construction Program. See Section 3.5.2 for further detail.

2005 – Mead & Hunt "External Source Flood Protection Plan, City of Wheatland" was released. See Section 3.5.2 for further detail.

2005 – Bookman–Edmonston Engineering/GEI "Bear River Setback Levee, Design Report in 4 Volumes" was released. See Section 3.5.2 for further detail.

The project (Phase III of the TRLIA construction program) was initiated September 2005 to be completed October 2006.

2005 – Mead & Hunt "Yuba County Drainage Master Plan – Yuba County Airport, Reclamation District No. 784, Yuba County, California" was released. See Section 3.5.2 for further detail.

2005 – Civil Solutions Incorporated "Wheatland General Plan Update – Internal Drainage Report, City of Wheatland, Yuba County, California" was released. See Section 3.5.2 for further detail.

2006 – MBK Engineers "Three Rivers Levee Improvement Authority Phase IV Erosion Investigation" was released. See Section 3.5.2 for further detail.

2006 – Kleinfelder Engineering "Problem Identification Report (PIR) (Final), TRILA Phase IV Feather and Yuba Rivers Left Bank Levees, RD 784, Yuba County" was released. Design of the Feather River levee remediation was initiated March 2006. See Section 3.5.2 for further detail.

2006 – HDR "Bear River, WPIC, and Yuba River Levees Repair Project, Basis of Design" was released. See Section 3.5.2 for further detail.

2006 – Kleinfelder "Problem Identification Report (PIR), Bear River North Levee, Reclamation District 2103, Yuba, Placer, and Sutter Counties" was released. This remediation work is scheduled for construction August 2006. See Section 3.5.2 for further detail.

2006 – MHM Incorporated "Upper Lateral 15/Bingham Canal Study, Reclamation District No. 784, Yuba County, California" was released. See Section 3.5.2 for further detail.

2006 – In August 4th the Lennar Development in Plumas Lake experienced an urban fire that consumed four homes under construction, with a fifth receiving substantial fire damage, and other surrounding homes receiving heat damage. The blaze ignited from a plumber's propane leak while welding. The fire that started at approximately 11:45 am was contained August 4th following a nine minute response by the Linda Fire Department.

2006 – Marysville Fire burned 442 acres north of Dobbins. A total of 231 personnel, 10 CDF engines, and 6 water tenders responded to the fire which destroyed one residence. The FireSafe treatments zones created and area for the fire crews to establish a line from which to back burn from easing the complexity of controlling the fire. The fire which started August 16th was contained August 19th.

Until 2003, when the Three Rivers Levee Improvement Authority was formed, YCWA was the only viable local source to generate local funding for major flood control activities in Yuba County. Current estimates place the local share of levee strengthening and other flood control

improvements at over $300 million, including the state and federally authorized Yuba River Basin Project.

1.8.8 Local Mitigation Activities

The need for flood control on the Yuba River was the principle reason for the creation of the Yuba County Water Agency and the construction of New Bullards Bar Dam on the North Yuba River. The Yuba County Water Agency has taken a lead role in hazard mitigation planning in Yuba County. The Water Agency itself is a hazard mitigation project, the result of a 1950 flood in Linda and Olivehurst that convinced Yuba County of the need for an effective flood control agency along the Yuba River. Since then, the agency has been at the forefront of efforts to develop solutions to the flood problems on the Yuba River drainage system.

1.8.8.1 Yuba River Development Project

The Agency immediately set to work on the Yuba River Development Project. The feasibility study for the project was completed in 1961 and was primarily funded by a bond issue passed by the citizens of Yuba County. Other funding sources came from federal contributions for flood control and a state (Davis-Grunsky) recreation and fish grant. Construction on the project began in 1996; following two bid processes and a power agreement with PG&E (see section 1.2). The total cost of the project came to $180,200,000, including interest, engineering, legal, rights of way, and purchase of PG&E facilities. The construction cost of $142,891,459 is the largest construction contract ever let in the United States. The elements of the Yuba River Development Project are:

- **Our House Dam and Lohman Ridge Tunnel**: cost $6,451,000 to complete. The concrete dam stands 89 feet high above the stream bed on the Middle Fork of the Yuba River in Sierra and Nevada Counties. The YCWA operates Our House Dam for diversion purposes only diverting water through the 12.5 foot high Lohman Ridge Tunnel 19,410 feet to Oregon Creek.

Image 1-15 Our House Dam

- **Log Cabin Dam and Camptonville Tunnel**: $2,763,370. Log Cabin Dam is a concrete Dam 57 feet high on Oregon Creek. The tunnel has a 14.5' diameter and diverts water to New Bullards Bar Reservoir. It is used for diversion purposes only

Image 1-17 Log Cabin Dam

- **New Bullards Bar Dam and Reservoir:**
  The New Bullards Bar Dam and Reservoir is the centerpiece of the Yuba County Water Agency's projects. It is used for flood control, irrigation, water storage, power generation, recreation and fish enhancement. Located on the North Yuba River, New Bullards Bar Dam is located near the Yuba County town of Dobbins and is the tallest concrete dam in California. The project was completed in 1969 and cost $108,987,237 to complete. The dam itself is a variable-thickness double-curvature monolithic concrete arch structure standing 645 feet tall and spanning 2,323 feet. 2,717,000 cubic yards of concrete was used to construct the dam, whose reservoir has a capacity of 966,103 acre-feet, with 170,000 acre-feet reserved for flood storage from November 1 through April 1. The minimum operating level of the reservoir is 1,732 feet above mean sea level (msl) and the maximum is 1,956 feet above msl. The crest of the dam is 2,323 feet long and 25 feet wide and sits at 1,965 feet above msl. The spillway is located 1,902 feet above sea level whose gates measure 30 ft x 53 ft with a total capacity of 160,000 cubic feet per second. The New Bullards Bar Reservoir has a surface area of 4,790 acres and is surrounded by 55 miles of shoreline. The reservoir includes recreation facilities including camp sites and boat launch facilities. Power is not generated at the dam itself, but is generated at the New Colgate Power Plant.
- **New Colgate Tunnel and Power Plant**: in service since 1970, cost $20,053,125 to complete. The primary source of hydroelectric power within the Yuba River Development Project, the power plant generates more energy than any hydroelectric plant in the PG&E system. Sitting at the base of the New Bullards Bar Dam, the Colgate Power Tunnel has a 26 foot diameter and diverts water from New Bullards Bar Reservoir 24,137 feet to the Colgate Power Plant. The Powerhouse contains 2 units, whose capacity is 315,000 kilowatts. The two turbines run at 212,000 horsepower each and generate a combined annual average of 1,314 gigawatt hours of electricity. The 1,314 gigawatt hours of electricity generated yearly by the power plant is obligated to PG&E in exchange for bond payments and operation and maintenance costs.

- **New Narrows Power Plant**: $3,821,487. The New Narrows power plant is located at the base of the USACE owned Englebright Dam. It generates 248.4 gigawatt hours of electricity annually.
- **Recreation Facilities**: $815,200. Located at New Bullards Bar Reservoir, the recreation facilities satisfy the requirements of the grant obtained through the Davis-Grunsky Act and include boat launch facilities, picnic area and camp sites. The reservoir features a surface area of 4600 acres and 55 miles of shoreline.

Image 1-16 New Narrows Power Plant

The Yuba River Development Project originally included a second dam, the Marysville Dam and Reservoir, which would have provided flood control for runoff from the entire Yuba River watershed. Subsequent studies by USACE lead to the congressional authorization to construct a dam at Parks Bar, below the confluence of the North, Middle, and South Forks of the Yuba River, with 240,000 acre-feet of flood storage. Its construction is unlikely since the passage of legislation to add the South Yuba River to the California Wild and Scenic River System and the designation the spring run salmon and steelhead in the Yuba River as endangered species. Consequently, only the 170,000 af of dedicated storage in NBB Reservoir and the incidental, but important, nearly 15,000 af of surcharge flood storage at Englebright Reservoir, can be used to regulate flood flows in the Lower Yuba River. (*Source: Yuba County Water Agency, 1996)*

1.8.8.2 Levee Improvement Projects

YCWA initiated the region's commitment to flood control and proactive efforts to address interagency coordination

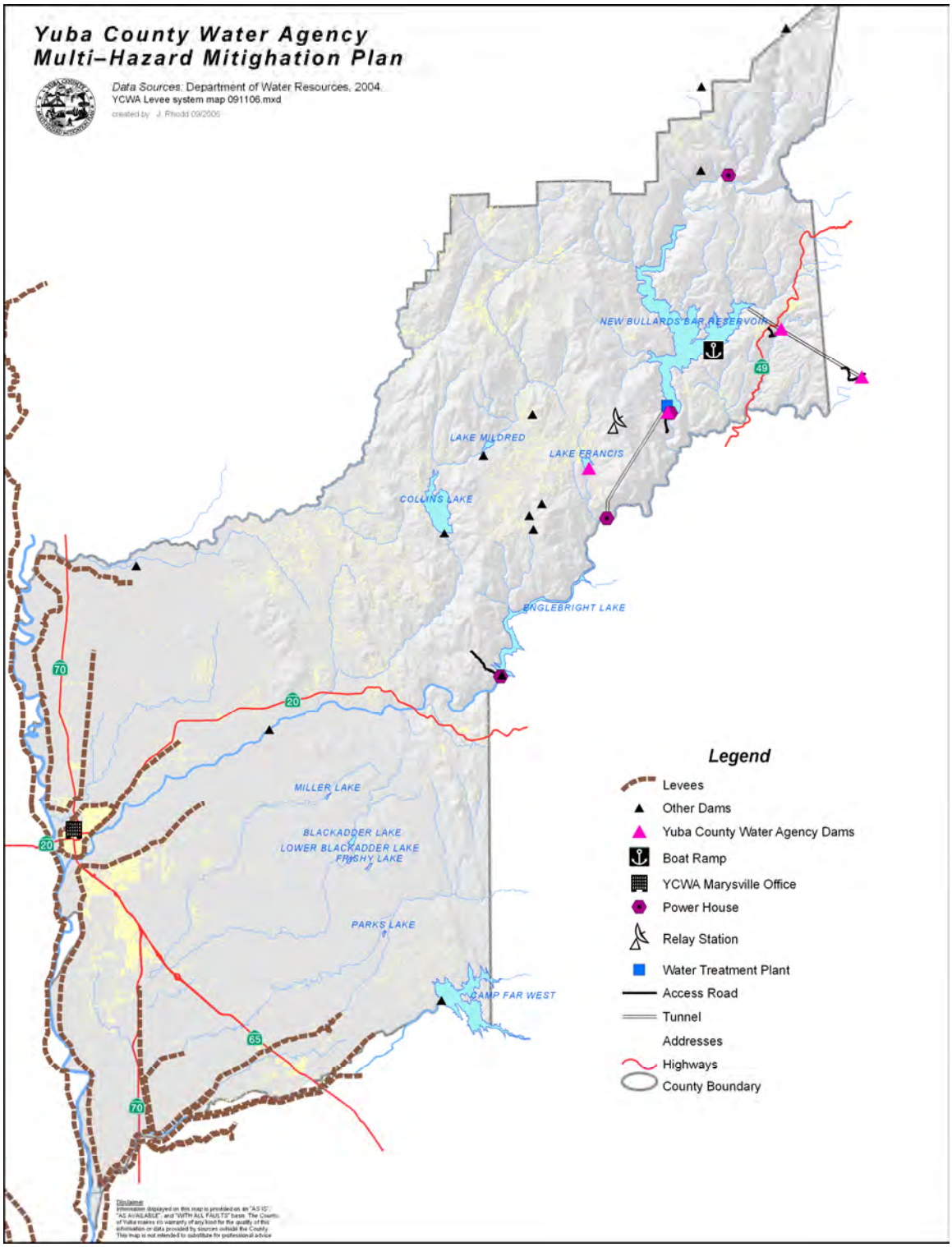
The Water Agency has also provided the local share on many levee improvement projects, including:

- $328,000 for 2.6 miles of toe drains and 0.6 miles of slurry walls along the Feather River for Reclamation District 10 and the Marysville Levee Commission, completed in 1996.
- $3,720,000 for 6.1 miles of slurry wall, 4.1 miles of toe drains and berms, and 8 miles of levee raising along the feather and Yuba Rivers for Reclamation District 784, completed in 1998.

The Water Agency has been an informal partner in the Three Rivers Levee Improvement Authority's levee improvement projects in South Yuba County. The proposed levee setback along the Bear River, part of Phase 4 of the project, was first studied as part of the Report on Feasibility of Yuba-Feather Supplemental Flood Control Project. See section 1.8.8.3 *(Source: http://www.ycwa.com/crntfld.htm, accessed 6/13/06)*

The Yuba County Water Agency continues to lobby on behalf of the Agency and the residents of Yuba County to provide maximum protection and support of infrastructure improvement.

Figure 1–5 YCWA Levee System



1.8.8.3 Report on Feasibility of Yuba-Feather Supplemental Flood Control Project

Following the 1997 flood, the Agency initiated studies directed toward developing a high level of flood protection for Yuba County and the surrounding communities. YCWA received a $3,000,000 Proposition 13 grant to complete the study. The Report on the Feasibility of the Yuba-Feather Supplemental Flood Control Project was completed in June 2003, and was prepared for the Yuba County Water Agency to present the feasibility of several key elements of the proposed project. The conclusions of the report on these elements are:

- **Controlled surcharge of Lake Oroville for Additional Flood Control** – This alternative would temporarily suspend use of the Emergency Spillway Release Diagram and would rely only on the Flood Control Diagram. This results in higher and more frequent surcharge above the emergency spillway and greater control in downstream releases for larger storms. A consideration for this alternative is the frequency of risk of erosion below the emergency spillway. DWR could implement this alternative under its existing authority.
- **Thermalito Afterbay Emergency Reopertation for Flood Control** – Storage in this facility could be released prior to a forecasted storm providing an additional 45,000 af of storage for flood management which would reduce downstream releases. This alternative could be implemented under existing DWR authority after reviews of dam stability and possible impacts in power production and fisheries. There would be no impacts on water supply.
- **New Bullards Bar Reservoir Outlet Capacity Increase** – Increasing the release capacity by 20,000 cfs at pool elevation 1918 would improve flexibility to evacuate storage ahead of the peak inflow from a major storm. The increased release capacity would be accomplished by constructing a new outlet works just to the east of the existing spillway. This outlet would have a three slide gate intake structure discharging into a horseshoe shaped conveyance tunnel connected to a flip bucket outlet structure. No funding is being sought for this project at this time as efforts are being focused on higher priority levee improvements.
- **New Colgate Powerhouse Tailwater Depression** – Adding compressed air near the turbine runners would allow higher releases from New Bullards Bar Reservoir and preserve peak flood storage capacity while also providing significant power generation benefits. This element was proposed for advance approval an implementation. No funding is being sought for this project at this time as efforts are being focused on higher priority levee improvements.
- **Feather River Setback Levees in Yuba County** - New setback levees designed and constructed with modern construction practices would provide safer, more reliable levees and lower the peak flood stages upstream. Some of the land between the river and the new levees could be developed for environmental restoration benefits in addition to mitigation. Even though the objective flow would not be changed, there would be a potential to pass higher flows downstream and hydraulic mitigation to offset such a risk would have to be considered. This option is currently being considered as part of Phase 4 of the Three Rivers Levee Improvement Authority levee improvement project.
- **Forecast-Coordinated Operations for Yuba and Feather Rivers (F-CO)** – More efficient and reliable flood operation of the reservoirs and better utilization of floodway capacity would be accomplished with better forecasting and coordination of releases from the reservoirs in the system. See section 1.8.8.4

1.8.8.4 Forecast-Coordinated Operations for Feather and Yuba Rivers (F-CO)

After the 1997 flood, the Agency initiated studies directed toward developing a high level of flood protection for Yuba County and the surrounding communities. The resulting Feasibility Study for Yuba-Feather Supplemental Flood Control Project identified six specific flood control improvement measures:

Forecast-Coordinated Operations (Document 1-2), was identified as one of the most cost effective measures identified in the Report on Feasibility of Yuba Feather-Supplemental Flood Control Project and is currently being implemented. Through enhanced communication between local, state, and federal agencies, improved data gathering and exchange, and utilization of the most recent advancements to weather and river forecasting, the F-CO will help minimize the risk of exceeding river channel capacity and increase the warning times to the communities along the Yuba and Feather Rivers and downstream. The goal of F-CO is to improve flood protection by improving coordination between Lake Oroville (flood storage capacity: 750,000 acre-feet) and New Bullards Bar Reservoir (flood storage capacity: 170,000 acre-feet) flood operations without impacting the water supply of the projects. The project is a multi-agency collaborative effort involving the Yuba County Water Agency, California Department of Water Resources (Flood Management and State Water Project departments), National Oceanic and Atmospheric Administration, National Weather Service – River Forecast Center, and the US Army Corps of Engineers.

The coordinated operations of the reservoirs will facilitate early and timely releases of flood flows from Lake Oroville and New Bullards Bar Reservoir. The goal is to reduce peak flows on the Feather and Yuba rivers and provide regional flood control benefits.

The coordinated operations of the program will also improve notification processes and provide better river stage forecast data to downstream emergency operation managers, state and local Offices of Emergency Services, and levee districts.

The improved flood forecasting of Yuba and Feather River flows will allow water managers to operate the reservoirs in advance of major flood events with an improved level of certainty; thus, reducing peak flows of the rivers. To improve flood forecasting, river gauging stations have been installed to collect real-time rainfall, and snow and streamflow data in the Yuba and Feather River basins. Flood forecasting models will be upgraded to incorporate the additional real-time data and weather forecasts. Realistic information defining certainty in reservoir inflow forecasts will be available to reservoir operator to aid with decision-making. Sophisticated reservoir simulation and routing models will be developed to guide operation of the reservoirs and to forecast flows at downstream points.

The F-CO project is divided into two phases, design and implementation. The design phase is estimated to cost about $11.2 million. Fifty percent of the design cost will be in the form of in-kind services provided by DWR, NOAA, and USACE. The other 50 percent will be financed by the Costa-Machado Water Act of 2000. The implementation phase is estimated to cost $1.6 million and will receive funding from the same sources.

In late 2005, the grant application to fund the F-CO program was approved and a grant contract was executed for the design of the program. Work on this multi-year program has been initiated. Staff from participating agencies and consultants has formed working teams, and an annual work plan will be prepared at the beginning of each year. The major task for the first year was to develop tools to improve the quality of flood forecasting data and identify real-time data needs and hardware and software needs. In the second and third years, program work will focus on preparing an improved communication protocol between reservoir operators and flood emergency agencies, development of the sophisticated forecasting models, and updating flood operation protocols for the Yuba and Feather Rivers.

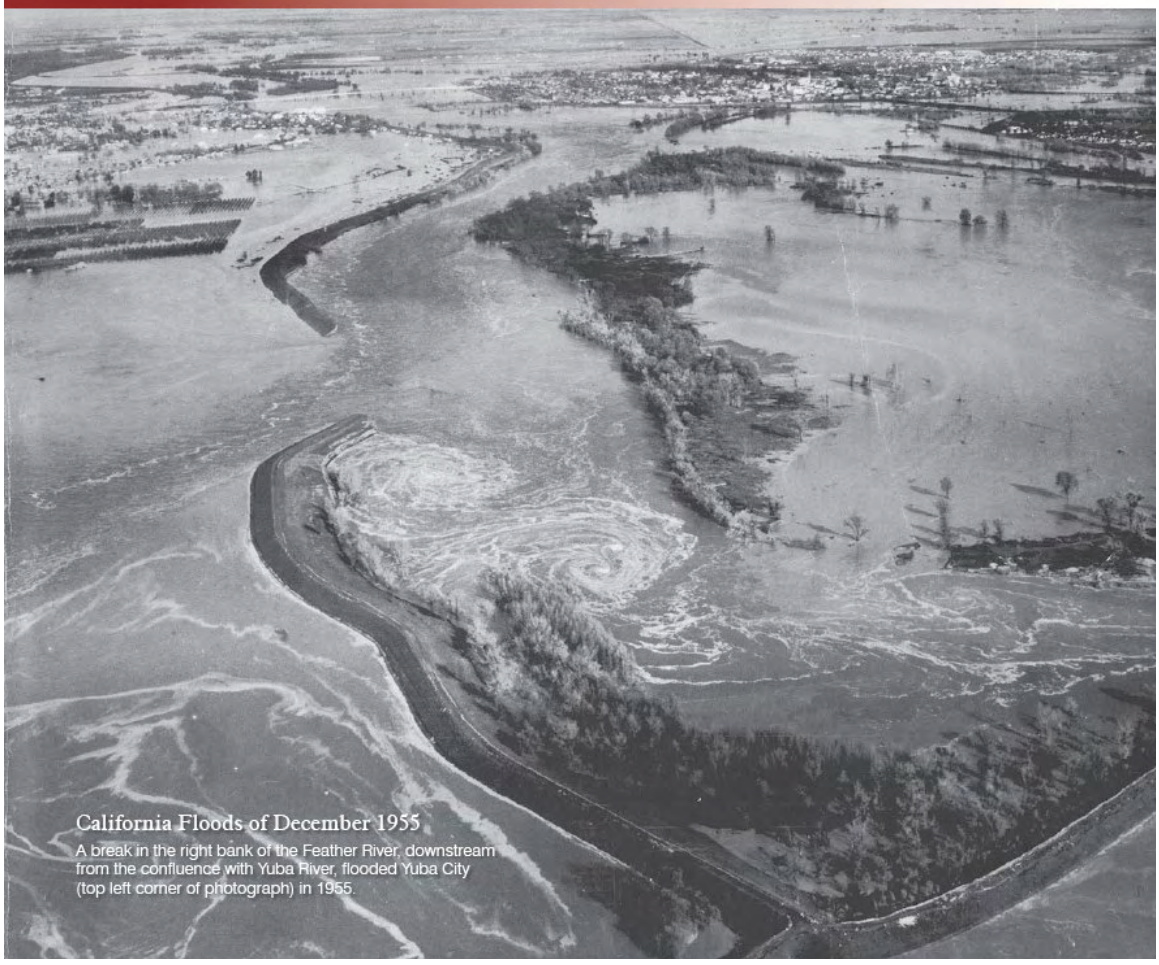
Document 1-2 F-CO Brochure

Forecast-Coordinated Operations

of Lake Oroville and New Bullards Bar Reservoir for Managing Major Flood Events

A Multi-Agency Regional Flood Management Program in Partnership with:

USACE YCWA DWR NOAA



California Floods of December 1955

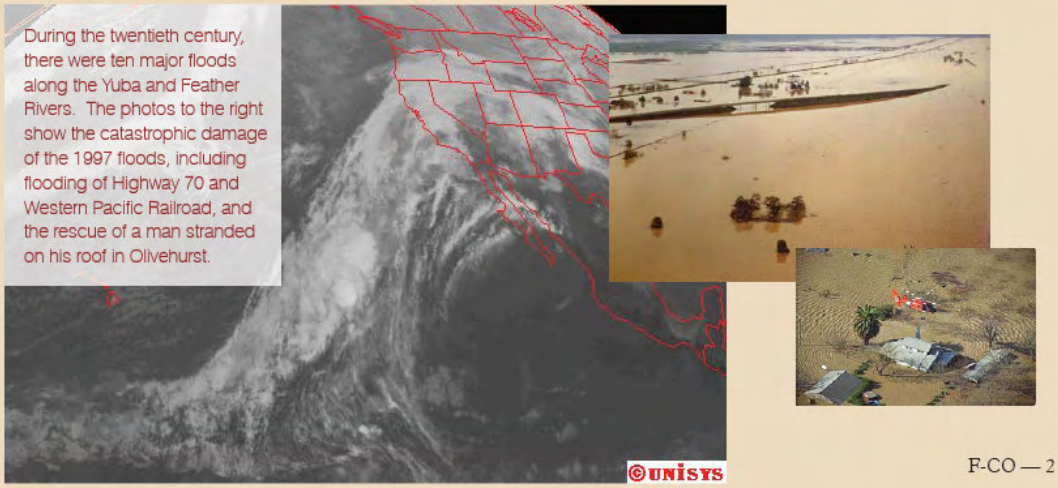
A break in the right bank of the Feather River, downstream from the confluence with Yuba River, flooded Yuba City (top left corner of photograph) in 1955.

Flood Management of the Yuba and Feather Rivers

The communities along the Yuba and Feather Rivers have a long history of catastrophic flooding. Since the early 1900s, this region has been partially protected by a flood control system of levees. Flood protection was increased in 1968 with the addition of upstream storage on the Feather River, and again in 1970 on the Yuba River. Despite these improvements, the current system does not provide adequate **flood protection**. Improved flood management and flood warning is essential for the health, safety, and economic stability of communities along Yuba and Feather Rivers.

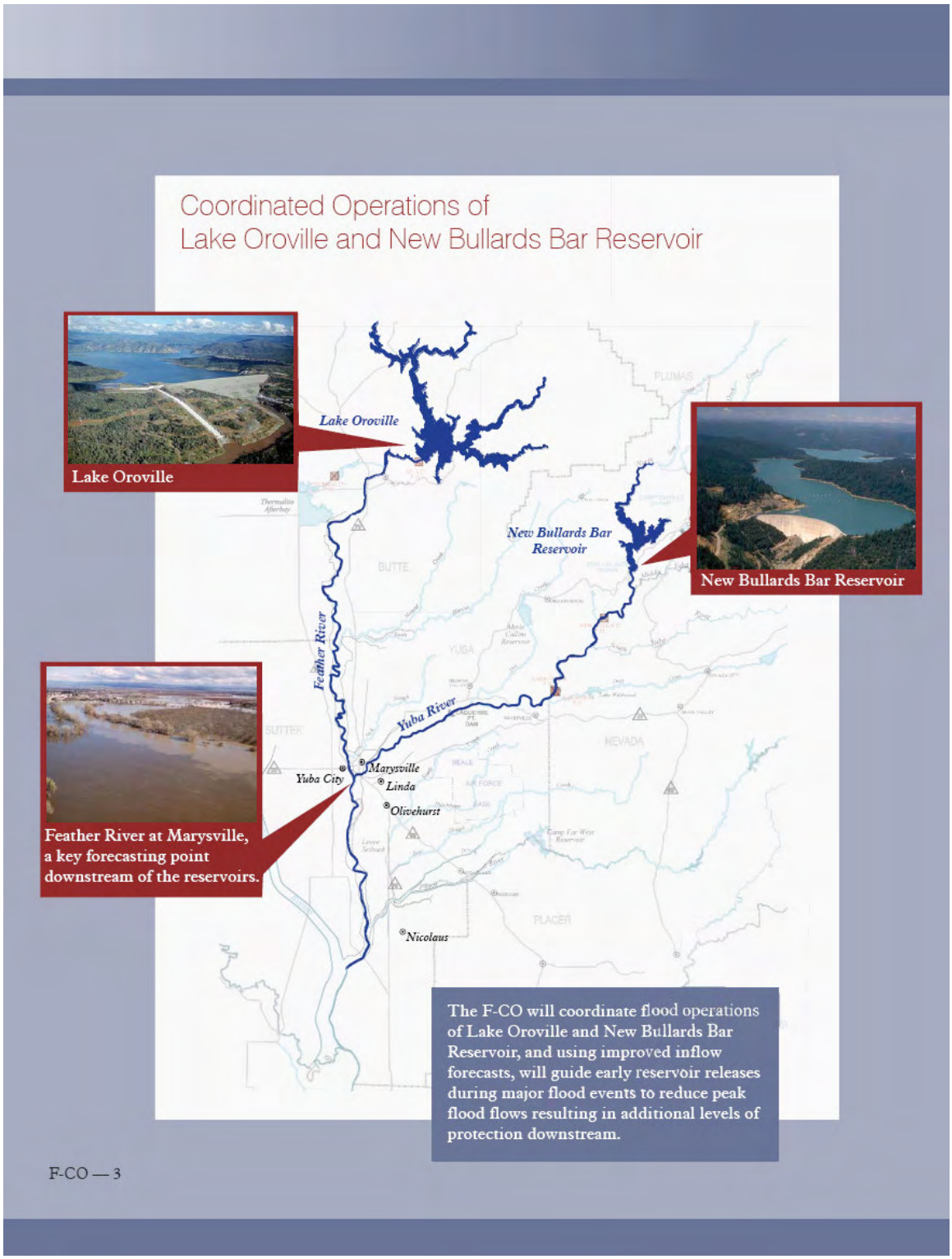
Origin of the Forecast-Coordinated Operations Program

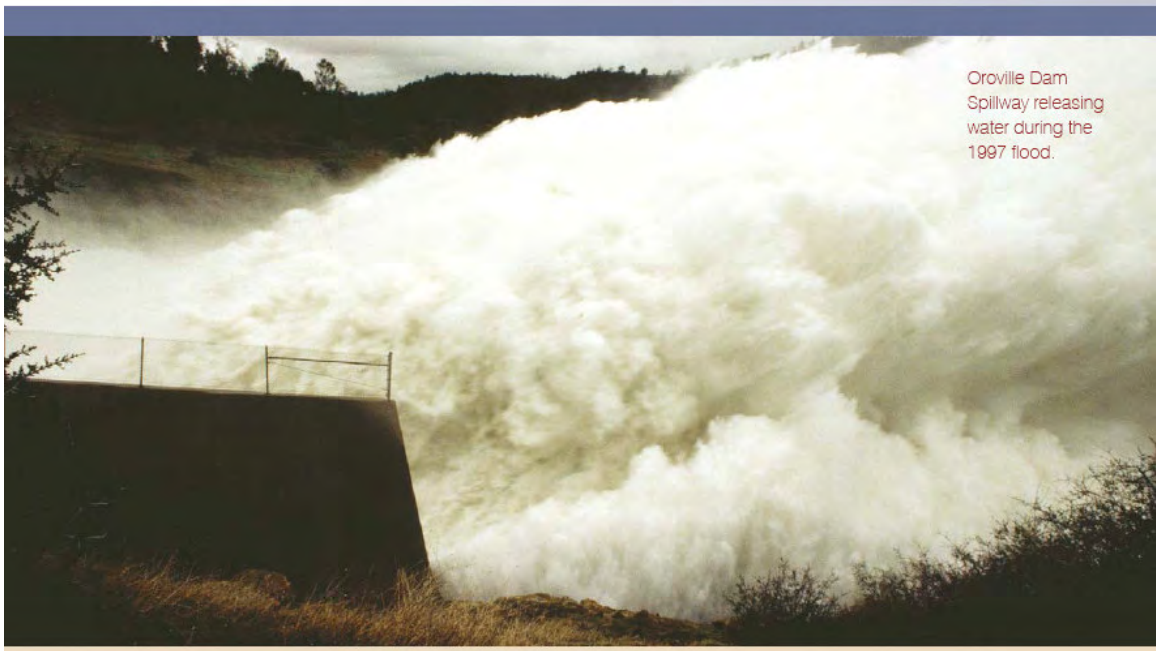
After a devastating flood in 1997, Yuba County Water Agency initiated studies directed toward developing a high level of flood protection for Yuba County and the surrounding communities which have about one hundred thousand residents and several billion dollars in property and infrastructure. The resulting Feasibility Study for Yuba-Feather Supplemental Flood Control Project identified six specific flood control improvement measures. One of the most cost-effective measures is the **Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir** (F-CO). Through enhanced communication between local, state and federal agencies, improved data gathering and exchange, and utilization of the most recent advancements to weather and river forecasting, the F-CO will help minimize the risk of exceeding river channel capacity and increase the warning times to the communities along the Yuba and Feather Rivers and downstream.



During the twentieth century, there were ten major floods along the Yuba and Feather Rivers. The photos to the right show the catastrophic damage of the 1997 floods, including flooding of Highway 70 and Western Pacific Railroad, and the rescue of a man stranded on his roof in Olivehurst.

F-CO — 2


Coordinated Operations of
Lake Oroville and New Bullards Bar Reservoir
Lake Oroville
Lake Oroville
New Bullards Bar Reservoir
New Bullards Bar Reservoir
Feather River at Marysville, a key forecasting point downstream of the reservoirs.
Feather River
Yuba River
Yuba City
Marysville
Linda
Olivehurst
Nicolaus
PLUMAS
BUTTE
YUBA
SUTTER
NEVADA
PLACER
The F-CO will coordinate flood operations of Lake Oroville and New Bullards Bar Reservoir, and using improved inflow forecasts, will guide early reservoir releases during major flood events to reduce peak flood flows resulting in additional levels of protection downstream.
F-CO — 3



Oroville Dam Spillway releasing water during the 1997 flood.

F-CO, an Interagency Partnership Program

The development and implementation of the Forecast-Coordinated Operations is a **multiagency** partnership effort. The participating agencies have a history of working together to prepare flood-related information, to operate and maintain the flood control structures, and to serve the public during flood emergencies. They have established procedures, protocols, and infrastructure for exchanging and sharing flood information which will be enhanced by the Forecast-Coordinated Operations Program.

Program Participants

- Yuba County Water Agency (YCWA)
- Department of Water Resources (DWR)
  - *Flood Management*
  - *State Water Project (SWP)*
- National Oceanic and Atmospheric Administration, National Weather Service–River Forecast Center (NOAA)
- US Army Corps of Engineers (USACE)

Program Objective

The objective of the F-CO is to improve flood protection for the communities along the Yuba, Feather and downstream rivers by reducing peak river flows through better river flow forecasting, and improved coordination between Lake Oroville and New Bullards Bar Reservoir flood operations. The goal of the program is to improve flood protection without impacting the water supply of these projects.

F-CO — 4

F-CO Program

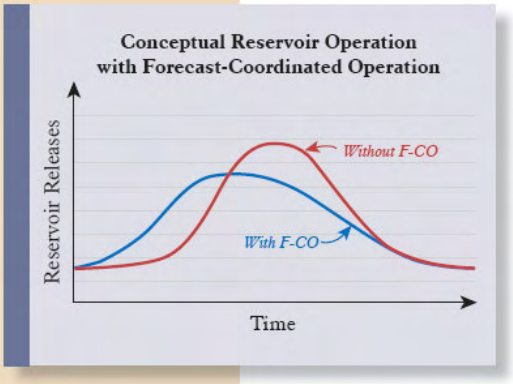
Program development consists of **two phases**. Phase 1 is design, and Phase 2 is implementation. The design phase of the program is underway. Implementation will begin when design of the program or a major element of the design is completed.

Lake Oroville is operated by the Department of Water Resources and has a flood storage capacity of 750,000 acre-feet. New Bullards Bar Reservoir is operated by the Yuba County Water Agency and has a flood storage capacity of 170,000 acre-feet. The key to improving flood protection is the **coordination of these operations during major flood events** through a decision process that uses the best forecast information that can be obtained, including estimates of flood forecast uncertainty.

Stations that gauge precipitation and stream flows are used to collect and transmit real-time data to flood forecasters at the NOAA National Weather Service–River Forecast Center, and the California Department of Water Resources.

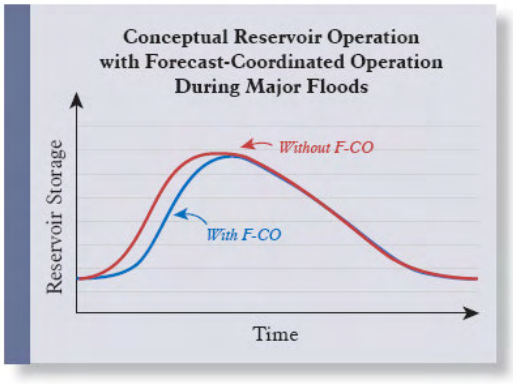
F-CO — 5

The coordinated operations of the reservoirs will facilitate **early and timely releases of flood flows** from Lake Oroville and New Bullards Bar Reservoir. The goal is to **reduce peak flows** on the Feather and Yuba Rivers and downstream, and provide regional flood control benefits.



The coordinated operations of the program will also improve **notification processes** and provide better river stage forecast data to downstream emergency operation managers, state and local Offices of Emergency Services, and levee districts.

The improved flood forecasting of Yuba and Feather River flows will allow water managers to operate the reservoirs **in advance of major flood events** with an improved level of certainty; thus, reducing peak flows of the rivers. To improve flood forecasting, **additional gaging stations** will be installed to collect real-time rainfall, and snow and streamflow data in the Yuba and Feather River basins. Flood forecasting models will be upgraded to incorporate the additional real-time data and weather forecasts. Probalistic information defining certainty in reservoir inflow forecasts will be available to reservoir operators to aid with decision-making. Sophisticated reservoir simulation and routing models will be developed to guide operation of the reservoirs and to forecast flows at downstream points.



F-CO — 6

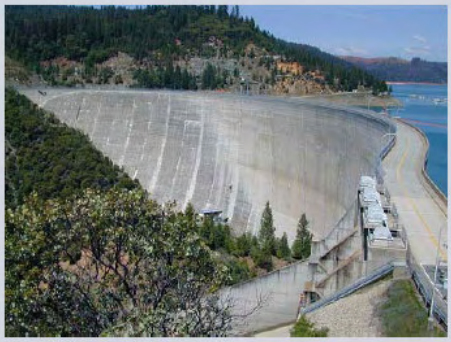
Funding the F-CO

F-CO design (Phase 1) cost is estimated to be about $11.2 million. About 50 percent of the design cost will be in the form of in-kind services provided by the Department of Water Resources, NOAA and US Army Corps of Engineers. The other 50 percent of the cost will be financed by the Costa-Machadoo Water Act of 2000.

F-CO implementation (Phase 2) cost is estimated to be about $1.6 million of which about 50 percent will be in-kind services provided by DWR , NOAA, USACE and SWP. The other 50 percent will be financed by the Yuba County Water Agency and the Costa-Machado Water Act of 2000.

Program Status

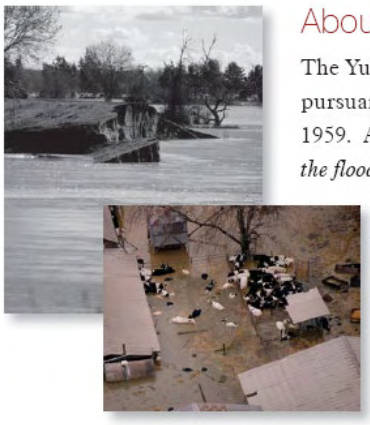
In late 2005, the grant application to fund the F-CO Program was **approved** and a grant **contract** was executed for the design of the program. Work on this multi-year program has been initiated. Staff from participating agencies and consultants have formed working teams, and an **annual work plan** will be prepared at the beginning of each year. The major task for the first year was to **develop tools** to improve the quality of the flood forecasting data and identify information technology needs of the F-CO. This included identification of additional real-time data needs and hardware and software needs. In the second and third years, program work will focus on preparing an improved communication protocol between reservoir operators and flood emergency agencies, development of the sophisticated forecasting models, and updating flood operation protocols for the Yuba and Feather Rivers.



New Bullards Bar Dam

Lake Oroville and Oroville Dam

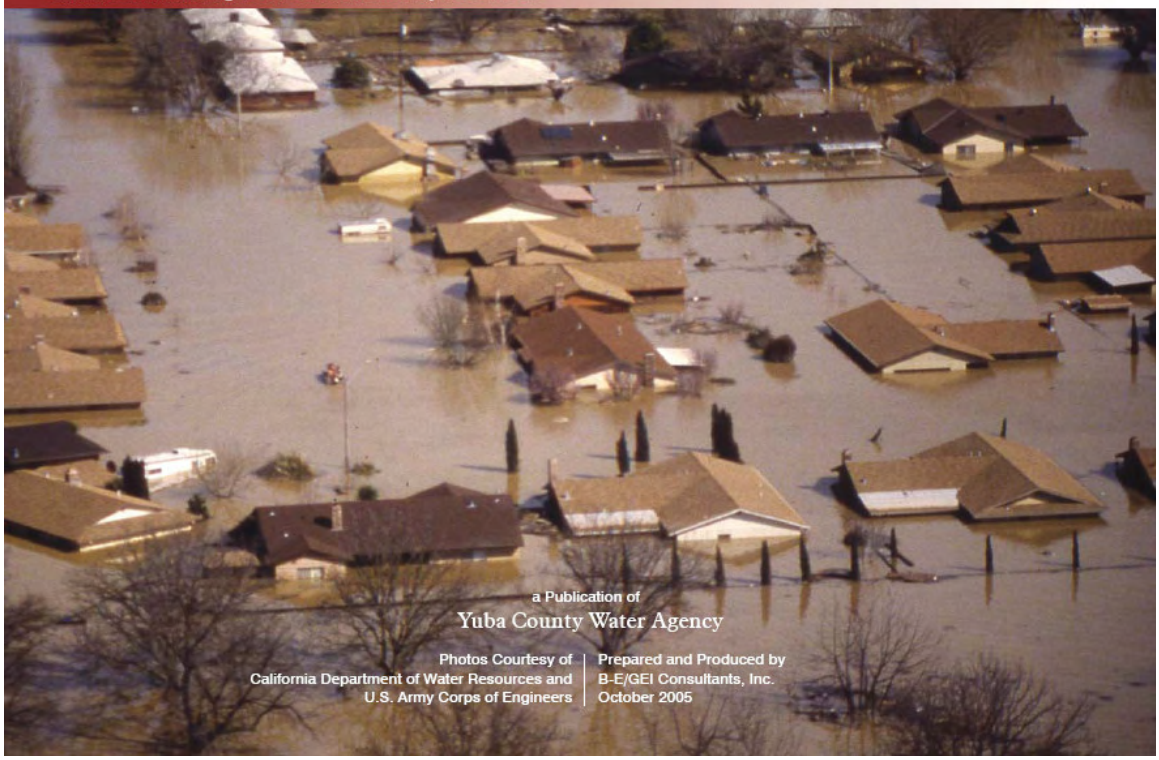
F-CO — 7



About Yuba County Water Agency

The Yuba County Water Agency was created pursuant to an act of the California legislature in 1959. Among its powers is the "*...power to control the flood and storm waters of the agency and the flood and storm waters that flow into the agency, and to conserve such waters for the ben eficial and useful purposes of said agency ...*" (West's Water Code Appendix section 84-4.2.)

Linda residential neighborhood inundated by 1986 flood.



a Publication of
Yuba County Water Agency

Photos Courtesy of
California Department of Water Resources and
U.S. Army Corps of Engineers

Prepared and Produced by
B-E/GEI Consultants, Inc.
October 2005

1.8.8.5 The Lower Yuba River Accord

After 5 years in development, the 17-party consensus based proposed Lower Yuba River Accord (Document 1-3) is now under way. The California State Water Resources Control Board (SWRCB) approved a 1-year pilot program for the Yuba Accord in April 2006, and this program is working well.
(*Yuba County Water Agency, Accessed 03/27/07*)

The 2006 Pilot Program establishes higher minimum instream flows, which exceed state and federal requirements, for the lower Yuba River's Chinook salmon and steelhead. It also provides operational information on the program, and funding for an environmental review of the Yuba Accord required under state and federal law.
(*Yuba County Water Agency, Accessed 03/27/07*)

The SWRCB is scheduled to consider the approval of a second 1-year pilot program for 2007. All 17 conservation groups, agricultural interests, and state and federal agencies participating in the Yuba Accord support the 2006 and 2007 pilot programs. The Yuba Accord is scheduled to go into effect in 2008.
(*Yuba County Water Agency, Accessed 03/27/07*)

The pilot programs are essential for the Yuba Accord's development. Under the 2006 and 2007 pilot programs, Yuba County Water Agency (YCWA) releases water from its reservoir, New Bullards Dam and Reservoir, to meet significantly higher minimum instream flows for the fisheries resources of the lower Yuba River. These new flows range from 260,000 acre-feet of water in dry years to over 574,000 acre-feet of water in wet years. The higher flows will improve habitat conditions for the lower Yuba River's Chinook salmon and steelhead, among the last remaining wild populations in California's Central Valley. Other fish and wildlife species in the Yuba River will benefit as well.
(*Yuba County Water Agency, Accessed 03/27/07*)

The pilot programs include water sales to the CALFED Bay-Delta Program Environmental Water Account (EWA) to benefit the fisheries resources of the Bay-Delta. Revenues from these sales help fund the cost of the Yuba Accord's Environmental Impact Report/Environmental Impact Statement (EIR/EIS), currently being prepared, and implementation of the Yuba Accord, as well as other activities, such as YCWA's share of costs for ongoing flood protection efforts in Yuba County.
(*Yuba County Water Agency, Accessed 03/27/07*)

The Yuba Accord contains three proposed agreements:

1. A Fisheries Agreement
2. A Water Purchase Agreement
3. Conjunctive Use Agreements

The Fisheries Agreement, developed by local, state, and federal fisheries biologists, advocates, and policy representatives, will establish higher minimum instream flows during specified periods of the year. To provide these flows, YCWA will implement the Conjunctive Use Agreements, which will establish a comprehensive conjunctive use program that integrates surface water and groundwater supplies with irrigation districts/mutual water companies YCWA serves in Yuba County.
(*Yuba County Water Agency, Accessed 03/27/07*)

Under the Water Purchase Agreement, the California Department of Water Resources and U.S. Bureau of Reclamation will enter into a long-term agreement to purchase water from YCWA to

improve reliability for the State Water Project and Central Valley Project, including for fish and wildlife purposes, and to contribute to long-term EWA security.
(*Yuba County Water Agency, Accessed 03/27/07*)

The Yuba Accord's instream flows may be modified when the Federal Energy Regulatory Commission issues a new long-term Federal Power Act license to YCWA for the Yuba Project during or after 2016.
(*Yuba County Water Agency, Accessed 03/27/07*)

Once implemented, the actions contained in these agreements will provide the following benefits:

- A stable source of revenue for flood control and other activities in Yuba County, including the conjunctive use program to be implemented by the local irrigation districts/mutual water companies. Yuba County has an estimated need of more than $150 million for flood control projects such as strengthening existing levees.
- Improved water supply reliability for the Yuba County farming economy, along with a responsible conjunctive use program to improve water use efficiency for local farmers.
- Improved water supply reliability for DWR and Reclamation, including a firm commitment of 60,000 acre-feet per year for the EWA, and up to an additional 140,000 acre-feet of water in dry years for the State Water Project (SWP) and the Central Valley Project (CVP), including for fish and wildlife purposes.
- Higher instream flow requirements to protect lower Yuba River Chinook Salmon, steelhead, and other fish species, ranging from 260,000 acre-feet in a dry year to more than 574,000 acre-feet in a wet year – an increase of 25,000 acre-feet in a dry year and to more than 170,000 acre-feet in a wet year.
- A $6 million long-term fisheries monitoring, studies, and enhancement program.

(*Yuba County Water Agency, Accessed 03/27/07*)

The Yuba County Water Agency engaged in a public outreach program to disseminate information on the Yuba River Accord to the public and solicit comments on the environmental impacts of the proposal. YCWA developed a brochure (Document 1-4) and made it available at the main office of the Water Agency as well as all community meetings that YCWA participated in. These brochures were also distributed by the Yuba County Hazard Mitigation Project at all community meetings held by the project.

Document 1-3 Federal Register - Yuba River Accord

DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

Lower Yuba River Accord, Yuba County, CA

AGENCY: Bureau of Reclamation, Interior.

ACTION: Notice of Intent to prepare an Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) and to hold public scoping meetings.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, the Bureau of Reclamation (Reclamation) proposes to participate and serve as the lead agency under NEPA in the preparation of a joint EIS/EIR on the Lower Yuba River Accord (Yuba Accord). The Yuba County Water Agency (YCWA), a local public water agency, is proposing the project and will serve as the lead agency under the California Environmental Quality Act (CEQA). The purpose of the Yuba Accord is to resolve instream flow issues associated with operation of the Yuba River Development Project (Yuba Project) in a way that protects and enhances lower Yuba River fisheries and local water-supply reliability, while providing revenues for local flood-control and water-supply projects, water for the CALFED Program to use for protection and restoration of Sacramento-San Joaquin Delta (Delta) fisheries, and improvements in state-wide water supply management, including supplemental water for the Central Valley Project (CVP) and the State Water Project (SWP).

This notice is published in accordance with NEPA regulations found in 40 CFR 1501.7. The purpose of this notice is to obtain suggestions and information from other agencies and the public on the scope of issues to be addressed in the EIS/EIR. A similar notice is being published by YCWA in accordance with CEQA. Comments and participation in the scoping process are encouraged.

DATES: Four public scoping meetings will be held on the following dates:

- July 19, 2005–1 p.m., Sacramento, CA
- July 19, 2005–6:30 p.m., Sacramento, CA
- July 20, 2005–1 p.m., Marysville, CA
- July 20, 2005–6:30 p.m., Marysville, CA

ADDRESSES: The public scoping meeting locations are:

- Sacramento—Doubletree Hotel, 2001 Point West Way, Sacramento, CA
- Marysville—Yuba County Government Center, 915 8th Street, Marysville, CA

Written comments on the scope of the Yuba Accord or issues to be addressed in the EIR/EIS must be received no later than August 4, 2005. Send written comments to Mary Grim, Bureau of Reclamation, 2800 Cottage Way, MP–400, Sacramento, CA 95825. Grim, Bureau of Reclamation, 2800 Cottage Way, MP–400, Sacramento, CA 95825.

FOR FURTHER INFORMATION CONTACT: Mary Grim, Environmental Specialist, Reclamation, at the above address; telephone number 916–978–5204.

SUPPLEMENTARY INFORMATION: YCWA is a public agency created and existing pursuant to the provisions of the Yuba County Water Agency Act of 1959. YCWA owns and operates the Yuba Project, which includes New Bullards Bar Dam and Reservoir on the North Yuba River. YCWA operates the Yuba Project in accordance with a Federal Energy Regulatory Commission License, flood control rules promulgated by the U.S. Army Corps of Engineers, state water rights permit terms, and an agreement with the California Department of Fish and Game (CDFG) for instream flows.

In March of 1991, CDFG released a "Lower Yuba River Fisheries Management Plan", which contained recommendations regarding fishery protection and enhancement measures in the lower 24-mile section of the Yuba River. CDFG requested that the State Water Resources Control Board (SWRCB) consider modifying YCWA's water rights permits to implement the recommendations contained in CDFG's Plan. Based on CDFG's request, and to address various allegations raised by a coalition of non-governmental fisheries organizations (NGOs) against several water agencies in 1989 filings, the SWRCB initiated a proceeding to consider fishery protection and water right issues on the lower Yuba River in early 1992.

The SWRCB held hearings on these issues in 1992 and 2000. The SWRCB adopted Water Rights Decision 1644 (D–1644) on March 1, 2001. D–1644 established new instream flow requirements for the lower Yuba River in YCWA's water right permits, required YCWA to take actions to address potential concerns regarding water temperatures for Chinook salmon and steelhead, and required studies and consultation on various other issues.

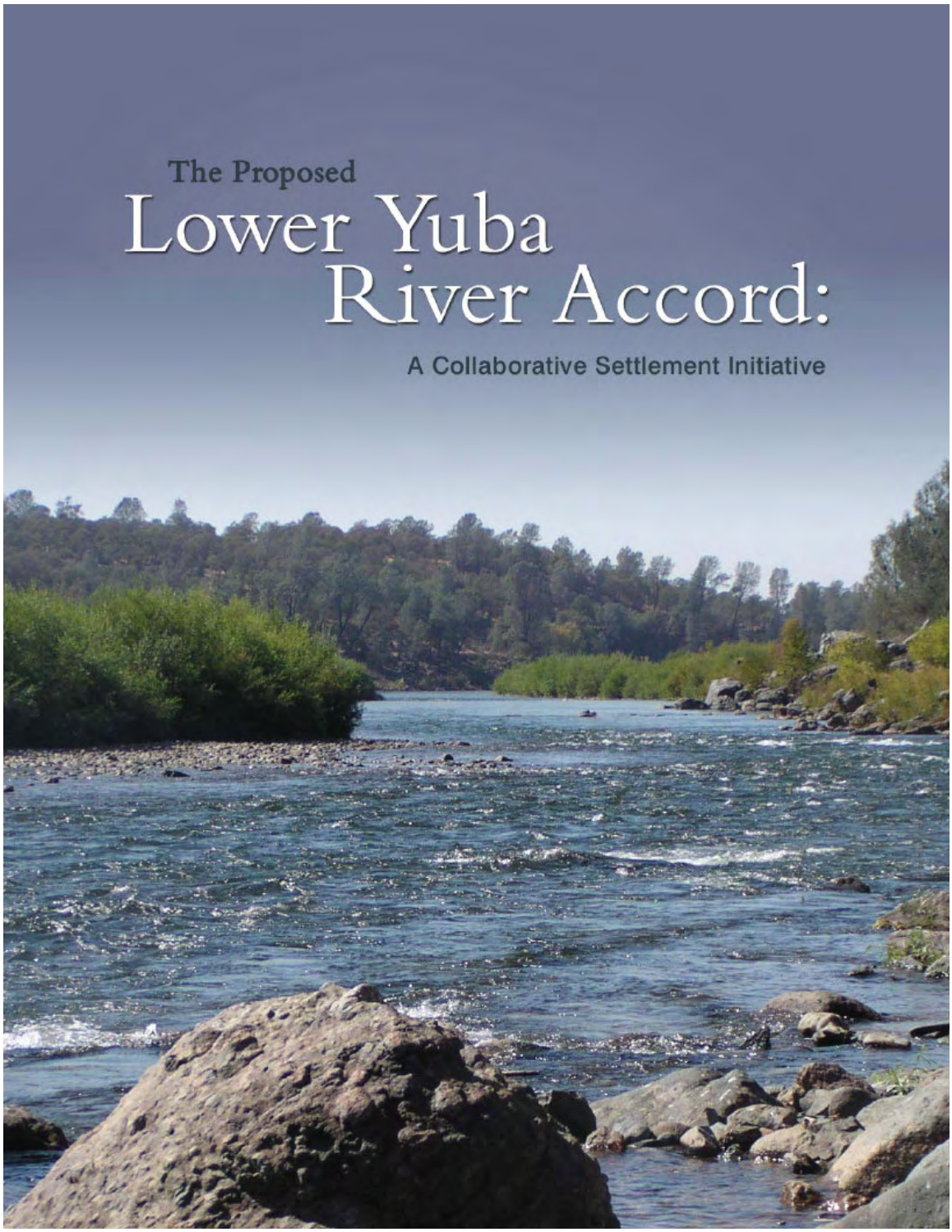
YCWA, several local water districts in Yuba County, and a collective of fisheries NGOs all initiated legal actions challenging D–1644 on a variety of issues. After considering some new evidence, the court remanded D–1644 to the SWRCB for reconsideration in light of the new evidence. After a brief hearing in 2003, the SWRCB issued Revised Water Rights Decision 1644 (RD–1644), which contains only minor changes from D–1644. The same parties that had challenged D–1644 then initiated new legal proceedings challenging RD–1644 on most of the same issues.

Since RD–1644 was issued, the parties to the litigation and the state and Federal fisheries agencies have been engaged in a collaborative, interest-based initiative to try to resolve the flow and other fisheries issues on the lower Yuba River. The potential settlement has become known as the Yuba Accord. If implemented, the Yuba Accord would resolve issues associated with operation of the Yuba Project in a way that would protect and enhance lower Yuba River fisheries, protect local water supply reliability, provide revenues for local flood-control and water-supply projects, provide water for protection and restoration of Delta fisheries, and increase state-wide water supplies.

The Yuba Accord would include three major elements:

- The first element would be an agreement (Yuba Accord Fisheries Agreement) between YCWA, CDFG and the collective of NGOs, with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service supporting the agreement. Under the Yuba Accord Fisheries Agreement, YCWA would revise the operation of the Yuba Project to provide higher flows in the lower Yuba River to protect and enhance fisheries and to increase downstream water supplies.

Document 1-4 Lower Yuba River Accord Brochure



The Proposed Lower Yuba River Accord

EXECUTIVE SUMMARY

Working with a broad coalition of 17 agricultural, environmental, and fisheries interests, including state and federal agencies, the Yuba County Water Agency (YCWA) has developed an innovative set of agreements that together form a framework – the proposed Lower Yuba River Accord (Yuba Accord) – that will resolve nearly 15 years of controversy and litigation over instream flow requirements for the lower Yuba River.

The science-based, consensus-oriented Yuba Accord proposes new instream flow requirements for the lower Yuba River that will significantly increase protection for the river's remarkable fisheries resources. These requirements will range from 260,000 acre-feet in a dry year to over 574,000 acre-feet in a wet year, and will improve habitat conditions for the lower Yuba River Chinook salmon and steelhead – among the last remaining wild populations in California's Central Valley.

The Yuba Accord also will represent the first major long-term water acquisition by the State of California for the CALFED Bay-Delta Program (CALFED) Environmental Water Account (EWA) and will improve water supply reliability for Yuba County farmers, the California Department of Water Resources (DWR), and the U.S. Bureau of Reclamation (Reclamation). In addition, it will provide YCWA with a source of revenue for local activities, including a comprehensive conjunctive use program, flood control improvements, and a lower Yuba River fisheries monitoring, studies, and enhancement program.

The Yuba Accord will promote the objectives of CALFED and the responsible stewardship of California's water supplies.

Yuba Accord Environmental and Economic Benefits

The Yuba Accord will be based on three separate but related proposed agreements: a Fisheries Agreement, a Water Purchase Agreement, and Conjunctive Use Agreements. Once implemented, the actions contained in these agreements will provide the following benefits:

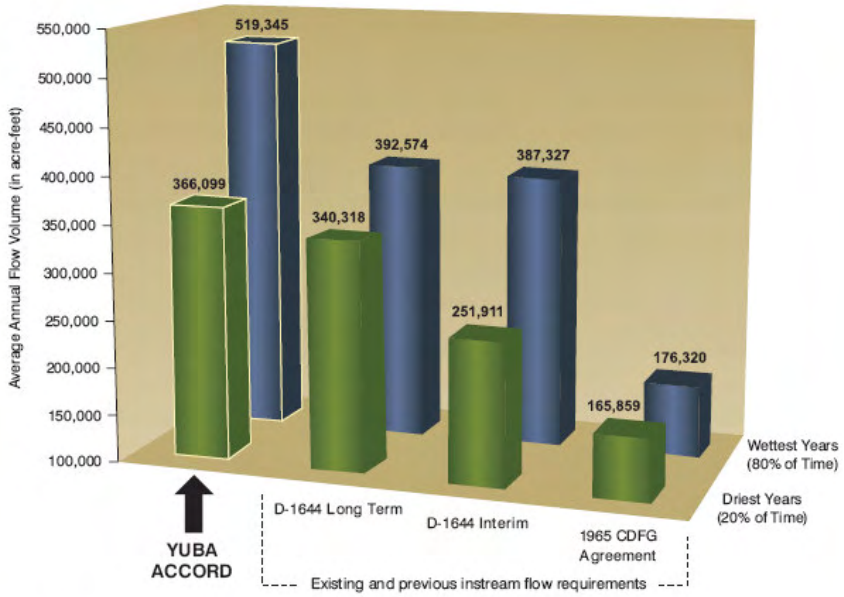
- Higher instream flow requirements to protect lower Yuba River Chinook salmon, steelhead, and other fish species, ranging from 260,000 acre-feet in a dry year to more than 574,000 acre-feet in a wet year – an increase of 25,000 acre-feet in a dry year to more than 170,000 acre-feet in a wet year.
- Improved water supply reliability for DWR and Reclamation, including a firm commitment of 60,000 acre-feet per year for the EWA, and up to an additional 140,000 acre-feet of water in dry years for the State Water Project (SWP) and the Central Valley Project (CVP), including for fish and wildlife purposes.
- A $6 million long-term fisheries monitoring, studies, and enhancement program.
- Improved water supply reliability for the Yuba County farming economy, along with a responsible conjunctive use program to improve water use efficiency for local farmers.
- A secure funding source for YCWA and the local irrigation districts/mutual water companies it serves to finance conjunctive use and water use efficiency activities, levee strengthening, and other measures to improve flood control protection, and other water management actions in Yuba County.

Cover photo by Curt Aikens

Page 1

A Collaborative Settlement Initiative

The Yuba Accord includes higher instream flow requirements for salmon and steelhead.



Notes: Average annual flow requirement volumes are shown. The Yuba Accord instream flow requirements for the lower Yuba River will range from 260,000 acre-feet in a dry year to more than 574,000 acre-feet in a wet year.

Extensive Public Involvement and Next Steps

Local, state, and federal agencies, the public, and other interested parties will have ample opportunities to comment on the Yuba Accord throughout the environmental compliance process. Public meetings, workshops, and scoping sessions are being scheduled as part of the preparation of a joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), and additional reviews required by the state and federal Endangered Species Acts (ESAs). Several local, state, and federal agencies, as well as other parties to the Yuba Accord process, will be involved in developing and reviewing environmental analyses and documentation.

The goal of the participants is to implement the Yuba Accord by late 2006. The first step in this process was completion of a Statement of Support (for the Fisheries Agreement), a Memorandum of Understanding (for the Water Purchase Agreement), and Principles of Agreement (for the Conjunctive Use Agreements with YCWA's local irrigation districts/mutual water companies). With these measures now in place, parties to the Yuba Accord that also are parties to the litigation will request that the California Superior Court stay its proceedings so that the parties and other participants in the Yuba Accord may initiate a 2006 pilot program and the environmental compliance process. The State Water Resources Control Board (SWRCB) will be asked to take actions to implement both the 2006 pilot program (including instream flow and water transfer provisions consistent with the Yuba Accord) and the Yuba Accord. Throughout the process, local, state, and federal agencies and the public will be involved in extensive input, review, and comment activities. Such involvement will be welcomed and encouraged.

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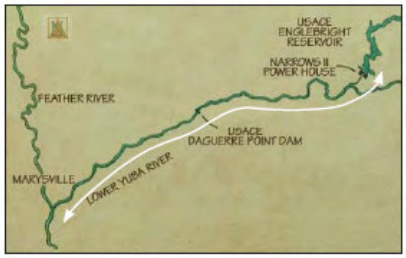
The Proposed Lower Yuba River Accord

INTRODUCTION



Deb Pate (modified by MWH)

The lower Yuba River is designated as the 24-mile reach from the USACE Englebright Dam and Reservoir to the confluence with the Feather River.

The lower Yuba River flows 24 miles from Englebright Dam and Reservoir to its confluence with the Feather River, just past the city of Marysville. Today, the Yuba River is one of California's most important rivers because it nurtures one of the Central Valley's last wild, native Chinook salmon and steelhead runs. But the river has been the subject of controversy since the 1850s, when Gold Rush miners plundered it in their relentless search for gold. Hydraulic mining and other destructive techniques took a devastating toll on the river. Debris from these activities – estimated at a volume equal to three times the volume of the earth excavated for constructing the Panama Canal – clogged the river, damaged salmon and steelhead spawning beds, and led to later flooding in nearby communities.

To stabilize the debris and reduce the flood risk, the California Debris Commission – a division of the U.S. Army Corps of Engineers (USACE) – constructed Daguerre Point Dam in 1906 and Englebright Dam in 1941. In the late 1960s, YCWA financed and built the Yuba River Development Project (Yuba Project) to further reduce the risk of flooding in Yuba County. Located upstream of the two USACE projects, this multipurpose project includes New Bullards Bar Dam and Reservoir, several small dams, diversion tunnels, and hydroelectric facilities. The Yuba Project provides a water supply to local farmers, flood control, and recreational benefits, and produces nearly 360 megawatts of hydroelectric power.

Despite the flood control capacity provided by the Yuba Project and an extensive system of levees, flooding is still a significant problem in Yuba County. In 1986 and 1997, the Yuba and Feather rivers ripped through levees in the county. In each flood, several people were killed and tens of thousands of acres of land were inundated, destroying businesses, schools, and homes.

Appeal-Democrat/Brian Davies

Submerged Arboga neighborhood. Of the more than 890 Arboga area homes damaged when the Feather River levee broke, 730 were destroyed or suffered major damage. (January 3, 1997)

Appeal-Democrat/Craig Kohlruss

Vanessa Castorana feeds a baby at the Red Cross evacuation center. More than 6,000 people filled the school while thousands more took shelter in private homes. (January 2, 1997)

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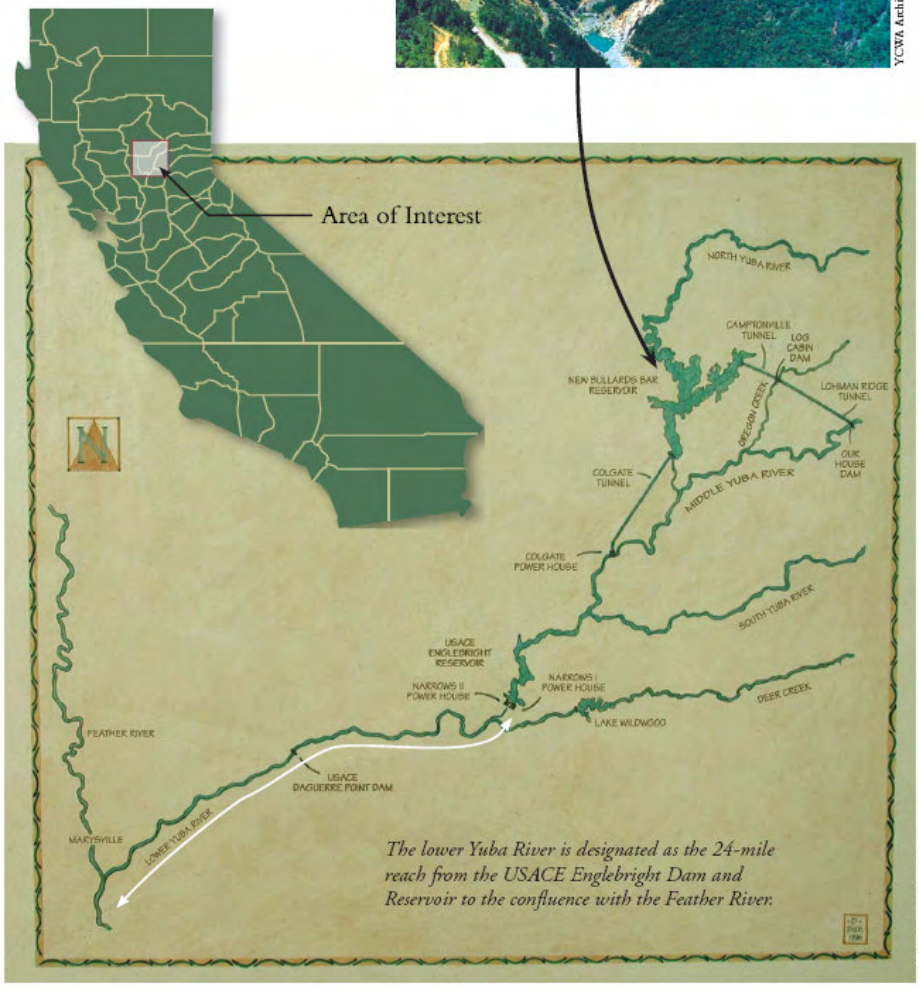
New Bullards Bar Dam and Reservoir (pictured right) was financed and constructed by YCWA in 1969. This modern multipurpose facility is part of the Yuba Project and produces 360 megawatts of hydroelectric power, provides flood control and recreation benefits, and water supplies to local farmers.

YCWA Archives

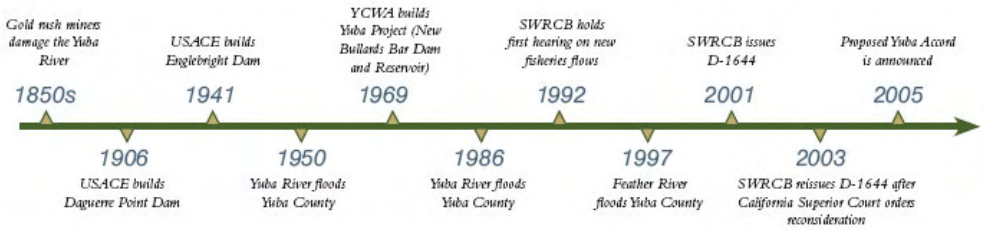


Deb Pate (modified by MWH)

The Proposed Lower Yuba River Accord

FROM CONTROVERSY TO CONSENSUS

In the early 1990s, the California Department of Fish and Game (CDFG) released a "Lower Yuba River Fisheries Management Plan," which proposed new instream flow requirements to improve lower Yuba River fisheries habitat conditions. The plan called for significantly higher flows than those required by a 1965 agreement between CDFG and YCWA. After a decade of hearings and court actions, the SWRCB in 2001 adopted new instream flow requirements. The SWRCB order is known as Water Right Decision 1644 (Decision 1644 or D-1644), and is today the subject of legal challenges in California Superior Court from both YCWA and environmental interests.



To resolve this controversy, the litigants, YCWA, the South Yuba River Citizens League, Trout Unlimited, The Bay Institute, and Friends of the River, along with CDFG, the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NOAA Fisheries), developed the comprehensive proposal contained in the Fisheries Agreement.

Improving habitat for the lower Yuba River wild fisheries and preserving the value of Yuba Project water and hydroelectric facilities are both beneficial.

The Yuba Accord will increase instream flows in the lower Yuba River for the benefit of Chinook salmon, steelhead, and other fish and wildlife species.

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THE THREE AGREEMENTS

The Yuba Accord will contain three separate but related proposed agreements:

(1) A Fisheries Agreement

(2) A Water Purchase Agreement

(3) Conjunctive Use Agreements

The Fisheries Agreement will be the cornerstone of the Yuba Accord. It was developed by state, federal, and consulting fisheries biologists, fisheries advocates, and policy representatives. In comparison to the interim flow requirements of D-1644, the Fisheries Agreement will establish higher instream flow requirements during specified periods of the year. To provide these flows, YCWA proposes to implement the Conjunctive Use Agreements, which will establish a comprehensive conjunctive use program that integrates surface water and groundwater supplies with the local irrigation districts/mutual water companies YCWA serves in Yuba County. Under the Water Purchase Agreement, DWR and Reclamation propose to enter into a long-term agreement to purchase water from YCWA to improve water supply reliability for the SWP and CVP, including for fish and wildlife purposes, and contribute to long-term EWA security.

The Water Purchase and Conjunctive Use agreements will enable YCWA to operate the Yuba Project in a new, more comprehensive manner in order to implement the Yuba Accord's higher instream flow requirements. Additionally, an amendment to a power agreement between YCWA and the Pacific Gas and Electric Company (PG&E) will enable YCWA to meet Yuba Accord flow requirements while still providing PG&E with the ability to generate hydroelectric power from the Yuba Project for its customers.

The Yuba Accord's instream flow requirements may be modified when the Federal Energy Regulatory Commission issues a new long-term Federal Power Act license to YCWA for the Yuba Project, which will occur during or after 2016.

YCWA / Curt Aikens

The Yuba Accord will include a comprehensive monitoring, studies, and enhancement program. Rotary Screw Traps (like the one pictured above) will be used to evaluate the downstream movement of juvenile Chinook salmon and steelhead.

On behalf of the EWA, state and federal agencies buy water from willing sellers or divert surplus water when safe for fish, then bank, store, transfer, and release it as needed to protect fish and compensate water users.

The Proposed Lower Yuba River Accord

KEY YUBA ACCORD BENEFITS

Fisheries Agreement

- The Yuba Accord will establish instream flow requirements for lower Yuba River Chinook salmon, steelhead, and other fish species that are equal to or greater than current protections. These higher consensus-based flow requirements will range from 260,000 acre-feet in a dry year to over 574,000 acre-feet in a wet year – an annual increase of 25,000 acre-feet to over 170,000 acre-feet compared to present requirements. These higher flow requirements will improve habitat in the lower Yuba River for Chinook salmon and steelhead – among the last remaining wild populations in California's Central Valley.
- The Yuba Accord will improve instream habitat conditions, including water temperatures, during summer and fall months – a period critical to Chinook salmon adult immigration, holding, and spawning, and steelhead juvenile rearing. The Yuba Accord instream flow requirements for the fall will provide the maximum amount of suitable Chinook salmon spawning habitat in all but the driest years.
- The Yuba Accord River Management Fund (RMF), to be administered by the River Management Team (RMT), will provide $6 million to finance a long-term scientific fisheries monitoring, studies, and enhancement program for the lower Yuba River. The enhancement program element will include actual physical restoration projects. The RMT will comprise representatives from YCWA, CDFG, NOAA Fisheries, USFWS, Reclamation, DWR, PG&E, and key environmental and fisheries organizations.

Water Purchase Agreement

- The Yuba Accord will improve water supply reliability for DWR and Reclamation, including a firm commitment of 60,000 acre-feet per year for the EWA – the first major long-term water acquisition for the EWA, and a supplemental water supply of up to an additional 140,000 acre-feet in dry years for the SWP and CVP, including for fish and wildlife purposes. The proposed transfer flows will be used first to protect and improve fisheries habitat on the lower Yuba River.
- The Yuba Accord will provide YCWA with a stable source of revenue for flood control and other activities in Yuba County, including the conjunctive use program to be implemented by the local irrigation districts/mutual water companies. Yuba County has an estimated need of more than $150 million for flood control projects, such as strengthening existing levees.
- The Yuba Accord will help meet the goal of a new state law requiring DWR to use not less than 50 percent of the funds from Chapter 7(d) of Proposition 50 for the long-term purchase of water supplies for the EWA (Assembly Bill 1747, adding Water Code Section 79555).

Previous water transfers by YCWA have resulted in broad benefits. A 1992 Rand Corporation report noted that the state's 1991 drought water bank, to which YCWA significantly contributed, generated nearly $100 million in overall economic benefits.

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Gary Kramer

Many Yuba County rice farmers flood their fields in the winter months to decompose leftover rice stubble, providing habitat benefits for waterfowl, shore birds, and other wildlife species. The Yuba Accord will facilitate this practice.

Conjunctive Use Agreements

- The Yuba Accord will provide long-term water supply reliability for the continued irrigation of crops, helping to stabilize the Yuba County agricultural economy.
- The Yuba Accord will establish a comprehensive stewardship program of surface water and groundwater supplies used by the local irrigation districts/mutual water companies, including improved conservation, efficiency, and conjunctive use measures.
- The Yuba Accord will enable the local irrigation districts/mutual water companies to convert diesel motors to more efficient and cleaner electric motors to improve air quality conditions.

"Conjunctive use" is the coordinated management of surface water and groundwater supplies to increase the yield of both and enhance water supply reliability.

ENVIRONMENTAL COMPLIANCE PROCESS

The 17 participants in the Yuba Accord have completed a Statement of Support (for the Fisheries Agreement), a Memorandum of Understanding (for the Water Purchase Agreement), and Principles of Agreement (for the Conjunctive Use Agreements with YCWA's local irrigation districts/mutual water companies). Most participants are parties to only one of the agreements and reserve judgment on the other components of the Yuba Accord until the comprehensive environmental compliance process has been completed. With these interim measures now in place, parties to the Yuba Accord that also are parties to the litigation will request that the California Superior Court stay its proceedings so that the parties and other participants in the Yuba Accord may initiate the 2006 pilot program, a joint EIR/EIS required by CEQA and NEPA, and additional reviews required by the state and federal ESAs. The SWRCB will be asked to take actions to implement both the 2006 pilot program (including instream flow and water transfer provisions consistent with the Yuba Accord) and the Yuba Accord. The Yuba Accord would go into effect starting in late 2006. Throughout the process, local, state, and federal agencies, the public, and other interested parties will be involved in extensive input, review, and comment activities.

The Proposed Lower Yuba River Accord

YUBA ACCORD PARTICIPANTS

Most participants will be parties to only one of the proposed agreements and have reserved judgment on the other components of the Yuba Accord until the comprehensive environmental compliance process has been completed.

Fisheries Agreement			
	California Department of Fish and Game	www.dfg.ca.gov/news	(916) 358-2900
	Friends of the River	www.friendsoftheriver.org	(916) 442-3155
	South Yuba River Citizens League	www.yubariver.org	(530) 265-5961
	The Bay Institute	www.bay.org	(415) 506-0150
	Trout Unlimited	www.tu.org www.tucalifornia.org	(510) 528-4164
	Yuba County Water Agency	www.ycwa.com	(530) 741-6278
	National Marine Fisheries Service (NOAA Fisheries)[1]	swr.nmfs.noaa.gov/sac/index.htm	(916) 930-3601
	U.S. Fish and Wildlife Service [1]	www.delta.dfg.ca.gov/afrp	(209) 946-6400 ext. 315
Water Purchase Agreement			
	California Department of Water Resources	www.water.ca.gov	(916)653-6192
	Yuba County Water Agency	www.ycwa.com	(530) 741-6278
	U.S. Bureau of Reclamation	www.usbr.gov/mp	(916) 978-5100
Conjunctive Use Agreements			
BROPHY WATER DISTRICT	Brophy Water District		(530) 671-1550
	Browns Valley Irrigation District		(530) 743-5703
DRY CREEK MUTUAL WATER COMPANY	Dry Creek Mutual Water Company		(530) 633-0306
HALLWOOD IRRIGATION COMPANY	Hallwood Irrigation Company		(530) 632-4317
RAMIREZ WATER DISTRICT	Ramirez Water District		(530) 674-4211
SOUTH YUBA WATER DISTRICT	South Yuba Water District		(530) 674-2380
WHEATLAND WATER DISTRICT	Wheatland Water District		(530) 633-2908
	Yuba County Water Agency		(530) 741-6278

[1] *NOAA Fisheries and the U.S. Fish and Wildlife Service have signed the Fisheries Agreement Statement of Support. Because of federal law constraints, they will not be signing the final Fisheries Agreement.*

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1.8.8.6 The Yuba River Basin Flood Control Project

The Yuba River Basin Flood Control Project was initiated after the 1986 flood devastated the communities of Arboga, Linda, and Olivehurst. A collaborative initiative by YCWA, USACE, the State, RD 784, and the Marysville Levee Commission, the Project was designed to strengthen 21 miles of levees near the south County communities to the 200–300 year level of flood protection. Authorized by the State Legislature in 2000 and Congress in FY 2003 at roughly $27 million, the project's purpose to increase the level of flood protection included:

- specific levee modifications on 6.1 miles of the left bank of the Yuba River upstream of the confluence with the Feather River that included:
    - construction of 3.7 miles of new slurry wall,
    - deepening 2.5 miles of slurry wall,
    - construction of 1.4 miles of new berm,
    - raining 1.2 miles of levee, and
    - modification of 4.5 miles of berm and drain;
- 10 miles of levee on the left bank of the Feather River downstream of the confluence of the Yuba River that included:
    - Deepening 0.5 mile of slurry wall,
    - Construction of 0.5 mile of new berm, and
    - Modification of 3 miles of berm and drain; and
- 5 miles of the Marysville ring levee that included:
    - 5.1 miles of new slurry wall and berm along the Marysville Ring Levee. (*source: DWR, 1998*)

The Yuba River Basin is currently under general reevaluation and a final feasibility report is expected by 2009.

1.8.8.7 Yuba County Integrated Regional Water Management Plan (IRWMP)

The Yuba County Water Agency is in the process of crafting a plan to address local water planning and management needs through 2025. The IRWMP will address forecasted water demands for urban needs, agriculture uses and water supply availability, flood protection requirements, ecosystem restoration needs, and recreational opportunities
(*Yuba County Water Agency, Accessed 04/05/07*)

The IRWMP came about as part of the Integrated Regional Water Management Planning Act passed by the California state legislature in 2002. Funding for the Act was passed as part of the Water Security, Clean Drinking Water, Coastal and Beach Protection Act passed by the legislature and codified in the State Water Code as Proposition 50. Chapter 8 of the Act provides funding for the development and implementation of integrated regional strategies for management of water resources. The California Department of Water Resources used the IRWMP Act to prepare guidelines for the preparation of an IRWMP.
(*Yuba County Water Agency, Accessed 04/05/07*)

The Yuba County Water Agency applied for and received planning grant through proposition 50 for the development of the Yuba County IRWMP. The $99,640 grant was administered by DWR and the State Water Resource Control Board.
(*Yuba County Water Agency, Accessed 04/05/07*)

Developing the IRWMP involves a comprehensive, integrated planning process for the valley floor of Yuba County that solicits, evaluates, prioritizes, and documents water projects. The planning process will facilitate obtaining funding for implementation of the projects from existing and future state funds.
(*Yuba County Water Agency, Accessed 04/05/07*)

The service area for the IRWMP is the area bounded by Honcut Creek to the north, the Feather River to the west, the Bear River to the south, and the valley/foothill to the east. The Cities of Marysville and Wheatland and the communities of Linda and Olivehurst are included in the planning area. The participating agencies in the IRWMP are:

- Yuba County Water Agency
- Browns Valley Irrigation District
- Olivehurst Public Utilities District
- Linda County Water District
- City of Marysville
- City of Yuba City
- Reclamation District 784
- Yuba County
- California Water Service Company - Marysville

The Yuba County Water Agency is acting as the lead Agency in developing the IRWMP, acting as the contract liaison with DWR and facilitating meetings of the IRWMP group. The City of Yuba City lies outside the planning area, but is involved for the sole purpose of exploring the integration of common wastewater management issues and water recycling with Linda County Water District, the City of Marysville, and the Olivehurst Public Utilities District. A common discharge point and water recycling will be included in the waste water management strategies for the Yuba County IRWMP.
(*Yuba County Water Agency, Accessed 04/05/07*)

Under the planning guidelines set out by DWR, the following topics must be addressed and related water management strategies identified:

- Flood management and protection
- Water quality protection
- Water supply reliability
- Groundwater management
- Water recycling and conservation
- Ecosystem restoration
- Recreation opportunities and public access
- Storm water capture and management
- Wetland enhancement and habitat protection

The work group will review the water management strategies and prioritize projects that may be funded in the future, and which projects should receive priority.
(*Yuba County Water Agency, Accessed 04/05/07*)

1.8.8.8 Seismic Analysis and Safety Evaluation of the Strengthened Radial Spillway Gates at New Bullards Bar Dam

The seismic analysis and safety review of the New Bullards Bar Dam spillway gates was initiated in response to 2004 letter from the Acting Chief of DSOD that required the radial gates to be evaluated under specified seismic conditions. The analysis of the gate performance under two levels of earthquake (0.20g page and 0.25g page events) was completed in April 2005. The report concluded that several members of the existing gates needed strengthening to meet dynamic loading safety criteria.

- Bullards Bar Dam Regional Seismic Study identified the earthquake faults within 25 miles of the dam and determined the dam could experience a 6.5 magnitude earthquake with a resulting force of 0.25g.
    - The dam was found to be safe for a force of .25g and,
    - The spill gates were found to need some minor reinforcement to withstand the controlling earthquake.
    - The strengthening of the spill gates ($800,000) should prevent the possibility of damage to the Dam and damage downstream in the event of an earthquake.

Strengthening work is scheduled to be completed in 2007.

1.8.8.9 Emergency Action Plan (EAP)

The EAP program has evolved in to a comprehensive set of guidelines for dam owners the Federal Energy Regulatory Commission (FERC) initiated as an integral and critical part of its dam safety program. The EAP exercise program tests the workability of the EAP with the emergency responders, offers the opportunity to help ensure that the EAPs are properly updated, new personnel are "trained" in the EAP, new relationships of cooperation are established, and the previously established relationships continue and are strengthened for responders.

In 2006, FERC formally required annual face–to–face meetings (Document 1-5) with the emergency responders to:

- discuss the EAP,
- provide the annual EAP updates,
- to establish/strengthen relationships with emergency responders in the areas of coordination, communication, and cooperation
- Personally update the plans of emergency responder to ensure they have only the most recent version of the EAP.

Document 1-5 EAP Face-to-Face Correspondence

YUBA COUNTY
WATER AGENCY

1402 D STREET
MARYSVILLE
CALIFORNIA
95901-4226

TELEPHONE
530.741.6278
FACSIMILE
530.741.6541

December 28, 2006

Mr. Takeshi Yamashita
Regional Engineer
Federal Energy Regulatory Commission
901 Market Street, Suite 350
San Francisco, CA 94103

RE: Emergency Action Plan Face to Face Meetings - Project No. 2246

Dear Mr. Yamashita:

To satisfy the April 11, 2006 FERC requirement regarding Emergency Action Plan (EAP) annual updates, the Yuba County Water Agency (YCWA) held two separate meetings. Each attendee was asked to bring their current YCWA EAP binder with them and were given a new revised EAP plan. The meetings were facilitated by Steve Onken, Power System Manager.

Each meeting started with introductions by YCWA and each attendee. The following information was covered at both meetings.

1. **Purpose of the Meeting** - face to face meeting with emergency responders to review the EAP, establish a relationship with each of the agencies and to personally update each EAP plan. The importance of making sure that each plan holder has the most up-to-date version of our EAP. Also, there was a brief overview of the updates to this plan.

2. **Importance of Bullards Bar** - a brief overview of the history of the Yuba County Water Agency and the significance and importance of Bullards Bar Dam.

3. **Flow/Notification Charts** - the flow/notification charts were reviewed and an explanation was given about how the charts worked and who was responsible for notifying the various agencies.

4. **Inundation Maps and Key Sheet** - A brief review of the inundation maps and key sheet was presented. A review was done of the Key Map and how it works. The main features of the map were highlighted during this discussion. An explanation was given of how to find a specific area on the key map and how to identify the corresponding inundation map of that area.

   It was noted that the Bullards Bar inundation maps were redone based on the recent PMF study. However, the inundation maps for Our House and Log Cabin Dams were done in 1998.

The first meeting was held on Thursday, December 7, 2006 at 9:00 a.m. at our Marysville office. The following people were in attendance at this meeting.

Attendee	Agency	Returned Old EAP	Received New EAP
John Anderson	California State OES	Yes	Yes
Steve Bowen	PG&E Wise Powerhouse	Yes	Yes
John DeBeaux	Sutter County OES	Yes	Yes
Jeff Galloway	Skippers Cove Marina	N/A*	Yes
Dennis Hauck	Marysville Police Dept.	N/A*	Yes
Charles Wynne	California State OES	Yes	Yes
Ed Clark	Placer County Sheriff's Office	Yes	Yes
Aaron Ward	Yuba County OES	Yes	Yes
Kevin Elcock	Dept. Water Resources Flood Ops Center	Yes	Yes
Tami Randolph	Sacramento County OES & Sheriff's Office	N/A*	Yes

The second meeting was held on Friday, December 15, 2006 at 9:00 a.m. at our Marysville office. The following people were in attendance at this meeting.

Attendee	Agency	Returned Old EAP	Received New EAP
Alan Long	Yuba County Sheriff's Office	Yes	Yes
Cindy Matthews	National Weather Service	Yes	Yes
Dave Samson	Sutter County Sheriff's Office	N/A*	Yes
Bill Pennington	DWR-Division of Safety of Dams	Yes	Yes
Doug Grothe	US Army Corps of Engineers	Yes	Yes
Kim Estes	Nevada County Sheriff's Office	Yes	Yes

*Did not previously have a binder but were given one.

On Thursday, December 28, 2006, Rose Shipman met face-to-face with Lt. Gary Teragawa, California Highway Patrol, at his office in Yuba City. A brief review of the plan was done. The old EAP was collected and a new one given to Lt. Teragawa. This was the final emergency responder to meet.

At the end of the presentation by Mr. Onken, there was a question and answer period. These are the questions that were asked by the attendees and answered by Mr. Onken.

1. Are the inundation maps showing the worst case scenario?
2. What influence can increasing the channel capacity have during floods?
3. Was high tide in the delta taken into account when the modeling for the maps was done?
4. Why are there no inundation maps for Englebright Dam?
5. If there is not a dam failure but excessive releases, at what point would we lose the Highway 20 bridge?
6. California OES stated that this is a good forum to raise issues.
7. There have been past problems with gages. Do we have people who periodically check the gages to make sure they are working properly?

All the old EAP plans were collected from the attendees. The non-emergency responders who did not attend the meeting sent their old plans to the Agency by mail and were sent new plans by mail. FERC acknowledged receipt of the new plans received by mail and that they destroyed the old plans. All the old EAP plans were boxed up and will be shredded by a professional paper shredding company in January 2007.

If you have any questions regarding our compliance with FERC's April 11, 2006 letter, please contact either Mr. Steve Onken at 530-692-3400 or Mr. Curt Aikens at 530-741-6278.

Sincerely,

Rosemarie Shipman

Rosemarie Shipman
Senior Accountant

cc: Gerry Maloney, FERC
Steve Onken
Curt Aikens

1.8.8.10 Additional Local Mitigation Activities

The YCWA has under taken several additional mitigation projects that included:

- YCWA, in cooperation with Yuba County Sheriff's Department and the U.S. Forest Service, purchased five high-band multiple frequency mobile radios for use in the Yuba County Sheriff's boat and four patrol vehicles stationed in the foothill area around New Bullards Bar Reservoir. In times of emergency, such as security problems, flood, wildfire, or earthquakes, the Yuba County Sheriff is the key department for the Yuba County OES for communication, response, and evacuation notification and evacuations. Until now, each agency had their own radio frequency, which could not be used to communicate with the other agencies. These radios allow the Sheriff to communicate with the US Forest Service and the YCWA.

- Cottage Creek Boat launching Facility Improvements funded with an $845,000 grant from the California Department of Boating and Waterways. In 2004 the YCWA embarked in construction improvements to the boat launching facility that included:
    - Additional drainage and oil separation basins,
    - A chain link safety fence, and
    - Signage for public information in emergencies
    - Protection of critical infrastructure.

- YCWA owns and operates the New Bullards Bar Dam, the only Department of Homeland Security (DHS) identified potential terrorist target within the County of Yuba. In 2006, YCWA, in cooperation with the Yuba County Sheriff's Department, applied for and received a grant for $48,000 from DHS for the first phase of a security camera system on Bullards Bar Dam (Buffer Zone Protection Plan).

  In 2007, YCWA, in cooperation with the Yuba County Sheriff's Department, applied for a second grant for $176,000 for DHS for the second phase of a security camera system on Bullards Bar Dam

- YCWA developed a Vulnerability and Security Assessment for the entire Yuba River project to handle existing security infrastructure and secure new areas that were identified. This plan was required by FERC and is not to be made public.

- Probable Failure Mode Analysis (PFMA), The Federal Energy Regulatory Commission, in 2005 required YCWA to gather a panel of experts to identify potential failure modes for project facilities (dams, penstocks, powerhouses, roads, communications, and transmission lines) and develop plans to protect or respond to potential failures.

2 Prerequisites

The plan identifies and evaluates specific local hazard mitigation strategies to be considered by the Agency and its planning support for those strategies developed by its Committee.

The strategies presented are deemed appropriate and effective by recommendation of the Yuba County Water Agency Hazard Mitigation Planning Committee and the Yuba County Office of Emergency Services and individual local agencies and private groups.

Upon acceptance by the Yuba County Water Agency Board of Directors, the selected strategies will be further developed for funding and implementation by the lead agencies. The plan describes the potential sources of Hazard Mitigation Strategy funding, and general procedures to obtain that funding.

The plan is based upon the Yuba County Water Agency Hazard Vulnerability Analysis (HVA) that considers the natural, technological, and human-caused risks to which the Agency is vulnerable. The plan describes strategies that the Agency may utilize as their capabilities to mitigate those hazards.

It is understood that the mitigation strategies adopted in this plan are recommendations only, and they must be approved and funded in order to be implemented as official Hazard Mitigation Strategies. They must be implemented by the Yuba County Water Agency, either solely or in conjunction with other governmental agencies or special districts.

2.1 Adoption by Yuba County Water Agency

DMA 2000 Requirements – Prerequisites
Adoption by the Local Governing Body **Requirement §201.6(c)(5)**: [The local hazard mitigation plan **shall** include] documentation that the plan has formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). **FMA Requirement §78.5 (f)**: Documentation of formal plan adoption by the legal entity submitting the plan (e.g., Governor, Mayor, County Executive, etc.
Element A. Has the local governing body adopted the plan? B. Is supporting documentation, such as a resolution, included?

This section describes the adoption of the development of a Hazard Mitigation Plan for Yuba County. The purpose of formally adopting this Plan is to secure support from agency directors and participating agencies and to implement the mitigation actions identified in the Plan.
The sample resolution will be replaced with the Adoption Resolutions signed by the Chairman of the Board of the Yuba County Water agency and submitted the Governor's Office of Emergency Services and the Department of Homeland Security, Federal Emergency Management Agency (FEMA).

2.1.1 Documentation of Adoption of the Hazard Mitigation Plan

The YCWA Board of Directors will adopt the LHMP following review and comment from the Governor's Office of Emergency Services and FEMA and following incorporation of the received recommendations.

The formal adoption of the YCWA Hazard Mitigation Plan occurred on June XX, 2007 and followed the submission to FEMA for review and recommended revisions with FEMA

Note: When the plan has been reviewed and approved pending the formal adoption by DHS, FEMA Region IX, the YCWA Adoption Resolution and accompanying documents will be scanned and provided for the YCWA Plan.

Document 2-1 YCWA Sample Resolution of Adoption

RESOLUTION NO ____
A RESOLUTION OF THE BOARD OF DIRECTORS
OF THE YUBA COUNTY WATER AGENCY ADOPTING THE
YUBA COUNTY WATER AGENCY MULTI-HAZARD MITIGATION PLAN

WHEREAS, The Yuba County Water Agency has developed a hazard mitigation plan by identifying hazards and potential mitigation projects and working with Stakeholders; and

WHEREAS, P.L. 106-390, the Disaster mitigation Act of 2000 amended the Stafford Disaster Relief and Emergency Assistance Act to require hazard mitigation planning; and

WHEREAS, A Federal Emergency Management Agency Approved Multi-Hazard Mitigation Plan must be adopted by the local governmental agency as a requirement and as a condition of funding for disaster mitigation funds after November 1, 2004; and

WHEREAS, YCWA fully participated and the Yuba County Multi-Hazard Mitigation Planning Process consistent with the federal prescribed planning process for the development of this Multi-Hazard Mitigation Plan; and

WHEREAS, the California Governor's Office of Emergency Services and the Federal Emergency Management Agency have reviewed and approved the "Yuba County Water Agency Multi-Hazard Mitigation Plan" contingent upon this official Adoption of YCWA Board of Directors;

NOW, THEREFORE BE IT RESOLVED, The Yuba County Water Agency adopts the Yuba County Water Agency Multi-Hazard Mitigation Plan" as an official plan; and

BE IT FURTHER RESOLVED, The Yuba County Water Agency will submit this Adoption Resolution to the Governor's Office of Emergency Services and the Federal Emergency Management Agency, Region IX for Approval of the YCWA Multi-Hazard Mitigation Plan.

PASSED AND ADOPTED By the Board of Directors of the Yuba County Water Agency on the _____ day of June 2007 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

By:_____
Don Schrader, Chairman

3 Planning Process

DMA 2000 Requirements – Planning Process
Requirement §201.6(b): An open public involvement process is essential to the development of an effective plan.

The YCWA Multi-Hazard mitigation Plan was completed as part of the Yuba County Hazard Mitigation Project. YCWA provided oversight and support for the creation of the YCWA Multi-Hazard Mitigation Plan, which was created by Yuba County Hazard Mitigation Project staff.

An open public involvement process is required for the development of a functional local hazard mitigation plan. In order to develop a more comprehensive approach to reducing the effects of natural and man-made disasters, the planning process included an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; opportunity for neighboring entities, and other interested parties, to be involved in the planning process; and the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. Each step in the planning process was built upon the previous step, providing a high level of assurance that the mitigation actions proposed by the participants and the priorities of implementation are valid. The following provides a narrative description of the plan preparation process.

Natural disasters have occurred in every state of the union. Each year hundreds of people lose their lives or property and thousands more are injured because of natural disasters. Billions of dollars and millions in resources are committed each year to help communities recover from these disasters. Despite all the funds, aid, and resources, victims cannot completely return to the way they were before the disasters struck.

Most of the natural disasters are predictable; many are repetitive, often with the same results. Hazard mitigation planning and subsequent implementation of projects, measures, and policies developed through planning, can reduce or eliminate losses from these disasters. Mitigation actions in the form of projects and programs can become long-term, cost effective means for reducing the impact of natural hazards.

Across Yuba County, natural disasters have led to increased levels of injury, property damage, interruption of business and government services and even death. The impact of disasters can result in regional economic consequences. The Yuba County Water Agency recognizes the consequences of disasters and the need to reduce the impacts of these hazards.

3.1 Purpose of Plan

The purpose of this plan is to identify those hazards which affect YCWA and its constituents, identify the risks these hazards pose, and integrate hazard mitigation strategies into the activities and programs of the Yuba County Water Agency to the extent practical. The Plan will serve as a foundation and guide for the Yuba County Water Agency and Yuba County to address potential hazards and risks by minimizing the damaging effects of future disasters and maintaining eligibility for certain hazard mitigation funds.

This Plan is intended to serve other purposes, including the following:

- **Enhance Public Awareness and Understanding** – to provide information towards better understand the natural and human-made hazards that threaten public health, safety, and welfare; economic vitality; and safeguard YCWA's resources.

- **Create a Decision Tool for Management** – to provide information that managers and leaders of local government, business and industry, community associations, and other key institutions and organizations need to take action to address vulnerabilities to future disasters.

- **Promote Compliance with State and Federal Program Requirements** – to ensure that Yuba County Water Agency complies with laws and regulations that encourage or mandate special districts to develop comprehensive mitigation plans.

- **Enhance Local Policies for Hazard Mitigation Capability** – to provide the policy basis for mitigation actions that should be promulgated by participating jurisdictions and districts to create a more disaster-resistant future.

- **Achieve Regulatory Compliance** – to qualify for the Pre-Disaster Mitigation (PDM) program, local jurisdictions must have an approved mitigation plan to receive a project grant. Local jurisdictions must have approved plans by November 1, 2004 to be eligible for HMGP funding for Presidential declared disasters after this date. Plans approved at any time after November 1, 2004 will make communities eligible to receive PDM and HMGP project grants.

3.1.1 Disaster Mitigation Act of 2000 (44 CFR 201)

Federal legislation has historically provided funding for disaster response and recovery and for hazard mitigation. In response to the rising cost of responding to, and recovering from, disasters, the President signed the Disaster Mitigation Act of 2000 (Public Law 106-390) on October 30, 2000.

By amending the Robert T. Stafford Disaster Relief and Emergency Services Act, (Public Law 93-288) (the Stafford Act), the Disaster Mitigation Act of 2000 reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. The law encourages a planning process based on cooperation between state and local authorities, and the community-at-large, to reduce the effects of disasters. The law rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance.

As a condition of receiving federal hazard mitigation funding, local governments must develop and submit a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government. The Plan meets the requirements of Section 322 of the Stafford Act, which calls for local governments to prepare mitigation plans. “Special districts” is included in the definition of “local government”. The Yuba County Water Agency is classified as a special district.

Under the regulations implementing this law, states and local governments must have an approved, adopted hazard mitigation plan in place by November 1, 2004. The Federal Emergency Management Agency (FEMA) is responsible for reviewing and approving state and local hazard mitigation plans.

3.1.2 Definition of Hazard Mitigation

Hazard Mitigation is any sustained action taken to eliminate or reduce long term risk to human life, property, and the environment posed by a hazard.

Hazard Mitigation Planning is the process of making any sustained plan or course of action to reduce or eliminate long-term risk to people and property from both natural and technological hazards and their effects. The planning process includes establishing goals and recommendations for mitigation strategies.

Hazard Mitigation may occur during any phase of a threat, emergency or disaster. Mitigation can and should take place during the preparedness (before), response (during), and recovery (after) phases.

The process of hazard mitigation involves evaluating the hazard's impact and identification and implementation of actions and projects to minimize the impact of disasters.

3.2 Documentation of the Planning Process

DMA 2000 Requirements – Planning Process
Documentation of the Planning Process **Requirement §201.6(b)**: In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval (2) An opportunity for neighboring communities, local and regional agencies that have authority to regulate development, as well as business, academia and other private non-profit interests to be involved in the planning process; and (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information **FMA Requirement §78.5 (a)**: Description of the planning process and public involvement. Public involvement **may** include workshops, public meetings, & hearings.
Element A. Does the plan follow a narrative description of the process to prepare the plan B. Does the plan include who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated in the plan committee, provided information, reviewed drafts, etc.?) C. Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to plan approval?) D. Was there an opportunity for neighboring communities, agencies, business, academia, nonprofits, and other interested parties to be involved in the planning process? E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, ad technical information?

To develop an effective plan, YCWA, through the Yuba County Hazard Mitigation Project, followed an open public involvement process to develop a more comprehensive approach to reducing the effects of natural disasters. The planning process included an opportunity for the public to comment on the plan during the plan drafting and prior to plan approval; opportunity for neighboring entities and other interested parties to be involved in the planning process; and the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. Each step in the YCWA planning process was built upon the previous step, providing a high level of assurance that the mitigation actions proposed by the participants and the priorities of implementation are valid. The following provides a narrative description of the plan preparation process.

3.2.1 Narrative Description of the Planning Process

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process included an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; opportunity for neighboring entities, and other interested parties, to be involved in the planning process; and the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. Each step in the planning process was built upon the previous step, providing a high level of assurance that the mitigation actions

proposed by the participants and the priorities of implementation are valid. The following provides a narrative description of the plan preparation process.

3.2.2 Persons, Companies, Agencies, and Organizations Involved in the Planning Process

The Yuba County Water Agency utilized every resource at its disposal in creating the YCWA Multi-Hazard Mitigation Plan. By partnering with the Yuba County Hazard Mitigation Project, the Agency was able to tap into resources within the public and private sectors, as well as receive the staff support necessary for completion of the YCWA Plan. By involving surrounding jurisdictions, other government agencies, and the public at large, a comprehensive picture of the risks facing the Agency and the steps that needed to be taken to mitigate those risks became clear. The partnerships formed through the hazard mitigation process were invaluable during the 2005/2006 winter storm event recovery and will continue to be drawn upon when needed.

3.2.2.1 Yuba County Water Agency Mitigation Planning Committee

John Nicoletti	Director
Curt Aikens	General Manager
Rosemarie Shipman	Committee Chair
Steve Onken	Power Systems Manager – Colgate Powerhouse
Patricia Beecham	Yuba County Office of Emergency Services – Hazard Mitigation Project Director
Stacey Brucker	Yuba County Hazard Mitigation Staff
David Slayter	Yuba County Hazard Mitigation Staff
Janice Rhodd	Yuba County Hazard Mitigation Staff
Andrew Vodden	Yuba County Hazard Mitigation Staff

The Yuba County Water Agency passed a resolution in support of development of the Yuba County Water Agency Multi-Hazard Mitigation Plan on February 2, 2005 (Document 3-1), as p[art of the Yuba County Hazard Mitigation Project The unanimous vote, filed as Yuba County Water Agency Resolution No. 2005-8, authorized YCWA staff to participate in the Yuba County Hazard Mitigation Project and utilize its staff and resources with the goal of creating a LHMP for YCWA. This resolution also authorized the creation of the YCWA Hazard Mitigation Planning Committee. YCWA Director John Nicoletti was appointed by the Board of Directors to the Committee.

Members of the committee met often during the plan development process. YCWA staff worked with Yuba County hazard mitigation staff to combine resources for work on both jurisdictions' hazard mitigation plans. The full committee met on October 10, 2006 at the regular meeting of the YCWA Board of Directors to review the draft plan and provide a final hazard ranking. The presentation (Presentation 3-4) included a brief review of the hazard mitigation process and a hazard by hazard explanation of the methodology used to determine the hazard rankings.

Document 3-1 Yuba County Water Agency Resolution of Support

RESOLUTION NO. 2005-8

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE YUBA COUNTY WATER AGENCY AUTHORIZING DEVELOPMENT OF A HAZARD MITIGATION PLAN

WHEREAS, the Yuba County Water Agency desires to develop a hazard mitigation plan by identifying hazards and potential mitigation projects in order to develop a comprehensive hazard mitigation plan to meet federal requirements for mitigation planning:

WHEREAS, P.L 106-390, the Disaster Mitigation Act of 2000, amended the Stafford Disaster Relief and Emergency Assistance Act to require hazard mitigation planning; and

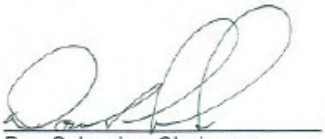
WHEREAS, local governments and governmental entities are required to have a federally approved hazard mitigation plan to be eligible for disaster mitigation funding, for any disaster declared after November 1, 2004; and

WHEREAS, the County of Yuba is developing a countywide multi-hazard mitigation plan and, through a cooperative relationship, the Yuba County Water Agency can provide support to the development of the Yuba County plan.

NOW, THEREFORE, BE IT RESOLVED, The Yuba County Water Agency agrees through a Hazard Mitigation Planning Committee, to develop a hazard mitigation plan.

PASSED AND ADOPTED by the Board of Directors of the Yuba County Water Agency on the 22nd day of February 2005 by the following vote:

AYES: DIRECTORS BELZA, CARPENTER, GRIEGO, LOGUE, NICOLETTI, SCHRADER AND STOCKER
NOES: NONE
ABSTAIN: NONE
ABSENT: NONE

By: 
Don Schrader, Chairman


Attest: Jeanene Upton
Assistant Secretary

Following adoption of the resolution of support, the YCWA Hazard Mitigation Planning Committee identified the following by-laws, tasks, goals, and objectives.

3.2.2.2 Hazard Mitigation Planning By-Laws

- The Yuba County Water Agency Hazard Mitigation Planning Committee was organized in February 2005, as reflected by the minutes of that meeting.
- Members of the Yuba County Water Agency Hazard Mitigation Planning Committee have elected a chair, Rosemarie Shipman and co – chair, Steve Onken.
- Members of the Yuba County Water Agency Hazard Mitigation Planning Committee agree to meet at least monthly to identify hazard priorities and review, identify, and implement Yuba County Water Agency hazard mitigation strategy recommendations.
- The Yuba County Water Agency Hazard Mitigation Planning Committee agrees to make and pass policy recommendations by a vote of a simple majority of those members present at the scheduled meeting.
- Any single Hazard Mitigation Planning Committee member may request, at a scheduled meeting of the Yuba County Water Agency Hazard Mitigation Planning Committee as a whole, an adoption of, or amendment to the plan or process.
- The Planning Committee may form subcommittees to review and develop those feasible hazard mitigation strategy recommendations identified that will be reviewed by the Hazard Mitigation Planning Committee as a whole.
- The sub-committees will identify and bring forward hazard mitigation strategies from existing recommendations contained in plans and documents, and from the input of service areas, appropriate jurisdictions, private citizens and organizations.
- The Yuba County Water Agency Planning Committee will identify constraints to mitigation strategies that affect Yuba County Water Agency's ability, authority, and responsibility to implement those strategies.
- Public Input will be implemented in the following manner: surveys made available at the Agency's administrative office, through public meetings, and continued participation with County of Yuba Multi-Hazard Mitigation Planning Committee and other jurisdictions.

3.2.2.3 Hazard Mitigation Planning Goals

- Provide for an adequate public awareness program for natural and technological hazards present in the service area and facilities of Yuba County Water Agency.
- Encourage scientific study and the development of data to support mitigation strategies for those hazards that are a threat to Yuba County Water Agency.
- Promote the recognition of the real value of hazard mitigation to public facilities, public safety, and the welfare of all citizens served by Yuba County Water Agency.
- Support the mitigation efforts of local governments, private citizens, non-profit organizations, and private businesses throughout the Yuba County Water Agency sphere of influence.
- Support the priorities of the Yuba County Water Agency; its mission statement, mandate, employees, students, citizens and the business community with regard to flood control.

3.2.2.4 Hazard Mitigation Planning Objectives

- Identify and implement mitigation actions to reduce loss of lives and damage to property.
- Implement mitigation actions to reduce loss of lives and property.
- Identify mitigation strategies that will allow the YCWA to perform its primary mission and achieve its goals.
- Identify mitigation opportunities for short- and long-range planning considerations.
- Identify areas of Yuba County Water Agency sphere of influence that have an interest in mitigation of specific hazards.
- Develop a standard mitigation program utilizing authorities, policies, and programs.

- Organize, train, and maintain an effective and ongoing YCWA Hazard Mitigation Planning Committee that will facilitate implementation of the Yuba County Water Agency Hazard Mitigation Plan.
- Review and update other YCWA programs as appropriate to identify current and future mitigation goals and objectives in compliance with appropriate city, county, state, and Federal requirements.
- Gain support of the YCWA Board of Directors for the Yuba County Water Agency Hazard Mitigation Program implementation.
- Achieve the overall goal of developing a comprehensive mitigation program with Federal, state, county and city organizations and other appropriate jurisdictions.
- Support identified hazard mitigation strategies that may exist in other Yuba County plans.

3.2.2.5 Hazard Mitigation Planning Tasks

- Establish Hazard Mitigation Planning Committee responsibilities 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 and timelines.
    - Identify lead divisions/departments for implementation of strategies.
    - Provide for the update of the Disaster Mitigation Plan on a regularly scheduled basis.
    - Evaluate and carry out mitigation activities.
    - Assist in implementation of funding identification and procurement.
- Develop, coordinate, and implement a methodology for receiving public input.
- Coordinate hazard mitigation planning tasks and activities with Yuba County staff to develop an all-hazards disaster mitigation plan.
- Assist in carrying out the goals and objectives of the Yuba County Water Agency Hazard Mitigation Plan in compliance with the Robert T. Stafford Act as amended by the Disaster Mitigation Act of 2000 and the guidelines laid out by the Federal Emergency Management Agency.
- Select designated critical facilities owned/and/or operated by Yuba County Water Agency and in proximity to Yuba County Water Agency facilities, and develop a risk exposure analysis for those facilities.
- Develop and implement long- and short-term goals.
- Prioritize risks for implementing mitigation strategies.
- Select highest priority and most-desired mitigation recommendations and develop those recommendations for further action by the Yuba County Water Agency.
- Review mitigation planning drafts, recommendations and updates resulting in the prioritization of strategies, and an implementation strategy.
- Provide for the implementation of Planning Committee decisions.

3.2.2.6 Opportunities for Participation by Neighboring Communities and Other Stakeholders

The Yuba County Water Agency received staff and resource support from the Yuba County Multi-Hazard Mitigation Plan Committee and was an active participant in monthly stakeholder meetings sponsored by the County. YCWA formed collaborative partnerships with Yuba County and The Dobbins-Oregon House Fire Protection District in its planning efforts.

The Yuba County Water Agency participated in the first major planning event for the Yuba County Multi-Hazard Mitigation Project. Held on August 13, 2004, the Yuba County Multi-Hazard Mitigation Plan Kickoff and Workshop brought together all of the agencies and special districts of Yuba County, as well as state, federal, and private agencies to provide information and training

for disaster mitigation training, which included speakers from FEMA, the Governor's Office of Emergency Services, DWR, CDF, Yuba County, the Yuba Watershed Protection and Fire Safe Council, American Red Cross, MBK Engineering, and NorthTree Fire International.

Yuba County Water Agency General Manager Curt Aikens gave a presentation at this event, detailing the Yuba River Basin project and the Water Agency's flood control efforts. He highlighted the attempt to bring 100 year level of protection for the residents along the Yuba and Feather Rivers.

Several agencies brought fire fighting, communications, and rescue equipment to demonstrate their roles in disaster preparedness and response. The American Red Cross showcased their Emergency Communications Response Vehicle communications vehicle and various others had information on flood and fire safety for Yuba County residents. Law enforcement agencies provided information and handouts explaining their responsibilities and services in disaster and pre-disaster response For the agency invitation, agenda, and list of attendees, see Documents 3-2, 3-3, and 3-4 respectively.

Document 3-2 Kickoff Agency Invitation 8/13/2004

The County of Yuba
Office of Emergency Services

(530) 749-7520 – Phone
(530) 741-6549 - Fax

To: Yuba County Water Agency

From: Patricia Beecham

Subject: Yuba County Pre-Disaster Mitigation Plan
Workshop Invitation- August 13, 2004

You are invited to attend a workshop to participate in the development of the Yuba County Multi-Hazard Mitigation Plan, the product of a competitive grant award of $1,510,000 from the Federal Emergency Management Agency (FEMA). The workshop will be held on August 13, from 8:30 am to 3:00 pm at the Yuba County Government Center 915 8th Street, Marysville.

The Multi-Hazard Mitigation Plan will address all hazards and establish a process to identify and assess risks, as well as prioritizing activities to reduce damage to property and prevent loss of life from natural and man-made disasters. The purpose of the workshop is to provide an overview of the program, initiate the planning process, and identify how existing agencies are integral to the development of the Plan.

The Disaster Mitigation Act of 2000 (DMA 2000) requires Hazard Mitigation Planning as part of the Stafford Disaster Relief and Emergency Assistance Act. Local government and governmental entities are required to develop and submit Hazard Mitigation plans by November 1, 2004 to be eligible to apply for federal Hazard Mitigation program funds.

Workshops will feature technical experts and representatives involved in emergency management, resources, and hazard mitigation.

To confirm your attendance at the workshop or for additional information, please call the Office of Emergency Services, attention Stacey at (530) 740-7331 or (530) 749-7520.

Document 3-3 Kickoff Agenda 8/13/2004

COUNTY OF YUBA

HAZARD MITIGATION WORKSHOP
YUBA COUNTY GOVERNMENT CENTER
915 8TH STREET, MARYSVILLE

DISASTER PREPAREDNESS AND HAZARD MITIGATION PLANNING
PLAN - Prevent Losses, Act Now

Friday August 13, 2004
The County of Yuba is sponsoring a Disaster Preparedness and Hazard Mitigation Workshop to provide information and training for Pre-Disaster and Hazard Mitigation planning for local governmental organizations and representatives. Workshops will feature technical experts and representatives involved in emergency management, prevention, and hazard mitigation programs.

Workshop Agenda:

7:30-8:30	Registration and coffee
8:30-9:00	Welcome/Overview Hal Stocker – Yuba County Supervisor 5th District Don Schrader – Yuba County Supervisor 4th District Steve Thompson – Office of Assemblyman Rick Keene
9:00-9:45	DMA 2000- Hazard Mitigation Planning Moderator: Charles Ken McClain, Yuba County Administrator Paul Jacks, Deputy Director – Governor's Office of Emergency Services Ken Worman- Governor's Office of Emergency Services
10:00-10:50	Developing a Hazard Mitigation Plan Workshop 1 - Yuba County Pre-Disaster Hazard Mitigation Plan: Pat Beecham, Emergency Services Coordinator – OES Kevin Mallen, Director of Public Works – County of Yuba Workshop 2: Frank Hauck, Hazard Mitigation Section – Governor's Office of Emergency Services Ken Worman - Governor's Office of Emergency Services

11:00-11:50	Hazard Risk Assessment – GIS: Mapping the Future Workshop 1: Moderator: Charles Kent McClain I-Ming Cheng, Chief of Floodplain Mapping - DWR Rick Reinhardt – MBK Engineers Workshop 2: Moderator: Pat Beecham Jerry Henry – County of Yuba/GIS Rick Carr – Yuba Watershed Protection & Fire Safe Council Ed Waggoner- North Tree Fire
12:00-1:00	Lunch Workshop – Conference Room 1/2 Moderator: Charles Kent McClain Paul Jacks, Deputy Director – Governor's Office of Emergency Services
1:15-2:00	Public- Private Initiatives in Mitigation Interagency Coordination Moderator: Dennis Pooler Curt Aikens - Yuba County Water Agency Keith Chambers, Jim Johnson – Yuba Watershed Protection & Fire Safe Council Genevieve P. Pastor Cohen – Dimensions Unlimited, INC.
2:15-3:00	Roundtable Discussion Moderator: Charles Kent McClain

Workshop Participants and Sponsors:
County of Yuba, Federal Emergency Management Agency (FEMA), Governor's Office of Emergency Services (OES), Department of Water Resources (DWR), Yuba County Water Agency (YCWA), Department of Forestry (CDF), Yuba Watershed Protection & Fire Safe Council, North Tree Fire MBK Engineering, and Dimensions Unlimited INC

Document 3-4 Kickoff Attendees 8/13/2004

Yuba County Pre-Disaster Multi-Hazard Mitigation
Workshop August 13, 2004

Speakers:

Paul Jacks, Deputy Director- Governor's Office of Emergency Services
Ken Worman- Hazard Mitigation Grant Program Governor's OES
Frank Hauck- Hazard Mitigation Section Governor's OES
I-Ming Cheng- Chief Floodplain Mapping DWR
Keith Chambers- Yuba Watershed Protection & Fire Safe Council
Jim Johnson- Yuba Watershed Protection & Fire Safe Council
Rick Carr- Yuba Watershed Protection & Fire Safe Council
Ric Reinhardt- MBK Engineers
Genevieve Pastor-Cohen- Dimensions Unlimited
Curt Aikens- Yuba County Water Agency
Kevin Mallen- Yuba County Director of Public Works
Pat Beecham- Yuba County Emergency Services Coordinator
Jerry Henry- Yuba County GIS Coordinator
Ed Waggoner- North Tree Fire
Zeke Lunder- North Tree Fire

Welcome and Overview:

Steve Thompson- Office of Assemblyman Rick Keene
Hal Stocker- Yuba County Supervisor 5th District
Don Schrader- Yuba County Supervisor 4th District
Kim Davis- Office of State Senator 4th District Sam Aanestad

Moderators:

Charles Kent McClain- Yuba County Administrator
Dennis Pooler- Yuba County Ag Commissioner

Attendees:

Elected Officials
Kim Davis- Office of State Senator 4th District Sam Aanestad
Steve Thompson- Office of Assemblyman 3rd District Rick Keene
Don Schrader- Yuba County Supervisor 4th District
Hal Stocker- Yuba County Supervisor 5th District

Yuba County Administrator
Charles Kent McClain

Governor's Office of Emergency Services
Paul Jacks- Deputy Director
Ken Worman- Hazard Mitigation Grant Program
Frank Hauck- Hazard Mitigation Section
Jerilyn Peterson
Victoria LaMar-Haas
Glen Nader- U.C. Davis Coop. Ext. Natural Resources

California Department of Water Resources
I-Ming Cheng, Chief of Floodplain Mapping

County of Yuba
Dean Sellers, Auditor/Controller
Sheriff Virginia Black
Undersheriff Steve Durfor
Lt. Shaun Smith

Dennis Pooler, Agricultural Commissioner
Patricia Beecham, Emergency Services Coordinator
John Fleming, Economic Development-Coordinator
Robert Meneni, Director Administrative Services
Steve Androvich, Assistant Director Administrative Services
Dr. Joe Cassady, County Health Officer
Tim Snellings, Director Community Development
Tejinder Maan, Environmental Health Manager
Marty Griffin, Chief Building Inspector
Kevin Mallen, Director Public Works
Mike Lee, Assistant Director Public Works
David McBride, Manager Information Technology
Jerry Henry, GIS Coordinator
Kathy Volf, Deputy Director Health and Human Services
Cyndi Journagan, Administrative Analyst Health and Human Services
Val Spooner, Director of Nurses

Yuba County Water Agency
Curt Aikens, General Manager

Sutter County
John DeBeaux, Emergency Services Manager
Mary Keller, Deputy Director Public Works Water

Colusa County
Janice Bell, Emergency Services

Marysville Police Department
Bret Smith, Chief of Police
Rosine Field

Yuba Watershed Protection & Fire Safe Council
Keith Chambers
Jim Johnson
Rick Carr

North Tree Fire
Ed Waggoner, Chief of Operations
Zeke Lunder

Three Rivers Chapter of the American Red Cross
Mike Scott, Disaster Director
Mike Colvin, Community Emergency Response Team and Citizen Corps Council Coordinator
Mike Hardesty

Marysville Joint Unified School District
Rob Gregor
Barbara Evans, Principal APEC/North Marysville Continuation
Ray McKinney, Administrative Services
Gary Cena, Assistant Principal Marysville High School
Ken Doglio, Principal Foothill School

Yuba City Fire Department
Bill Fuller

Olivehurst Fire Department
Wade Harrison, Captain

Linda County Water District
Doug Lofton

MBK Engineers
Ric Reinhardt, P.E

Dimensions Unlimited, INC.
Genevieve Pastor-Cohen, Senior Vice President

Yuba Sutter ARES
Art Craigmill

Home Owners of West Linda (HOWL)
Walt Whitenton

Dobbins Oregon House Action Committee (DOACT)
Dobbins Oregon House FPD
Jack Bartlett

Media
Harold Kruger- Appeal Democrat

PDM Support Staff
David Slayter
Greg Royat- CDF
Buck Weckman
Stacey Brucker
Andrew Vodden

The Agency sent a letter to neighboring jurisdictions, private businesses and local leaders informing them that the Agency was beginning the hazard mitigation planning process in compliance with the Disaster Mitigation Act of 2000. This letter was sent in order to solicit input and cooperation from regional stakeholders to participate in the planning process:

Dear _____:

Yuba County Water Agency is currently involved in writing a Local Hazard Mitigation Plan under the 2002 amendment to the Robert Stafford Act (PL 93-288) for reduction of damage from both natural- and human-caused risks that can affect our area. We share common borders with your jurisdiction and our jurisdiction may share some mutual corresponding risks, such as earthquake, flood, dam failure, wildland/urban interface fire, and other disaster hazards.

We are inviting your comments and input into the Yuba County Water Agency Multi-Hazard Mitigation Planning Committee. The committee would consider input suggestions for the reduction of risks between our two jurisdictions. Attached for your consideration is the list of Disaster Risk priorities in the order they were ranked by the Planning Committee and are being considered for mitigation strategies by Yuba County Water Agency.

Rose Shipman is the Chairperson for the Yuba County Water Agency Multi-Hazard Mitigation Planning Committee. The committee will be holding meetings on this subject. You are welcome to be our guest at a regular meeting or you may directly contact Rose Shipman at 741-6278 or Steve Onken at 692-3400.

Your concerns and Hazard Mitigation Strategy input would be both helpful and welcome. Thank you for your consideration.

Sincerely,
Rosemarie Shipman

The letter was sent to the following jurisdictions, businesses, and community leaders prior to the February 24, 2005 meeting of the Dobbins-Oregon House Action Committee, at which YCWA General Manager Curt Aikens gave a presentation (Presentation 3-1) on the YCWA mitigation planning process:

Adjunct Contributor:

Foothill Ace Hardware Co 13860 Willow Glen Rd Oregon House, CA 95962	Communications Support Group P.O.Box 806 Oroville, CA 95965
Brown's Gas Co. 423 4th Street Marysville, CA 95901	Colgate Power Plant P.O. Box 176 Dobbins, CA 95935
Collins Lake Recreation Area P.O. Box 300 Oregon House, CA 95962	Don Walker, President Yuba Feather Lions Club P.O. Box 538 Oregon House, CA 95962
Ellis Udwin Foothill Fire Protection District P.O. Box 332 Brownsville, CA 95919	Foothill Towing 9351 Marysville Rd Oregon House, CA 95962
Gary Kavanagh, Battalion Chief Loma Rica Station	Mr. Greg Holman Board of Directors, FOF

11845 Loma Rica Road Marysville, CA 95901	P.O. Box 1119 Oregon House, CA 95962
Jean Pierson Loma Rica Browns Valley Community Services District 7307 Pochert Way Browns Valley, CA 95918	Fire Chief John Murphy P.O Box 332 Brownsville, CA 95919-0332
Mr. G. Keith Chambers Applied Forest Management 200 Litton Drive #210 Grass Valley, CA 95945	Lewis Carroll School P.O Box 894 Oregon House, CA 95962
Lake Francis RV Park P.O. Box 39 Dobbins, CA 95935	Lynne Cardoza, Principal P.O Box 129 Dobbins School Lane Dobbins, CA 95935
Marc Zamora Smartville Fire Protection District P.O Box 294 Smartville, CA 95977	Fire Chief Matt Cooney P.O. Box 134 Camptonville, CA 95922-0134
Office of Emergency Services 915 8th Street, Suite 117 Marysville, CA 95901	Rev. William Taylor Oregon House Community Church P.O. Box 475 Oregon House, CA 95962
Rev. Jack Overbey 10386 Old Dobbins Road Dobbins, CA 95935	Mr. Phillip Lucas Facilities Manager, FOF P.O. Box 1171 Oregon House, CA 95962
Plumas Tahoe National Forest Arnold Olson 15924 Highway 49 Camptonville, CA 95922-049	Rick Cunningham Soper-Wheeler Co. 19855 Barton Hill Rd Strawberry Valley, CA
Rita Ortega Camptonville CSD P.O. Box 327 Camptonville, CA 95922-00327	Sacred Heart Catholic Church 10316 Old Dobbins Road Dobbins, CA 95935
Captain Alan Young Yuba County Sheriff's Dept. 215 5th Street, Suite 150 Marysville, CA 95901	Hal Stocker, 5th District Supervisor 915 8th Street, Suite 109 Marysville, CA 95901
Thousand Trails RV Park P.O. Box 190 Oregon House, CA 95962	Pete Hammontre, President – Dobbins-Oregon House Fire Protection District

For the development of the comprehensive county plan, the MHMPC invited county departments, local jurisdictions, volunteer organizations, health organizations, public transportation, public utilities, and interested residents to participate in a stakeholders group. The first meeting of the stakeholders was held in December of 2004. Meetings continued monthly throughout the entire plan development.

Stakeholder meetings featured technical experts, engineers and speakers from Federal, State and local government, from agency representatives involved in flood protection, fire protection, medical response, health professionals, transportation and utilities from both public and private sectors.

The Yuba County Water Agency was an active participant in these meetings, often providing presentations regarding the progress being made on their planning efforts and on ongoing hazard mitigation projects. Following the 2005/2006 winter storm event, the YCWA gave monthly updates on the status of the repair projects that were being federally funded as a result of their participation in the hazard mitigation planning process.

For Agendas and Sign-In Sheets for these meetings see documents 3-5 through 3-43

Table 3–1 YCWA Attendance at Yuba County Stakeholders Meetings

Meeting Date	Description
January 11, 2005	Presentations at this meeting included: • An overview of the DMA 200 process and each agencies role and responsibilities as outlined by the Act • An introduction to HAZUS GIS software and how it is used to identify and assess risks, prioritize activities to reduce damage to property, and prevent loss of life from natural and man-made disasters • A discussion of the FEMA's FY 2004/2005 competitive pre-disaster mitigation grant program and possible projects to apply for funding for • A workshop on multi-hazard mitigation risk assessment using worksheets for the FEMA How-To Guide #2. The Emergency Response and Communication, Fire Planning, and Flood Planning committee work groups met following the presentations.
February 8, 2005	The meeting began with an overview of DMA 2000 and the Yuba County Hazard Mitigation Project. The group then broke into workshops. Session one included workshops on: • Developing School Hazard Mitigation Plans • Developing Local Hazard Mitigation Plans with an emphasis on fire districts and special districts • State, City, and County Agencies The second session included workshops on: • Developing a communication plan • Developing an evacuation plan • Updating HAZUS GIS/Risk Assessment Inventory
March 8, 2005	Presentations at this meeting included: • An overview of the DMA 2000 process • A status report on the efforts by Yuba County Hazard Mitigation Staff to identify and assess risks, prioritize activities to reduce damage to property and prevent loss of life from natural and man-made disasters using FEMA's HAZUS GIS software • A report on the hazard mitigation event and agency meeting calendar • A presentation by the Yuba County Water Agency soliciting input for the development of the YCWA Multi-Hazard Mitigation Plan The Emergency Response and Communication, Fire Planning, and Flood Planning committee work groups met following the presentations. A workshop of Plan Development Assistance Workshop on Resource Identification and Risk Assessment using worksheets from FEMA How-To Guide

	#2.
April 12, 2005	Presentations at this meeting included: • An update on efforts by agencies on the progress being made in the DMA 2000 process and report on the meeting calendar. • An update on the Yuba County Multi-Hazard Mitigation Plan • A presentation by Don Snow of Union Pacific Railroad on chemical transportation safety, specifically emergency response, preparedness, and mitigation on the rail lines • Dan Walker of the California Department of Transportation provided information regarding CalTrans asset inventory and resources in Yuba County • A presentation from the Yuba County Water Agency on the progress being made on the YCWA Hazard Mitigation Plan • A presentation from the Dobbins-Oregon House Fire Protection District on the progress being made on the DOHFPD Hazard Mitigation Plan The Emergency Response and Communication, Fire Planning, and Flood Planning committee work groups met following the presentations.
May 10, 2005	Presentations at this meeting included: • An update on the DMA 2000 process and Yuba County's Progress on the project • A presentation from Jack McHatton, Chief of Telecommunications and Bill Pennington, Assistant Chief of Communications form the Governor's Office of Emergency Services regarding statewide communications and communications support and planning for emergency response, preparedness, and mitigation • A presentation from Captain Alan Long of the Yuba County Sheriff's Department Communications Division on emergency procedures and daily operations • Pete Hammontre, chairman of the Yuba County Rural Fire Joint Powers Agency provided information regarding emergency communications support and future planning efforts • An update on HAZUS risk assessment analysis and review worksheet information, asset inventory, and future planning efforts The Emergency Response and Communication, Fire Planning, and Flood Preparedness committee work groups met following the presentations.
June 14, 2005	Presentations at this meeting included: • An report on the progress being made on the Yuba County Hazard Mitigation Project • A presentation from Jim Johnson of the Yuba Watershed Protection & Fire Safe Council regarding strategic plans and a summary goals, objectives, and projects • The Dobbins Oregon House Fire Protection District gave a presentation regarding development of the DOHFPD local hazard mitigation plan and potential hazard mitigation projects and activities • A discussion of the planning for the July evening workshop designed to share information regarding successful mitigation planning efforts and project information to the public The Emergency Response and Communication, Fire Planning, and Flood Preparedness committee work groups met following the presentations.
July 12, 2005	Presentations at this meeting included: • An overview of the Yuba County Hazard Mitigation Project and progress on the County Plan • An overview of the Yuba Watershed Protection & Fire Safe Council's planning process and collaboration with resource agencies to identify

	community fire prevention strategies and support the Yuba County Project • A report on the capabilities of GIS for fire mapping, mitigation strategies, and projects. A summary of GIS project work and fire hazard models • An overview of the mission of Beale Air Force Base and it current efforts including planning, exercises, anti-terrorism efforts, and coordination of resources to support local community mitigation efforts and projects. • Planning for an evening workshop to allow the community the opportunity to provide input to stakeholders The Emergency Response and Communication, Fire Planning, and Flood Preparedness committee work groups met following the presentations.
August 24, 2005	Presentations at this meeting included: • Planning updates from the Dobbins Oregon House Fire Protection District and Wheatland Elementary School District • A presentation form the Yuba County Health and Human Services Department on public health preparedness planning • A discussion on risk assessment and ranking priorities The meeting was continued to a special evening Stakeholder meeting designed to share information regarding successful mitigation planning efforts and project information to the public. Recognition of the efforts of Stakeholders representing federal, state, and local agencies in the planning process and to mitigate damage and impact from natural and man-made disasters. The meeting included presentations from: • Three Rivers Levee Improvement Authority – an update on South Yuba County levee projects • Yuba County Water Agency - • Yuba County Health & Human Services Department – Public Health & Safety • Pacific Gas & Electric Company – What You Should Know About Power Interruptions • American Red Cross, Three Rivers Chapter – The American Red Cross in Your Community • Yuba Watershed Protection & Fire Safe Council – Fire Prevention & Mitigation in Yuba County
December 13, 2005	Presentations at this meeting included: • A project overview and DMA 2000 plan update including county plan and special districts and a project timeline • A presentation from CalTrans • A presentation form Beale Air Force Base on its emergency plans • An update on hazard analysis and risk assessment summary form County hazard mitigation staff • A report on fire mitigation planning from Glenn Nader of the Yuba Watershed Protection & Fire Safe Council Workshop discussions on local hazard mitigation plan updates, potential hazard mitigation projects, and the Yuba Community Wildfire Protection Plan were undertaken
January 10, 2006	Presentations at this meeting included: • A project overview and reports on agency and special district progress on the hazard mitigation process • A status report on the damage sustained during the 2006 winter storm event • A presentation from the Yuba County Water Agency on the damage YCWA sustained as a result of the 2006 winter storm event • A workshop discussion of potential hazard mitigation projects

February 14, 2006	Presentations at this meeting include: • A discussion of fire risk assessment and asset inventories for fire departments • An update from the Yuba County Water Agency on damages sustained as a result of the 2006 winter storm event • A report on risk assessment and hazard mitigation and the role of GIS in these processes • A workshop discussion of potential hazard mitigation projects
April 11, 2006	Presentations at this meeting included: • An update on the damages sustained by participating agencies as a result of the 2006 winter storm event and the status of FEMA funding to aid in recovery • A presentation outlining the Community Wildfire Protection Plan and its role in helping with the hazard mitigation process • A summary overview of the Yuba County Multi-Jurisdictional Multi Hazard Mitigation Plan • A workshop discussion of potential fire mitigation projects • A technical assistance workshop for those agencies ready to begin writing their plan annexes
May 9, 2006	Presentations at his meeting included: • A discussion of building ordinances and fire planning by the Yuba County Building Department • A report on Avian Influenza and infectious disease preparation by hazard mitigation staff and the Yuba County Health and Human Services Department
July 11, 2006	Presentations at this meeting included: • Three Rivers Levee Improvement Authority and Plumas Lake update • Disaster Mitigation Act of 2000 update • Community Wildfire Protection Plan update by the Yuba Watershed Protection & Fire Safe Council • Woodleaf Evacuation and Sheltering plans by the United States Forest Service • A presentation on the formation of a Pandemic Flu Sub-Committee by the Yuba County Health & Human Services Department • A report on the development of the Yuba County Hazard Mitigation Website • A report on the progress of the Yuba County Mitigation Plan and Special District Annexes
August 8, 2006	Presentations at this meeting included: • A roundtable discussion of each agencies progress on their respective hazard mitigation efforts • An update on Pandemic Influenza from the Yuba County Health & Human Services Department • An overview of the hazard mitigation program from Fletcher Jackson and Jim Wyatt of FEMA and Robert Mead from State OES
September 12, 2006	Presentations at this meeting included: • An introduction to the group of Aaron Ward, Deputy County Administrator – Emergency Services • A report on the August 16, 2006 Marysville Road Fire by the California Department of Forestry & Fire Protection and the Yuba Watershed Protection & Fire Safe Council • An overview of hazardous materials mitigation by Yuba County Environmental Health – Certified Unified Program Agency (CUPA). • An update on the Yuba County Water Agency Multi-Hazard Mitigation

	Plan • An update on Pandemic Influenza from the Yuba County Health & Human Services Department
October 12, 2006	Presentations at this meeting included: • A roundtable discussion moderated by Yuba County Supervisor Mary Jane Griego on the Yuba County Hazard Mitigation Project • An update from the Yuba County Health and Human Services Department on their ongoing public safety plans The meeting was continued to a special evening Stakeholder meeting designed to share information regarding successful mitigation planning efforts and project information to the public. Recognition of the efforts of Stakeholders representing federal, state, and local agencies in the planning process and to mitigate damage and impact from natural and man-made disasters. The meeting included:: • Awards given to members of the Yuba County Sheriff's Department in honor of their efforts to save lives during a structure fire in the City of Marysville, the Trauma Intervention Program for aiding those displaced by the fire, the Yuba Watershed Protection & Fire Safe Council for its efforts in hazard mitigation planning, and Greg Crompton for his efforts in hazard mitigation planning • A presentation from Matt Furtado, Yuba County Fire Planner, on fire mitigation and safety • A report on the Yuba Watershed Protection & Fire Safe Council's chipping program • An overview of the Yuba County Hazard Mitigation Project • An update on the FEMA flood mapping process • A presentation from the Yuba County Water Agency on its Forecasted-Coordinated Operations project • A report from the Three Rivers Levee Improvement Authority on the current status of the levee improvement projects
November 14, 2006	Presentations at this meeting included: • A report from the Yuba County Office of Emergency Services on its participation in the Emergency Medical Services Authority statewide exercise • A report from the Yuba County Water Agency on its presentation to the YCWA Board of Directors and an update on the YCWA plan • A discussion of benefit cost analyses and project costs from hazard mitigation staff • An update on Yuba County hazard mitigation plans and a review of the water resources document • An update on Pandemic Influenza from the Yuba County Health & Human Services Department
December 12, 2006	A special workshop meeting. Representatives with agencies in attendance worked with Yuba County hazard mitigation staff individually to discuss the progress being made on individual agency plan annexes and identify information that was still needed.
January 9, 2007	Presentations at this meeting included: • A report on the efforts of the Yuba County Office of Emergency Services • An update on the South Yuba County levee projects by the Three Rivers Levee Improvement Authority • A report and presentation to the Stakeholders group regarding the Yuba County Municipal Services Review being undertaken by the Local Agency Formation Commission and collaboration with the mitigation project and process

YCWA gave presentations at several of these meetings, and participated in the roundtable discussions at those meetings in which they did not present. The following presentations were made by YCWA:

- March 8, 2005: Curt Aikens gave a presentation (Presentation 3-1) providing an overview of the Yuba County Water Agency and its facilities. The presentation was the same one presented to the Dobbins-Oregon House Action Committee on February 24, 2005. The presentation gave an initial assessment of the hazard rankings for the YCWA and solicited input from the committee for development of the YCWA plan. The group was also informed that YCWA would be submitted as a stand-alone plan, and not as an annex to the County Plan.

- April 12, 2005: Rose Shipman, Chair of the YCWA Hazard Mitigation Committee, gave a presentation on the progress of the planning efforts and solicited input into the planning process

- August 24, 2005: Curt Aikens gave a presentation at this public meeting on the role of the Agency in flood control activities. He also gave a report on the progress in development of the YCWA Multi-Hazard Mitigation Plan.

- January 10, 2006: Rose Shipman and David Slayter, Yuba County Hazard Mitigation Staff, gave a presentation (Presentation 3-2) on the scope of damage from the 2005/2006 winter storms. Initial damage estimates were given, with the caveat that much of the damage was still unknown at that point. The integration of the new information into the YCWA plan was also discussed along with a restructuring of hazard ranking priorities.

- February 14, 2006: Rose Shipman gave an update (Presentation 3-3) on the storm damages suffered during the winter storm event.

- September 12, 2006: Andrew Vodden, Yuba County Hazard Mitigation Staff, gave an update on the efforts to complete the draft of the YCWA Plan. He reported that a complete draft should be available for review at the next stakeholders meeting.

- October 12, 2006: Rose Shipman gave an update on the progress being made on the YCWA Plan as part of a roundtable discussion.

- November 14, 2006: Rose Shipman gave a report on the presentation (Presentation 3-4) made to the YCWA Board of Directors earlier in the day. The presentation gave a brief overview of the project and a draft hazard ranking for approval by the Board. She reported that the Board voted to accept the hazard ranking

Document 3-5 Stakeholders Meeting Agenda January 11, 2005

COUNTY OF YUBA
MULTI-HAZARD MITIGATION PLANNING MEETING

January 11, 2005- 1:00 PM to 3:00 PM
Yuba County Government Center
915 8th Street, Marysville
Conference Room 2

AGENDA

Welcoming Remarks: Patricia Beecham, Office of Emergency Services

Introductions and Agency information

Meeting Overview

DMA 2000
Disaster Mitigation Act of 2000 (public law 106-390), which mandates that local government and governmental entities develop and submit hazard mitigation plans to be eligible to apply for federal hazard mitigation program funds.

Presentation: David Slayter
HAZUS Risk Assessment
The HAZUS GIS software can be used to identify and assess risks, prioritize activities to reduce damage to property and prevent loss of life from natural and man-made disasters.

FEMA FY 2004/2005 Competitive Pre-Disaster Mitigation Grant Project
$255 million for E File competitive grants to fund hazard mitigation plans and projects. The deadline for filing is February 11, 2005.
Training offered by Governor's Office of Emergency Services for cities, counties and special districts:

January 12 and 13, 8 a.m. to 5 p.m. OES Sacramento
January 27 and 28, 8 a.m. to 5 p.m. Sonoma State University

Multi-Hazard Mitigation Risk Assessment
Identifying hazards and risks- Worksheet 1, 2,
Inventory Assets and Resources- 3a, 3b
Estimate Losses- 4

SUBCOMMITTEE WORK GROUPS
Emergency Response and Communication
Fire Planning
Flood Planning

Next Meeting: **February 8, 2005**

Document 3-6 Stakeholders Meeting Sign-In Sheet January 11, 2005

PDM Stakeholders Meeting
January 11, 2005

Name	Organization	Phone	Fax	E-Mail
John Gulserian	Butte OES	538-7773	5386760	jgulserian@buttecounty.net
Eddie Ramirez	USFS-	675-1142	675-1149	eramirez@fs.fed.us
GARY TAFT	9th RECON WING	634-3734	634-5451	gary.teft@beale.af.mil
MAJ BETH LARSON	9th RECON WING	634-3742	634-5451	ELIZABETH.LARSON@BEALE.AF.MIL
Scott Townsend	9th RECON WING	634-9213		Scott.Townsend@beale.af.mil
Dan Walker	CalTrans	741-6377		dan_walker@ca.dot.gov
Dan Ferchaud	Caltrans	741-4317	(530) 741-4072	dan_ferchaud dot.ca.gov
MIKE KOSTAS	MARYSVILLE PD	749-3912	749-3990	MKOSTAS@MARYSVILLECA.US
Joe Hernandez	EOF/ Marysville FD	741-6622	530 741-1147	jhernandez@marysville.ca.us
STEVEN DURFEE	YUBA SHERIFF	749-7776	741-6289	SDurfee@co.yuba.ca.us
RICH WEBB	LINDA FIRE DEPT	743-1553	741-4172	CH250@ONEMAIN.COM
DENNIS FOOLER	Yuba Co Dept. Agriculture	749-5400	749-5404	dfooler@co.yuba.ca.us
CURT AIKENS	YUBA COUNTY WATER AGENCY	741-6278	741-6541	caikens@ycwa.com
DAVID MCBRIDE	YUBA CO. INFORMATION TECH.	749-7890	749-7894	dmcbride@co.yuba.ca.us
Shirlee Belisle	Yuba Co - OES Consultant	916-487-7757		tmsbelisle@comcast.net

Robert Meneni Andrew Vodden
Randy Margo David Slayter
Tej Maan Mike Lee - Yuba Co. P. Works
Pat Beecham

Document 3-7 Stakeholders Meeting Agenda February 8, 2005

COUNTY OF YUBA
MULTI-HAZARD MITIGATION PLANNING MEETING
MID-YEAR PROJECT REVIEW

February 8, 2005- 1:00 PM to 6:00 PM
Yuba County Government Center
915 8th Street, Marysville
Conference Rooms 1 and 2

AGENDA

Welcoming Remarks:

Introductions and Agency information

Meeting Overview: Patricia Beecham, Office of Emergency Services
DMA 2000: Disaster Mitigation Act of 2000 (public law 106-390), which mandates that local government and governmental entities develop and submit hazard mitigation plans to be eligible to apply for federal hazard mitigation program funds.

WORKSHOPS

Session 1: Developing Local Hazard Mitigation Plans 2:00-3:00

Conference Room 1:	**Developing School Hazard Mitigation Plans** Genevieve P. Pastor-Cohen
Conference Room 2:	**Developing Local Hazard Mitigation Plans: Fire Districts, Special Districts**
Conference Room 3:	**State, County and City Agencies**

Session 2: 3:00-4:00

Conference Room 1:	**Developing a Communications Plan**
Conference Room 2:	**Developing an Evacuation Plan**
Conference Room 3:	**Updating HAZUS GIS / Risk Assessment Inventory** David Slayter

Updating HAZUS GIS / Risk Assessment Inventory
During this workgroup in Session II, maps that have been developed for the various inventory data in HAZUS and the Yuba County GIS will be reviewed. Stakeholders will be asked to review the existing inventory data and provide any new information as necessary. Simple forms will be used to ease information collection from workgroup participants.

Document 3-8 Stakeholders Meeting Sign-In Sheet February 8, 2005

*If you have previously attended, you do not need to provide e-mail or phone #

Meeting Sign-In Sheet

Community	**Stakeholders**	**Meeting Date:**	**02/08/05**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Conf. Rm 1 & 2**

Name	Organization	Phone	Fax	E-Mail
Bill Vickrey	~~THREE~~ RIVERS ARC	673 1460	673 1929	
Glenn Nader	Yuba Fire Safe	822-7515	673-5368	
Cory Manzo	MJUSD	749-6124		
Alan Long	YUBA CO. SHERIFF	749-7794		Along@co.yuba.ca.us.
Rose Shipman	Yuba County Water Ag.	741-6278	741-6541	rshipman@ycwa.com
Michael Colvin	Yuba Co OES	632-8080		michael-colvin@sbcglobal.net
Steve Onken	Yuba County Water Agency	692-3100	692-2513	Sonken@ycwa.com
Eddie Ramirez	Plumas NF. Feather River Ranger Dis	675-1142	675-1149	eramirez@fs.fed.us
MIKE CHERRY	TAHOE NATIONAL FOREST YUBA RIVER RANGER DISTRICT	(530) 288-3231		mcherry@fs.fed.us
Pete Hammontree	Dobbins/Oregon House FPD	692-0245	692-0247	hammontree@EARTHLINK.NET
Chuck Thomas	PG&E	634-6616	634-6548	CST1@PGE.com
MIKE LEE	YUBA CO. PUBLIC WORKS	749-5420	749-5424	mglee@co.yuba.ca.us
Gary Schroeder	9th Reconnaissance Wing Plans	634-7733	634-5457	gary.schroeder@beale.af.mil
Dione Beilby	Plumas School Dist	749-0690	749-0689	dbeilby@plusd.org
Kelly Purdom	YCOE	749-4959		Kelly Purdom@~~yuba~~ ycoe.k12.ca.us
STEVE ROPER	YUBA COUNTY PROBATION	749-7551		SROPER@CO.yuba.ca.us
Herschel Todd	Marysville Sch. Dist. Y.C.	741-6194	741-7847	htodd@mjusd.k12.ca.us.
Suzanne Nobles	Yuba Co. Health & Human Services	749-6291	749-6281	snobles@co.yuba.ca.us
Stacy Brucker				
Pat Beecham				
David Slayton				

Special Districts Workshop

*If you have previously attended, you do not need to provide e-mail or phone #

Meeting Sign-In Sheet

Community	**Stakeholders**	**Meeting Date:**	**02/08/05**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Conf. Rm 1 & 2**

Name	Organization	Phone	Fax	E-Mail
WADE HARRISON	OLIVEHURST FIRE DEPT OLIVEHURST PUBLIC UTILITY DIST.	743-7117	743-3928	WHARRISON@OPUD.ORG
DOUG LOFTON	Linda CSA Water Dist	743-2043	743-6858	lindah2o@sbcglobal.net
Cyndi Journagan	Health Dept	749-6279		cjournagan@co.yuba.ca.us
NICK BROWN	RD 784	743-4427	743-4465	
Jenny Brown	Yuba County Resource Conservation District	671-2564		
Dan Walker	CalTrans	741-6377		dwalker@dot.ca.gov
Ryan Bosch	Yuba County Resource Conservation District	674-1461 x130		ryanb_chatham@yahoo.com
MIKE TAMBORINI	SMARTSVILLE FIRE PROTECTION DIST	530) 639-2142	SAME	KATYMIKE@CCXN.COM
Pete Hammontree	Dobbins/Oregon House FPD	692-0245	692-0247	HAMMONTREE@EARTHLINK.NET
Tim CLARK	Smartsville Fire Protection Dist	902-0503	432-6723	timclark@JPS.Net
Glenn Nader	Yuba Fire Safe Council	822-7515	673-5389	ganader@ucdavis.edu
Gary Schroeder	Beale AFB Plans & Programs	634-3733	634-3733	gary.schroeder@beale.af.mil
BILL VICKREY	THREE RIVERS AMERICAN RED CROSS	673-1460	673-1929	
Steve Williams	Dimensions Unlimited	707 374-6529	707 374-6089	Steve@dimensionsunlimited.com

Document 3-9 Stakeholders Meeting Agenda March 8, 2005

COUNTY OF YUBA
MULTI-HAZARD MITIGATION PLANNING MEETING
March 8, 2005- 1:00 PM to 3:00 PM
Yuba County Government Center
915 8th Street, Marysville
Conference Room 2

AGENDA

Welcome: Patricia Beecham, Office of Emergency Services

Introductions and Agency information

Meeting Overview

DMA 2000
Disaster Mitigation Act of 2000 (public law 106-390), which mandates that local government and governmental entities develop and submit hazard mitigation plans to be eligible to apply for federal hazard mitigation program funds.

Presentation: David Slayter, Office of Emergency Services
HAZUS Risk Assessment: Status Report
The HAZUS GIS software can be used to identify and assess risks, prioritize activities to reduce damage to property and prevent loss of life from natural and man-made disasters.

Agency Meeting/Event Calendar

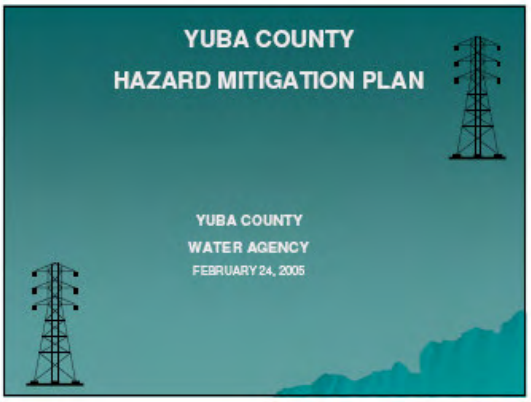
Presentation: Yuba County Water Agency- Curt Aikens
Yuba County Water Agency Hazard Mitigation Plan
The Yuba County Water Agency will provide a report and solicit input for the development of the Multi-Hazard Mitigation Plan. The Agency will be developing a plan to meet the federal requirements of DMA 2000.

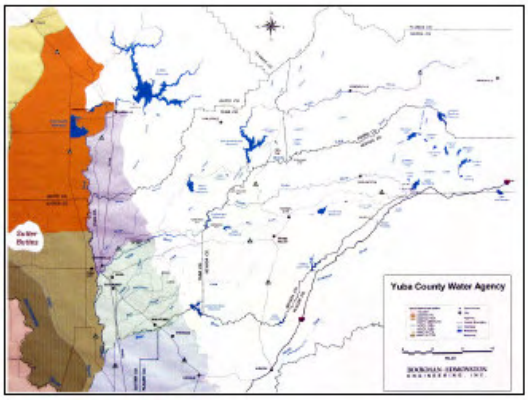
Committee Work Groups:
- **Emergency Response and Communication**
- **Fire Planning**
- **Flood Planning**

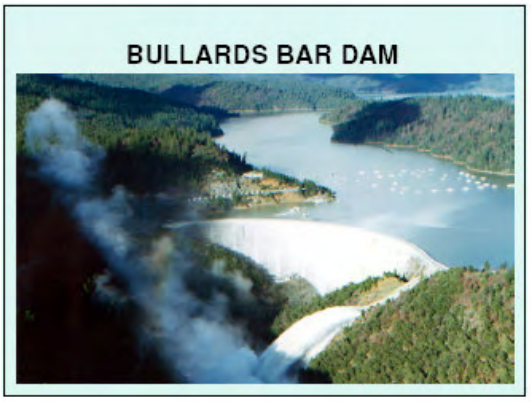
Plan Development Assistance Workshop
Resource Identification and Risk Assessment
- Identifying hazards and risks- Worksheet 1, 2,
- Inventory Assets and Resources- 3a, 3b
- Estimate Losses- 4

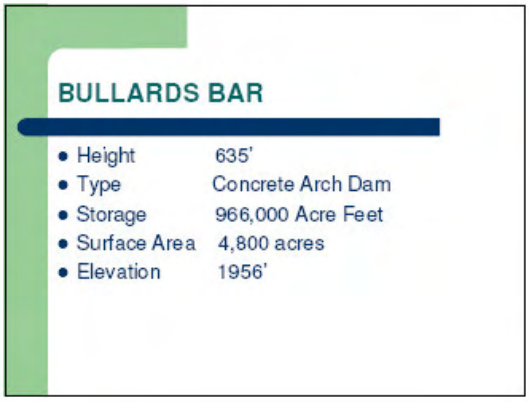
Next Meeting: April 12, 2005

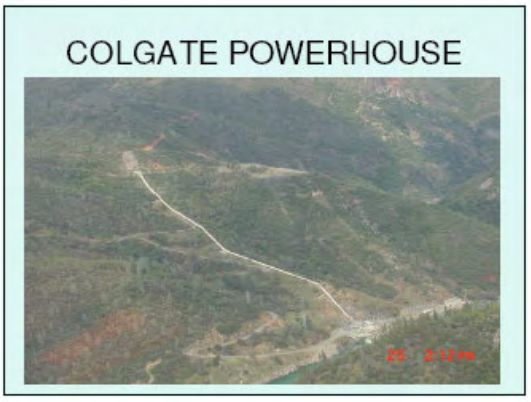
Presentation 3-1 Yuba County Water Agency March 8, 2005

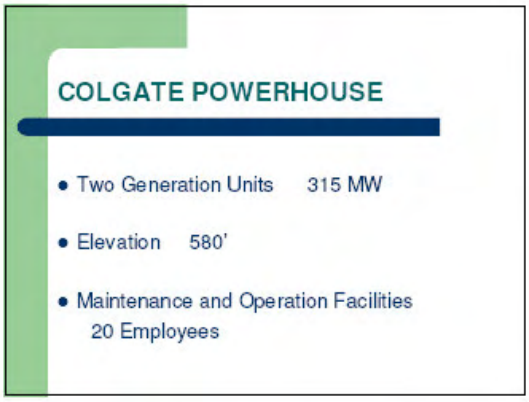


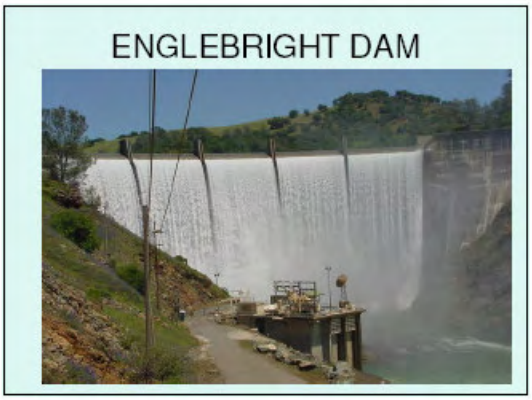


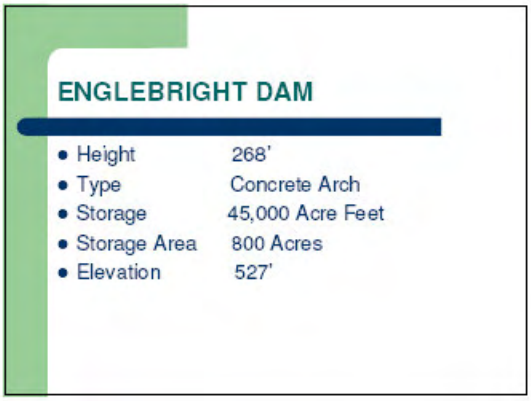


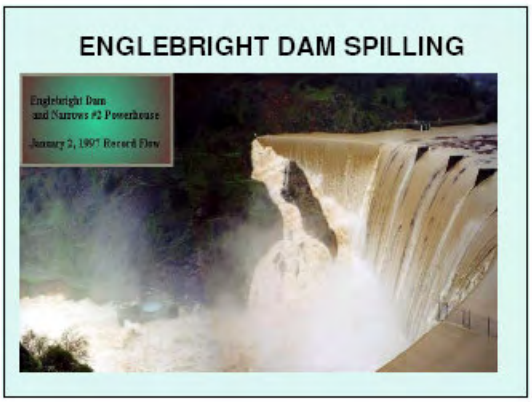


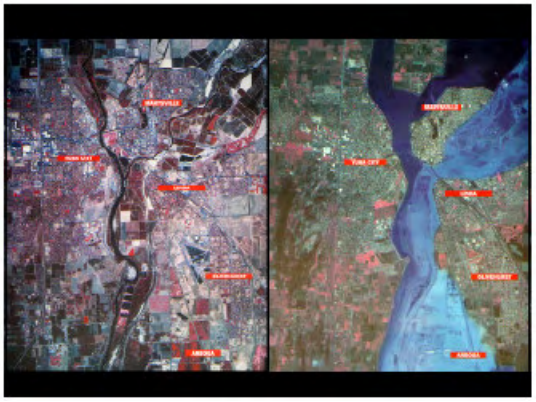





ENGLEBRIGHT DAM

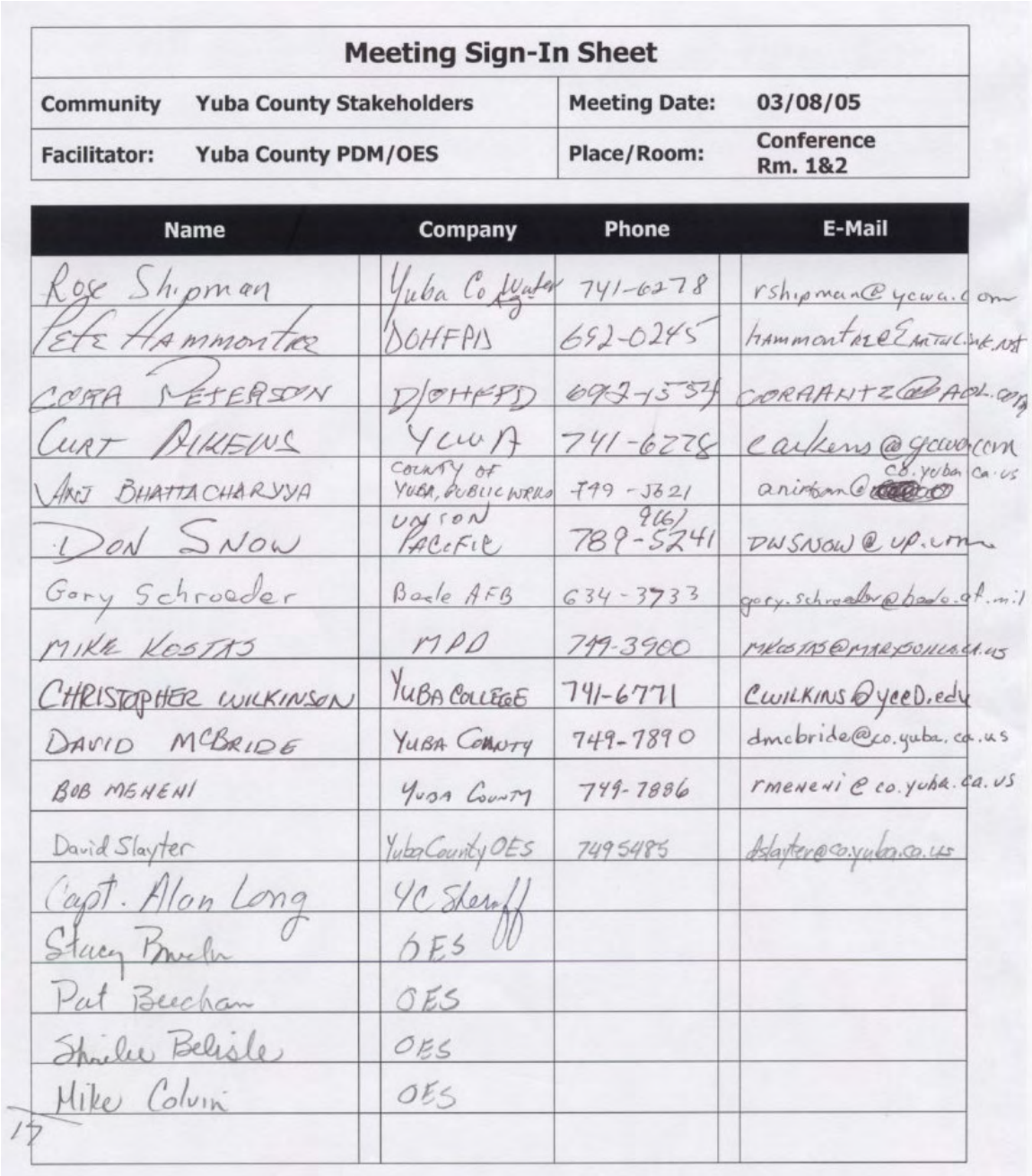

ENGLEBRIGHT DAM
Height 268'
Type Concrete Arch
Storage 45,000 Acre Feet
Storage Area 800 Acres
Elevation 527'


ENGLEBRIGHT DAM SPILLING




Disaster Risk Priorities
Yuba County Water Agency
Dam Failure
Flood
Earthquakes
Terrorist Attacks
Severe Winter Storm
Wind Storm
Land Slides
Wild Fires

Document 3-10 Stakeholders Meeting Sign-In Sheet March 8, 2005



Meeting Sign-In Sheet

Community	**Yuba County Stakeholders**	**Meeting Date:**	**03/08/05**
Facilitator:	**Yuba County PDM/OES**	**Place/Room:**	**Conference Rm. 1&2**

Name	Company	Phone	E-Mail
Rose Shipman	Yuba Co Water	741-6278	rshipman@ycwa.com
Pete Hammontree	DOHFPD	692-0245	hammontree@[illegible].net
CORA PETERSON	D/OHFPD	692-1554	CORAANTZ@AOL.com
CURT AIKENS	YCWA	741-6278	caikens@ycwa.com
ANJ BHATTACHARYYA	COUNTY OF YUBA, PUBLIC WORKS	749-5821	anirban@co.yuba.ca.us
DON SNOW	UNION PACIFIC	916) 789-5241	DWSNOW@up.com
Gary Schroeder	Beale AFB	634-3733	gary.schroeder@beale.af.mil
MIKE KOSTAS	MPD	749-3900	MKOSTAS@MARYSVILLE.us
CHRISTOPHER WILKINSON	YUBA COLLEGE	741-6771	CWILKINS@yccd.edu
DAVID MCBRIDE	YUBA COUNTY	749-7890	dmcbride@co.yuba.ca.us
BOB MENENI	YUBA COUNTY	749-7886	rmeneni@co.yuba.ca.us
David Slayter	YubaCountyOES	7495485	dslayter@co.yuba.ca.us
Capt. Alan Long	YC Sheriff		
Stacy Bowlin	OES		
Pat Beecham	OES		
Shirlee Belisle	OES		
Mike Colvin	OES		
17			

Document 3-11 Stakeholders Meeting Agenda April 12, 2005

COUNTY OF YUBA

MULTI-HAZARD MITIGATION PLANNING MEETING
April 12, 2005- 1:00 PM to 3:00 PM
Yuba County Government Center
915 8th Street, Marysville
Office of Emergency Services

AGENDA

Welcome: Patricia Beecham, Office of Emergency Services

Introductions and Agency information- Calendar Update

Meeting Overview
DMA 2000 / Yuba County Multi-Hazard Mitigation Plan Status Report

Presentation: Don Snow, Manager, Chemical Transportation Safety
Union Pacific Railroad
Don Snow will present information regarding the Union Pacific Railroad and emergency response, preparedness and mitigation.

Presentation: Dan Walker, Engineer- Maintenance and Support
California Department of Transportation- District 3
Dan Walker will provide information regarding Cal Trans Asset Inventory Report and resources in Yuba County

HAZUS: David Slayter, Office of Emergency Services
Update of the HAZUS Risk Assessment Analysis and review worksheet information, asset inventory and resource identification.

Presentation: Yuba County Water Agency- Rose Shipman
Yuba County Water Agency Hazard Mitigation Plan
YCWA status report regarding the Agency's Multi-Hazard Mitigation Plan and input from the planning committee.

Presentation: Dobbins-Oregon House Fire Protection District
Chairman Pete Hammontre
DOHFPD Multi- Hazard Mitigation Plan
The DOHFP District status report regarding the development of the District Mitigation Plan and community participation.

Committee Work Groups:
Emergency Response & Communication, Fire & Flood

Next Meeting: May 10, 2005

Document 3-12 Stakeholders Meeting Sign-In Sheet April 12, 2005

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**April 12, 2005**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Don L. Graham	RD 784	742-6074	dmgraham03@comcast.net
Walter Cotter	Brawns Valley ID	743-5703	wcotter@onemain.com
Don Snow	UPRR	789-5241	
Pete Hammontree	DOHFPD		
Philip V. Lucas	Fellowship of Friends	692-8376	PLUCAS@APOLLO.ORG.
Chris Wilkinson	Yuba College District	741-6771	CWILKINS@yccd.edu
Mike Cherry	USFS Tahoe Forest	530 288 3231	mcherry@fs.fed.us
Wade Harrison	OPUD Olivehurst Fire	743-7117 682-7094	WHARRISON@OPUD.ORG
John Fleming	Yuba County ED	741-6280	jfleming@yubacounty.org
Bill Vickrey	Am. Red Cross Rivers Chapter	673-1460	3RIVERSREDCROSS@SDCGLOBAL.NET
Rose Shipman	Yuba County Water Ag.	741-6278	rshipman@ycwa.com
Don Walker	CalTrans	741-5377	dwalker@dot.ca.gov
Cory Manzo	MJUSD	749-6124	cmanzo@mjusd.k12.ca.us
Suzanne Nobles	W + HS		
Daniel Slayter	OES-Contractor		
Shirley Belisle	OES-Contractor		
Pat Beecham	OES		
Marcia Christoffersen	OES - Hz Mat		
Stacy Brueffer	OES		

Document 3-13 Stakeholders Meeting Agenda May 10, 2005

COUNTY OF YUBA

MULTI-HAZARD MITIGATION PLANNING MEETING
May 10, 2005- 1:00 PM to 3:00 PM
Yuba County Government Center
915 8th Street, Marysville
Office of Emergency Services

AGENDA

Welcome: Patricia Beecham, Office of Emergency Services

Introductions and Agency information- Calendar Update

Meeting Overview
DMA 2000 / Yuba County Multi-Hazard Mitigation Plan Status Report

Presentation: Bill Pennington, Asst. Chief Telecommunications
Jake McHatton, Chief Telecommunications
Governor's Office of Emergency Services
Presentation from the State OES regarding statewide communications and communications support and planning for emergency response, preparedness and mitigation.

Presentation: Alan Long, Captain, Support Services Division
Yuba County Sheriff's Department
Presentation regarding the Yuba County Sheriff's Department Communications Division emergency procedures and daily operations.

Presentation: Pete Hammontre, Chairman
Yuba County Rural Fire- Joint Powers Agency
Presentation from the JPA Chair regarding emergency communications support and future planning efforts.

HAZUS: David Slayter, Office of Emergency Services
Update of the HAZUS Risk Assessment Analysis and review worksheet information, asset inventory and resource identification.

Committee Work Groups:
Emergency Response & Communication, Fire & Flood
Fire Planning
Flood Preparedness and Planning

Announcements:

Next Meeting: June 14, 2005
Discussion regarding evening meeting.

Document 3-14 Stakeholders Meeting Sign-In Sheet May 10, 2005

Meeting Sign-In Sheet

	Monthly Stakeholders Meeting	Meeting Date:	May 10, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Conference Rooms 1 and 2

Name	Title	Phone	E-Mail
ALAN LAMB	GRAPHICS	749-7794	ALAMB@CO.YUBA.CA.US
Michael Colvin	Mitigation Con	632-8080	mcolvin@gmx.net
Bill VICKREY	VOLUNTEER	673 1460	
John DeBeaux	Sutter County Emergency Services Mgr	822-7400	jdebeaux@co.sutter.ca.us
DON SNOW	MGR CHEMICAL TRANS.	789-9241 (916)	DWSNOW@UP.COM
Mara Christoffersen	Haz Mat Spec. III Yo. CUPA	749-7523	mchristoffersen@co.yuba.ca.us
Rose Shipman	Yuba Co. Water Agency Senior Accountant	741-6278	rshipman@ycwa.com
Greg Crompton	Chairman Action Cmte Robbins/Oregon House	692-0110	cpdod-omsem@juno.com
Pete HAMMONTREE	Chair DOHFPD	692-0245	hammontree@EARTHLINK.NET
Dennis Pooler	Yuba Co. Ag. Comm. Plans Section Chief	749-5400	dpooler@co.yuba.ca.us
LOREN OLSEN	Yuba County Water Dist	675-2506	
Cory Manzo	MJUSD	749-6124	cmanzo@mjusd.k12.ca.us
Tej Mann	YC Environmental Health.		
Keith Hohmann	ARC-Em. Ser. Directo		
Bill Pennington	CA OES. Ass Chief Telecommuta		
Jake MCHatton	CA OES Chief Telecommunications		
Bob Meneni	Ad. Ser. Director		
Bill Fuller	Yuba City Fire Dept		
~~Pat Beecham~~			
~~Stanley Brucker~~			

Page 1 of 1

Meeting Sign-In Sheet

	Monthly Stakeholders Meeting	Meeting Date:	May 10, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Conference Rooms 1 and 2

Name	Title	Phone	E-Mail
Dan Walker	Caltrans		
Pat Beecham	YC OES		
Stacey Brucker	YC OES		
David Slayton	YC OES		
Walt Cotter	Browns Valley Irrigation District		
John Fleming			
David McBride	YC IT		

Document 3-15 Stakeholders Meeting Agenda June 14, 2005

COUNTY OF YUBA

MULTI-HAZARD MITIGATION PLANNING MEETING
June 14, 2005- 1:00 PM to 3:00 PM
Yuba County Government Center
915 8th Street, Marysville
Conference Rooms 1& 2
AGENDA

Welcome: Patricia Beecham, Office of Emergency Services

Introductions and Agency information: Calendar Update

Meeting Overview:

DMA 2000 / Yuba County Multi-Hazard Mitigation Plan Status Report

Presentation: Jim Johnson, Fire Safe Coordinator
Yuba Watershed Protection & Fire Safe Council
Presentation from the Fire Safe regarding Council strategic plans and summary of goals objectives and projects.

Presentation: Cora Peterson, Board Member
Dobbins-Oregon House Fire Protection District
Presentation by DOHFPD regarding development of the districts Local Hazard Mitigation Plan and potential hazard Mitigation projects and activities.

HAZUS: David Slayter, Office of Emergency Services
Summary and update of HAZUS Risk Assessment Analysis and information, asset inventory information provided by stakeholders.

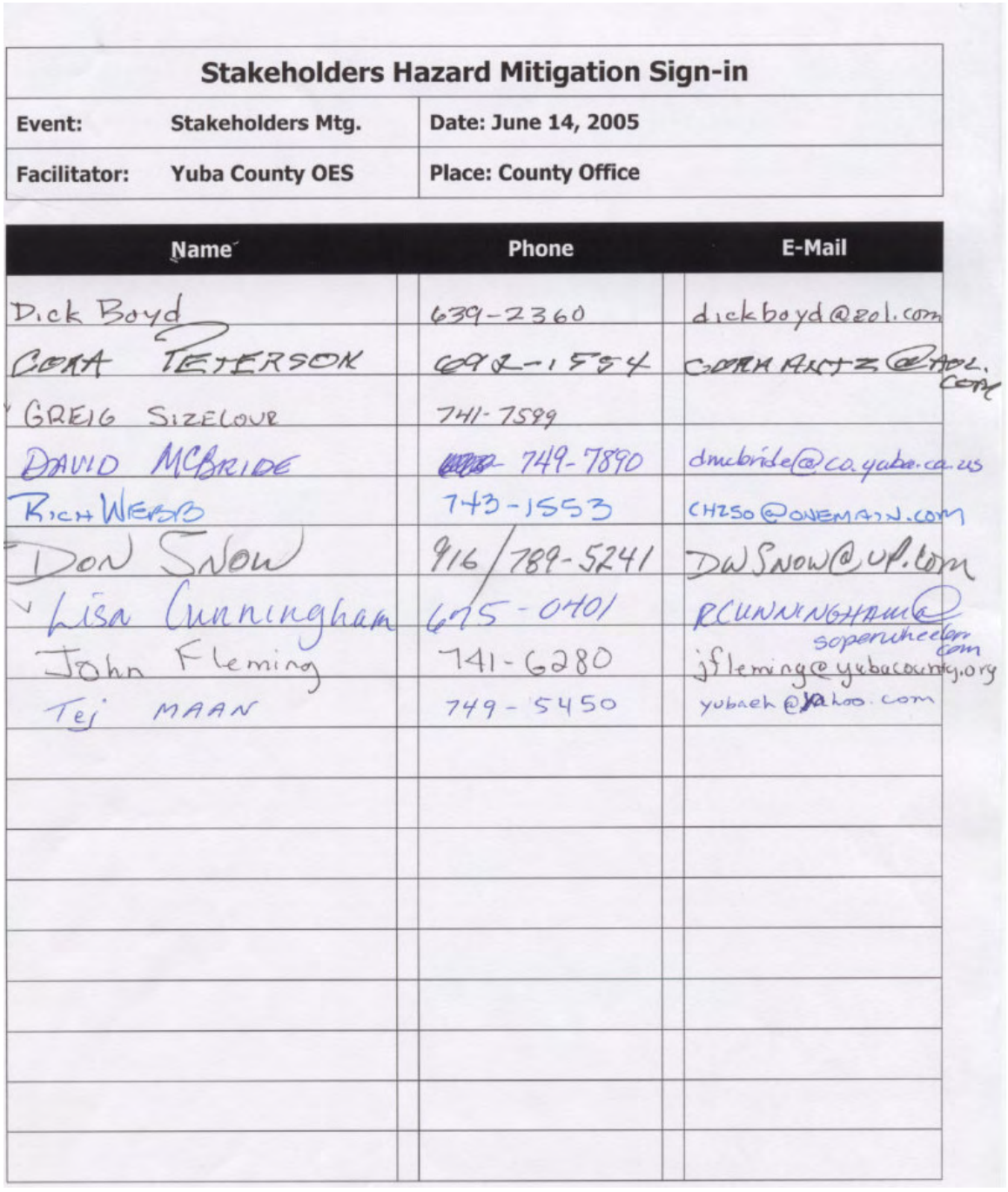
Multi-Hazard Mitigation Planning Workshop: July 2005
Evening workshop designed to share information regarding successful mitigation planning efforts and project information.

Committee Work Groups:
Emergency Response & Communication, Fire & Flood
Fire Planning
Flood Preparedness and Planning

Announcements:

Next Meeting: July 12, 2005
Discussion regarding evening meeting.

Document 3-16 Stakeholders Meeting Sign-In Sheet June 14, 2005



Stakeholders Hazard Mitigation Sign-in

Event:	Stakeholders Mtg.	Date: June 14, 2005
Facilitator:	Yuba County OES	Place: County Office

Name	Phone	E-Mail
Dick Boyd	639-2360	dickboyd@aol.com
CORA PETERSON	692-1554	CORAMAITZ@AOL.COM
GREIG SIZELOVE	741-7599	
DAVID MCBRIDE	749-7890	dmcbride@co.yuba.ca.us
RICH WEBB	743-1553	CH250@ONEMAIN.COM
DON SNOW	916/789-5241	DWSNOW@UP.com
Lisa Cunningham	675-0401	RCUNNINGHAM@soperwheeler.com
John Fleming	741-6280	jfleming@yubacounty.org
Tej MAAN	749-5450	yubaeh@yahoo.com

Document 3-17 Stakeholders Meeting Agenda July 12, 2005

COUNTY OF YUBA

MULTI-HAZARD MITIGATION PLANNING MEETING
July 12, 2005- 1:00 PM to 3:00 PM
Yuba County Government Center
915 8th Street, Marysville
Conference Rooms 1& 2
AGENDA

Welcome: Patricia Beecham, Office of Emergency Services

Introductions and Agency information: Calendar Update

Meeting Overview:
DMA 2000 Yuba County Multi-Hazard Mitigation Plan

Presentation:
Glen Nader, U C Davis Cooperative Extension
Yuba Watershed Protection & Fire Safe Council
Overview of Fire Safe Council's planning process and collaboration with resource agencies to identify community fire prevention strategies to support DMA 2000.

David Slayter, OES- GIS Specialist/ Geologist
GIS tools for fire mapping, mitigation strategies and projects.
Summary of GIS project work and Fire Hazard Models.

Presentation:
Gary Taft, Wing Plans & Programs- Beale AFB
Michael Seymour, 9RW-Anti-terrorism Officer
Overview of Beale's Mission, current efforts including planning, exercises, anti-terrorism efforts and coordination of resources to support to local community mitigation efforts and projects.

Multi-Hazard Mitigation Planning Workshop: July 2005
Evening workshop designed to share information regarding successful mitigation planning efforts and project information.

Committee Work Groups:
Emergency Response & Communication
Fire Planning
Flood Preparedness

Announcements:

Next Meeting: July 12, 2005

Document 3-18 Stakeholders Meeting Sign-In Sheet July 12, 2005

Meeting Sign-In Sheet

	Monthly Stakeholders Meeting	Meeting Date:	July 12, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Conference Rooms 1 and 2

Name	Title	Phone	E-Mail
Steve Brocil	Bi-County Ambulance	674-2780	s.brocil@succeednet.org
Rose Shipman	Yuba Co. Water Agency	741-6278	rshipman@ycwa.com
Loren Williamson	Rideout Emergency	749 4511	
Pete Hammontree	DOHFPD	692-0245	
Glenn Nader	Yuba Fire Safe	822-7515	ganader@ucdavis.edu
Joe Hernandez	Marysville FD/CDF	741-6622	jhernandez@marysville.ca.us
J. DURFOR	YUBA CO. S.O.	749-7776	SDURFOR@co.YUBA.ca.us
Don SNOW	UPRR	916 789-5241	dwsnow@up.com
Pat Camarena	Wheatland School District-Principal	788-0236	pcamarena.wheatland.k12.ca.us
Michael Seymour	BEALE ANTITERRORISM	634-3546	Michael.Seymour@BEALE AF.MIL.
Gary Schroeder	YCWA Plans & Programs	634-3733	gary.schroeder@bbcb.af.mil
Joe CASSADY	Health Officer	7496781	
Val Spooner	Yuba Co. Public Health DIRECTOR OF NURSES	1496774	Vspooner@co.yuba.CA.
Cyndi Journagan	Yuba Co. Public Health Admin Analyst	749-6279	cjournagan@co.yuba.ca.us
Clark Pickell	Hazard Materials Specialist II	749-7523	cpickell@co.yuba.ca.US
Gary Cantwell	Hazard Material Specialist I	749-7526	Gcantwell@co.yuba.ca.us
John Fleming	ED Coordinator	741-6280	
BOB MENENI	DIRECTOR OF ADM SERVICES	749-7880	rMeneni@co.Yuba.ca.us

Meeting Sign-In Sheet

	Monthly Stakeholders Meeting	Meeting Date:	July 12, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Conference Rooms 1 and 2

Name	Title	Phone	E-Mail
WAYNE HARRISON	CAPTAIN 2 OLIVEHURST FIRE	743-7117	WHARRISON@OFD.ORG
Bill VICKREY	VOLUNTEER	673 1460	
GARY TAFT	Beale AFB Plans & Programs	634-3734	gary.taft@beale.af.mil
David Slayter			
Virginia Black	Sheriff.		
Theresa Hayes	Consultant	916-804-3841	theresa@dimensionsii.com
Rich Webb	Linda FD	743-1553	ch280@oxemain.com
Pat Beecham	Yuba Co OES	749-7331	
Bob Coffelt	Beale AFB		

Document 3-19 Stakeholders Meeting Agenda August 24, 2005

The County of Yuba

MULTI-HAZARD MITIGATION PLANNING MEETING
August 24, 2005 - 6:00 PM
Yuba County Government Center
915 8th Street, Marysville- Conference Room 2

STAKEHOLDERS AGENDA

Welcome: Patricia Beecham

Agency Introductions and Activities

Plan Updates:

Dobbins Oregon House Fire Protection District- Hazard Mitigation Plan
Pete Hammontre and Cora Petersen

Wheatland Elementary School District Hazard Mitigation Plan
Pat Camarena

Presentations:

Yuba County Health Department Public Health and Safety
Cyndi Journagan, Administrative Analyst
Val Spooner, Director of Nursing

DMA 2000 Yuba County Multi-Hazard Mitigation Plan
Risk Assessment / Ranking Priorities – David Slayter

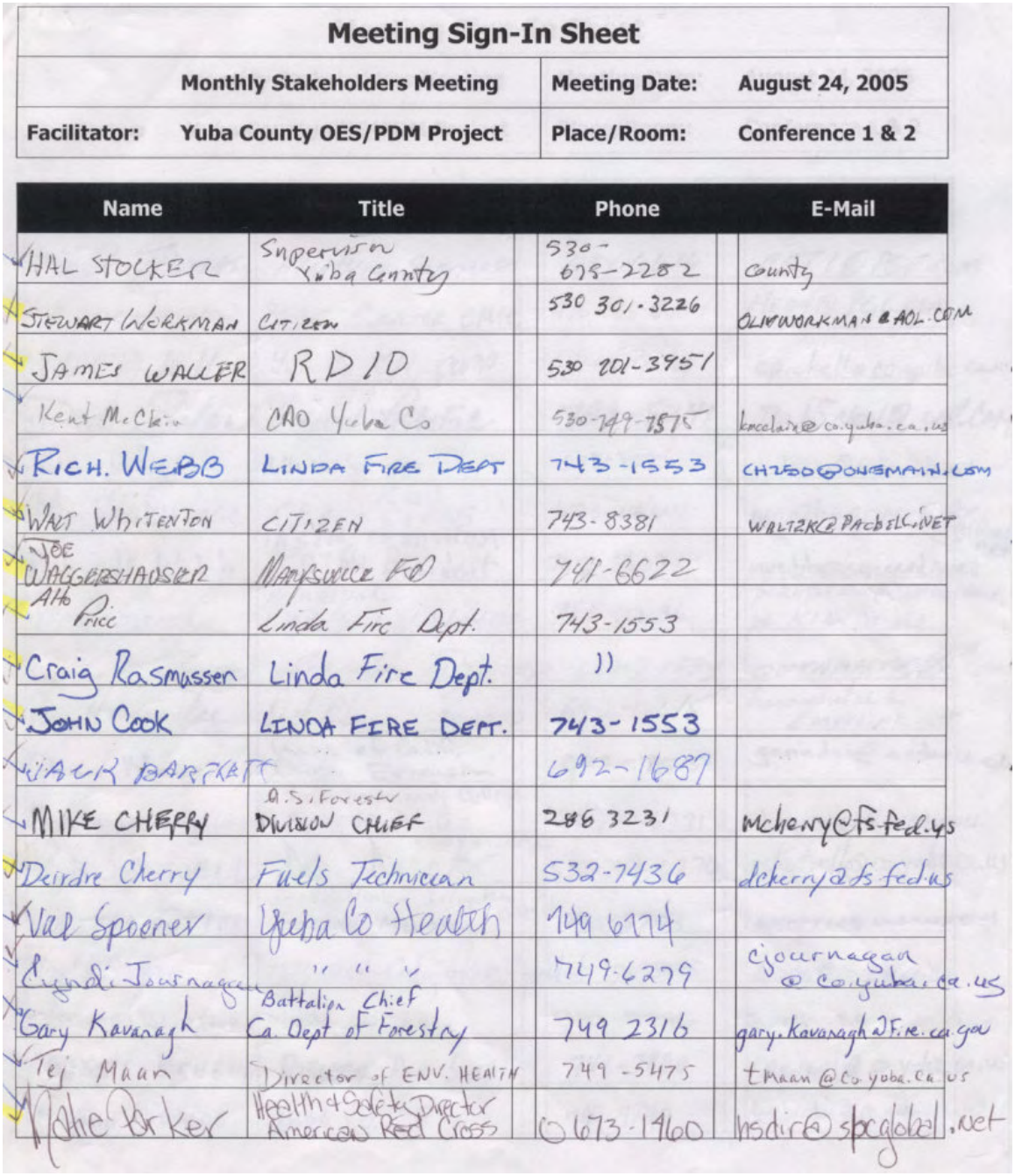
Break

Meeting Continued at Public Session - 7:00 PM - Board Chambers

6:30 PM - Demonstration – Front Parking Lot
Glen Nader, UC Davis Cooperative Extension
"Building Construction Material - One of Three Keys to Fire Safety"

Next Meeting:
September 13, 2005 – 1:00 PM

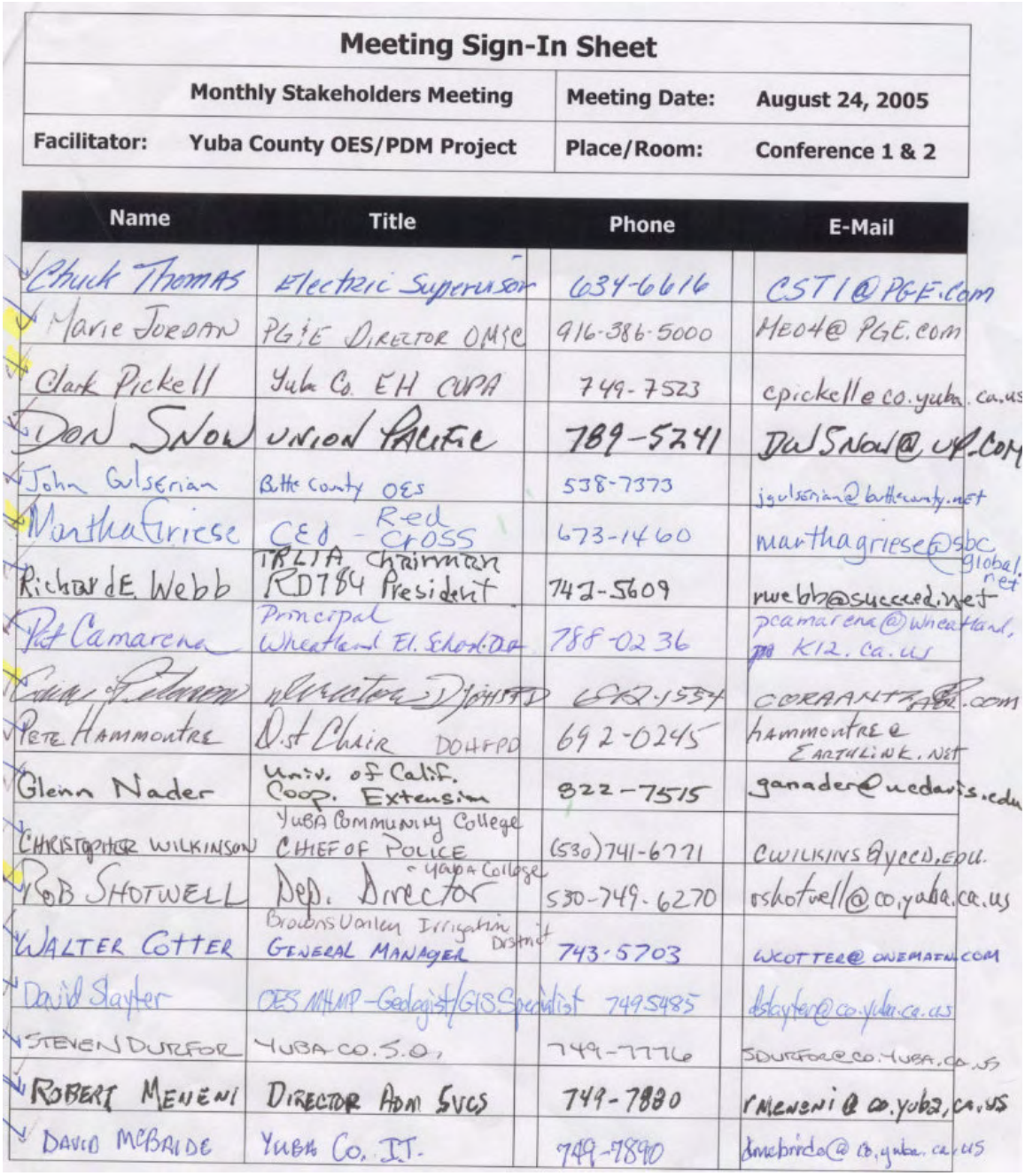
Document 3-20 Stakeholders Meeting Sign-In Sheet August 24, 2005



Meeting Sign-In Sheet

	Monthly Stakeholders Meeting	Meeting Date:	August 24, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Conference 1 & 2

Name	Title	Phone	E-Mail
HAL STOCKER	Supervisor Yuba County	530-675-2282	county
STEWART WORKMAN	CITIZEN	530 301-3226	OLDWORKMAN@AOL.COM
JAMES WALLER	RD 10	530 701-3951	
Kent McClain	CAO Yuba Co	530-749-7575	kmcclain@co.yuba.ca.us
RICH. WEBB	LINDA FIRE DEPT	743-1553	CH250@ONEMAIN.COM
WALT WHITENTON	CITIZEN	743-8381	WALT2KC@PACBELL.NET
JOE WAGGERSHAUSER	MARYSVILLE FD	741-6622	
Al & Price	Linda Fire Dept.	743-1553	
Craig Rasmussen	Linda Fire Dept.	))	
JOHN COOK	LINDA FIRE DEPT.	743-1553	
JACK BARKETT		692-1687	
MIKE CHERRY	U.S. Forest DIVISION CHIEF	286 3231	mcherry@fs.fed.us
Deirdre Cherry	Fuels Technician	532-7436	dcherry@fs.fed.us
Val Spooner	Yuba Co Health	749 6774	
Cyndi Journagan	" " "	749-6279	cjournagan@co.yuba.ca.us
Gary Kavanagh	Battalion Chief Ca. Dept of Forestry	749 2316	gary.kavanagh@fire.ca.gov
Tej Maan	Director of ENV. HEALTH	749-5475	tmaan@co.yuba.ca.us
Mike Parker	Health & Safety Director American Red Cross	673-1460	hsdir@sbcglobal.net



Meeting Sign-In Sheet

	Monthly Stakeholders Meeting	Meeting Date:	August 24, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Conference 1 & 2

Name	Title	Phone	E-Mail
Chuck Thomas	Electric Supervisor	634-6616	CST1@PGE.com
Marie Jordan	PG&E Director O&SC	916-386-5000	MEO4@PGE.com
Clark Pickell	Yuba Co. EH CUPA	749-7523	cpickelle co.yuba.ca.us
Don Snow	Union Pacific	789-5241	DWSnow@UP.com
John Gulserian	Butte County OES	538-7373	jgulserian@buttecounty.net
Martha Griese	CEO - Red Cross	673-1460	marthagriese@sbcglobal.net
Richard E. Webb	IRLTA Chairman RD784 President	742-5609	rwebb@succeed.net
Pat Camarena	Principal Wheatland El. School Dist	788-0236	pcamarena@wheatland.k12.ca.us
Cora Anttila	Director DOHFPD	692-1534	CORAANTTILA@AOL.com
Pete Hammontree	Dist Chair DOHFPD	692-0245	hammontree@earthlink.net
Glenn Nader	Univ. of Calif. Coop. Extension	822-7515	ganader@ucdavis.edu
Christopher Wilkinson	Yuba Community College Chief of Police	(530)741-6771	CWILKINS@yccd.edu
Rob Shotwell	Yuba College Dep. Director	530-749-6270	rshotwell@co.yuba.ca.us
Walter Cotter	Browns Valley Irrigation District General Manager	743-5703	WCOTTER@ONEMAIN.COM
David Slayter	OES MHMP-Geologist/GIS Specialist	749-5485	dslayter@co.yuba.ca.us
Steven Durfor	Yuba Co. S.O.	749-7776	SDURFOR@CO.YUBA.CA.US
Robert Meneni	Director Adm Svcs	749-7880	rmeneni@co.yuba.ca.us
David McBride	Yuba Co. IT.	749-7890	dmcbride@co.yuba.ca.us

Meeting Sign-In Sheet

	Multi-Hazard Mitigation Workshop Meeting	Meeting Date:	August 24, 2005
Facilitator:	Yuba County OES/PDM Project	Place/Room:	Board Chambers

Name	Title	Phone	E-Mail
Mary Jane Griego	Supervisor Yuba County	749-7510	
Janice Rhodd		635-0486	
Curt Aikens	GM YCWA	741-6278	
Pat Beeham	OES Coordinator	749-7331	
John Nicoletti	YC Board of Supervisor		
Therese Hayes	Consultant		
Keith Olsen	American Red Cross.		
Stacy Bruckar	YC OES		
3 Deputies YCSO.			

Document 3-21 Stakeholders Meeting Agenda December 13, 2005

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
December 13, 2005
Yuba County Government Center
915 8th Street, Marysville-
Conference Rooms 1 & 2

12:00 Noon- Pre-Meeting Workshop
Community Wildfire Protection Plan (CWPP)

1. Requirements for CWPP
2. Combining CWPP and DMA 2000
3. Area of Coverage
4. Review of Contents
5. Public comment and public hearing
6. Yuba County fire issues

1:00 PM Welcome: Patricia Beecham, Project Director

Agency Introductions:

Project Overview and DMA 2000 Multi-Hazard Mitigation Plan Update
County Plan and Special Districts, Project Time line

Agency Presentations:
CAL TRANS- Dan Walker, Kirk Hemstalk
Beale Air Force Base- Bob Coffelt Plans Update

Presentation: Yuba County Multi-Hazard Mitigation Plan
Hazard Analysis and Risk Assessment Summary
David Slayter, PDM GIS Project Consultant

Presentation: Fire Mitigation Planning
Glenn Nader, University of California
Cooperative Extension- Fire Safe Council
Yuba Community Wildfire Protection Plan

Workshop Discussion:
Local Hazard Mitigation Plans (LHMP) Update
Potential Hazard Mitigation Projects
Evacuation Planning

Announcements:
Next Meeting: January 10, 2006- 1:00 PM

Document 3-22 Stakeholders Meeting Sign-In Sheet December 13, 2005

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**December 13, 2005**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Rod Bondurant	CVFD	288-3550	rbon@ips.net
Rich Webb	Linda Fire	743-1553	CH250@ONEMAIN.com
Dan Crawford	Yuba County OES	682-8776	dhc5@yahoo.com
Bob Coffel/Beale		634-2744	robert.coffel@beale.af.mil
Rick Case	USFS	532 7431	rcase@fs.fed.us
Mike Cherry	USFS TNF	288-3231	mcherry@fs.fed.us
David Slayter	Yuba County MJMH MP	749 5485	dslayter@co.yuba.ca.us
[illegible]	RD 784	742-6074	dmgraham@comcast.Net
[illegible]	USFS	675-1142	eRamirez@fs.fed.us
Rose Shipman	Yuba Co. Water Ag	741-6278	rshipman@ycwa.com
Alan Lamb	YCBA Co. S.O.	749-7794	ALamb@co.YCBA.CA.US
Dan Walker	CalTrans	741-5377	dwalker@dot.ca.gov
Ray Smith	CALTRANS	895-4200	
Don Walker	Yuba Feather Fish Club	692-2110	
Claudia Hollis	FREED Center for Independent Living	742-4474	claudiah@freedcil.org
Gary Kavanagh	CDF Camp Rica-Browns Valley CSD	749 2316	
Cary Kayak	OES	749-7331	
Gary Schroeder			

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**December 13, 2005**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Cyndi Journagan	Health Dept	749-6279	cjournagan@co.yuba.ca.us
AL Ludwick	TBH.	742-5376	ALUDWICK@Succeed-Net
Tej Mann	YC Environtal		
D Beecham	OES		
Stacy Burke	YCOES		
Brian O'Hara	YC OES		
Glenn Noden	UC Ext.		

Document 3-23 Stakeholders Meeting Agenda January 10, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
January 10, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Rooms 1 & 2

10:00 am *Pre-Meeting Workshop - Community Wildfire Protection Plan (CWPP)*

1. Requirements for CWPP
2. Combining CWPP and DMA 2000
3. Area of Coverage
4. Review of Contents
5. Public comment and public hearing
6. Yuba County fire issues

1:00 pm Welcome: Patricia Beecham, Project Director

Agency Introductions

Project Overview and DMA 2000 Multi-Hazard Mitigation Plan Update
Agency / Special District reports

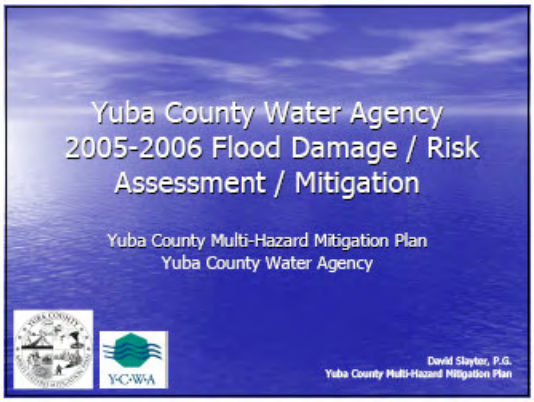
OES Presentation: Status of damage in the county from recent storms –
Brian O'Hara, Yuba County OES

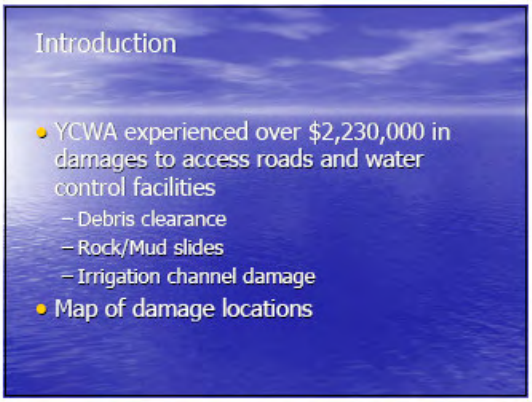
Presentation: Yuba County Water Agency – December Storm Damage,
Risk Assessment and Mitigation
David Slayter, MHMP GIS Project Consultant
Rose Shipman, YCWA

Workshop Discussion:
Potential Hazard Mitigation Projects

Next Meeting: February 14, 2006 - 1:00 pm

Presentation 3-2 Yuba County Water Agency 2005-2006 Flood Damage/Risk Assessment/Mitigation January 10, 2006





Debris on New Bullards Bar Reservoir




List of Clean-Up Projects

Facility	Summary of Damage
NBB Dam access road	Mud/Rock slides
NBB reservoir	Wood and other debris removal
South diversion – Daguerre Point Dam	Debris clogged entrance channel to fish screen
South county diversion channel	Channel bank erosion at Pond 17
Our House Dam	Wood debris washed into reservoir
Our House Dam access road	Mud/Rock slide

Summary of Damage versus Projected Vulnerability

- YCWA estimated vulnerability to severe winter storms prior to these events. These are included in the YCWA Multi-Hazard Mitigation Plan.

Facility	Estimated Clean-Up Vulnerability	2005/2006 Storms Actual Clean-Up
Our House Dam	$3,000,000	$2,000,000
NBB Dam & Facilities	$20,000,000	$100,000
Project Access Roads	$500,000	> $100,000

Example Mitigation Opportunities

Facility	Mitigation Opportunities
Debris Accumulation	Booms across reservoir headwaters or contributing upstream watersheds?
Mud/Rock slides	Geo-engineered slope stabilization?

What Did We Learn?

- Estimations by responsible agencies with local knowledge are going to be better than those by Plan developers
- PROVIDE YOUR ASSET INFORMATION!
  - If not, future storm damage may exceed MHMP estimations
  - This could result in a limit on available funds in Declared Disasters
- Each disaster presents knowledge for future mitigation opportunities

Document 3-24 Stakeholders Meeting Sign-In Sheet January 10, 2006

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**January 10, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Glenn Nader	UCCE	822-7515	ganader@ucdavis.edu
Catharine Dykes	City of Marysville	749 3936	cdykes@marysville.ca.us
Rose Shipman	Yuba Co. Water Ag.	741-6278	rshipman@ycwa.com
VIRGINIA BLACK	Yuba Co SO	749-7779	vblack@co.yuba.ca.us
Cyndi Journagan	Health Dept	749-6279	cjournagan@co.yuba.ca
Richard E. Webb	RD784 + TRLIA	742-5609	rwebb@succeed.net
Don L. Graham	RD784	742-6074	dmgraham03@comcast.net
Lucille Janvier	Yuba County Water District	675-2567	ycwdoa@aol.com
TOM SCHULTZ	RECLAMATION D10	7436422	SKISCHULTZ@AOL.COM
TERRY O'CONNELL	US FOREST SERVICE	532 7472	taoconnell@fs.fed.us
STEVE WRIGHT	CITY OF WHEATLAND	633-2761	SWRIGHT@WHEATLAND.CA.GOV
DAN BOON	CITY OF WHEATLAND	633-2014	dboon@wheatland.ca.gov
Bob Goffett	Beale AFB	634-2744	robert.coffett@beale.af.mil
Walter Miller	Beale AFB	634-2719	walter.miller@beale.af.mil
Gary Schroeder	Beale AFB	634-3733	gary.schroeder@beale.af.mil
STEVEN DURFOR	YUBA CO. SHERIFF OFC	749-7776	SDURFOR@co.YUBA.CA.US
Art Paavette	Wheatland Fire Auth.	682-9819	Art@wheatland.CA.GOV
Darryl Stineman	Wheatland Fire Authority Rec 2103	632 8990	darryl@stinemanranches.com

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**January 10, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Dan Walker	Caltrans 03	741-5377	dwalker@dot.ca.gov
Tej Maan	Yuba Co ENV. Health	749-5475	tmaan@co.yuba.ca.us
Martha Griese	Red Cross	673-1460	marthagriese@sbcglobal.net
Cory Manzo	Marysville JS.D.	749-6124	cmanzo@mjusd.com
Rob Shotwell	HHSD	749-6270	rshotwell@co.yuba.ca.us
Gary Kavanagh	COF/Long Rec Browns Valley	CSD. 749 2316	
Greg Royst	OES Redwash	749-7331	
STEPHEN HART	OLIVEHURST FIRE	743-7117	CHIEF300@OPUD.ORG

Staff - ~~Cindy Pursons~~, David Slayter, Pat Statcham, Andrew Vaudin

Document 3-25 Stakeholders Meeting Agenda February 14, 2005

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
February 14, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Rooms 1 & 2

1:00 pm **Welcome:** **Patricia Beecham, Project Director**

Agency Introductions

Presentation: **Fire risk assessment and asset inventories**
Greg Royat

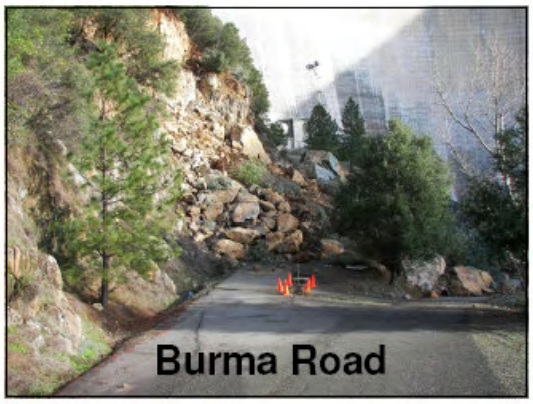
Presentation: **Updated storm damage report**
Rose Shipman – Yuba County Water Agency

Presentation: **Risk Assessment and Mitigation**
Janice Rhodd, MHMP GIS Project Consultant

Workshop Discussion:
Potential Hazard Mitigation Projects

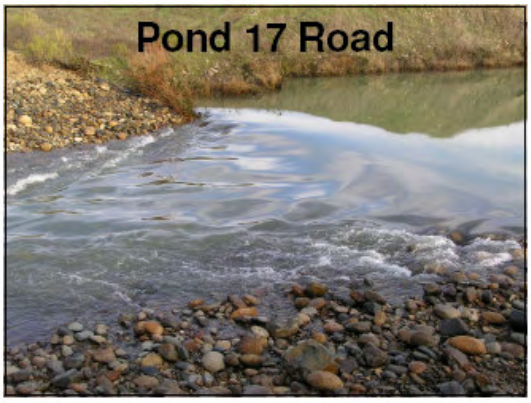
Next Meeting: **March 14, 2006 - 1:00 pm**

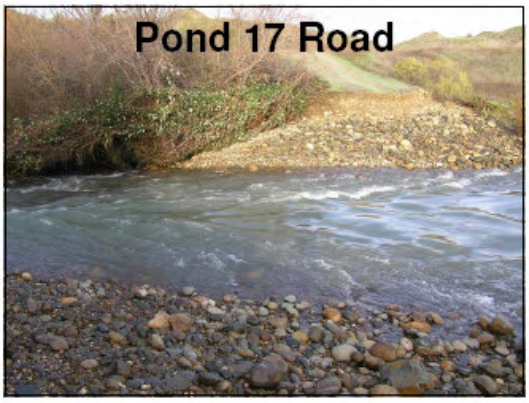
**Presentation 3-3 Yuba County Water Agency 2005/2006 Winter Storms Damage Update
February 14, 2006**




Pond 17 Road


Pond 17 Road


Pond 17 Road


Pond 17 Road


Bullards Bar Reservoir
Debris


Bullards Bar
Reservoir Debris


Bullards Bar
Reservoir Debris


Bullards Bar
Reservoir Debris


Daguerra Fish Ladder


Daguerra Fish Ladder

Document 3-26 Stakeholders Meeting Sign-In Sheet February 14, 2006

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**February 14, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Rose Shipman	Yuba Co. Water Ag	741-6278	rshipman@ycwa.com
Pete Hammontree	DOHFPD	692-0245	you have it
DAN BOON	CITY OF WHEATLAND	633-2014	dboone@wheatland.ca.gov
Arthur Poucette	wheatland fire Auth	633-0861	art@wheatland.ca.gov
DOLORES McGUIRE	PEORIA CEMETERY DIST	749-8473	dedemc@infostations.com
Greg Rogt	OES		
RICH WEBB	LINDA FIRE DEPT	743-1553	CH250@ONEMAIN.COM
STEVE DUNFORD	YUBA CO. SHERIFF DEPT.	749-7776	SDUNFORD@CO.YUBA.CA.US
John Gulserian	Butte County OES	538-7373	jgulserian@buttecounty.net
Martha Griese	Red Cross	673-1466	marthagriese@sbcglobal.net
VIRGINIA BLACK	SHERIFF'S DEPT	749-7779	VBLACK@CO.YUBA.CA.US
STEPHEN HART	OLIVEHURST FPD	749-7117	CHIEF300@OPUD.ORG
Gary Kavanagh	COF/Loma Rica Browns Valley	749 2316	gary.kavanagh@fire.ca.gov
JOHN FLEMING	Yuba County ED	741-6280	jfleming@yuba.county.org
Kevin Guerrero	COF	889-0111 x127	kevin.guerrero@fire.ca.gov
Clark Pickell	Yuba County EH CUPA	749-7523	cpickell@co.yuba.ca.us
Richard Webb	RD784 & TRLIA	742-5609	rwebb@succeed.net
JOHN GILBERT	RD 817	701-8873	jjgilbert@earthlink.net

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**February 14, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
WALTER COTTER	BVID	743-5703	WCOTTER@STARBAND.NET
Darryl Stineman	Wheatland Fire Authority Rec. 2103	530 682 8990	darryl@wheatland.ca.gov darryl@stinemanranches.com
Staff – PDM			
Andrew Vodden			
Stacey Brucken			
Janice Rhodd			

Document 3-27 Stakeholders Meeting Agenda April 11 , 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
April 11, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome: Patricia Beecham, Project Director

Agency Introductions-

Update on 2005-2006 Winter Storms and FEMA funding

Presentation: Community Wildfire Protection Plan
Glenn Nader, UC Davis Cooperative Extension
Greg Royat, Yuba County Mitigation Staff
Fire Mitigation Goals and Projects

Summary Overview of County Multi-Hazard Mitigation Plan-
Goals for planning process and plan development

Workshop Discussion:
Potential Fire Hazard Mitigation Projects

Technical Assistance workshop-

Next Meeting: May 9, 2006 - 1:00 pm

Please schedule time for assistance in individual agency/ special districts hazard mitigation local plan development.

Document 3-28 Stakeholders Meeting Sign-In Sheet April 11, 12006

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**April 11, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Rose Shipman	Yuba Co. Water Ag	741-6278	rshipman@ycwa.com
Glenn Nader	UCCE	822-7515	ganader-ucdavis.edu
Joe Classen			
John Maskell	Yuba Co Public Hlth	749-6366	jmaskell@co.yuba.ca.us
Ani Bhattacharyya	Yuba County Public Works	749-5621	abhattacharyya@co.yuba.ca.us
Pete Hammontree	DOHFPS	692-0245	Hammontree@earthlink.net
Rob Shotwell	HHSD	749-6270	rshotwell@co.yuba.ca.us
Rich Webb	Linda Fire	743-1553	CH256@ONEMAIN.COM
Darryl Stineman	Rec 2103 Wheatland Fire Authority	682-8990	darryl@wheatland.ca.gov
Greg Royal	OES		
Steve Hart	OFD	743-7117	CHIEF300@OPUD.ORG
John Fleming	Ec Developmt	741-6280	jfleming@yubacounty.org
John J. Gilbert	RD 817	530-7018873	jjgilbert@earthlink.net
Andrew Vodden			
Pat Beecham			

Document 3-29 Stakeholders Meeting Agenda May 9, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
May 9, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome: Patricia Beecham, Project Director

Agency Introductions-

Presentation: Building ordinances and fire planning
Marty Griffin, Chief Building Inspector, Yuba County

Avian Influenza and Infectious Disease Preparation
Dr. Joe Cassady, Yuba County Public Health Officer
Andrew Vodden, MHMP Staff

Workshop Discussion:
Hazard Mitigation Projects and Strategies

Next Meeting: June 13, 2006 - 1:00 pm

Please schedule time for assistance in individual agency/ special districts hazard mitigation local plan development.

Document 3-30 Stakeholders Meeting Sign-In Sheet May 9, 2006

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**May 9, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Val Sprooner	Health	749 6774	vsprooner@co.yuba.ca.us
Kevin Roush	Ag	5400	Kroush@CO.YUBA.CA.US
Rose Shipman	Yuba Co. Water Ag	741-6278	rshipman@ycwa.com
Phil Hendrix	PESD	870-6933	phendrix@plusd.org
Martin Griffin	Building Inspector	749-5433	
Pat Beechan	OES		
Martha Griese	Red Cross	673-1460	martha.griese@redcross.net
John Fleming	Yuba County ED	741-6280	jfleming@yubacounty.org
Andrew Vaughan	OES		

Document 3-31 Stakeholders Meeting Sign-In Sheet July 11, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
July 11, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome: Patricia Beecham, Project Director

Agency Introductions: Stakeholders and Guests

Three Rivers Levee improvement Authority and Plumas Lake update
Paul Brunner, Executive Director, TRLIA
Randy Margo, Assistant County Administrator

DMA 2000 – Status Report
Pat Beecham, Hazard Mitigation Project Director

Community Wildfire Protection Plan
Glenn Nader, Yuba Watershed Protection and Fire Safe Council

Woodleaf Evacuation and Sheltering plans
Eddie Ramirez, United States Forest Service
Greg Royat, Yuba County Hazard Mitigation

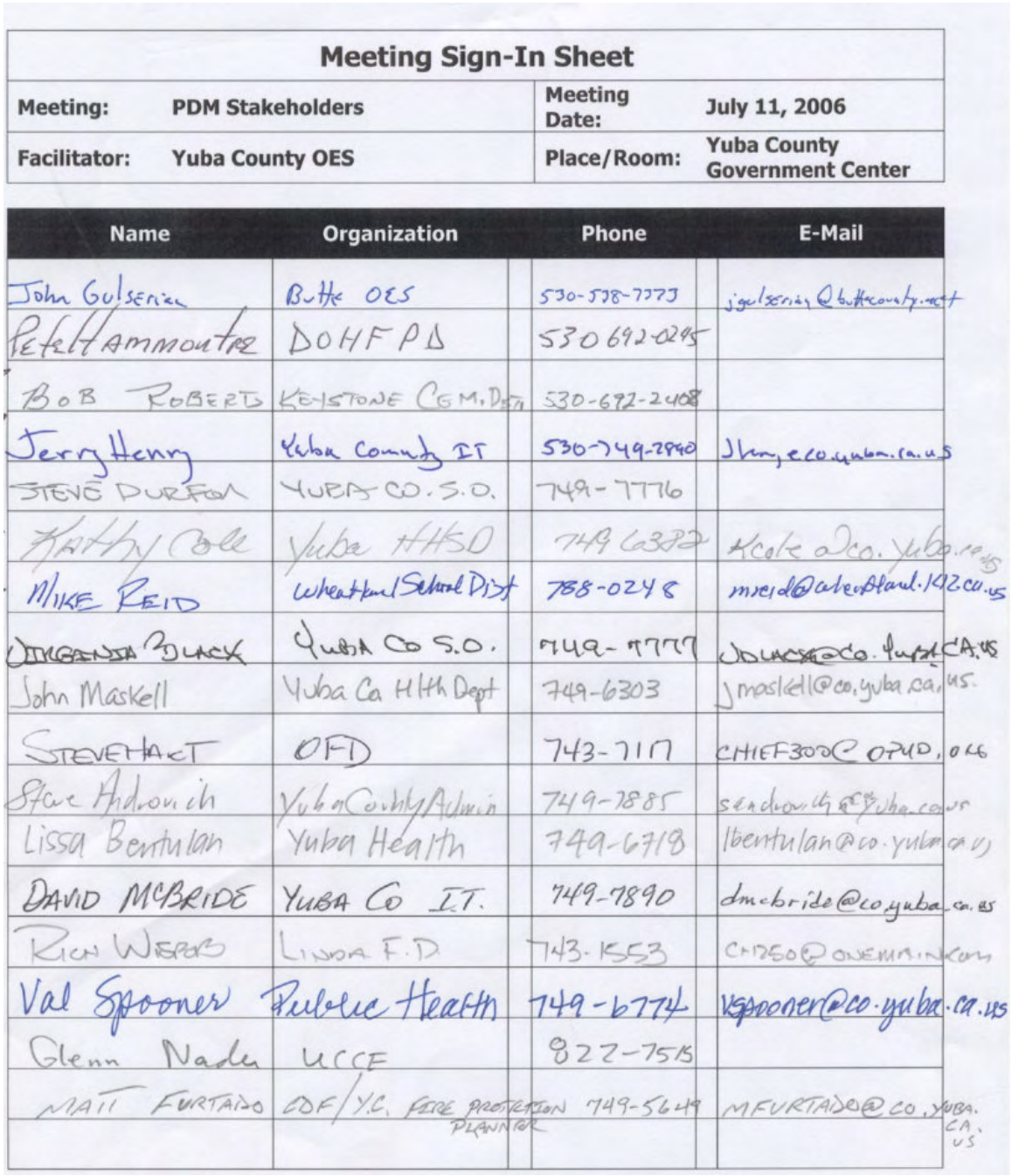
Pandemic Flu Sub-Committee Formation
Lissa Bentulan, Epidemiologist
Yuba County Health and Human Services

Yuba County Hazard Mitigation Website Development
Andrew Vodden, Hazard Mitigation Staff

Yuba County Mitigation Plan & Special District Annexes
Hazard Mitigation Staff

Next Meeting: Tuesday, August 8 2007

Document 3-32 Stakeholders Meeting Sign-In Sheet July 11, 2006



Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**July 11, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
John Gulserian	Butte OES	530-538-7777	jgulserian@buttecounty.net
Pete Hammontree	DOHFPD	530 692-0295	
Bob Roberts	Keystone CSM. Dist	530-692-2408	
Jerry Henry	Yuba County IT	530-749-7840	Jhenry@co.yuba.ca.us
Steve Durfor	Yuba Co. S.O.	749-7776	
Kathy Cole	Yuba HHSD	749 6382	Kcole@co.yuba.ca.us
Mike Reid	Wheatland School Dist	788-0248	mreid@wheatland.k12.ca.us
Virginia Black	Yuba Co S.O.	749-7777	VBLACK@co.yuba.CA.US
John Maskell	Yuba Co Hlth Dept	749-6303	jmaskell@co.yuba.ca.us
Steve Hart	OFD	743-7117	CHIEF300@OFD.046
Steve Andronich	Yuba County Admin	749-7885	sandronich@yuba.co.us
Lissa Bentulan	Yuba Health	749-6718	lbentulan@co.yuba.ca.us
David McBride	Yuba Co I.T.	749-7890	dmcbride@co.yuba.ca.us
Rich Weber	Linda F.D.	743-1553	CH250@ONEMAIN.com
Val Spooner	Public Health	749-6774	Vspooner@co.yuba.ca.us
Glenn Nader	UCCE	822-7515	
Matt Furtado	CDF/Y.C. Fire Protection Planner	749-5649	MFURTADO@CO.YUBA.CA.US

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**July 11, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Robert Bendorf	Yuba County Administrator		
Patricia Beecham	Project Director		
Stacey Brucker	Project Staff		
Barbara Miles	Project Staff		
Janice Rhodd	Project Staff		
Andrew Vodden	Project Staff		

Document 3-33 Stakeholders Meeting Agenda August 8, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
August 8, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome: Patricia Beecham, Project Director

Agency Introductions: Stakeholders and Guests

Pandemic Influenza Update
Lissa Bentulan, Epidemiologist, Yuba County Health Department

Hazard Mitigation Program Overview
Fletcher Jackson, Federal Emergency Management Agency
Jim Wyatt, Federal Emergency Management Agency
Robert Mead, Governor's Office of Emergency Services

Document 3-34 Stakeholders Meeting Sign-In Sheet August 8, 2006

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**August 8, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
Cyndi Journagan	Public Health	749-6279	cjournagan@co.
Rose Shipman	Yuba Co Water Ag	741-6278	rshipman@ycwa.com
John Gulseria	Butte County OES	538-7373	jgulseria@buttecounty.net
LISSA BENTULAN	YUBA CO. PUB. HLTH	749-6718	lbentulan@co.yuba.ca.us
Val Spooner	YCHHS	749-6774	vspooner@co.yuba.ca.us
Joe Cassady			
Richard Webb	RD784 HTRLIA	742-5609	rwebb@succeed.net
DOLORES M'GUIRE	PEORIA CEMETERY DIST	749-8473	
STEVE DURFOR	YUBA CO. S.O.	749-7776	
DAN BOON	WHEATLAND P.D.	633-2014	dboone@wheatland.
Martha Griese	Red Cross	673-1460	martha.griese@redcross.gov
ERIK ANGLE	PINEHURST FR	749-4524	eangle@cfng.org
RICK WEBB	LINDA FIRE	743-1553	CH250@ONEMAIN.com
Pete Hammontree	DOHFPS	692-0245	hammontree@emsa.ca.gov
John Moskell	YC Hlth Dep	741-6302	jmoskell@co.yuba.ca.us
Jim Wyatt	FEMA		Jim.Wyatt@DHS.gov
Fletcher Jackson	FEMA		
Janice Rhodd	Y.C. OES	749-5660	jrhodd@co.yuba.ca.us

Meeting Sign-In Sheet

Meeting:	**PDM Stakeholders**	**Meeting Date:**	**August 8, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Yuba County Government Center**

Name	Organization	Phone	E-Mail
MATT FURTADO	CDF/YC	749-5649	MFURTADO@co.yuba.ca.us
Fletcher Jackson	FEMA	339 251-4223	fletcher.jackson@dhs.gov
ROBERT MEHAN	OES	916 845-8174	ROBERT.MEHAN@OES.CA.GOV
Andrew			
Pat			
Stacey			
Robert Bendorf			
Greg Royat			
John Fleming			

Document 3-35 Stakeholders meeting Agenda September 12, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
September 12, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome: Patricia Beecham, Project Director

Agency Introductions: Stakeholders and Guests

Introduction of Aaron Ward, Deputy County Administrator – Emergency Services

Report on August 16 Marysville Fire and Recovery
Matt Furtado, Yuba County Fire Planner/California Department of Forestry & Fire Protection
Glenn Nader, UC Davis Cooperative Extension/Yuba Fire Safe Council

Hazardous Materials Mitigation
Clark Pickell, CUPA Manager, Yuba County Environmental Health

Update on Yuba County Hazard Mitigation Plans
Pat Beecham, Yuba County Office of Emergency Services

Update on Yuba County Water Agency Hazard Mitigation Plans

Pandemic Influenza Update
Lissa Bentulan, Epidemiologist, Yuba County Health Department

Discussion and Planning for October Community Forum and exhibits

Next meeting: Community Forum October 12 @ 6:00 (tentative)

Document 3-36 Stakeholders Meeting Sign-In Sheet September 12, 2006

Meeting Sign-In Sheet

Meeting:	**Stakeholders**	**Meeting Date:**	**September 12, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Conference Room 1**

Name	Organization	Phone	E-Mail
DAN BOON	CITY OF WHEATLAND	633-2014	dboon@wheatland.ca.gov
Cyndi Journeagan	Public Health		cjournagan@co.yuba.ca.us
Glenn Nader	UCCE	822-7515	ganader@ucdavis.edu
Susan Tiffany	Red Cross	673-1460	disasterdirsbcglobal.net
Lissa Bentulan	Public Health	749-6718	lbentulan@co.yuba.ca.us
Rose Shipman	Yuba Co. Water Ag	741-6278	rshipman@ycwca.com
Clark Pickell	Yuba County EM	749-7523	cpickell@co.yuba.ca.us
Jerry Henry	Yuba County, IT	749-7848	jhenry@co.yuba.ca.us
STEVE HART	OLIVEHURST FIRE	743-7117	CHIEF300@OPFD.org
MIKE REID	WHEATLAND SCHOOL DIST	788-0248	mreid@wheatland.k12.ca.us
MATT FURTADO	YC. FIRE PLANNER	749-5649	MFURTADO@CO.YUBA.CA.US
Craig Root	OES	749-7520	—
Jamie Rhodd	OES	747-5660	jrhodd@co.yuba.ca.us
Dan Graham	RD 784	742-6074	dmgraham03@comcast.Net
Aaron Ward	OES	749-7519	award@co.yuba.ca.us
Pat Camarena	OES	633-9041	pcamarena1@comcast.net
Angela Vieira			
Pat Brazelton			

Mary Jean Gregg Gary Kavanagh
Hal Stocker
Stacey Brooks

Document 3-37 Stakeholders Meeting Agenda October 12, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
October 12, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 2

4:00 pm Welcome

Agency Introductions:
Stakeholders and Guests

Program Overview of Community Workshop

Hazard Mitigation Plan Updates

Yuba County Multi-Hazard Mitigation Plan and Planning Process

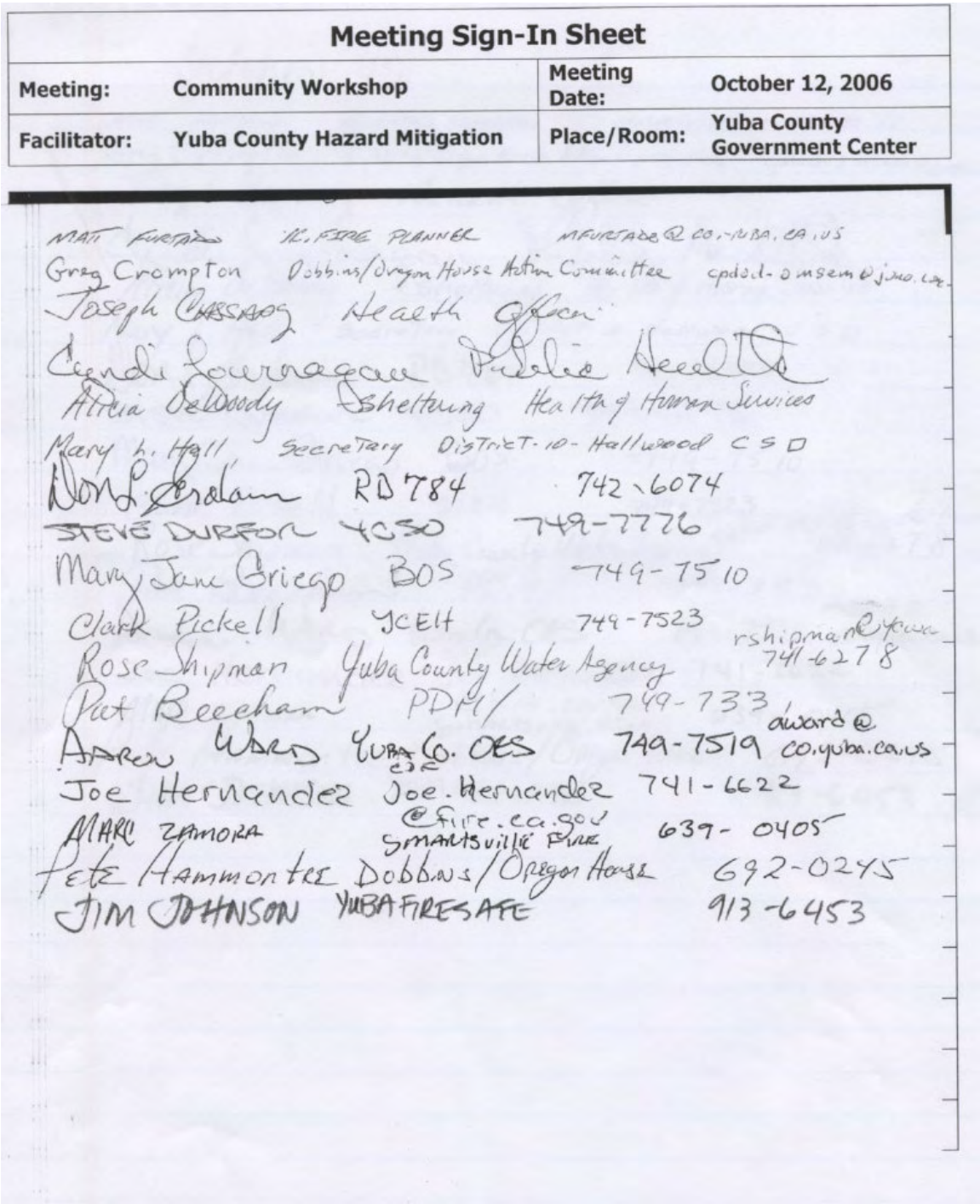
Presentation:

Yuba County Health Department Planning Update
Dr. Joe Cassady
Cyndi Journagan
Shannon Cortez

Comments

Adjourn to Public Meeting and Exhibits

Document 3-38 Stakeholders Meeting Sign-In Sheet October 12, 2006



Meeting Sign-In Sheet			
Meeting:	Community Workshop	Meeting Date:	October 12, 2006
Facilitator:	Yuba County Hazard Mitigation	Place/Room:	Yuba County Government Center

MATT FURTADO — FIRE PLANNER — MFURTADO@CO.YUBA.CA.US
Greg Crompton — Dobbins/Oregon House Action Committee — cpdsd-omsem@jmo.com
Joseph Cassady — Health Officer
Cindi Lourenzo — Public Health
Alicia DeWoody — Sheltering — Health & Human Services
Mary L. Hall — Secretary — District 10 - Hallwood CSD
Don Graham — RD 784 — 742-6074
STEVE DURFOR — YCSO — 749-7776
Mary Jane Griego — BOS — 749-7510
Clark Pickell — YCEH — 749-7523
Rose Shipman — Yuba County Water Agency — rshipman@ycwa 741-6278
Pat Beecham — PDM/ — 749-733
AARON WARD — YUBA CO. OES — 749-7519 award@co.yuba.ca.us
Joe Hernandez — Joe.Hernandez@fire.ca.gov — 741-6622
MARC ZAMORA — SMARTSville FIRE — 639-0405
Pete Hammontree — Dobbins/Oregon House — 692-0245
JIM JOHNSON — YUBA FIRESAFE — 913-6453

Document 3-39 Stakeholders Meeting Agenda November 14, 2006

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
November 14, 2006
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome

Agency Introductions: Stakeholders and Guests

Office of Emergency Services report and Emergency Medical Services Authority (EMSA) statewide exercise
Aaron Ward, Deputy County Administrator – Emergency Services

USDA Rural Development Programs
Paula Galvan, Rural Development Manager

Report on presentation to the Yuba County Water Agency Board of Directors and update on YCWA Plan
Rose Shipman, Yuba County Water Agency

Benefit Cost Analysis and Project Costs
Janice Rhodd, Yuba County Hazard Mitigation GIS Coordinator

Update on Yuba County Hazard Mitigation Plans and Review of Water Resource Document
Pat Beecham, Yuba County Office of Emergency Services

Pandemic Influenza Update
Lissa Bentulan, Epidemiologist, Yuba County Health Department

Next meeting: Tuesday, December 12, 2006 @ 1:00

Presentation 3-4 Yuba County Water Agency Hazard Ranking November 14, 2006

What Is Hazard Mitigation?

Mitigation defined:
any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

- The goal of mitigation is to save lives and reduce property damage.
- Mitigation can reduce the impact from disasters.
- Mitigation provides protection of critical facilities, reduces exposure to liability, and minimizes losses and disruption of service.

Why Plan For Hazard Mitigation?

Disaster Mitigation Act of 2000
(Public Law 106-390)

The Disaster Mitigation Act of 2000 (DMA 2000) requires hazard mitigation planning as a part of the Stafford Relief and Emergency Assistance Act. *Local government entities are required to develop and submit local hazard mitigation plans by November 1, 2004 to be eligible to receive federal hazard mitigation grant program (HMGP) funds.*

Local government entities include: special districts, school districts, fire protection districts, cemetery districts, community service districts, water districts, reclamation districts, etc.

Advantages of participation in the Hazard Mitigation Project

- Compliance with the Disaster Mitigation Act of 2000 requirements
- Assessment of hazards that affect YCWA
- Identification of potential hazard mitigation projects to mitigate hazards and reduce impact of disasters
- Eligibility for funding from FEMA and non-FEMA hazard mitigation sources
- A living document to address the needs of the Agency as it grows

DMA 2000

- Emphasizes inter-agency coordination.
- Emphasizes the local government's responsibility for mitigation of hazards
- Increases the emphasis placed on state and local planning to:
  - Organize resources
  - Assess risks
  - Implement loss reduction measures
  - Ensure critical services/facilities survive a disaster

Disaster Mitigation Act of 2000 Process

- Resource Organization
- Assess Risks
- Develop Goals
- Adopt Hazard Mitigation Plan
- Multi-Jurisdictional Plan
- Interface with County Plans and Strategic Planning

Assessing Your Risks

Identify Your Hazards and Estimate Your Losses

Step 1: Identify Hazards

Step 2: Profile Hazard Events

Step 3: Inventory Assets/Facilities

Step 4: Estimate Losses
Value of assets affected

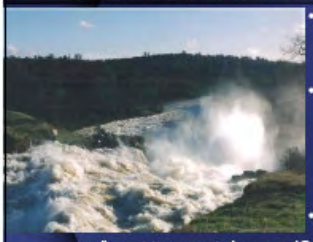
YCWA Hazard Mitigation Projects

- Forecast-Coordinated Operations (in progress)
- Sediment pass-through plan (concept for Our House & Log Cabin dams)
- Spill Gate Strengthening Project
- Vegetation control at Oregon Peak
- Levee Improvement Projects
  - USACE Yuba Basin Project
  - Other support (e.g., TRLIA project, financial support of levee repairs)

Hazard Identification and Ranking

- The following considerations were utilized in the ranking of hazards for the YCWA
- Hazards were ranked based on
  - Past history
  - Likelihood of occurrence
  - Potential cost and impact
- The recommended hazard ranking is subject to change based on input provided by the board and community input

Winter Storms/flooding



- Includes flood events, post-fire debris, and sedimentation
- Five major floods since 1950 have resulted in loss of life, significant property damage, and constrained economic development in the area
- Recent winter storm event show effects of sediment transport damage (Our House sedimentation)
- YCWA facilities can be impacted by both large and small storm events

Wildland Fire

- Fire affects the Agency by producing debris, which are transported via storm events into water bodies, causing damage and obstructions.
- Landslides and slippage have occurred due to wildland fire and caused sufficient damage to the water systems

Wildland Fire

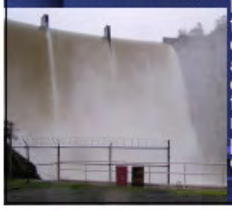
- Several YCWA facilities are in remote areas with high fire hazard severity, placing access to these facilities, and the facilities themselves at risk.
- Communications facilities located on Oregon Peak are potentially at risk in the event of fire.

Landslides/slip outs

- Landslides occur in several forms: slumps, slides, flows and falls of rock, mud, earth, and debris. The effects of landslides could potentially damage several millions of dollars of infrastructure.
- The 2006 winter storms showcased YCWA's vulnerability to landslides – Burma Road project

Dam Control

- This hazard includes events such as uncontrolled releases, blockage, and anything else that interferes with dam operation
- Yuba County has not suffered a dam failure in its history. However, because of the large population living downstream of YCWA's dams, and the potential for future development downstream, a failure of any of the dams would result in significant damage to property and potentially the loss of life.



Terrorism

- Water systems such as; dams, levees, reservoirs, lakes, and rivers may be terrorist targets.
- Effects could include, but not be limited to, dam failure, extensive flooding, water contamination, and financial crisis.

Drought/water supply

- Long periods without substantial rainfall.
- Water is delivered for irrigation and fire protection to downstream agencies
- YCWA is a source of water to 7 water and irrigation districts

Hazardous Materials

- A hazardous materials spill in the New Bullards Bar Reservoir or Agency facilities may affect the downstream water supply and habitat

- The Agency provides limited potable water for public facilities such as the Marina and campgrounds at New Bullards Bar Reservoir

Utility Loss

- Utility loss caused by storms, fire, earthquakes, or terrorism may have an economic impact on the Agency.

Earthquake

- No active faults are present in Yuba County; however, several faults have been identified with displacement in the geologic past (greater than 10,000 years ago). Minor earthquakes do occur within the county and in adjacent counties.
- The largest recent earthquakes occurred in Butte County south of Lake Oroville with a maximum magnitude of 5.7.
- YCWA's recent study shows that Bullards Bar Dam is adequately designed for the maximum credible earthquake and minor repairs are planned for the gates

Non-profiled hazards

The following hazards are considered to be low risk to the Yuba County Water Agency:

- Infectious Disease
- Extreme Heat
- Winds
- Hail Storm
- Avalanche
- Land Subsidence
- Expansive Soils
- Tornado
- Volcano

Proposed Hazard Ranking

- The following is the proposed ranking of hazards as they affect the YCWA, based on past history, likelihood of occurrence, and potential cost and impact:

HIGH	MODERATE	LOW
Winter Storms – High Water	Dam Control	Infectious Disease
Flood	Terrorism	Extreme Heat
Fire	Drought – Water Supply	Winds
Landslide – slips	Hazardous Materials	Hail Storm
	Utility Loss	Avalanche
	Earthquake	Land Subsidence
		Expansive Soils
		Tornado
		Volcano

YCWA Board Comments

- Hazardous Materials
  - Spills unlikely to affect New Bullards Bar Reservoir
  - Haz Mat spill in Nevada County could impact south and middle forks of Yuba River
  - Train derailment along the Yuba River could result in haz mat being introduced to the Yuba River

YCWA Board Comments

- Climate Change
  - DWR has recently released a report on global warming
  - Funding could be made available for global warming related projects
- Board Action
  - The hazard ranking as suggested was approved by the YCWA Board of Directors

Document 3-40 Stakeholders Meeting Sign-In sheet November 14, 2006

Meeting Sign-In Sheet

Meeting:	**Stakeholders**	**Meeting Date:**	**November 14, 2006**
Facilitator:	**Yuba County Hazard Mitigation**	**Place/Room:**	**Conference Room 1**

Name	Organization	Phone	E-Mail
Paula Galvan	USDA Rural Development	673-4347 ext. 4	paula.galvan@ca.usda.gov
Lynne MacIntosh	USDA Rural Development	"	lynne.macintosh@ca.usda.gov
Michael Scott	FREED	742 4474	mscott@freed.org
Rose Shipman	Yuba County Water Agency	741-6278	rshipman@ycwa.com
SHAUN SMITH	Y.C.S.O.	749.7777	SSMITH@@YUBACA.US
Phil Hendrix	PLUSD	740-3680	phendrix@plusd.org
Richard Webb	RD784+TRLIA	742-5609	rwebb@succeednet
Lissa Bentulan	Public Health	749-6719	lbentulan@co.yuba.ca.us
Cyndi Journegan	" "	6279	cjournagan@co.yuba.ca.us
Jamie Law			
Andrew Vaughn			
Pat Breeham			
Aaron Wood			
Paul Brenner			

Document 3-41 Stakeholders Meeting Sign-In Sheet December 12, 2006

Meeting Sign-In Sheet

Meeting:	**Stakeholders**	**Meeting Date:**	**December 12, 2006**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Conference Room 1**

Name	Organization	Phone	E-Mail
Rose Shipman	Yuba Co. Wtr Ag	741-6278	rshipman@ycwa.com
Mike Reid	Wheatland School Dist	cell 682-8700	mreid@wheatland.k12.ca.us
Matt Furtado			
Janice Rhodd			
Andrew Vodden			

Document 3-42 Stakeholders Meeting Agenda January 9, 2007

The County of Yuba

AGENDA

MULTI-HAZARD MITIGATION PLANNING MEETING
January 9, 2007
Yuba County Government Center
915 8th Street, Marysville
Conference Room 1

1:00 pm Welcome

Agency Introductions: Stakeholders and Guests

Office of Emergency Services Report
Aaron Ward, Deputy County Administrator – Emergency Services

Presentation: Local Agency Formation Commission (LAFCO)
Municipal Services Review (MSR)
John Benoit, Executive Director
Beverly Burr, Burr Consulting
Report and presentation to the Stakeholders group regarding the Yuba County MSR project and collaboration with mitigation process and project.

Update on Yuba County Hazard Mitigation Project
OES/FEMA Review Process and timeline
New FEMA Guidelines for Multi-jurisdictional Plans
Crosswalk compliance
Plan and Annex development and Project Identification

Grant Funding Opportunities and deadlines
Federal Emergency Management- FEMA

Next meeting: Tuesday, February 13, 2007 at 1:00 pm

Document 3-43 Stakeholders Sign-In Sheet January 9, 2007

Meeting Sign-In Sheet

Meeting:	**Stakeholders**	**Meeting Date:**	**January 9, 2007**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Conference Room 1**

Name	Organization	Phone	E-Mail
JOHN WASKIEWICZ	SMARTVILLE FPD	639 1682	
Don L Graham	RD 784	742-6074	
Joe Massey	H+HSD	749 6781	
Gary Kavanagh	LRBV COF	749 2316	
Susan Cerf	LRBV CSD	741-0755	
Chris Haile	D-10/Hallwood	632-0330	
Art Paquette	wheatland fire	633-0861	
MIKE MATHERLY	DOMFPD	692-1005	
John Jackson	YCWD	675-2611	
STEPHEN HART	OLIVEHURST FPD	743-7117	
Karl Cozad	O.P.U.D W/D PARD	682-0624	
Eddie Ramirez	Forest Service	5675-1142	
Rick Cunningham	Foothill Fire Dept.	675-2343	
Rose Shipman	Yuba Co. Water Ag.	741-6278	rshipman@ycwa.com
MIKE REID	WHEATLAND ~~SANITARY~~ DIST	788-0248	mreid@wheatland.k12.ca.us
WALTER COTTER	BROWNS VALLEY ID	743-5703	WALTER@BVID.ORG
Darryl Stineman	Wheatland Fire Authority Rec 2103	682 8990	darryl@wheatland.ca.gov
John Fleming	ED Coordinator	741-6280	jfleming@yubacounty.org

Meeting Sign-In Sheet

Meeting:	**Stakeholders**	**Meeting Date:**	**January 9, 2007**
Facilitator:	**Yuba County OES**	**Place/Room:**	**Conference Room 1**

Name	Organization	Phone	E-Mail
Richard Webb	RD784+TRLIA	742-5609	rwebb@syinet.net
Beverly Burr	LAFCO/Burr Consulting	888-287-7322	bburr@burrconsulting.com
Paige Hensley	LAFCO	749-5467	PStimson@CO.yuba.ca.us
Jasmine Fox	LAFCO/Burr Consulting	888-287-7322	jfox@burrconsulting.com
Silvio Pecchi	LRJBV CSD	741-0755	Zusil@Hughes.net
Rich Webb	Linda Fire Prot Dist	743-1553	CH2CO@ONEMAIN.COM
Matt Curtis	YC Fire Protection	749-5649	MCURTIS@CO.YUBA.CA.US
Pete Hammontree	DOHFPD	692-0245	hammontree@Sbcglobal.net
Mary Jane Cariego	Yuba County BOS		
Dave Lamon			
Matt			
Stacey			
Janice			
Andrew			
Pat Beecham			
Aaron Wurz			

3.2.2.7 Public Involvement in the Planning Process

YCWA involved the public in the Plan's development and updates. The public had the opportunity to submit comments through surveys, public meetings, and committee planning meetings. The Yuba County Water Agency Hazard Mitigation Questionnaire was made available to the public at the Agency's administrative office. YCWA used the questionnaire to provide a ranking of the hazards that affect the Agency. This ranking was then adopted by the YCWA Board of Directors at their regular meeting on October 10, 2006 (Presentation 3-4).

Image 3-1 YCWA GM Curt Aikens discusses Hazard Mitigation with a Plumas Lake Resident

Throughout the planning process, the Agency participated in numerous public outreach meetings, to discuss the role of the Agency in hazard mitigation planning and provide a forum for receiving public input into the planning process

Dobbins-Oregon House Action Committee Meeting 2/24/2005

The first of these presentations was held at the regular meeting of the Dobbins-Oregon House Action Committee (DOACT) on February 24, 2005. The meeting was held in conjunction with Pete Hammontre, president of the Dobbins-Oregon House Fire Protection District (DOHFPD). General Manager Curt Aikens gave a presentation (Presentation 3-1) giving an overall description of the Agency, its facilities, and responsibilities. The requirements of the Disaster Mitigation Act of 2000 in regards to hazard mitigation planning were also discussed as pertaining to both the Agency and DOHFPD. Questionnaires developed for the YCWA plan were distributed to those in attendance to assess community concerns regarding the risks of hazard to the Agency. For the minutes of this meeting, see Document 3-44.

Document 3-44 DOACT Meeting Minutes 2/24/2005

Dobbins/Oregon House Action Committee
Minutes of General Meeting – February 24, 2005

Chair Greg Crompton called the meeting to order at 6:30 PM at the Lake Francis Grange Hall. The Pledge of Allegiance was led by Greg.

SECRETARY'S REPORT: The minutes were approved as written (Grabowski, Bartlett).

TREASURER'S REPORT: Last month the Treasurer's Report showed a balance of $1037.62. $27.60 was collected at the donation plate. Bills paid totaled $15.31 for refreshment costs with an ending balance of $1049.92. (M/S/C Garland, Menzel)

COMMITTEE REPORTS:

Water District - Ginny Brown gives an update – Irrigation season is starting up – Letters will be sent out soon. Those who are on the ditch and wish to receive surplus water should call the district and request to be on a list and write a letter requesting same. Meetings are held on the third Wednesday of each month and Ginny encourages attendance. Vacancy for Brownville/Challenge area continues and may have to be put before the Board of Supervisors.

Community Center Update - Lloyd Appleby gives an update – Metal studs are in! Framing, doors and jambs are next on the list. Help is always welcome.

Zoning and Land Use – See Below.

NEW BUSINESS:

Pre-Disaster Multi-hazard Mitigation Plan – Pete Hammontre gives us an update on the plan's progress. He requests that we all sign the specific Pre-Disaster Multi-hazard Mitigation Plan attendance sheet. Letters were written to community members in order to get the required input from community members for the plan as counties must have a hazard mitigation plan in order to be eligible for federal/state disaster relief funds. The first step is to identify possible local hazards, i.e. besides the possibility of fire; we have 4 local dams, local earthquake history, floods, volcanoes, landslides, windstorms. The committee has brainstormed to try to identify as many potential "manmade" disasters as possible, but needs input from the community. He distributed surveys and wishes all to review and add information about ANYTHING that could pose a hazard. The committee will review each submission and try to address the hazard as part of our plan. Examples include: small bridges located on private property that are too small for fire equipment to cross; the location of private water tanks and do these tanks have water in them; evacuation routes are also critical. Gene Scheel tells us that there are 6 emergency service routes – 3 are passable and 3 need improvement. But as our population has grown, we need to identify additional ways out, how do we maintain them and are they on private land are some of the questions the committee is grappling with. Alan Hetrick tells us that his home was lost in the last fire because his n road (Indiana School/Indiana Ranch) was not passable due to brush along the road – has this issue been rectified. This is a good question and exactly the kind of information the committee is hoping to learn from the community

Pat Beecham of Yuba County Office of Emergency Services (OES) tells us that the levee projects are among the most important issues on the OES agenda right now and asks Supervisor Stocker to give us an update. Supervisor Stocker tells us about current issues/activities related to the new building projects "down below" and their relationship to

the flood plain. This completed plan will give us access to monies targeted to improve our levees and give us future protection.
Pat introduces Curt Aikens of the Yuba County Water Agency. Curt tells us about Bullard's Bar, Colgate Powerhouse and ongoing project activities. (Tape is available for review)
Pat introduces Alan Long of the Yuba County Sheriff's Office. He tells us about the emergency communication system operated by YCSO and OES. This system can notify 3,000 residents an hour over 16 telephone lines and can be targeted to specific neighborhoods.
Pat introduces Keith Chambers of Chy Company. He is a participant on the Fire Safe Council and values the efforts that this community puts forth to protect our area.

New Fire Code Regulation – 100 Foot Clearance Law - Gary Cavanaugh of our Local Fire Department is here to talk to us about a new law effective January 2005. This law was passed without CDF/local fire department input and is a result of the devastating fires that occurred recently in southern CA. The 100-foot clearance rule has been in effect "at the discretion" fire departments – now this rule is mandatory. Gary's plan is to work with us and this law in a manageable way – over the next few years 30 ft -> 50 ft -> 100 feet. If properties are kept "park like" they should be in compliance. Limb trees up 6 to 8 feet and keep the grass down. If a home ***does*** pose a hazard – CDF will cite the owner. Insurance companies now have the authority to demand a clearance area and have been "dropping" those who do not comply. He further explains that there needs to be open space between the canopies of trees – this is so fire retardant can touch the ground if required. New building requires that 100 feet must be cleared in order to be permitted. (Tape is available for review).

Yuba Highlands – The concern is that this development butts up against Beale and may have a negative impact on Beale staying. An Environmental Impact Report (EIR) has been published and talks about "**when**" the roads through Beale are developed .... It implies that this may be a done deal. Greg suggests that DOACT write a strong letter about our this EIR was presented – one has to read all the way to the end to find any reference to the county not supporting encroachment on Beale. It appears the writer of the EIR presents info that will support development. It was M/S/C (Plonta, Grabowski) that DOACT write a very strong letter expressing how important Beale is to our local economy and that if development occurs it must be done in a way that does not threaten Beale – ideas could include a "buffer zone" of no building for a specified area around Beale.

Do we need Special Meetings? – Correspondence is often received that requires input from DOACT "yesterday" or very quickly. The DOACT Board has taken it upon itself to represent DOACT and respond to the letters. The "rules" really require that a special meeting be called and the general membership informed and solicited for input. The question is – should they continue to act for us without special meetings or not? The membership M/S/C (Grabowski, Menzel) that the Board continue its actions and expresses appreciation for the Board's activities

Announcements:
See agenda.

Respectfully Submitted,

Pamela Cook, Secretary

Page 2 of 2

Stakeholders Community Meeting 8/24/2005

The Yuba County Multi-Hazard Mitigation Plan stakeholders meeting on August 24, 2005 was a special evening meeting where the public was invited to participate in the planning process. A meeting for the stakeholders preceded the public portion of the event, where the Agency solicited input for its ongoing hazard mitigation project. The public portion of the meeting featured a demonstration by the Yuba Watershed Protection and Fire Safe Council on construction using fire safe materials during which two small building facades were set on fire to showcase the difference between two types of materials. YCWA general manager Curt Aikens gave a presentation on the progress being made on the development of the YCWA Multi-Hazard Mitigation Plan. He gave an overview of the flood control responsibilities of the Agency and its role in past levee projects. Hazard mitigation projects already underway were discussed. The community was given the opportunity to provide input into the planning process and cite the concerns that they felt needed to be addressed by any hazard mitigation plan. Questionnaires were made available to the attendees to identify the hazards that are of concern to the populace. See Document 3-45 for this meeting's agenda

Document 3-45 Stakeholders Public Meeting Agenda 8/24/2005

The County of Yuba

MULTI-HAZARD MITIGATION PLANNING MEETING
August 24, 2005 - 6:00 PM
Yuba County Government Center
915 8th Street, Marysville- Conference Room 2

September 13, 2005 – 1:00 PM

MULTI-HAZARD MITIGATION WORKSHOP
August 24, 2005 - 7:00 PM
Yuba County Government Center
915 8th Street, Marysville
Board of Supervisors Chambers

Welcome: Mary Jane Griego, Chair of the Board of Supervisor's

Multi-Hazard Mitigation Planning Workshop:
Evening workshop designed to share information regarding successful mitigation planning efforts and project information. And recognize our Stakeholders representing federal, state and local agencies for their efforts in the planning process and to prevent and mitigate damage and impact from natural disasters and manmade disasters.

Stakeholder Introductions:
Stakeholders with introduce themselves and briefly discuss their role and plans.

Workshop Overview: Patricia Beecham
Yuba County Multi-Hazard Mitigation Plan- DMA 2000

Presentations:

Yuba County Levee Improvement Project
Charles Kent McClain- County Administrative Officer-
Executive Director- Three Rivers Levee Improvement Authority

Yuba County Water Agency Hazard Mitigation Plan
Curt Aikens, General Manager Yuba County Water Agency

Yuba County Health Department Public Health and Safety
Cyndi Journagan, Val Spooner, Director of Nursing
Dr. Joseph Cassady, Health Officer

Pacific Gas & Electric (PG&E)

Marie Jordon Director of Operations and Maintenance
Chuck Thomas, Supervisor, PG&E, Marysville
"What you should know about Power Interruptions"

American Red Cross in our Community
Martha Griese, Executive Director, Three Rivers Chapter ARC

Fire Prevention and Mitigation in Yuba County
Yuba County Watershed Protection and Fire Safe Council
Glen Nader, U C Davis Cooperative Extension

Announcements:

Linda Community Meeting 1/19/2006

On January 19, 2006, YCWA participated in a town hall meeting for the community of Linda at the Feather River Center. The meeting was held in response to the concerns of the community following the 2005/2006 winter storm event. Curt Aikens was present to explain the role of the Agency in flood control, including operation of New Bullard Bar Dam and the Agency's Forecast-Coordinated Operations project with Oroville Dam. The meeting was also used to describe the damages the Agency suffered as a result of the storms, and the possible funding sources for repairs. The hazard mitigation project was also discussed and questionnaires were distributed to the audience to assess their ranking of hazards with regard to the Agency. The progress being made on the YCWA hazard mitigation plan was highlighted, with emphasis on the integration of new hazard information from the storm event being integrated into the planning document. Hazard mitigation ideas and projects to mitigate the effects of the newly identified hazards were discussed for possible inclusion into the YCWA plan. For the flier, press release, and agenda of this meeting, see documents 3-46, 3-47, and 3-48 respectively.

Image 3-2 YCWA Director Daniels Logue addresses the Linda Community

Document 3-46 Linda Community Meeting Flier 1/19/2006

YUBA COUNTY MULTI-HAZARD MITIGATION PLANNING

HAZARD MITIGATION

COUNTY OF YUBA

LINDA AREA COMMUNITY MEETING

January 19th, 7:00 pm

Feather River Center

6000 Lindhurst Ave.,

Marysville

Information & Presentations
Hosted by Dan Logue

- Levee Project Update
- Hazards and Risks
- Flood Protection

- Learn How to Protect your Home
- Help develop the Linda Mitigation Plan
- Participate in Yuba County's Multi-Hazard Mitigation Plan

For More Information
Please call: (530) 749-7520

Document 3-47 Linda Community Meeting Press Release 1/19/2006

The County of Yuba

Press Release
For Immediate Release
Contact: Yuba County Office of Emergency Services
530-749-7520 or 530-749-7331
Jan. 13, 2006

Linda "Town Hall" meeting

Ways to deal with natural and man-made disasters and hazards in the Linda community is the topic of a "town hall" meeting scheduled for 6:30 p.m. Thursday, Jan. 19, 2006.

Yuba County Supervisor Dan Logue will host the session at the Feather River Center at 6000 Lindhurst Ave., Room 700.

Topics will include:

- Developing Linda's Hazard Mitigation Plan
- Participation in the Yuba County Multi-Hazard Mitigation Plan
- Yuba County Levee Project Update
- Hazards and Risks
- Flood Protection
- Home Protection Strategies

The town hall is the latest in a series of community meetings designed to encourage residents to raise their awareness of potential hazards and disasters that could affect their community. They also can participate in developing personal and community-wide strategies to deal with calamities. The aim is to be prepared in advance for the most likely types of disasters and to develop activities or projects that would reduce the impact of a particular hazard or natural disaster.

Yuba County's Multi-Hazard Mitigation Plan will address hazards and establish a process to identify and assess risks, and prioritize activities to reduce damage to property and prevent loss of life from natural and man-made disasters.

Document 3-48 Linda Community Meeting Agenda 1/19/2006

The County of Yuba

MULTI-HAZARD MITIGATION PLAN
LINDA COMMUNITY MEETING

January 19, 2006 – 6:30 PM
Feather River Center
6000 Lindhurst Avenue, Linda

AGENDA

Welcome and Meeting Overview:
Dan Logue, Yuba County Board of Supervisors, District 1
Board of Directors, Three Rivers Levee Improvement Authority

Patricia Beecham
Yuba County Pre Disaster Multi-Hazard Mitigation Project

Presentations:

Three Rivers Levee Improvement Project
Charles Kent McClain, Executive Director TRLIA
County of Yuba, County Administrative Officer

Yuba County Hazard Mitigation Projects
Curt Aikens, Manager, YCWA

Yuba County Hazard Mitigation Projects
Kevin Mallen, Director – Yuba County Public Works

Yuba County Sheriff's Department – Emergency Evacuation Procedures
Steve Durfor, Yuba County Undersheriff

National Flood Insurance Program
Gary Ashburn, Insurance Agent

Yuba-Sutter Domestic Animal Disaster Assistance
Meg Burgin, YSDADA

DMA 2000- Yuba County Multi-Hazard Mitigation Plan
Patricia Beecham, Project Director

Closing Remarks:
Supervisor Dan Logue

Plumas Lake Community Meeting 6/11/2006

The Plumas Lake Homeowners Association, in conjunction with the Yuba County Office of Emergency, held a Safety and Information Fair on June 11, 2006. The event was hosted by Mary Jane Griego, Yuba County Board of Supervisors and Chairman of the YCWA Board of Directors and Carla Wilcoxen of the Plumas Lake Homeowners Association. The Fair included presentations, booths, information, and handouts from:

- Yuba County Water Agency
- Yuba County Office of Emergency Services
- Three Rivers Levee Improvement Authority
- Yuba County Sheriff's Department
- Yuba County Health and Human Services Department
- Linda Fire Department
- California Highway Patrol
- Bi-County Ambulance
- American Red Cross
- Yuba-Sutter Transit
- The Appeal-Democrat
- Sutter-Yuba Mosquito and Vector Control
- Yuba Sutter Disposal, Inc.
- Yuba County Office of Education
- Fremont-Rideout Hospital
- Sutter North Medical Foundation
- Yuba County Economic Development
- Yuba County Public Works

General Manager Curt Aikens from YCWA was on-hand to present information on the flood control efforts being undertaken by the Agency. He discussed the damages that resulted form the 2005/2006 winter storm event and the funding sources that were available to YCWA because of their participation in the Yuba County Hazard Mitigation Project and the ongoing development of the YCWA Multi-Hazard Mitigation Plan. Brochures on the Forecast-Coordinated Operations project were distributed to the audience, outlining the coordination being planned between New Bullards Bar and Oroville Dams for coordinated releases during a high water period. Questionnaires were made available to the residents in attendance to rank and prioritize the identified hazards. For the agency invitation, flier, press release, and agenda of this meeting, see documents 3-49, 3-50, 3-51, and 3-52 respectively

Image 3-3 YCWA Director Mary Jane Griego

Document 3-49 Plumas Lake Community Meeting Agency Invitation 6/11/2006

The County of Yuba

Office of Emergency Services

Date: June 1, 2006

To: Yuba County Water Agency

From: Patricia Beecham

Subject: Plumas Lake Homeowners Association Safety and Information Fair

You are invited to participate in the Plumas Lake Homeowners Safety Fair to be held on Sunday, June 11, from 4:30 PM to 7:30 PM. Yuba County 3rd District Supervisor Mary Jane Griego will be hosting the event, which is a joint venture of the Yuba County Office of Emergency Services and the Plumas Lake Homeowners Association. The picnic will provide an opportunity for Plumas Lake residents to meet their neighbors, share information, and learn about their community. The Safety Fair, will feature exhibits, displays, workshop presentations, and demonstrations from the public service agencies that serve the Plumas Lake Community.

The Plumas Lake Homeowners Association is an organization of Plumas Lake residents created to foster a sense of community. The Homeowners Association is dedicated to bringing information and resources to the Plumas Lake area, in order to educate and aid all residents.

Your participation is essential to making this event a success to provide resource information and services for the residents of the Plumas Lake Community. Many of the residents of Plumas Lake are new to our area and are not aware of many of the services available to them. Your participation in the Safety Fair will provide valuable information to some of our newest residents of Yuba County.

The displays and featured topics will include emergency services, hazard mitigation, a levee improvement project update, law enforcement, fire safety and prevention, health and safety, and community services. Residents will be encouraged to bring a picnic lunch to the fair and spend time learning more about essential services offered by agencies and organizations in Yuba County.

We look forward to your participation at this Community Safety and Information Fair. For more information, please contact Andrew at the Yuba County Office of Emergency Services at (530) 749-7520 to confirm your participation.

Document 3-50 Plumas Lake Community Meeting Flier 6/11/2006

YUBA COUNTY MULTI-HAZARD MITIGATION PLANNING
HAZARD MITIGATION

PLUMAS LAKE
HOMEOWNERS ASSOCIATION
SAFETY FAIR

June 11th, 4:30 - 7:30 pm

Rio Del Oro School
1220 Zanes Drive
Plumas Lake

Information & Presentations
Hosted by Plumas Lake Homeowners Association & Yuba County

Exhibits
Displays
Demonstrations
Workshop Presentations

The displays and featured topics will include emergency services, fire safety & prevention, flood protection, hazard mitigation, health & safety, levee improvement project update, law enforcement, and community services.

For more Information, Please call (530) 749-7520 or visit www.plumaslake.info

Document 3-51 Plumas Lake Community Meeting Press Release

The County of Yuba

Office of Emergency Services

NEWS RELEASE

June 1, 2006

To: Appeal-Democrat

From: Yuba County Office of Emergency Services

Yuba County 3rd District Supervisor Mary Jane Griego, along with the Plumas Lake Homeowners Association and Yuba County Office of Emergency Services, will be hosting the Plumas Lake Community Picnic and Safety Fair on Sunday, June 11, 2006. The event, which begins at 4:30 pm, will be held at Rio Del Oro Elementary School at 1220 Zanes Drive in Plumas Lake. The picnic will provide an opportunity for residents to meet their neighbors, share information, and learn more about their community. The Safety Fair will feature exhibits, displays, workshop presentations, and demonstrations from the public service agencies that serve the Plumas Lake Community. The displays and featured topics will include; emergency services, hazard mitigation, a levee improvement project update, law enforcement, fire safety and prevention, health and safety, and community services. Participants in the Plumas Lake Community Safety Fair will include:

Three Rivers Levee Improvement Authority
Reclamation District 784
Olivehurst Public Utilities District
California Highway Patrol
Yuba County Sheriff's Department
Linda Fire Department
Yuba County Office of Emergency Services
Yuba Sutter Transit
Yuba Sutter Disposal
Yuba County Health and Human Services Department
Yuba County Department of Public Works
Sutter-Yuba Mosquito and Vector Control

For more information, contact the Yuba County Office of Emergency Services at (530) 749-7520 or visit www.plumaslake.info.

Document 3-52 Plumas Lake Community Meeting Agenda 6/11/2006

Plumas Lake Homeowners Association
Safety Fair and Picnic

June 11, 2006 4:30 PM
Rio Del Oro School
1220 Zanes Drive

AGENDA

4:30 – Welcome

Mary Jane Griego, Yuba County District 3 Supervisor
Carla Wilcoxen, Plumas Lake Homeowners Association

4:30 – 7:30: Picnic and Service Agency Booths

Emergency Services

Yuba County Office of Emergency Services
Yuba County Sheriff's Department
Yuba County Health and Human Services
Linda Fire Department
California Highway Patrol
Bi-County Ambulance
American Red Cross

Community Services

Yuba Sutter Transit
The Appeal-Democrat
Sutter-Yuba Mosquito & Vector Control
Yuba Sutter Disposal, Inc.
Yuba County Office of Education

Levees and Flood Control

Three Rivers Levee Improvement Authority
Yuba County Water Agency

5:30: Yuba County Hazard Mitigation, Levee Projects, and Flood Control

Mary Jane Griego, Yuba County District 3 Supervisor
Paul Brunner, Executive Director, Three Rivers Levee Improvement Authority
Curt Aikens, General Manager, Yuba County Water District
Patricia Beecham, Project Director, Yuba County Multi-Hazard Mitigation Plan

Other materials provided by: Fremont-Rideout Hospital, Sutter North Medical Foundation, Yuba County Economic Development, Yuba County Public Works

Stakeholders Community Meeting 10/12/2006

The October 12, 2006 Stakeholders meeting was held in the evening to provide an opportunity for the public to attend the planning meetings that were normally held during the day. YCWA aided in distributing fliers advertising the event and were integral to the planning process. Curt Aikens, YCWA General Manager, and Rose Shipman, YCWA Hazard Mitigation Committee Chair, attended the event. The presentation (Presentation 3-5) centered on the hazard ranking developed for the YCWA plan and the Forecast-Coordinated Operations Project. The Agency also provided fliers and handouts for the public, as well as photos of their facilities for viewing purposes. The draft of the YCWA plan was also made available at this meeting with a sign up sheet for those interested in reviewing and providing comments for the final draft. For the flier, press release, and agenda, see documents 3-53, 3-54, 3-55, and 3-56 respectively.

Image 3-4 YCWA Director John Nicoletti recognizes the Yuba Watershed Protection & Fire Safe Council for their Hazard Mitigation Efforts

Document 3-53 Stakeholders Community Meeting Flier 10/12/2006

MULTI-HAZARD MITIGATION AND DISASTER PREPAREDNESS

County of Yuba Hazard Mitigation Community Workshop

October 12, 6:00pm

915 8th Street—Government Center

Public Session: 6:00pm

- Fire Safety Demonstrations
- Flood Protection Information
- Exemplary Projects and Exhibits
- Emergency Response and Mitigation
- Evacuation Planning
- Special District Mitigations
- Public Comment for:
  - Yuba County Multi-Jurisdictional, Multi-Hazard Mitigation Plan
  - Yuba County Water Agency Multi-Hazard Mitigation Plan

Sponsored by the Yuba County Hazard Mitigation Planning Committee

For more information: (530) 749-7331

Document 3-54 Stakeholders Community Meeting Press Release 10/12/2006

NEWS RELEASE

October 6, 2006

To: Appeal Democrat

From: Yuba County Office of Emergency Services
Patricia Beecham

Release: ASAP

YUBA COUNTY HAZARD MITIGATION COMMUNITY WORKSHOP
October 12, 2006

The Yuba County Hazard Mitigation Planning Committee will be hosting a Hazard Mitigation Community Workshop on Thursday, October 12 at 6:00 PM at the Yuba County Government Center, 915 8th Street in Marysville.

Draft copies of the Yuba County Multi-Jurisdictional, Multi-Hazard Mitigation Plan and the Yuba County Water Agency Multi-Hazard Mitigation Plan will be available for public comment and review. The plans are the result of an extensive planning process that incorporated input and information from public and private entities including local, state, and federal agencies, private business, and utilities. A series of community meetings have been held to solicit input from the community in identification of hazards and potential mitigation projects.

The workshop will include displays and exhibits from public service agencies that will also be on hand to provide tips and information on disaster preparedness, fire prevention, flood protection, emergency response, and hazard mitigation. A special demonstration conducted by Glen Nader of UC Davis and the Yuba Watershed Protection & Fire Safe Council will compare use of fire resistant materials for building construction. Local law enforcement and fire departments will be showcasing the equipment used to safeguard Yuba County and its residents, including Marysville Fire Department's Hazard Materials Response Vehicle.

The event will include presentations from the Yuba County Water Agency, Three Rivers Levee Improvement Authority, Yuba County Sheriff's Department, Olivehurst Fire Department, Smartville Fire Department, and the Yuba County Hazard Mitigation Planning Team and others.

The public and local government agencies are urged to attend.
For more information please call (530) 749-7331

Document 3-55 Stakeholders Public Meeting Agenda 12/12/2006

The County of Yuba

MULTI-HAZARD MITIGATION PLAN
COMMUNITY WORKSHOP
October 12, 2006 - 6:00 PM
Yuba County Government Center
915 8th Street, Marysville

OUTSIDE: GOVERNMENT CENTER PARKING LOT

Welcome
John Nicoletti, Yuba County Board of Supervisors District 2

Introductions
Robert Bendorf, Yuba County Administrator

Awards and Special Recognitions
Robert Bendorf
Randy Margo, Assistant County Administrator
Aaron Ward, Deputy County Administrator – Emergency Services
Joe Hernandez, Chief, Marysville Fire Department

Presentations:

Fire Safety and Mitigation
Matt Furtado, California Department of Forestry/Yuba County Fire Planner

Yuba Watershed Protection & Fire Safe Council Chipper Program
Jim Johnson, Yuba Watershed Protection & Fire Safe Council
Pete Hammontre, Dobbins-Oregon House Fire Protection District

Fire Mitigation Demonstration: Yuba City Fire Safety Trailer
Marysville Fire Department Fire Department

INSIDE: BOARD OF SUPERVISORS CHAMBERS

Introductions and Special Presentations:
Mary Jane Griego, Chairman Yuba County Water Agency

Yuba County Hazard Mitigation Project and Program Overview
Patricia Beecham, Project Director

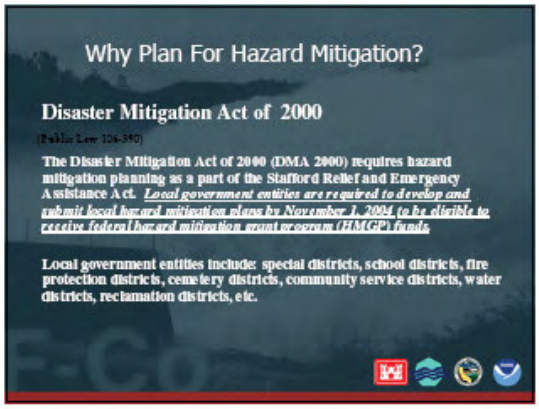
FEMA Floodplain Mapping Update
Randy Margo, Assistant County Administrator

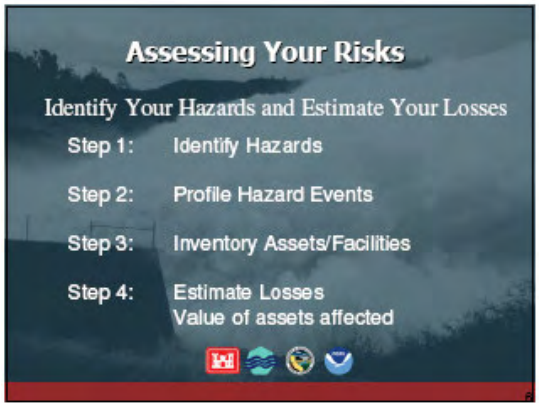
Yuba County Water Agency Forecast Coordinated Operations/ YCWA Hazard Mitigation Plan
Curt Aikens, General Manager YCWA

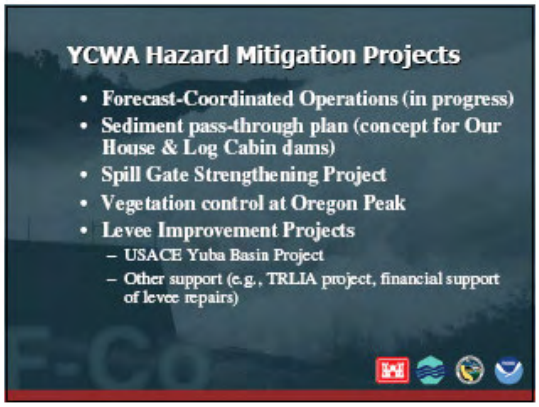
Yuba County Levee Improvement Projects
Mary Jane Griego, Board Member, Three Rivers Levee Improvement Authority
Ric Reinhardt, Program Director, TRLIA

Community Input and Comments

Presentation 3-5 YCWA Hazard Ranking & F-CO 10/12/06



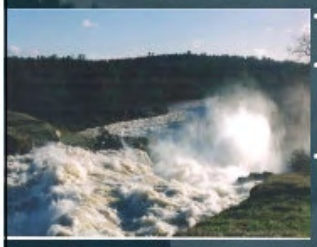




Hazard Identification and Ranking

- The following considerations were utilized in the ranking of hazards for the YCWA
- Hazards were ranked based on
  - Past history
  - Likelihood of occurrence
  - Potential cost and impact
- The recommended hazard ranking is subject to change based on input provided by the board and community input

Winter Storms/flooding



- Includes flood events, post-fire debris, and sedimentation
- Five major floods since 1950 have resulted in loss of life, significant property damage, and constrained economic development in the area
- Recent winter storm event impacted YCWA with landslides, reservoir sedimentation and debris

Wildland Fire

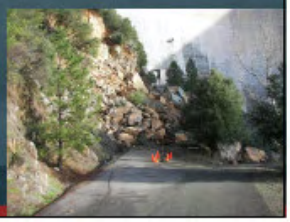
- Fire affects the Agency by producing debris, which are transported via storm events into water bodies, causing damage and obstructions.
- Landslides and slippage have occurred due to wildland fire and caused sufficient damage to the water systems

Wildland Fire

- Several YCWA facilities are in remote areas with high fire hazard severity, placing access to these facilities, and the facilities themselves at risk.
- YCWA communication facilities on Oregon Peak are at risk

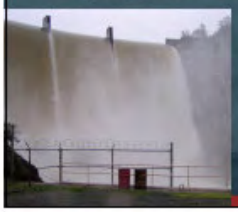
Landslides/slip outs

- Landslides occur in several forms: slumps, slides, flows and falls of rock, mud, earth, and debris. The effects of landslides could potentially damage several millions of dollars of infrastructure.
- The 2006 winter storms showcased YCWA's vulnerability to landslides – Burma Road project

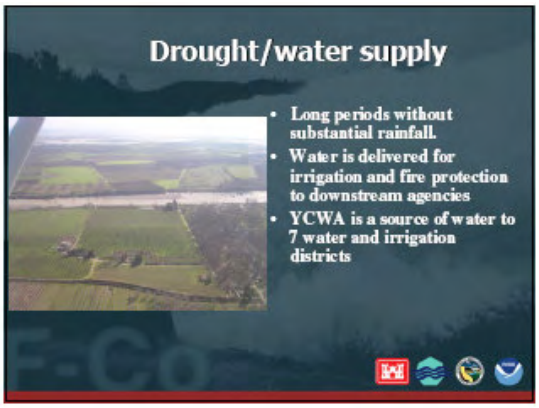


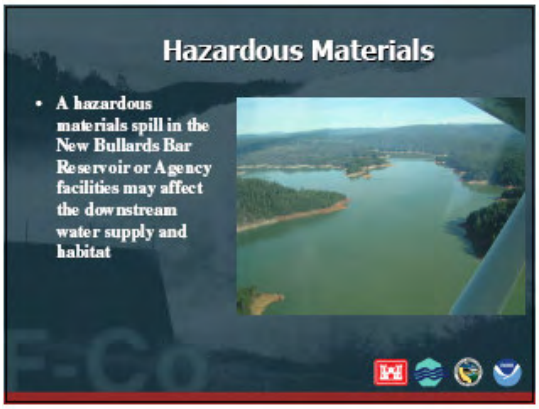
Dam Control

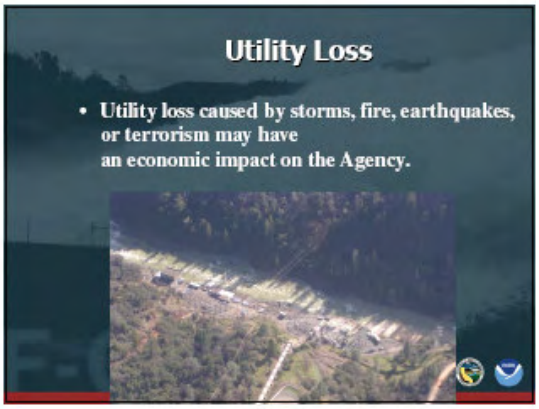
- This hazard includes events such as uncontrolled releases, blockage, and anything else that interferes with dam operation
- YCWA and its federal and state regulators regularly review New Bullards Bar Dam and emergency operating procedures to ensure safe operation during extreme events

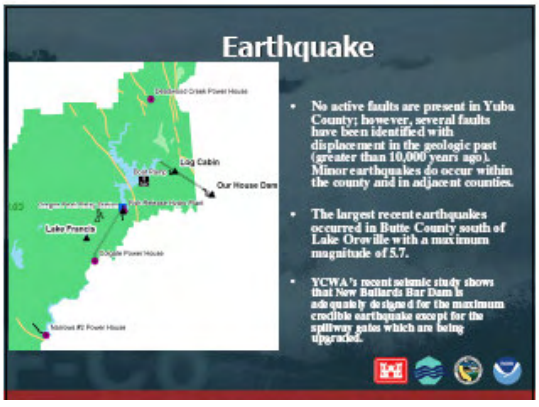


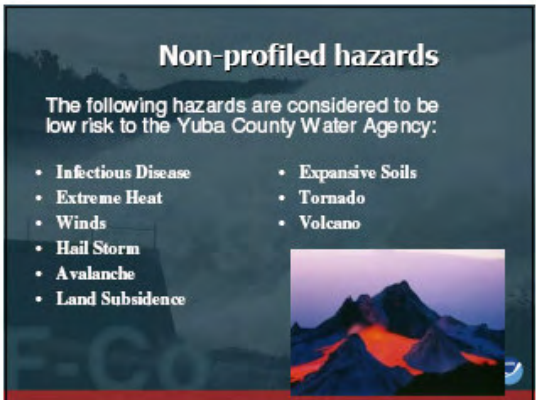

Terrorism
• Water systems such as; dams, levees, reservoirs, lakes, and rivers may be terrorist targets.
• Effects could include, but not be limited to, dam failure, extensive flooding, water contamination, and financial crisis.


Drought/water supply
• Long periods without substantial rainfall.
• Water is delivered for irrigation and fire protection to downstream agencies
• YCWA is a source of water to 7 water and irrigation districts


Hazardous Materials
• A hazardous materials spill in the New Bullards Bar Reservoir or Agency facilities may affect the downstream water supply and habitat


Utility Loss
• Utility loss caused by storms, fire, earthquakes, or terrorism may have an economic impact on the Agency.


Earthquake
Log Cabin
Our House Dam
Lake Francis
• No active faults are present in Yuba County; however, several faults have been identified with displacement in the geologic past (greater than 10,000 years ago). Minor earthquakes do occur within the county and in adjacent counties.
• The largest recent earthquakes occurred in Butte County south of Lake Oroville with a maximum magnitude of 5.7.
• YCWA's recent seismic study shows that New Bullards Bar Dam is adequately designed for the maximum credible earthquake except for the spillway gates which are being upgraded.


Non-profiled hazards
The following hazards are considered to be low risk to the Yuba County Water Agency:
• Infectious Disease
• Extreme Heat
• Winds
• Hail Storm
• Avalanche
• Land Subsidence
• Expansive Soils
• Tornado
• Volcano

Proposed Hazard Ranking

- The following is the proposed ranking of hazards as they affect the YCWA, based on past history, likelihood of occurrence, and potential cost and impact:

HIGH	MODERATE	LOW
Winter Storms – High Water	Dam Control	Infectious Disease
Flood	Terrorism	Extreme Heat
Fire	Drought – Water Supply	Winds
Landslide – slips	Hazardous Materials	Hail Storm
	Utility Loss	Avalanche
	Earthquake	Land Subsidence
		Expansive Soils
		Tornado
		Volcano

Forecast-Coordinated Operations

Lake Oroville and New Bullards Bar Reservoir

Forecast-Coordinated Operations (F-Co) Goal

To improve flood protection downstream without impacting the water supply of Lake Oroville and New Bullards Bar Reservoir.

F-Co Objective

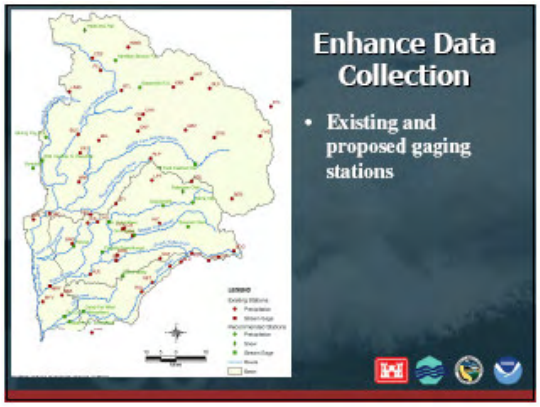
To improve flood protection for communities along the Yuba-Feather Rivers and downstream through better river flow forecasting and coordinated operations of the reservoirs.

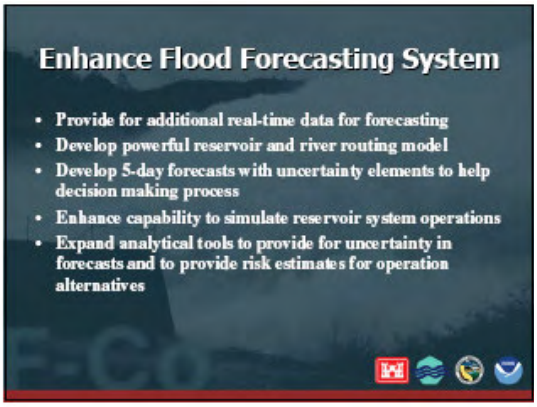
F-Co will be designed to:

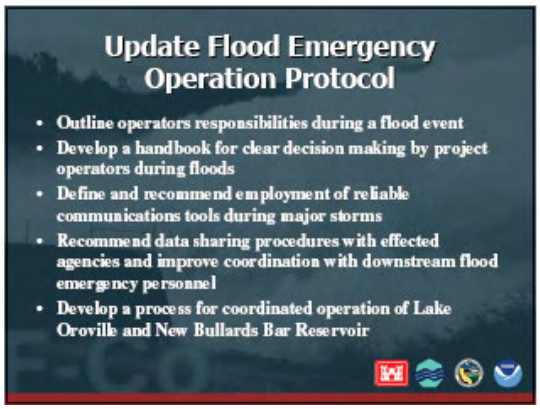
- Operate New Bullards Bar Reservoir and Lake Oroville in a coordinated manner during major flood events
- Utilize improved weather, precipitation, and runoff information
- Improve flood forecasting to allow for more efficient operation of flood space
- Provide for annual orientation exercises, table top exercises, and staff training
- Improve reporting to downstream flood emergency personnel

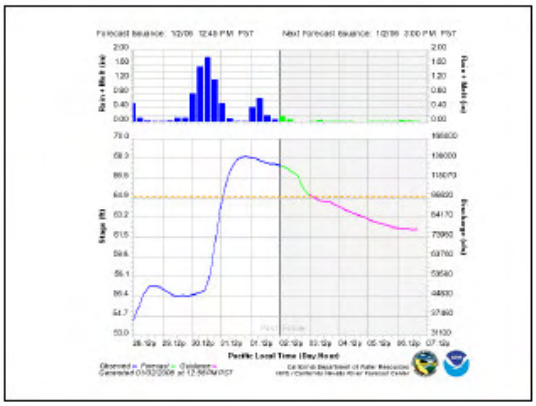
F-Co Benefits

- Reservoirs interconnected, so decisions are felt throughout.
- System delivers most benefit when operated in coordinated manner.
  - For example, 300K cfs channel capacity downstream of confluence best used considering comparative state of reservoirs.


Enhance Data Collection
• Existing and proposed gaging stations


Enhance Flood Forecasting System
• Provide for additional real-time data for forecasting
• Develop powerful reservoir and river routing model
• Develop 5-day forecasts with uncertainty elements to help decision making process
• Enhance capability to simulate reservoir system operations
• Expand analytical tools to provide for uncertainty in forecasts and to provide risk estimates for operation alternatives


Update Flood Emergency Operation Protocol
• Outline operators responsibilities during a flood event
• Develop a handbook for clear decision making by project operators during floods
• Define and recommend employment of reliable communications tools during major storms
• Recommend data sharing procedures with effected agencies and improve coordination with downstream flood emergency personnel
• Develop a process for coordinated operation of Lake Oroville and New Bullards Bar Reservoir



YCWA Board of Directors Meeting 11/14/2006

On November 14, 2006, a presentation (Presentation 3-4) was made before the YCWA Board of Directors at their regular meeting. The goal of the presentation was the finalization of the hazard ranking for the YCWA Plan. A brief overview of the planning process and the benefits derived by YCWA by participating in the Yuba County Hazard Mitigation Project were also discussed. The Board unanimously agreed with the suggested hazard ranking. Suggestions from the Board of Directors were solicited and incorporated into the final plan document. The hazard ranking approved by the Board of Directors is:

Table 3–2 YCWA Hazard Ranking

High	Moderate	Low
Winter Storms–High Water	Dam Control	Infectious Disease
Flood	Terrorism	Extreme Heat
Fire	Drought–Water Supply	Winds
Landslide–Slips	Hazardous Materials	Hail Storm
	Utility Loss	Avalanche
	Earthquake	Land Subsidence
		Expansive Soils
		Tornado
		Volcano

At every point in the planning process, the public was given an opportunity to provide input into the creation of the Yuba County Water Agency Multi-Hazard Mitigation Plan. The comments from the public resulting from the public outreach effort were incorporated into the plan at as they were received. The involvement of the public was integral to creating a hazard mitigation plan that reflected the concerns of the Agency and the people it serves.

3.2.3 Review and Incorporation of Existing Plans, Reports, Studies, and Technical Information

YCWA has funded or been otherwise associated with a variety of studies and reports over the course of its history. As part of the planning process, Yuba County Hazard Mitigation Project staff acquired these studies for the express purpose of incorporating the hazards and projects already identified into the plan. Many of these plans identified future projects that YCWA had yet to find a funding source for. Other reports provided information on projects YCWA already had underway. Hazard Mitigation staff was able to utilize many of these studies for use in the Yuba County Multi-Jurisdictional Multi-Hazard Mitigation Plan as well. These plans are referenced throughout the YCWA Hazard Mitigation Plan. These plans and studies include:

- The Yuba County Water Agency Act
- Yuba County Water Agency Power Purchase Contract
- Federal Energy Regulatory Commission Licenses
- California Department of Fish & Game 1600 Permit
- United States Fish and Wildlife Service National Marine Fishery Service Section 7 Biological Opinion
- State Water Resources Control Board 401 Permit
- State Water Resources Control Board d-1644 Interim Flow Schedule
- Army Corps of Engineers 404 Permit
- The Yuba River Development Project
- Report on Feasibility of Yuba-Feather Supplemental Flood Control Project
- Forecast-Coordinated Operations for Feather and Yuba Rivers
- The Lower Yuba River Accord
- The Yuba River Basin Flood Control Project
- Yuba County Integrated Regional Water Management Plan
- Seismic Analysis and Safety Evaluation of the Strengthened Radial Spillway

- Emergency Action Plan
- California Division of Mines and Geology(CDMG) Fault Hazard Rupture Zones in California
- Review of Potential Seismic Sources and Potential Ground Motions, New Bullards Bar Dam
- Yuba County General Plan
- Western US Climate Historical Summaries for Marysville Station
- Western US Climate Historical Summaries for Dobbins Station
- Yuba County Emergency Operations Plan

3.3 Local Capabilities Assessment - §201.4(c)(2) and §201.6(c)(1)

DMA 2000 Requirements – Planning Process
Local Capabilities Assessment **Requirement §201.4(c)(3)(ii)**: Of the Federal Register Interim Final Rule 44CFR Parts 201 and 206 states "[The **State** mitigation strategy **shall** include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities. The following elements should be covered as they provide information that assists the State to meet the required planning element in the State's mitigation plan. More importantly,. Providing this information benefits the local community in their planning efforts. A "needs improvement" score will not preclude either plan from being recommended for approval by OES or approved by FEMA
Element A. Does the plan provide a description of the human and technical resources available within this jurisdiction to engage in a mitigation planning process and to develop a local hazard mitigation plan? B. Does the plan list local mitigation financial resources and funding sources (such as taxes, fees, assessments, or fines) which affect or promote mitigation within the reporting jurisdiction? C. Does the plan list local ordinance which affect of promote disaster mitigation, preparedness, response or recovery within the reporting jurisdiction? D. Does the plan describe the details of in-progress, ongoing, or completed mitigation projects and programs within the reporting jurisdiction?

3.3.1 Local Capabilities

As the lead agency of the Yuba County Hazard Mitigation Project, the County of Yuba was provided the opportunity to participate in the development of a local hazard mitigation plan and as a stakeholder in the development of the Yuba County Multi-Jurisdictional Multi Hazard Mitigation Plan. The County of Yuba contributed staff time and resources to aid YCWA in developing their hazard mitigation plan. YCWA is constrained by the limits of its revenue, whose source is primarily the sale of water and grant funding. YCWA's Board of Directors has made a commitment to improve community safety through flood control efforts and construction of projects. The Yuba County Water Agency, through its participation in the Yuba County Hazard Mitigation Project as a stakeholder has provided support and technical assistance for County agencies participating as stakeholders in developing and implementing hazard mitigation plans in the County.

The Yuba County Water Agency Hazard Mitigation Planning Committee identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment portion of the mitigation plan identifies administrative, technical, legal, and fiscal capabilities. This includes a summary of departments and their responsibilities associated with hazard mitigation

planning, as well as codes, ordinances, and plans already in place associated with hazard mitigation planning. The second part of the Assessment provides Yuba County Water Agency's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

3.3.2 Fiscal Resources

The table below shows the specific financial resources available to the Yuba County Water Agency.

Table 3–3 YCWA Financial Resources

Financial Resources	Y/N	Comments
Sale of Electricity	Y	YCWA has a contract with PG&E that runs through 2016. Per the terms of the agreement, PG&E receives all electricity generated by New Bullards Bar Dam and pays $7.7 million annually for YCWA's bond commitments and approximately $5-15 million for all operation and maintenance costs annually. YCWA sells electricity generated at the Deadwood Creek Powerhouse and the Fish Release Powerhouse at the base of New Bullards Bar Dam. These facilities generate approximately $300,000 annually
Sale of Water	Y	YCWA sells wholesale water to seven water service districts in Yuba and surrounding counties. YCWA sells over 151,000 af of water to local farmers, accounting for approximately $400,000 annually. Periodically, YCWA will sell water to the State of California when there is a water shortage
Grants	Y	YCWA receives State and Federal grants for specific projects, often related to flood control. The grants are one-time projects whose funds cannot be used for anything other than the project they have been prescribed for.
County property taxes	Y	YCWA receives approximately $200,000 per year through County property taxes
State taxes	N	
Federal taxes	N	
Recreation	Y	YCWA provides recreation at New Bullards Bar Reservoir, as mandated by its FERC license. The recreation generates revenue, but not enough to cover the facility costs. The recreation area operates at a loss.

The Yuba County Water Agency will be beginning its FERC re-licensing process in 2008. YCWA has a reserve of funds set aside for the process, and will continue to allocate portions of its income specifically for the FERC process. The re-licensing is a five to eight year process with defined milestones that FERC requires the owner to meet. Currently, the typical project license costs approximately $3 to $6 million. The Yuba River is a large and complex project that may cost from $20 to $40 million to re-license in the Agency's re-licensing schedule of 2008-2016.

3.3.3 Local Human, Technical, and Financial Resources

The following is (1) a summary of existing positions and their responsibilities related to hazard mitigation planning and implementation; and (2) a list of existing planning documents and regulations related to mitigation efforts within YCWA. The administrative and technical capabilities of each jurisdiction, as shown in the table below, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include: those involving technical personnel, such as planners/engineers with knowledge of land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or human-caused hazards, floodplain managers, surveyors, personnel with GIS skills, and scientists familiar with hazards in the community.

3.3.3.1 Administrative and Technical Capacity

Table 3–4 Administrative & Technical Capacity

Position	Y/N	Department/Agency
Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	General Manager and Power Systems Manager
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Y	General Manager and Power Systems Manager
Planners or Engineer(s) with an understanding of natural and/or human-caused hazards	Y	General Manager and Power Systems Manager
Floodplain manager	Y	General Manager
Surveyors	N	Contractors
Staff with education or expertise to assess the community's vulnerability to hazards	Y	General Manager and Power Systems Manager
Personnel skilled in GIS and/or HAZUS	N	Contractors
Scientists familiar with the hazards of the community	N	Contractors
Emergency manager	Y	General Manager and Power Systems Manager
Grant writers	Y	General Manager, Power Systems Manager, and consultants

For technical expertise required for administration of specific tasks and projects, consultants are secured by the Agency

3.3.4 Local Mitigation Funding Sources

Support for the planning process was provided to YCWA by Yuba County through its FY 2003/04 PDM grant. The required YCWA match was provided with both cash and "in-kind" matches, through YCWA, and the many hours spent on this effort by each of the Committee members attending meetings, collecting data, managing administrative details, as well as through the use of its facilities for meetings.

National Dam Safety Program (NDSP) formally established by the Water Resources and Development Act of 1996. This program includes:

- Grant assistance to States for the improvement of state dam safety programs;
    - Increase in the number of dam inspections;

  - Increase in the submittal and testing of Emergency Action Plans;
  - Improved coordination with state emergency preparedness officials;
  - Identification of dams to be repaired or removed; and
  - Conduct dam safety awareness workshops and creation of dam safety videos and other outreach materials;
- Dam Safety Research for technical and archival research; and
- Dam Safety Training for dam safety staff and inspectors.

Water Resources and Development Act of 1996 (Public Law 104–303)
Dam Safety and Security Act of 2002 (Public Law 107–310)

3.3.5 Local Ordinances and Regulations

3.3.5.1 Local

The County of Yuba governs land use decisions and has numerous laws and ordinances which regulate building limitations and provides for the mitigation of hazards.

3.3.5.1.1 Yuba County Housing Element III-C:

Flood Hazards: Flood hazards present the main environmental constraint to the development of housing in the County. Several areas of the County are subject to flooding from the Yuba River, Bear River, Feather River, tributaries of these rivers, and from storm runoff. Nearly the entire western portion of the County, including the urbanized areas of Linda and Olivehurst, is within either a 100-year or 500-year flood hazard area. In order to minimize the potential damage resulting from flooding, the County Standards of Building Construction contain standards for construction of buildings in flood hazard areas. If a proposed building site is in a location that has a flood hazard, the Building Official requires that the development:
(1) Be designed (or modified) and anchored to prevent the flotation, collapse, or lateral movement of the structure, or portions of the structure due to flooding.
(2) Use construction materials and utility equipment that are resistant to flood damage
(3) Use construction methods and practices that will minimize flood damage
(4) Provide adequate drainage in order to reduce exposure to flood hazards
(5) Construct utilities and facilities, including sewer, gas, electrical, and water systems on the site in such a manner as to minimize or eliminate flood damage.
In addition, the Department of Public Works reviews all subdivision applications to ensure that:
(1) All such proposed developments are consistent with the need to minimize flood damage
(2) Adequate drainage is provided so as to reduce exposure to flood hazards
(3) Adequate drainage is provided so as not to increase the exposure to flood hazards of adjacent lands
(4) All utilities and facilities, including sewer, gas, electrical, and water systems are located, elevated The County has successfully used its flood protection standards to allow residential development to proceed, as exemplified by the Plumas Lake Specific Plan, currently under construction in western Yuba County about ten miles south of Marysville.

3.3.5.1.2 Yuba County General Plan Land Use – 5-83

Flood Protection
14-LUG Secure adequate flood protection for urban and other developing areas

61-LUO Implementation of flood protection measures described in the revised South Yuba Drainage Master Plan.

209-LUP Flood protection measures contained in the revised South Yuba Drainage Master Plan shall be implemented in conjunction with specific plans and other new development projects.

210-LUP Financing for major components of the Master Plan shall be actively pursued by the County, including collection of drainage fees from new development projects, in order to enhance flood protection in the Linda/Olivehurst region.

62-LUO Routine maintenance and improvement of Feather River and Yuba River flood protection levees.

211-LUP The County shall discourage development projects that may interfere with the integrity of levees.

212-LUP The County shall support and coordinate with the various reclamation districts in matters of levee maintenance and improvement.

63-LUO Appropriate flood protection and drainage measures built into all new development project approvals.

213-LUP The County shall maintain drainage standards and apply those standards to development projects.

214-LUP Flood waters leaving new development projects shall conform to existing drainage plans or be directed to existing watercourses and shall not exceed either historical volumes or rates of flow. Retention and/or detention ponds shall be incorporated in new development projects to achieve this condition.

64-LUO Attainment of an upstream storage facility on the South Fork of the Yuba River

215-LUP The County shall support initiatives to construct a new reservoir on the South Fork of the Yuba River including active lobbying for its authorization and funding.

65-LUO Review and strengthen the present County floodplain protection ordinance.

216-LUP The County shall review its present floodplain protection ordinance to assure that it fully complies with the policies of the General Plan and other applicable regulations.

3.3.5.1.3 Yuba County General Plan Land Use – 7-43

10-OSCGC are fully regulate development projects located in floodplains, unstable soil areas, high fire hazard areas, areas of steep slope, and other areas with similar constraints.

35-OSCO Protection of future development projects from the threat of flooding in a 100 year or more frequent flood event.

147-OSCP Proponents of new development projects shall be required to undertake an evaluation of flood hazards and shall present the evaluation results to the County prior to approval of development projects.

148-OSCP The installation of storm drain and other flood protection/prevention improvements shall be required as a condition of approval for of all new development projects.

149-OSCP When considering approval of new development projects, areas subject to flooding should be avoided unless appropriate mitigation measures have been incorporated into the project or required as a condition of project approval.

150-OSCP The County shall work closely with the U.S. Army Corps of Engineers, local reclamation districts and levee commissions to assure that maximum protection from potential

levee breaks or overtopping during periods of high water is provided to the Linda and Olivehurst region.

151-OSCP The flood protection measures contained in the South Yuba Drainage Master Plan shall be implemented as opportunities and resources allow.

36-OSCO Maintenance and improvement of existing regulations protecting properties from hazards and constraints to development

152-OSCP The County shall continue to maintain floodplain zoning and shall take all necessary steps to maintain its eligibility for the Federal Flood Insurance Program as administered by the Federal Emergency Management Agency.

153-OSCP All proposals for dams and levees shall be carefully reviewed by the County to assure that potential hazards are not created by their construction or the manner of their construction. Proposals for dam and levee construction shall be coordinated with the State Reclamation Board and the Department of Water Resources, Division of Dam Safety.

154-OSCP Emergency and public assembly facilities shall not be constructed in areas subject to 100 year floods unless fully protected.

155-OSCP Natural waterways shall be protected from unnecessary alteration whenever flood protection structures or other forms of construction are proposed.

156-OSCP Integration of recreational uses with flood protection facilities shall be considered whenever such uses do not interfere with the facilities' primary purpose.

4 Risk Assessment

DMA 2000 Requirements – Risk Assessment
Requirement §201.6(c)(2): The plan **shall** include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards/ Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

This section describes the components of the risk assessment process, including a discussion of the identified hazards, a profile of these hazards, a review of the YCWA asset inventory, a vulnerability assessment, and the impact of future development in the service area of YCWA.

According to FEMA, a risk assessment "is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards" (FEMA 2001). Any mitigation activity to reduce losses to life and property must be based upon a thorough assessment of the risks to these assets.

The steps involved in conducting the risk assessment include:

- A profile of the potential hazard occurrences (location and extent) and historical occurrences;
- Probability of a hazard;
- Vulnerability to assets and potential impacts; and
- Analysis of future development trends.

These steps provide the basis for the risk assessment presented in this section.

4.1 Hazards

All hazards that may affect the Agency, whether natural or man-made, must be addressed in the plan. Natural hazards include those that arise from natural earth processes, such as uncontrollable meteorological or geological events. Events of man-made origin include accidental (derailment of a train car containing hazardous materials) or intentional (terrorism) events. All hazards that may affect the Agency must be considered and ranked according to the likelihood of their occurrence using the best-available knowledge and data.

Hazards included in the plan as potential threats to the county are described in terms of the nature of the hazard, their magnitude, duration, and location. Each hazard is then summarized by its history of occurrence and the probability and location of future hazard events. This is accomplished through review of previous studies conducted by the county or other jurisdictions, including state and federal agencies. Mapped information is used, in either GIS or hardcopy, to identify areas potentially at risk of a particular hazard.

Profiled hazards are described by their location, likelihood of occurrence, extent and magnitude, and history of occurrence in the YCWA service area. Each hazard will be described in an informative manner to ensure that users of this Plan who may be unfamiliar with a particular hazard will have a better idea of the potential for property damage or loss of life. Figures are referenced to help orient the reader to the potential locations of each hazard across the YCWA service area.

4.1.1 Identifying Hazards

DMA 2000 Requirements – Risk Assessment

Identifying Hazards
Requirement §201.6(c)(2)(i): [The risk assessment **shall** include a] description of the type … of all natural hazards that can affect jurisdiction.
FMA Requirement §78.5 (b): Description of the existing flood hazard and identification of the flood risk, including the estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.

Element

A. Does the plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?

   If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a satisfactory score.

   Consult with the State Hazard Mitigation Office to identify applicable hazards that may occur in the planning area.

Assets are the buildings and facilities, equipment, and infrastructure owned by a jurisdiction as well as the population served or within the boundary of the jurisdiction. A review of the YCWA's assets was completed. All assets are organized and categorized in GIS so their locations can be identified with respect to identified hazards.

Working with the Yuba County Office of Emergency Services, and participating communities and special districts, Yuba County Water Agency narrowed the list of hazards to those with the greatest potential for risk. The selected hazards are identified in Table 4-1.

Table 4–1 Hazard Rank Priorities

High	Moderate	Low
Winter Storms–High Water	Dam Control	Infectious Disease
Flood	Terrorism	Extreme Heat
Fire	Drought–Water Supply	Winds
Landslide–Slips	Hazardous Materials	Hail Storm
	Utility Loss	Avalanche
	Earthquake	Land Subsidence
		Expansive Soils
		Tsunami
		Tornado
		Volcano

4.1.1.1 Location, Extent, Magnitude, and Severity of Each Identified Hazard

This section documents the process for identifying potential hazards to YCWA facilities and personnel. The requirements for this process are described in DMA 2000 and summarized below.

The YCWA Hazard Mitigation Committee completed the FEMA Workshop #1 "Identify the Hazards". The Workshop tasks include:

- Listing the hazards that may occur
  - Research newspapers and other historical records
  - Review existing plans and reports
  - Consult with experts in the area
  - Gather information on Internet websites
- Focus on the most prevalent hazards in the community

- Go to hazard websites
- Locate your agency or state on the website map
- Determine whether YCWA is in a high-risk area. Get more localized information if necessary

YCWA used the tools above as a baseline. With collaboration with other agencies such as Fire Districts, Reclamation Districts, and Yuba County OES, YCWA referenced their historical disaster data, local disaster recovery data, GIS mapping, and local Emergency Operations Plans to assess their risk to each disaster.

YCWA has summarized hazards identified through the process above. These hazards are listed in Table 4-2. Hazards excluded from profiling through the above process are listed in Table 4-3.

4.1.1.2 List and Description of All Natural Disasters Affecting the Jurisdiction (Technological and Human-Caused Hazards)

The hazards listed in Table 4-2 were identified as potential hazards that could affect YCWA. In general, these hazards are considered to pose a significant threat to YCWA facilities, assets and employees.

Table 4–2 Summary of Profiled Hazards

Hazard	Justification for Inclusion
Winter Storm–High Water	Northern California in general and Yuba County in particular is a region that experiences waves of storms each winter with large amounts of falling or blowing participation that last for several hours. Their impact ranges from accumulations of sediment and debris that affect YCWA facilities to a loss of control of the water passing through/over YCWA facilities. Particular problems for the YCWA arise under the influence of Pineapple Express incidents which can result in catastrophic high water events.
Flood (including riverine flooding, dam failure, and post-fire debris flow)	Yuba County has a long history of catastrophic flooding events involving both the Yuba and Feather Rivers. Five major floods since 1950 have resulted in loss of life, significant property damage, and constrained economic development in the area.
Fire	The foothill areas of Yuba County have a long history of wildfire. Several YCWA facilities are in remote areas with high fire hazard severity, placing access to these facilities, and the facilities themselves, at risk. In addition to physical damage to YCWA buildings, fire affects the Agency by producing mud, ash, & debris, which flows into the waterways, causing damage and obstructions. The agency is then responsible for sediment & debris removal, an additional financial burden. Fire also impacts the occurrence of landslides by destroying the vegetation whose root system hold soils on the slopes, which then cause damage to YCWA assets. Human fire suppression efforts over the past century extinguished lightning–ignited blazes that would otherwise have thinned the forests. As a result the forests are now so overcrowded and diseased that they pose a major fire threat.
Landslide–Slips	Landslides occur in several forms: slumps, slides, flows and falls of rock, mud, earth, and debris. The effects of landslides could potentially damage several millions of dollars of infrastructure as indicated by the 2006 YCWA Burma Road slide.
Dam Control	Dam failure -YCWA has not suffered a dam failure in its history. However, because of the large population living downstream of YCWA dams, and the potential for future development downstream, a failure of any of the YCWA dams would result in significant damage to property and potentially the loss of life.
Terrorism	Water systems such as; dams, levees, reservoirs, lakes, and rivers are terrorist targets. If any of the dams, levees, or local water systems were affected by an act of foreign or domestic terrorism, the effects could include, but not be limited to, dam failure, extensive flooding, water contamination, and financial crisis. The threat of foreign terrorism is of concern to YCWA given the agency's infrastructure and critical facilities. YCWA, like other jurisdictions or communities in the U.S., is not immune to the threat of domestic terrorism. The 1992 Lindhurst High School shooting in the community of Linda is an example of this type of threat.

Drought/Water Supply	Long periods without substantial rainfall.
Hazardous Materials	Impact varies by location, type of material released, and dispersion mechanism.
Utility Loss	Utility loss caused by earthquakes, fires, or terrorism has an economic impact on the YCWA. This loss is covered by the respective hazard event and its effect on YCWA facilities. Widespread power failures due to coincident planned scheduled maintenance at other production facilities, unscheduled facility power loss, and power transfer issues at the wholesale level occurred for 32 statewide blackout & service interruption days during California's energy crisis of 2000 and 2001.
Earthquake	While a quiescent fault bisects the New Bullards Bar Reservoir, no active faults are present in Yuba County. Several faults have been identified with displacement in the geologic past (greater than 10,000 years ago). Minor earthquakes do occur within the county and in adjacent counties. The largest recent earthquakes occurred in Butte County south of Lake Oroville with a maximum magnitude of 5.7.

4.1.1.3 Non-Profiled Hazards

The hazards listed in Table 4-3 were excluded from profiling and further risk assessment consideration. In general, these hazards are considered to pose a lower threat to life and property in the sphere of influence of the Yuba County Water Agency due to the low likelihood of occurrence or the fact that it is unlikely that life and property would be significantly affected. Should the risk from these hazards increase in the future, the plan can be updated to incorporate vulnerability analyses for these hazards.

Table 4–3 Hazards Excluded From Profiling

Hazard	Description	Reason for Exclusion
Infectious Disease	Epidemics typically occur during winter months. In the past pandemics occurred infrequently, however, air travel presents an opportunity for rapid exposure to atypical diseases. Influenza, West Nile Virus, & Anthrax are known to exist in the County. Should a pandemic peak during flood season, the YCWA may experience staffing issues.	Staffing redundancy and resource support from PG&E reduce the vulnerability to this hazard.
Extreme heat	Temperatures that remain 10 degrees or more above the average high temperature for the region and last for several weeks.	While extreme temperatures are known to occur, particularly in inland valleys, prolonged heat waves are rare especially in YCWA critical facility locations.
Windstorm	A storm accompanied by sustained high winds. Widespread damage may occur when winds reach hurricane force (greater than 74 miles per hour).	Winter storms are known to be accompanied by high winds. However, levels of damage are historically minor compared to those accompanying other hazards.

Hazard	Description	Reason for Exclusion
Hailstorm	Can occur during thunderstorms that bring heavy rains, strong winds, hail, lightning and tornadoes.	Occurs during severe thunderstorms, which only occasionally occur in the region.
Avalanche	A mass of snow moving down a slope. There are two basic elements to a slide: a steep, snow-covered slope and a trigger.	Areas where heavy snowfall is likely to occur are largely uninhabited in the YCWA service area.
Land subsidence	Occurs when large amounts of ground water have been withdrawn from certain geologic formations. The rock compacts as water is withdrawn because the water is partly responsible for supporting surrounding formations.	No historical record of widespread occurrence of this hazard.
Expansive soils	Expansive soils shrink when dry and swell when wet. This movement can exert enough pressure to crack sidewalks, driveways, basement floors, pipelines and even foundations.	Presents a minor threat to limited portions of the county.
Tsunami	A series of traveling waves of extremely long length and period, usually generated by disturbances associated with earthquakes below the water surface	A Pre-Quaternary fault runs underneath the existing New Bullards Bar Reservoir. This fault was last active over 2,000,000 years ago, making it unlikely to activate. The magnitude of earthquake necessary to create a Tsunami at New Bullards Bar Reservoir is unknown
Tornado	A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and windblown debris.	Less than one tornado event, on average, is observed in the entire State of California in any given year. However, in May 2005 a tornado touched down in adjacent Sutter County and the funnel cloud crossed Yuba County.
Volcano	A volcano is a mountain that is built up by an accumulation of lava, ash flows, and airborne ash and dust.	No active volcanoes exist in Yuba County. The Sutter Buttes, approximately 15 miles west of Yuba County, are the remains of an extinct volcano with an eruptive history. In May 1915, Lassen Peak, California, the southern-most active volcano in the Cascade Range, erupted explosively. Avalanches, mudflows, and flows of hot ash and gas devastated nearby areas, and volcanic ash fell as far away as 200 miles to the east. The Lassen area remains volcanically active, and the volcano hazards demonstrated in 1915 still can threaten not only nearby areas but also more distant communities. Recent work by scientists with the U. S.

Hazard	Description	Reason for Exclusion
		Geological Survey (USGS) in cooperation with the National Park Service is shedding new light on these hazards. -- *Clynne, et.al., 2000, USGS Fact Sheet 022-00* Lassen Peak is 100 miles north of Wheatland. Mt Shasta is still considered to be an active volcano, which is 193 miles north of Yuba County. Fallout on YCWA critical facilities could be a remote threat depending on prevailing winds.

4.1.2 Profiling All Yuba County Water Agency Hazards

DMA 2000 Requirements – Risk Assessment
Profiling Hazards **Requirement §201.6(c)(2)(i)**: [The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events. **FMA Requirement §78.5 (b)**: Description of the existing flood hazard and identification of the flood risk, including the estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.
Element A. does he risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan? B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan? C. Does the plan provide information on **previous occurrences** of each hazard addressed in the plan? D. Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?

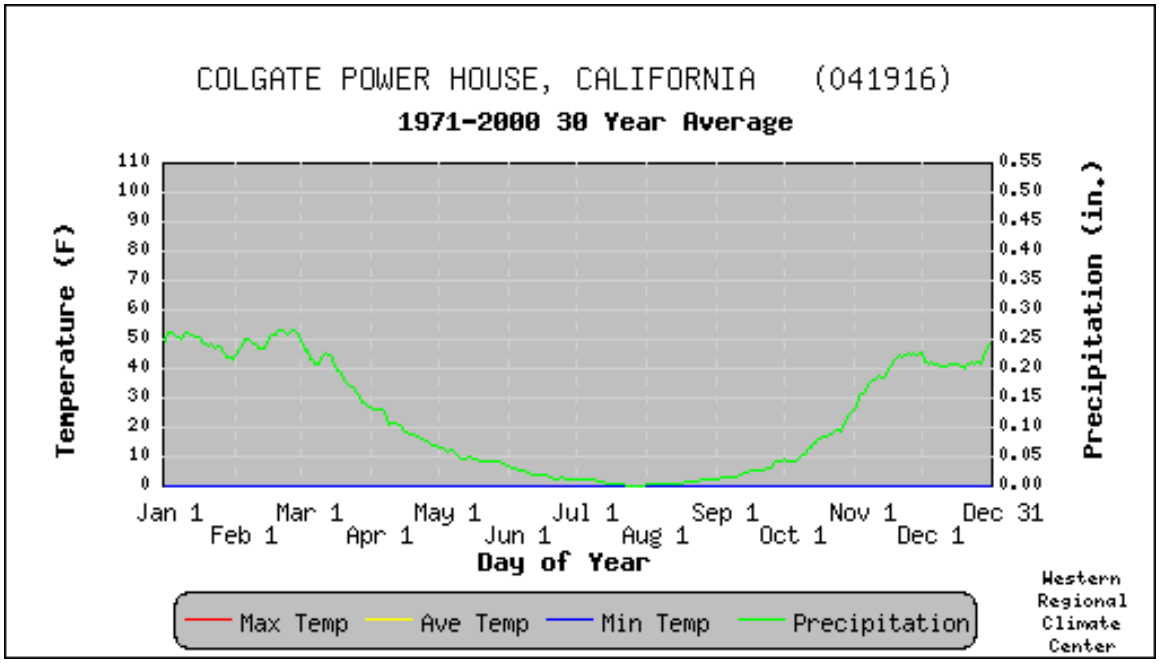
This section describes the hazards that can affect YCWA facilities and assets. For each hazard, the location, extent, potential magnitude, and severity is discussed, along with any previous occurrences and the probability of future occurrences.

4.1.2.1 Winter Storms–High Water Hazard Profile

The YCWA has ranked Winter Storms–High Water as a HIGH PRIORITY HAZARD.

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 ranges from 30 inches in the valley to over 60 inches in the mountains (www.wrcc.dri.edu 2005). Bullards Bar averaged 3.71 inches of precipitation in October, 8.36 inches in November, 12.56 inches in December, 13.84 inches in January, 9.61 inches in February, and 8.93 inches in March from 1948 through 1968. The rainy season for the YCWA watershed typically begins in the middle of November and lasts until the middle of March as can be seen in Figure 4–1.

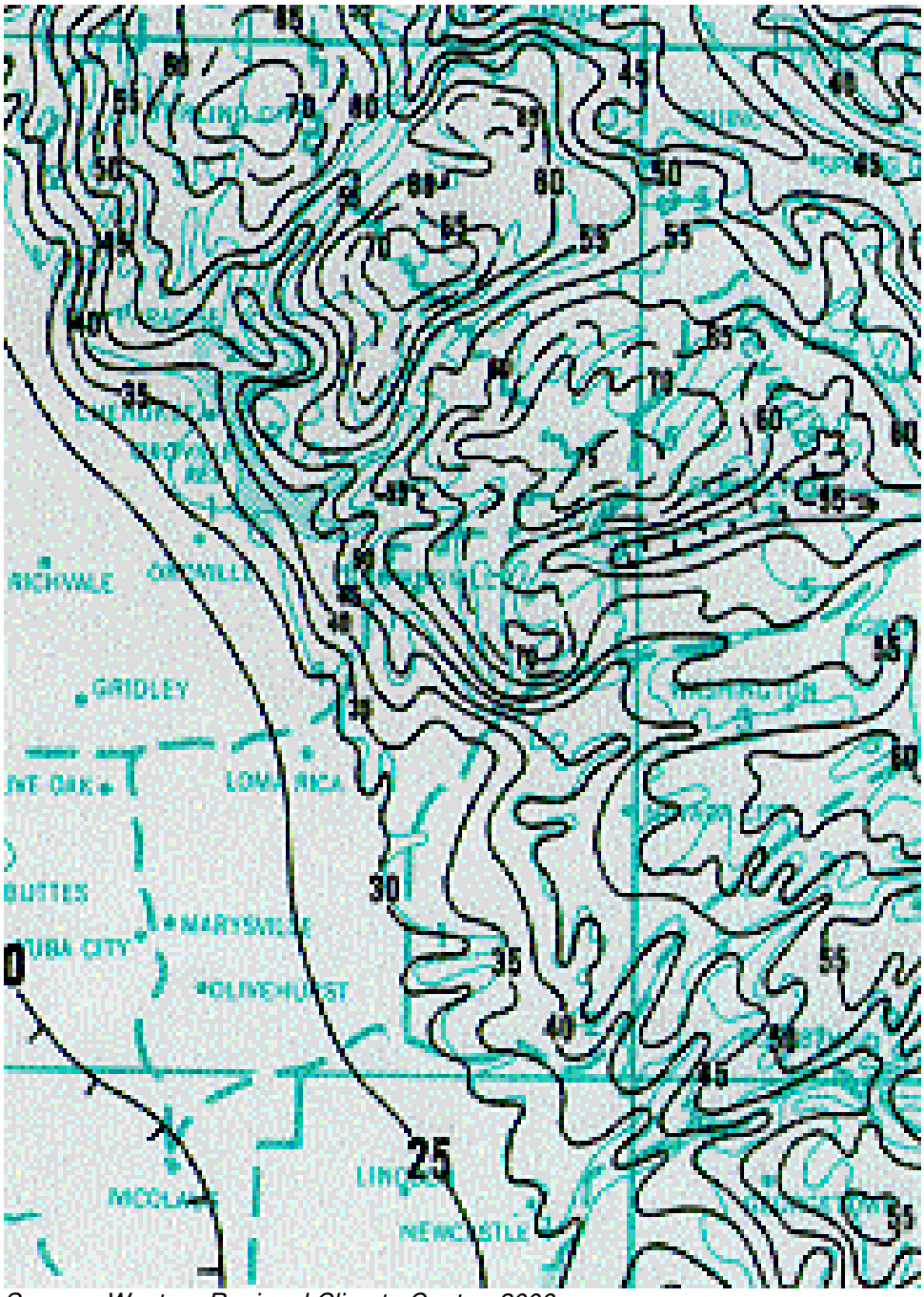
Figure 4–1 Colgate Power House Average Annual Precipitation (1971–2000)



Source: Western Regional Climate Center, 2006

Typical precipitation patterns in the YCWA watershed are illustrated in Figure 4–2. The highest intensity rainfall in a two year event occurs in the northern reaches of the YCWA watershed (75 tenths of an inch) and in the eastern portion of the watershed (70 tenths of an inch) near New Bullards Bar Dam.

Figure 4–2 Short Duration Rainfall (2yr 24hr–tenths of an inch)



Source: Western Regional Climate Center, 2006

Many of the heaviest winter precipitation seasons are associated with El Niño conditions in the Pacific Ocean and storm tracks that deliver strong winter storms repeatedly across northern California. When these waves of storms occur in late spring, they can hasten snowmelt in the Sierra Nevada; flows in the areas creeks and rivers can raise dramatically filling YCWA reservoirs which can result in flooding and/or loss of dam control. See the Flooding and Dam Control Hazard discussions.

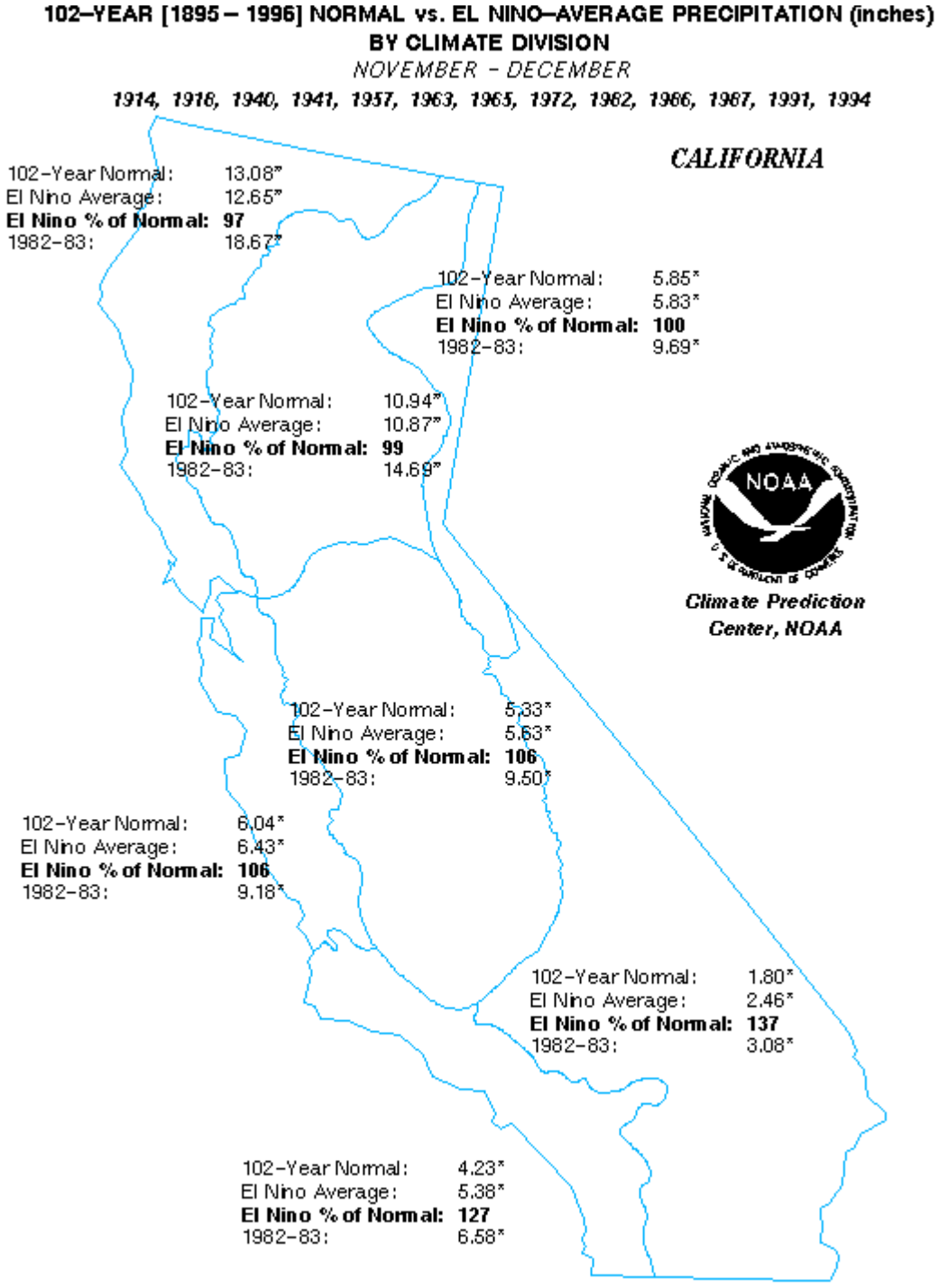
El Nino–Southern Oscillation (ENSO) is a global coupled ocean–atmospheric phenomenon. The Pacific Ocean signatures, El Nino and La Nina are major temperature fluctuations in surface waters of the tropical Eastern Pacific Ocean. The cycle for the ENSO events can take up to 24 months to complete when involving moderate to strong El Niños. It should also be noted that El Niño events that are very strong to extreme in their intensity can reduce the cycle time to as little as 12 to 18 months. Once the ENSO event ends, the weather pattern will return to a more normal sequence. As of September 2006, El Nino is currently active, and is expected to continue into 2007.

4.1.2.1.1 Location, Extent, Magnitude and Severity of Winter Storms–High Water

One of the causes for these strong winter storms is a local climatic condition associated with the ENSO known as the Pineapple Express. This anomaly in winter precipitation occurs at irregular intervals and results from a combination of three climatic conditions: 1) an abundance of tropical moisture in the equatorial Pacific Ocean, 2) a southward-dipping jet stream below a high pressure ridge in the Gulf of Alaska and 3) neutral to weak El Niño conditions in the Pacific Ocean (NOAA 2005). The warm, tropical moisture associated with the Pineapple Express can exacerbate the threat of flooding by melting the winter snow pack. Figures 4–3 and 4–4 show the average precipitation in inches that can be expected during an El Nino event.

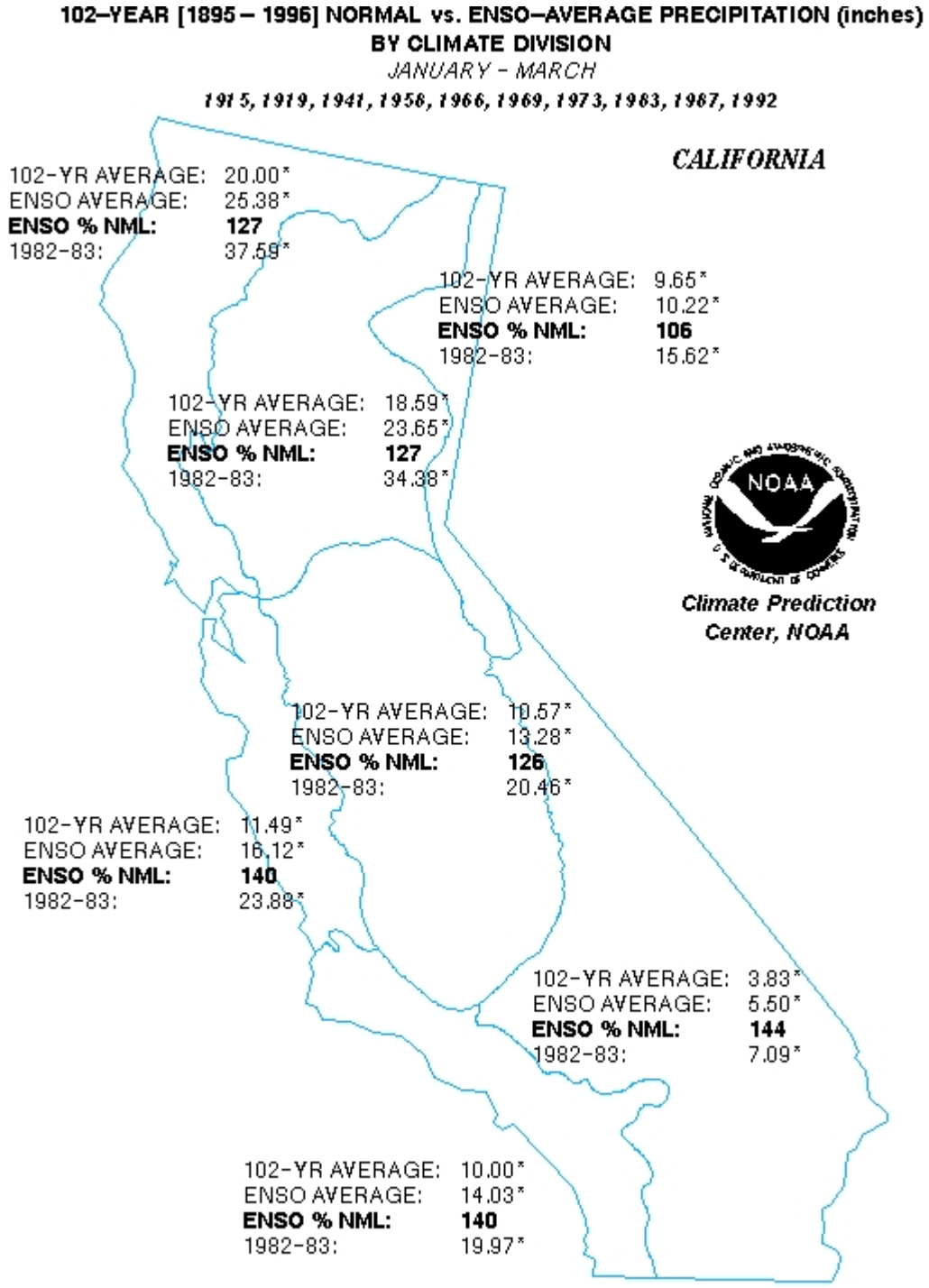
During a winter under the influence of an El Nino, on average the precipitation will be 99 percent of normal November through December, and the January through March precipitation will on average be 127 percent of normal.

Figure 4–3 Nov to Dec El Nino Precipitation Averages



Source: NOAA, Climate Prediction Center, 2006

Figure 4–4 Jan to Mar El Nino Precipitation Averages



Source: NOAA, Climate Prediction Center, 2006

4.1.2.1.2 Previous Occurrences and Probability of Future Occurrences of Winter Storms– High Water

Historical Occurrences

There is strong evidence for a linkage between weather and climate over the western United States. From these studies it is known that extreme precipitation events can occur at all phases of the ENSO cycle, but the largest fraction of these events occur during La Nina episodes and during ENSO–neutral winters. During La Nina episodes the YCWA jurisdiction can experience increased storminess, and increased precipitation. The risk of flooding increases as the strength of the cold episode decreases due to an increase in extreme precipitation events in the weaker episodes. A recent example is the winter of 1996–1997, which featured heavy flooding. In 1995 the entire State experienced unusual storms. Heavy snows caused broken tree limbs, fallen telephone lines, and a heavy accumulation of debris. The storm was considered severe enough to be declared federal disasters (FEMA-1044-DR-CA and FEMA-1046-DR-CA); all 58 counties had been declared. The large amount of downed, suspended, and standing vegetation created a fuel hazard and left the area subject to an extreme fire threat (CDF 2004a).

A Pineapple Express was responsible for very heavy rainfall in 1986 and 1997 when breached levees resulted in disastrous flooding in the valley towns of Linda, Olivehurst, and Arboga (McCarthy 1997). During the 1997 Pineapple Express, almost 40 inches of rain fell in the Feather River basin in eight days (McCarthy 1997). Warm rainstorms melted almost the entire Sierra Nevada snow pack, resulting in major flooding and the aforementioned levee breaks along the valley's levee system (FEMA-1155-DR-CA).

The 2006 Winter Storm event (FEMA 1628-DR-CA) resulted in severe damages to YCWA. The event began in late December 2005 and ran through early January2006 (Document 4-1). A breakdown of the damages suffered by the Agency is illustrated in Table 4-4.

Table 4–4 YCWA 2006 Winter Storm Damage

Project Location	Project Work #	Damage Cost
Pond 17 Access Road	27	3,220.00
Our House Sediment Removal	1808	4,077,880.85
South Diversion Canal Intake Channel	1949	23,949.82
Owl Gulch Diversion	2016	17,096.68
Deadwood Creek Diversion	2797	34,193.32
Prospect Lane erosion	2955	5,000.00
Bullards Bar Hiking Trails	3067	11,570.00
Paving of Burma Road	3386	58,100
Bullards Bar debris removal	3394	892,930.27
Burma Road debris removal	3395	632,585.58
TOTAL		**5,756,527.31**

Document 4-1 Federal Register Notice FEMA-1628-DR

Federal Register Notice

Billing Code 9110-10-P

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

[FEMA-1628-DR]

California; Major Disaster and Related Determinations

AGENCY: Federal Emergency Management Agency, Department of Homeland Security.

ACTION: Notice.

SUMMARY: This is a notice of the Presidential declaration of a major disaster for the State of California (FEMA-1628-DR), dated February 3, 2006, and related determinations.

EFFECTIVE DATE: February 3, 2006.

FOR FURTHER INFORMATION CONTACT: Magda Ruiz, Recovery Division, Federal Emergency Management Agency, Washington, DC 20472, (202) 646-2705.

SUPPLEMENTARY INFORMATION: Notice is hereby given that, in a letter dated February 3, 2006, the President declared a major disaster under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121-5206 (the Stafford Act), as follows:

I have determined that the damage in certain areas of the State of California, resulting from severe storms, flooding, mudslides, and landslides from December 17, 2005, through and including January 3, 2006, is of sufficient severity and magnitude to warrant a major disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5206 (the Stafford Act). Therefore, I declare that such a major disaster exists in the State of California.

In order to provide Federal assistance, you are hereby authorized to allocate from funds available for these purposes such amounts as you find necessary for Federal disaster assistance and administrative expenses.

You are authorized to provide Individual Assistance and Public Assistance in the designated areas and Hazard Mitigation throughout the State. Consistent with the requirement that Federal assistance be supplemental, any Federal funds provided under the Stafford Act for Public Assistance, Hazard Mitigation, and the Other Needs

Assistance under Section 408 of the Stafford Act will be limited to 75 percent of the total eligible costs.

Further, you are authorized to make changes to this declaration to the extent allowable under the Stafford Act.

The time period prescribed for the implementation of section 310(a), Priority to Certain Applications for Public Facility and Public Housing Assistance, 42 U.S.C. 5153, shall be for a period not to exceed six months after the date of this declaration.

The Federal Emergency Management Agency (FEMA) hereby gives notice that pursuant to the authority vested in the Acting Director, under Executive Order 12148, as amended, Thomas P. Davies, of FEMA is appointed to act as the Federal Coordinating Officer for this declared disaster.

I do hereby determine the following areas of the State of California to have been affected adversely by this declared major disaster:

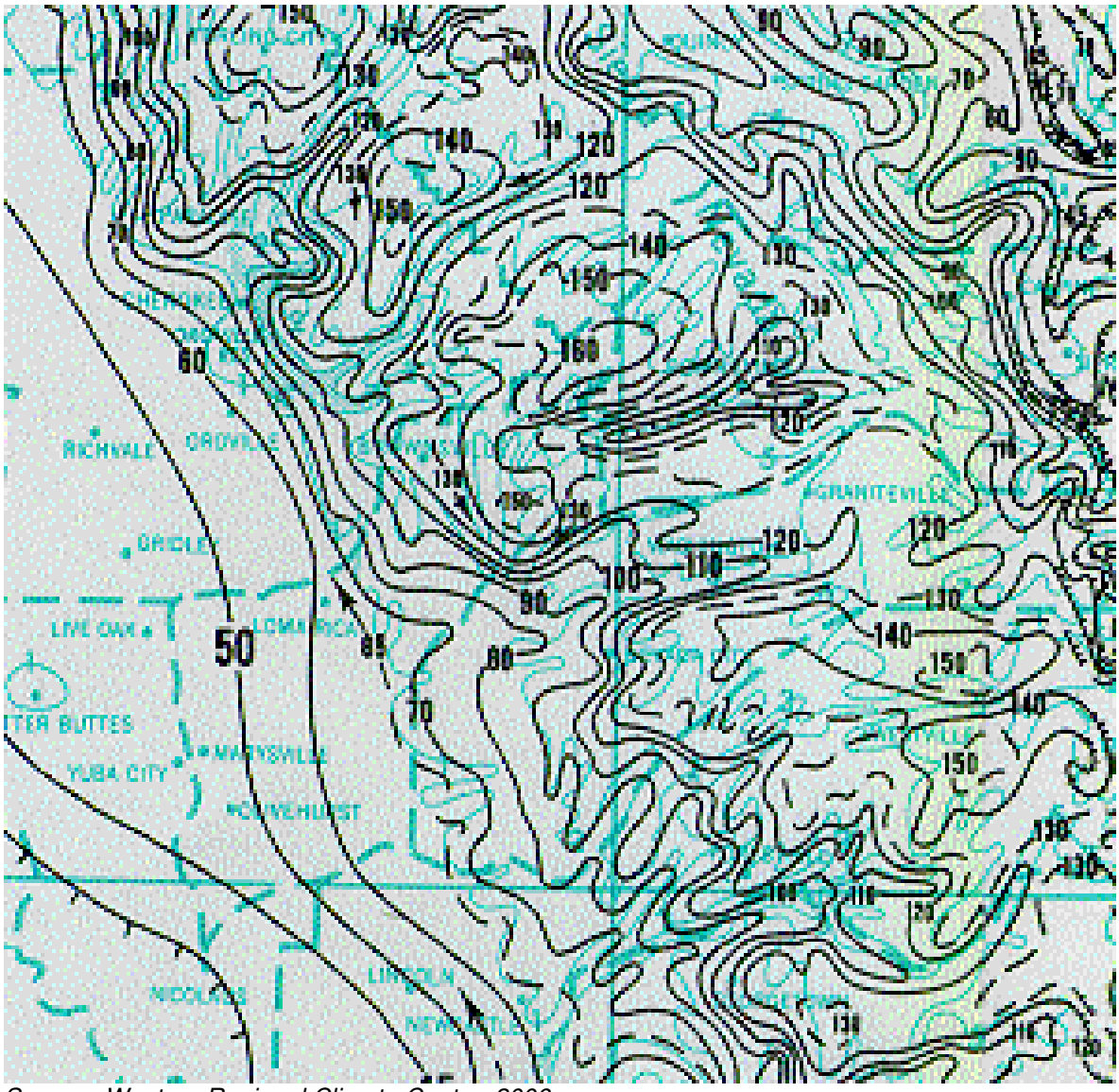
The counties of Contra Costa, Del Norte, Lake, Marin, Mendocino, Napa, Sacramento, Siskiyou, Solano, and Sonoma for Individual Assistance.

The counties of Alpine, Amador, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Humboldt, Lake, Lassen, Marin, Mendocino, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, San Luis Obispo, San Mateo, Santa Cruz, Sierra, Siskiyou, Solano, Sonoma, Sutter, Trinity, Yolo, and Yuba for Public Assistance.

All counties within the State of California are eligible to apply for assistance under the Hazard Mitigation Grant Program.

(The following Catalog of Federal Domestic Assistance Numbers (CFDA) are to be used for reporting and drawing funds: 97.030, Community Disaster Loans; 97.031, Cora Brown Fund Program; 97.032, Crisis Counseling; 97.033, Disaster Legal Services Program; 97.034, Disaster Unemployment Assistance (DUA); 97.046, Fire Management Assistance; 97.048, Individuals and Households Housing; 97.049, Individuals and Households Disaster Housing Operations; 97.050 Individuals and Households Program-Other Needs, 97.036, Public Assistance Grants; 97.039, Hazard Mitigation Grant Program.)

Figure 4–5 24–Hour 100 Year Rainfall Event (tenths of an inch)



Source: Western Regional Climate Center, 2006

YCWA experiences damage to facilities due to debris and sediment that flows into the Agency's reservoirs and damages critical infrastructure. Table below lists the maximum monthly inflows that Our House Reservoir experienced from 1985 to 2006.

Table 4–5 Historic Our House Maximum Inflow per Month

Our House Inflow CFS Data Maximum Daily Inflow per Month									
	YEAR								
Month	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
January		873	7	44	37	42	36	36	2240
February		17000	1000	40	75	40	33	892	849
March		8660	239	36	3820	184	2830	35	1320
April		539	54	59	438	63	248	54	314
May		721	57	54	57	287	56	53	100
June		648	55	55	57	68	54	51	146
July		71	34	35	37	35	37	32	35
August		150	23	25	37	33	34	25	33
September		120	22	23	37	32	31	23	33
October	29	57	38	23	51	32	34	37	34
November	36	50	41	2000	65	34	38	34	34
December	71	54	1190	43	37	34	36	376	38
	1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
January	34	5230	646	21000	2200	2310	788	38	224
February	37	285	4090	1260	1910	3400	5200	44	420
March	37	5970	1070	89	2320	787	151	77	226
April	55	1900	778	204	297	54	57	58	56
May	55	5010	4830	105	483	565	71	56	56
June	54	2410	54	87	777	58	55	54	55
July	33	67	35	66	46	38	37	38	40
August	25	33	35	47	35	37	37	29	35
September	31	33	34	43	34	37	37	31	30
October	32	33	34	104	33	39	40	31	30
November	290	33	259	45	498	59	38	42	43
December	694	1760	9330	78	608	38	38	243	405
	2003	**2004**	**2005**	**2006**					
January	182	39	43	9178					
February	44	322	41	6127					
March	358	39	619	2113					
April	91	57	59						
May	399	57	8100						
June	132	56	139						
July	39	36	37						
August	38	33	38						
September	38	35	38						
October	35	37	35						
November	39	36	38						
December	142	42	25985						

Likelihood of Future Occurrences
Luckily, severe storms, such as ice, heavy wet snow, and excess rain are not a frequent occurrence in the YCWA watershed. While the watershed does experience waves of heavy precipitation patterns, they occur cyclically and can often be forecast on a seasonal basis. Given the influence of the ENSO atmospheric phenomenon, episodes of series of winter storms that result in high water conditions in the YCWA watershed will occur in the future.

4.1.2.2 Flood Hazard Profile

Flooding results in more deaths nationwide annually than any other natural hazard (NOAA 1992). As a result, the causes of flooding and the mitigation of its effects have been the topics of much storm water research. In disaster mitigation, there are many ways to lessen the effects of flooding. This section reviews the background of flooding as a natural hazard, introduces the fluvial setting of Yuba County, its history of significant flooding, the potential location, extent, and magnitude of the flooding hazard in Yuba County, 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 coastal areas, flooding occurs when tides or ocean swells (storm surge) inundate shoreline areas not normally affected by tidal waters. 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.

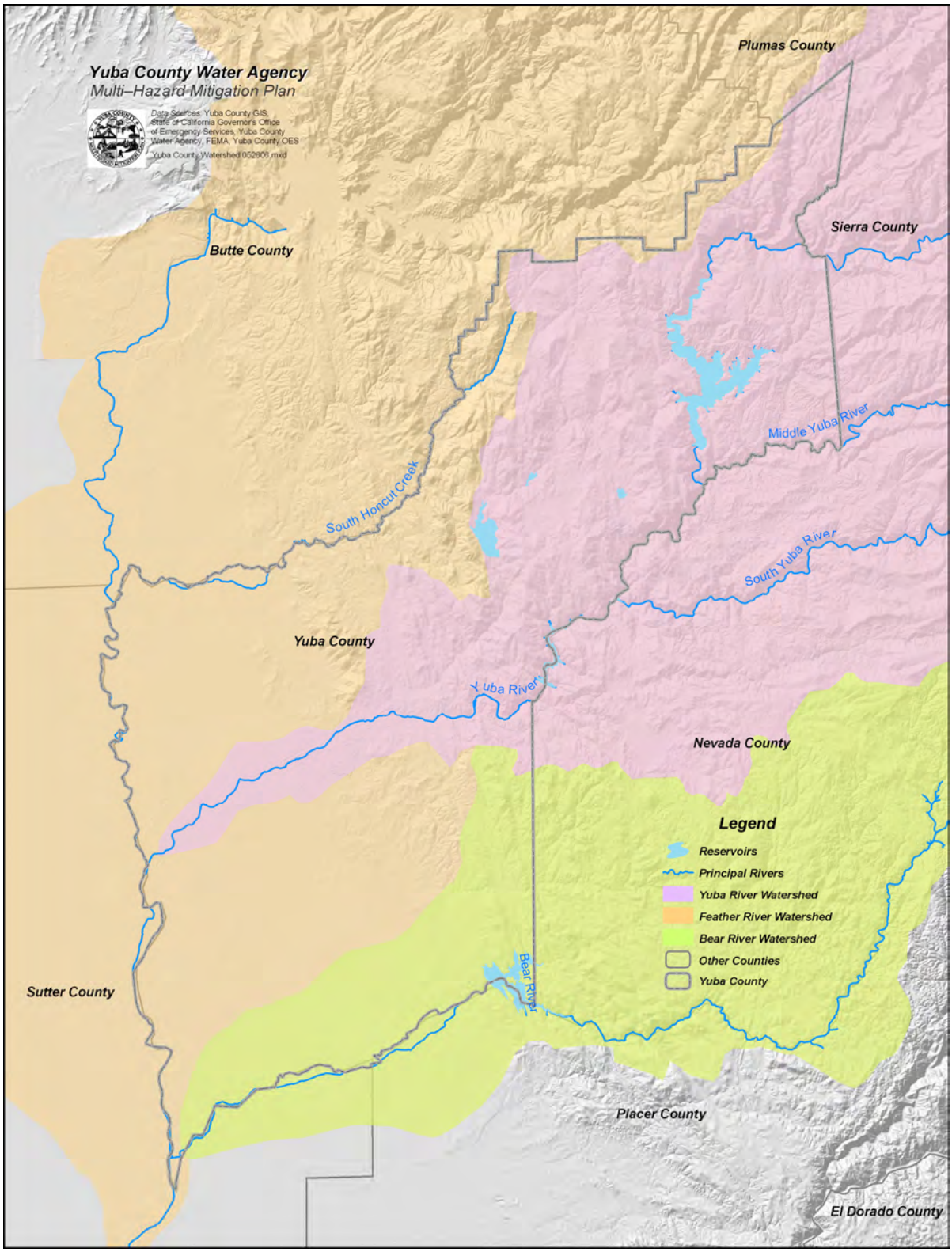
Flooding occurs in many forms: *riverine*, *urban, flash* and *coastal* flooding. The best known causes of flooding result from excess rainfall or snowmelt, especially for riverine or flash flooding. Other causes include storm surge or strong winds and high tide for coastal flooding and dam or levee failure. 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. *Urban flooding* results from a clogged or insufficient stormwater drainage system where infiltration is insufficient, or in flat, low-lying areas with insufficient overland 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 in the next subsection.

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 is located within the watershed of the Sacramento River.

Yuba County exhibits a wide range of physiomorphic features, a result from its occurrence in two major geomorphic provinces: the Great Valley and Sierra Nevada (Figure 4–6). Three significant rivers border or run adjacent to the county: the Feather River, the Yuba River and the Bear River.

Figure 4–6 Feather, Yuba, and Bear River Watersheds



The Feather River rises in the Sierra Nevada at elevations near 8,000 feet above sea level. The Feather River drains an area of 6,227 square miles (including the Yuba and Bear River watersheds). It forms a natural division between the Sierra Nevada and Cascade Range geomorphic provinces. It is approximately 130 miles long from its headwaters to its confluence with the Sacramento River just north of the city of Sacramento (County of Yuba 2004). The Feather River and its canyon provide the lowest elevation pass through the Sierra Nevada, allowing rail and automobile traffic. State Highway 70 follows and divides the Sierra Nevada and Cascade Mountain Ranges, providing the lowest pass route through the Sierra Nevada (County of Yuba 2004).

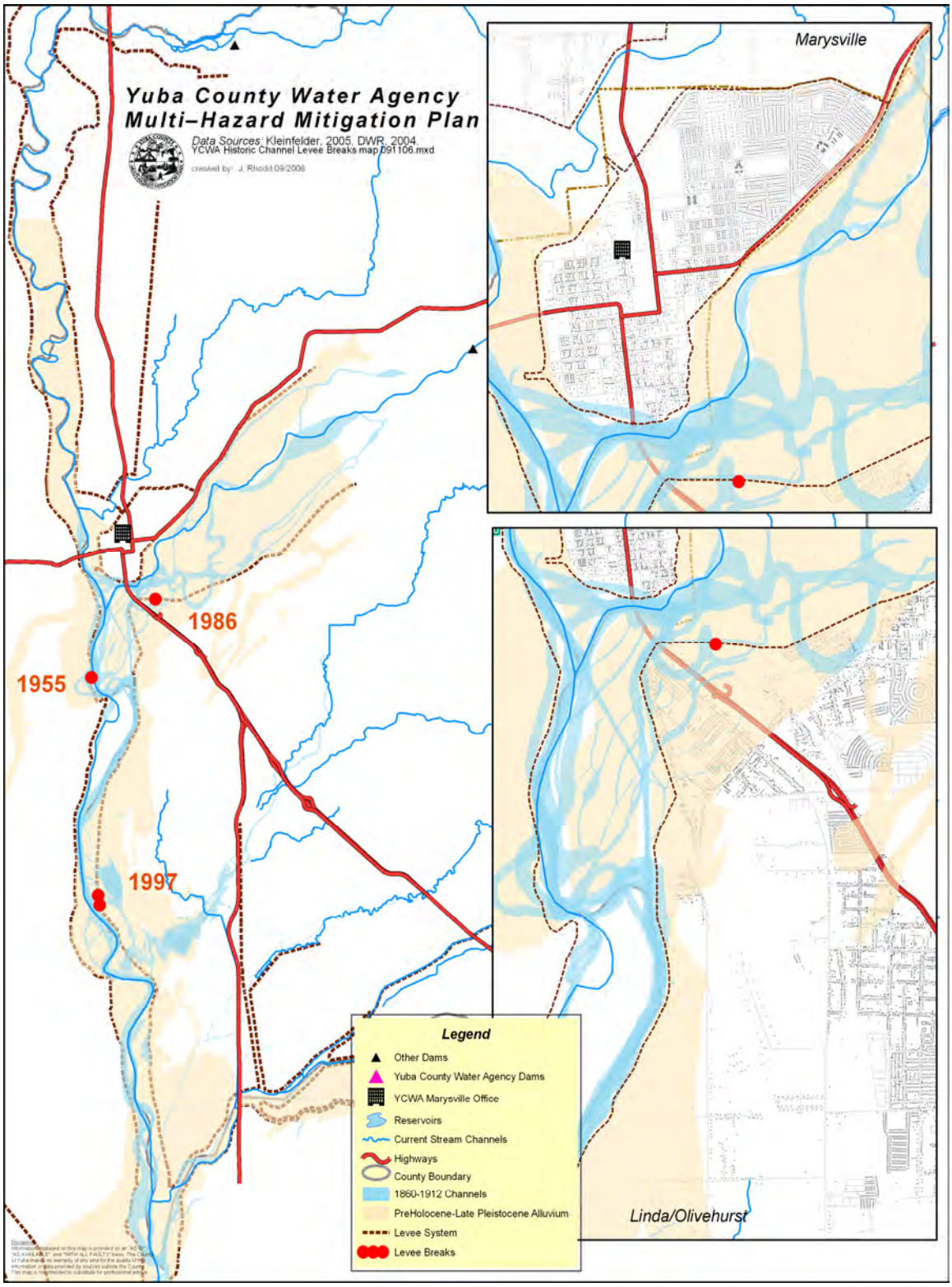
The Yuba River rises in the Sierra Nevada at over 8,000 feet above sea level, threading its way down hundreds of miles of canyons to join the Feather River at Marysville at an elevation of only sixty-seven feet above sea level. It drains a 1,336-square-mile watershed only thirty-five miles across at its widest point (County of Yuba 2004).

The Bear River flows westerly from the Sierra Nevada to its confluence with the Feather River, forming the southern boundary of Yuba County (County of Yuba 2004). The Bear River drains a watershed of 469 square miles.

4.1.2.2.1 Location, Extent, Magnitude, and Severity of Flood

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 flow 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. Figure 4–7 illustrates how 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 streamflow, the construction of bridges or culverts, or the creation of levee or other impoundment structures which control the flow in the watercourse.

Figure 4–7 Historic River Channels and Recent Levee Breaks



Other causes of flooding include dam or levee breaks and storm drain overloading in developed areas. Many low-lying areas in Yuba County adjacent to the Feather, Yuba, and Bear Rivers are now protected from flooding river flows by levees. Levee failure occurs when the structural integrity of the levee is compromised in some way. Urban flooding from storm drain overloading is typically of local concern and usually causes roads to be impassable until the water recedes.

Levee failure has been the cause of the devastating flood loss that has occurred in recent Yuba County history. Historically, levee failure in Yuba County has occurred from both overtopping and from the undermining of the levee structure. The most common cause of levee failure in recent history is due to the undermining of the levee structure. Levee failure due to the localized collapse or subsidence of surface elevations from the removal of subsurface support caused by water piping during the high–water season occurred in the 1955 Christmas Eve levee break at Shanghai Bend south of Yuba City, the 1986 Linda levee break, and the 1997 levee break just north of Star Bend. (*source*: DWR aerial photos). This undermining of surface elevations generally occurs within the rivers' historic meander zones, where the uplift pressures in the pervious meander zone deposits underlay an impervious top stratum landward of a levee become greater than the effective weight of the top stratum. The immediate result is generally a sand boil; the later result can be a collapse of the levee due to the undermining of the structure.

Not only do floods result in significant damage in the short-term, long-term economic effects are significant as the community tries to recover from the effects of the flood. Businesses may close temporarily or permanently as a result of the flood damage, causing loss of revenue as well as unemployment. Critical facilities such as utilities (electric, telephone, water and sewer, gas/oil pipelines) and roadway and airport infrastructure may be disrupted, causing a significant impact to the functioning of a community and the subsequent clean-up and reconstruction.

Threatened and endangered species
Critical habitat impacts options for pre-disaster mitigation strategies by reducing the options available for mitigation strategies in addition to the increased cost incurred by the impacted district through purchasing exchange habitat to relocate endangered and threatened species. Issues involving endangered species have played a major role in flood control along the Lower Yuba River. The Yuba River Development Project was implemented with the anticipation of a second dam, the Marysville Dam, being constructed and adding an additional 240,000 af of dedicated flood storage. Despite a USACE study and congressional authority, the dam is unlikely to be constructed because of the effect it would have on endangered spring run salmon and steelhead.

4.1.2.2.2 Previous Occurrences and Probability of Future Occurrences of Flood

Historic Occurrences
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 (USACE), California Department of Water Resources (DWR) and the Bureau of Reclamation (County of Yuba 2004).

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 1,357 and 469 square miles, respectively. As a result, Yuba County has a long history of disastrous flooding as illustrated in Table 4-6.

Table 4–6 Yuba County Flood Disaster History

Year	Flooded Area	Economic Impact

1805		
1825-1826	Entire Sacramento Valley	
1849-1850	Entire Sacramento Valley	
1852-1853	Four flood events	
1861-1862	Entire Sacramento Valley	
1866-1867	Entire Sacramento River Basin	
1875-1876	Entire Sacramento River Basin	
1881	Lower Sacramento River	
1890	Throughout Northern California	
1907	Sacramento River Basin	
1909	Nearly all the main tributaries to the Sacramento River	
1914		
1937	Feather River–east bank levee failure in RD 10	
1940	WPIC east bank and north Bear River levee failure	
1950	Yuba River thru dredger tailings near Hammonton	
1955	Feather River backed up into WPIC, Bear River, and Dry Creek; Jack Slough flooding	$33 million statewide
1964	Feather River Floodway	
1970		
1983		
1986	Yuba River– south levee failure–Linda	
1995	Low-lying areas in RD 784	
1997	Feather River–RD 784–east levee break	
1998	February flooding	
2005-2006	Jack Slough, Simpson Lane, Reeds Creek flooding	
source: Army Corps of Engineers, Sacramento District, Appendices, August 2005		

The legendary floods of 1862 and 1876 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 Englebright Dam was built prior to 1945 (County of Yuba 2004). New Bullards Bar Dam was built in the late 1960's to replace the original Bullards Bar Dam and provide additional flood control on the Yuba River.

Major floods have been experienced on both the Yuba and Feather Rivers over the past century.. In 1950 the Yuba River broke through its banks at Hammonton and flooded 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 40 people and forcing the evacuation of over 30,000 people (*Yuba County Water Agency*). From 1986 to 1999 the County experienced major flooding from localized flooding as well as levee failure. 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 (1986 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 few County departments (County of Yuba 2004).

Likelihood of Future Occurrences

The likelihood of future occurrences of the flooding hazard is considered to be high

The theory of "Hydraulic Fracture" proposes under–seepage flows through the gravel layer and subsequent eruption of water of the land side of the levee through a clay layer. The impenetrable

clay layer causes a buildup of water pressure until it can cause a fracture through the clay layer above the gravel.

The theory of "Progressive Internal Erosion" postulates that progressive wetting and drying of the sand lenses over many years has led to shrinkage and open passage ways through the gravel layer. In the next flood event, the water moves rapidly horizontally to the land side with minimal hydraulic loses which leads to higher pressures on the land side of the levee with each flood event. Together these two theories, "Hydraulic Fracture" and Progressive Internal Erosion" suggest that areas with repeated boil activity should be watched closely for possible collapse of the overlying levees.

The possibility of flooding can be mitigated with dedicated flood storage behind dam facilities. The Feather, Yuba, and Bear watersheds in and above Yuba County contain 55 water storage facilities. Of the 55 reservoirs completed only two have dedicated flood storage, Oroville Dam and Reservoir and New Bullards Bar Dam and Reservoir. As mentioned, flooding causes more damage annually across the nation than any other natural hazard (NOAA 1992). Types of damage that typically result from flooding include:

- Erosion of stream banks or building foundations and improvements
- Destruction of crop lands directly from flooding, flooding velocity or sediment deposition
- Inundation of buildings or other structures such as water treatment facilities, or park/recreation land
- Flow velocity damage to buildings, bridges or culverts, roadways, croplands

4.1.2.3 Fire Hazard Profile

Factors that contribute to the amount of damage from fires are:

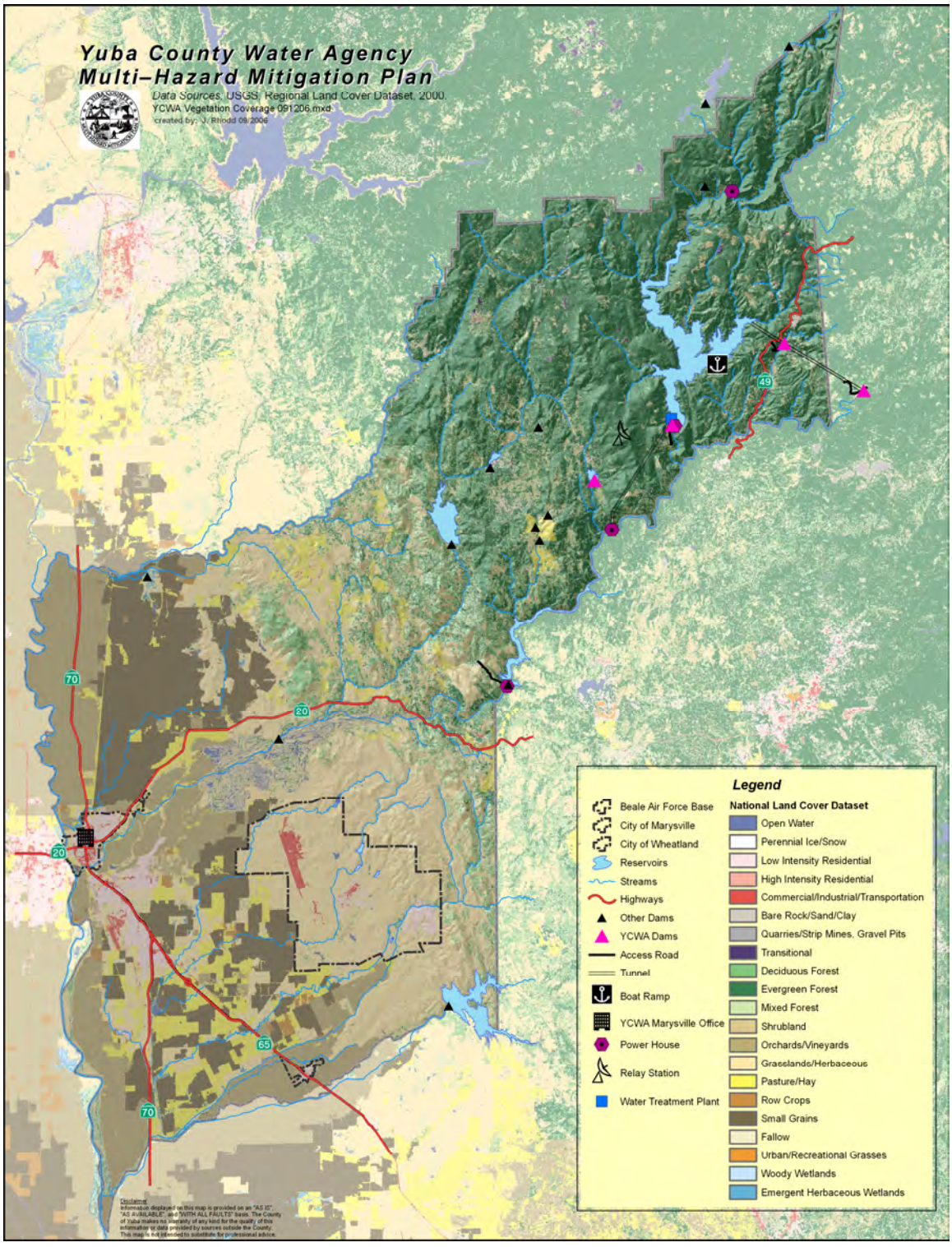
- Impact of combustible vegetation
- Impact of inadequate defensible space around affected buildings
- Impact of construction materials and practices
- Impact of wind driven aspect of the fires

YCWA facilities are located in the rural foothills region of Yuba County, an area with a disastrous history of wildfire. Given the remoteness of the area, the fuel load available, and hot summer conditions, wildfire can have a disastrous impact on YCWA facilities and assets. This section discusses the nature of the fire hazard around YCWA assets and facilities.

4.1.2.3.1 Location, Extent, Magnitude and Severity of the Hazard

This section presents the fire hazard threat in the area of YCWA's assets. The location of historic fire events and their extent, and the severity of the current threat are presented. Figure 4–8 illustrates the fuel load that characterizes the YCWA service region. As seen in the figure YCWA assets are surrounded by mixed evergreen forest.

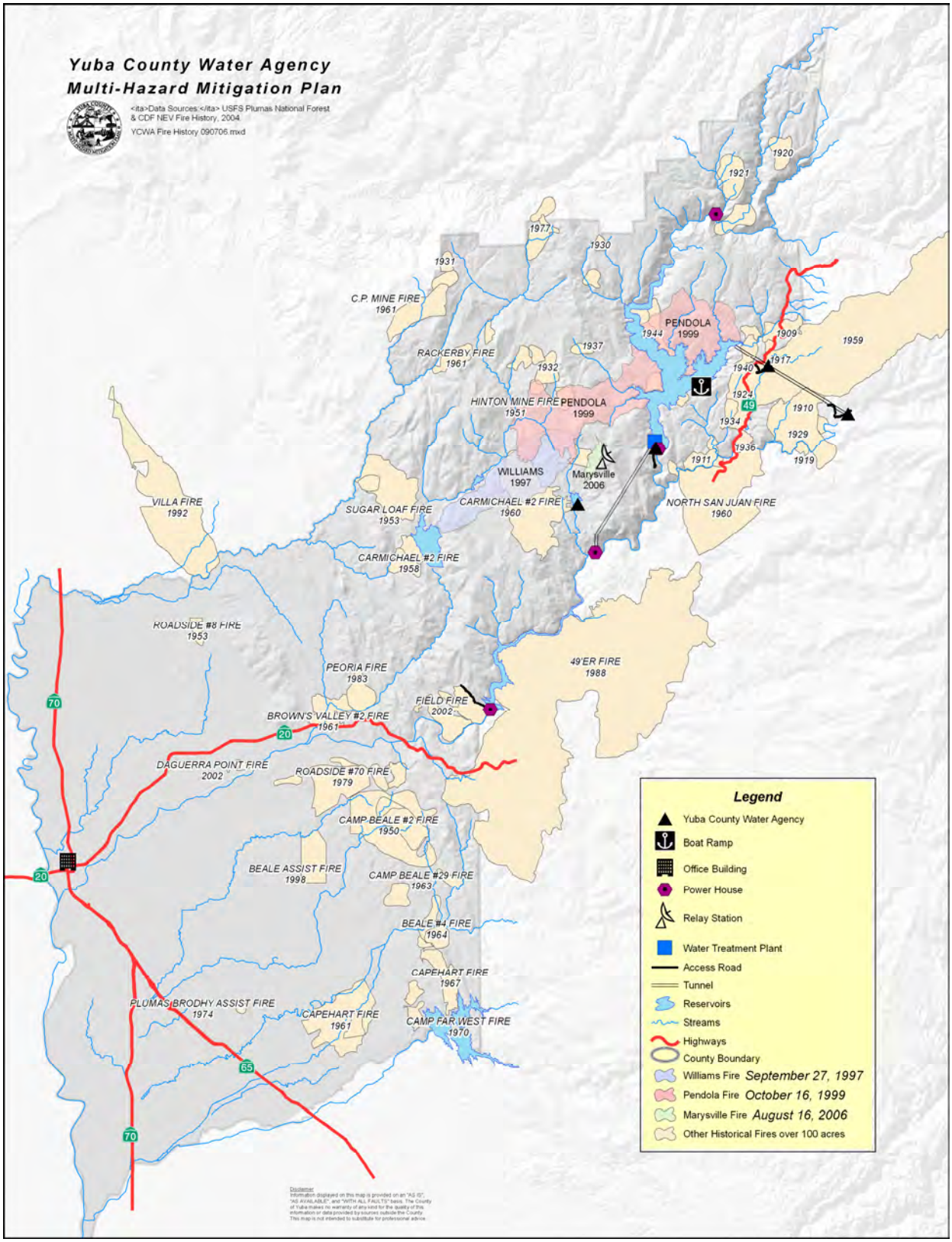
Figure 4–8 YCWA Regional Fuel Load



A large area of Yuba County has been affected by wildfire. CDF has prepared a GIS layer of historic fires in the county since 1900 and is displayed in Figure 4–9. As seen in the figure, YCWA assets are surrounded by areas where fires have historically occurred. Additionally, considering fire behavior, this is perhaps even more indicative of a greater threat since unburned areas may have a higher fuel load than areas with a previous fire history.

Two large wildfires occurred recently in the foothill portion of Yuba County near YCWA assets. The 1997 Williams Fire and the 1999 Pendola Fire caused extensive damage in the area. If the Williams Fire occurred today, the financial loss would be approximately $29,849,987 (based on current, 2005 assessed structural improvements), and approximately $4,714,154 for a repeat of the Pendola Fire. Similar large wildfires in the vicinity of YCWA assets could cause damage and restrict access to assets and facilities.

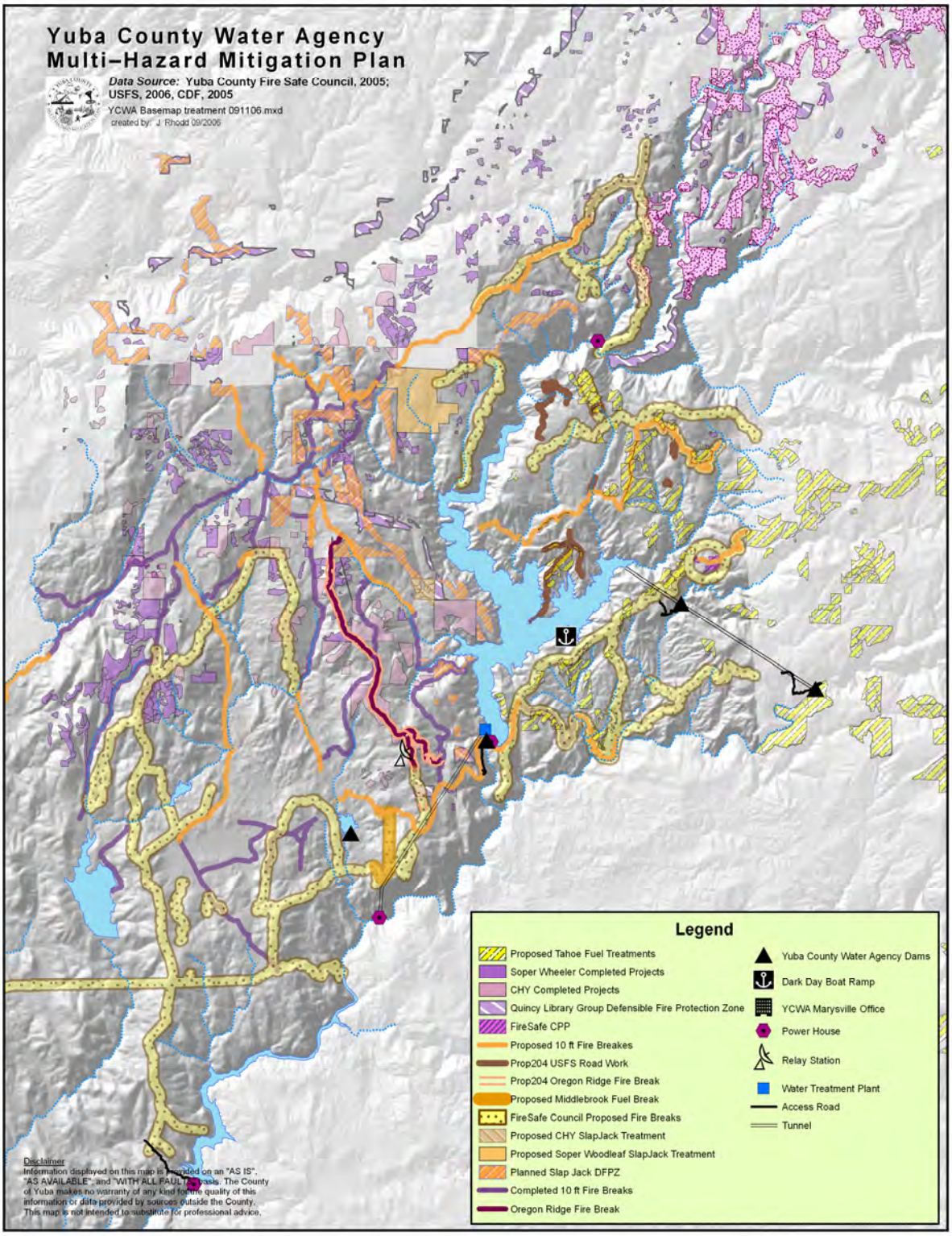
Figure 4–9 Yuba County Fire History



From May to October of each year, the foothill portion of Yuba County faces a serious threat from wildland fires. Undeveloped rugged terrain, with heavily forested and highly flammable brush-covered land, long dry summers with high temperatures and high winds may exacerbate the potential for wildland fires. Threat levels are also exacerbated during this period when the population doubles due to a large influx of recreational visitors and tourists who frequent the area adjacent to YCWA facilities. This additional transient population increases the potential for wildland fires from camping, off-road vehicle use, and improper fire prevention practices.

The Yuba Watershed Protection and Fire Safe Council (YWPFSC) have been at the forefront of a combined effort to reduce the risk of wildfire in the foothills of Yuba County. YWPFSC, in cooperation with local community groups and the Yuba County Public Works Department, have cleared high fuel load brush throughout the foothills and cleared roadsides. Areas of proposed fuel reduction or fuel breaks have also been identified through the efforts of YWPFSC (Figure 4–10).

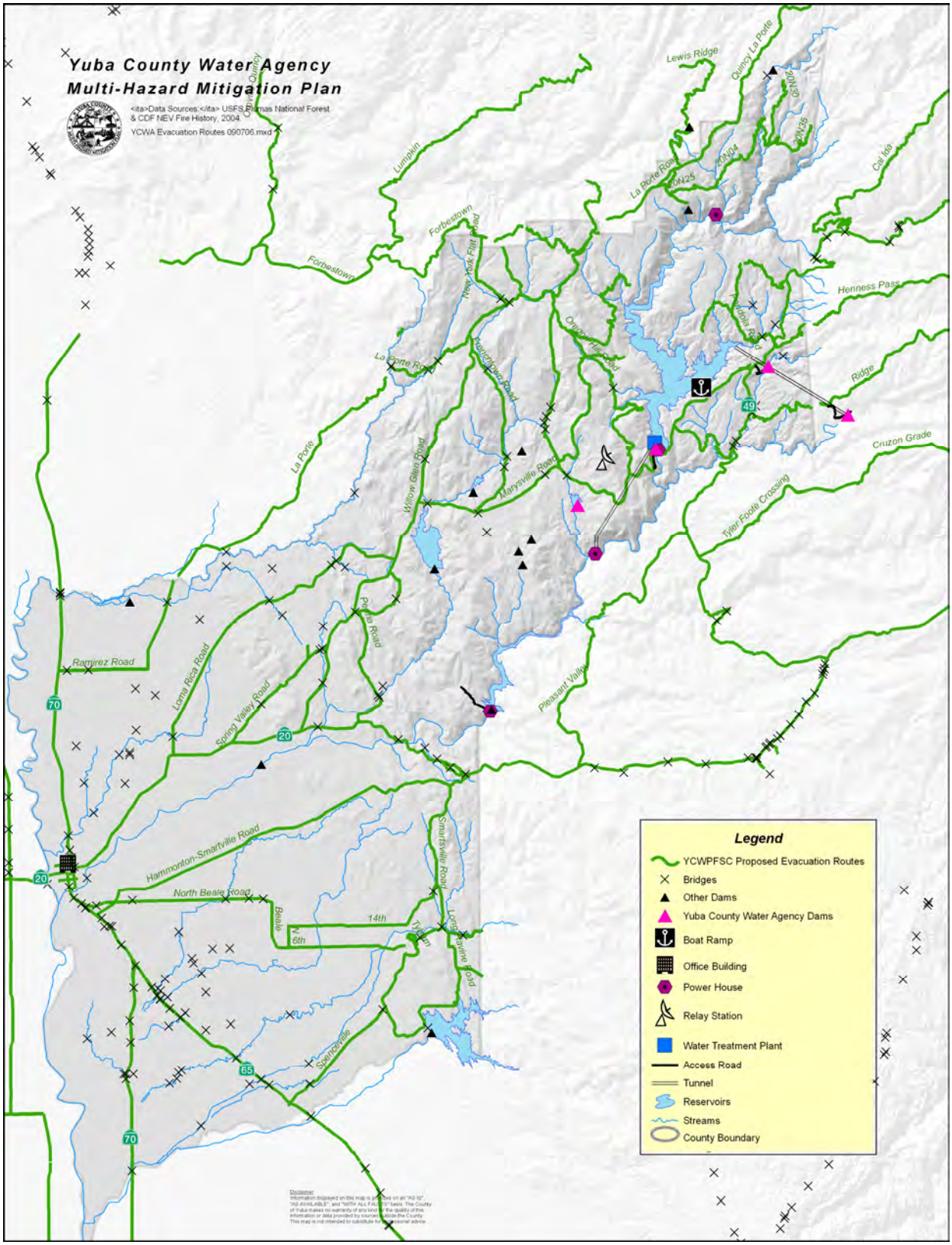
Figure 4–10 Fire Suppression Treatment Zones



Evacuation Routes

The main transportation corridor to YCWA facilities is Marysville Road, a two-lane road traversing the foothills from east to west. Marysville Road begins at State Highway 20 in Browns Valley and terminates in the east at State Highway 49 at Camptonville. Proposed principal evacuation corridors have been identified by YWPFSC and are shown on Figure 4–11.

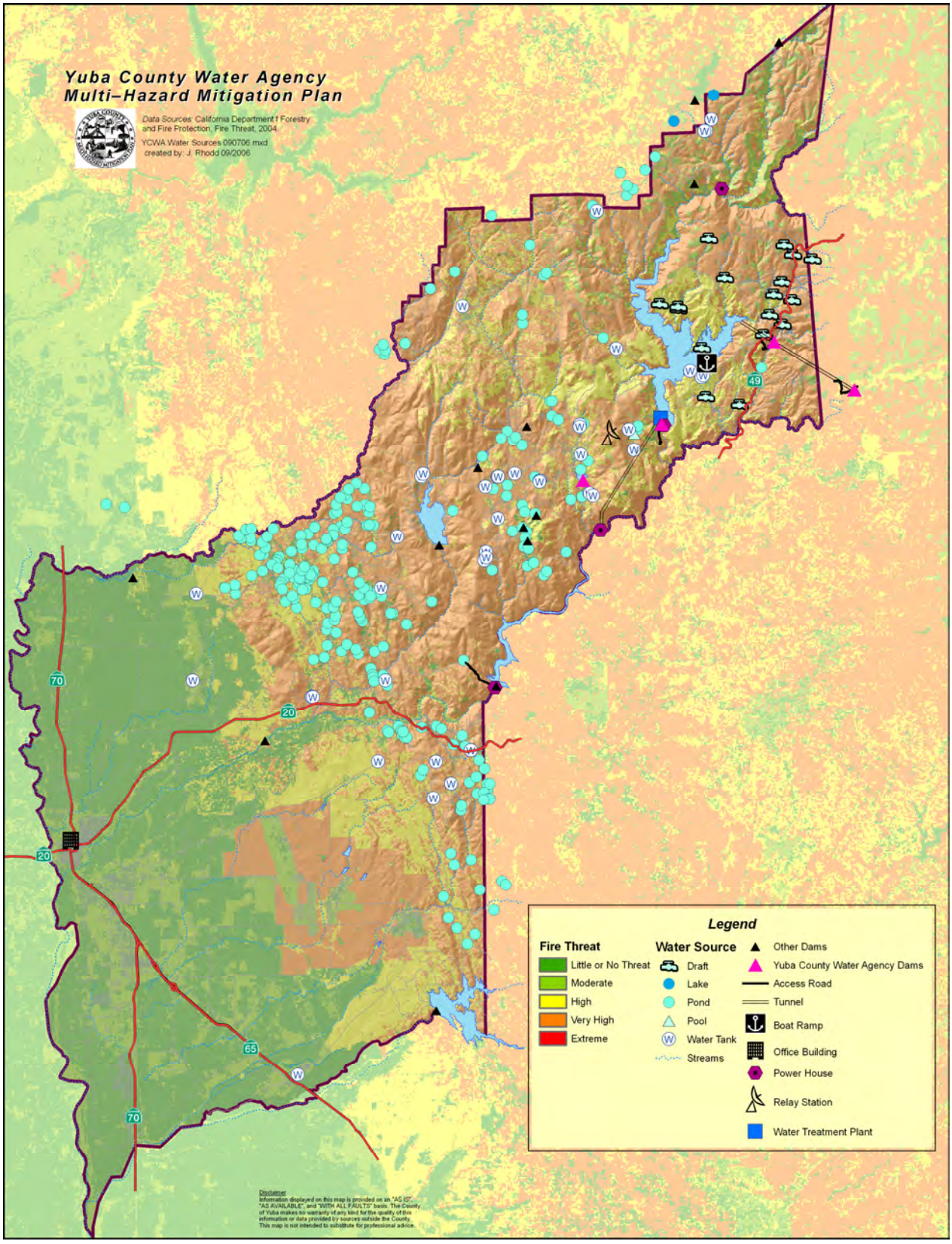
Figure 4–11 Yuba County Proposed Evacuation Routes



Water Resources

During fire season, access to water is limited to fight fires that may occur in the foothills. Water tanks and other water sources have been identified and are continuing to be proposed in the foothill portions of the county to be able to fight fires. These locations are shown on Figure 4–12. CDF, Dobbins-Oregon House Fire Protection District, Foothill Fire Protection District, Camptonville Community Services District and the North San Juan Fire Protection District are the surrounding agencies able to provide fire-fighting capabilities to YCWA facilities located throughout the foothills of the county.

Figure 4–12 Yuba County Water Source Sites



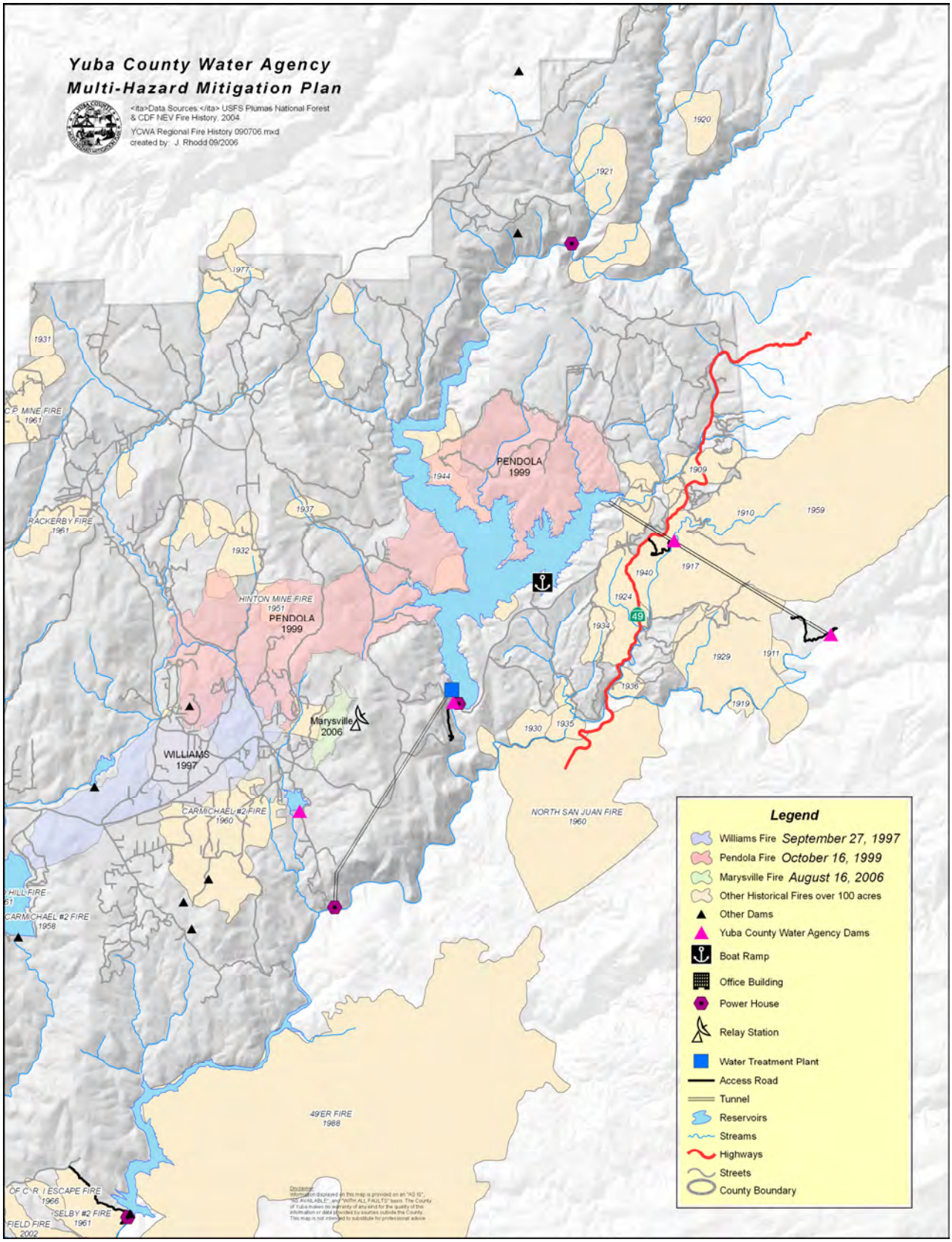
Additionally, there are numerous water storage tanks located within the foothills of Yuba County in the vicinity of YCWA facilities. The tanks are strategically placed to provide quick access for fire response units. The tanks typically range in capacity from 2,500 to 10,000 gallons. The tanks are refilled through water from irrigation canals and ditches. There are also many privately-owned tanks on residences across the foothills that are refilled from well water or springs. 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. Unfortunately, vehicle access is limited.

4.1.2.3.2 Previous Occurrences and Probability of Future Occurrence of Fire Hazard

Historical Occurrences

As shown in Figure 4-13, a large area of Yuba County has been affected by wildfire. The two most recent major wildland fires, the aforementioned Williams and Pendola Fires, have destroyed thousands of acres and hundreds of structures in the Dobbins, Oregon House, and Pendola areas surrounding New Bullards Bar Reservoir and areas to the west. As shown on Figure 4–13, the Pendola Fire in 1999 and the Williams Fire in 1997 burned large areas near YCWA facilities. These two fires are highlighted below.

Figure 4–13 YCWA Regional Fire History



The Williams Fire destroyed 5,743 acres of vegetation, 91 housing structures, 136 out-buildings and 184 vehicles (NEU-11935). The fire started in September 1997. Weather conditions were hot that day, 86 degrees, with 8-20 mph winds gusting to 39 mph. The average age class of the fuels in the area was over 40 years old. The fire started approximately two miles north of the community of Dobbins, and was determined to have been caused by an electrical short in a motor home. Before the fire was contained, 186 engines, 45 hand crews, 27 dozers, 21 water tenders, six helicopters, seven air tankers and 201 overhead personnel were assigned to fight the fire. The DOHFPD committed a total of 18 personnel and assisted in the initial attack with Engine 6571 and Tender 6591, plus an additional 12 personnel at the Foothills Station H1 Incident Command Post to aid in logistics and planning.

Damage Summary (Dollars)

There was a total of $19 million dollars in damage to buildings, equipment, and land.

Structures & Vehicles

36 Frame Houses	$4,828,380
55 Modular Homes	$4,286,280
6 Commercial Buildings	$997,000
103 Out-Buildings	$286,537
23 Garages	$254,000
10 Barns	$145,000
38 Travel Trailers	$275,000
9 Recreational Vehicles	$208,000
14 Miscellaneous	$28,000
P G & E	$200,000

Natural Resources

2,940 acres oak pine grass	$6,174,000
330 acres timber	$1,320,000
1,570 acres brush	$314,000
970 acres grass	$194,000

(source: Williams Incident NEU-11935, 9/27/97; Damage Assessment Report Summary)

The Pendola Fire burned a total of 11,725 acres of vegetation and timber beginning October 16, 1999. Fourteen residences, three commercial buildings, 65 out-buildings, and 41 vehicles were destroyed by the fire (NEU-15141). The cause of the fire was determined to be from a wind thrown conifer that fell onto an electrical power line just west of the Pendola Road/Pendola Extension. Weather on the day the fire started was hot, dry and windy. At the height of the incident there were a total of 2,505 resources assigned to the incident. A total of 31 different agencies, fire departments and cooperators participated.

Damage Summary (Dollars)
There was a total of $2,686,190 in damage to buildings, equipment, and land.

Structures & Vehicles:

14 Residential Structures	
3 Commercial Structures	
65 Other Buildings	
41 Vehicles	$2,091,190
Smoke damage to saved homes	$500,000
P G & E losses	$95,000

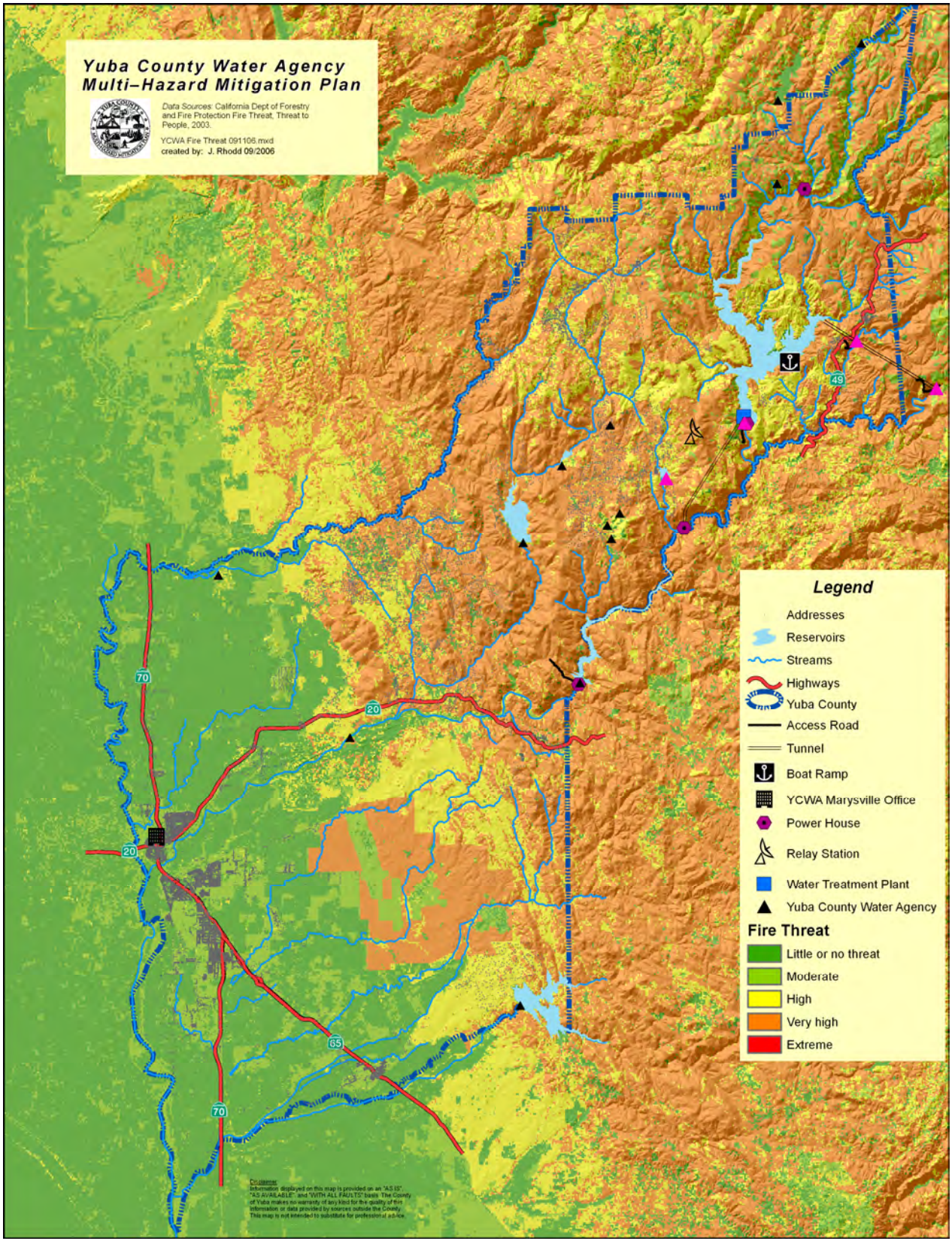
(source: After Action Report; Pendola Incident; TNF-015208; Oct 16-26, 1999)

Fires have occurred in both 2002 and 2003 in an area bounded by Lake Francis Road on the east, the Yuba River on the south, Dixon Hill Road on the west and Texas Hill Road on the north, comprised of steep, brush filled canyons that are not easily accessible.

Likelihood of Future Occurrences

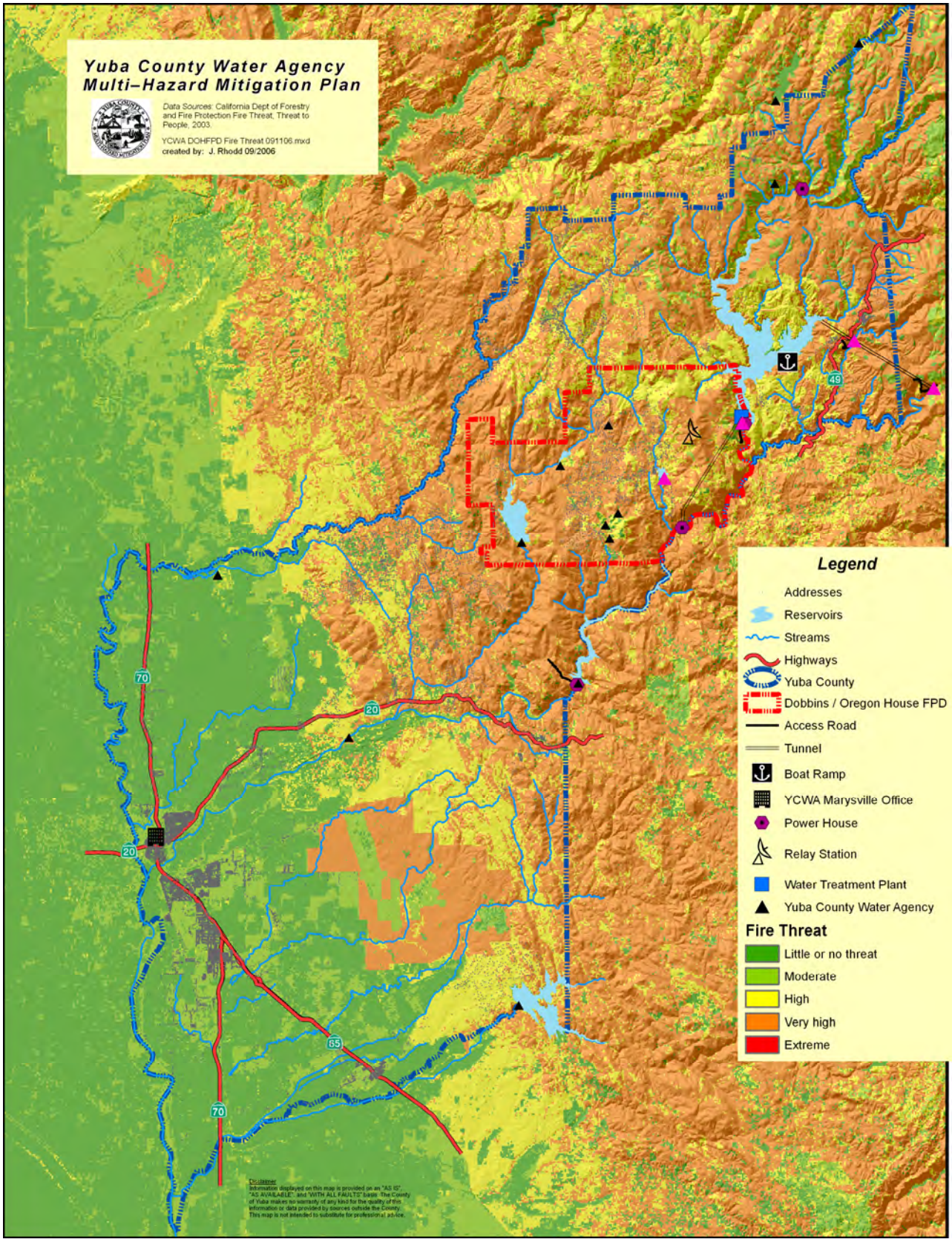
According to CDF, the agency responsible for fighting wildland fires in the majority of the foothills of Yuba County, the foothills exhibit a high to very high fuel rank (Figure 4–14).

Figure 4–14 Yuba County Regional Fuel Rank



The fuel rank is assigned using expected fire behavior for a given set of physiographic and climatic conditions (topography, vegetative fuels, wind speed, humidity, and temperature) (CDF 2004b). Additionally, the Dobbins/Oregon House Fire Protection District has identified areas of heavy brush that has become increasingly flammable with age in their district that poses a greater risk of hazardous fire than surrounding areas (Figure 4–15). As can be seen from the figure, there is an area of heavy brush immediately west of the Colgate Powerhouse and Lake Francis Dam. Proactive steps taken to mitigate the threat and spread of wildfire in the foothills will help to reduce the threat to YCWA facilities and infrastructure.

Figure 4–15 Yuba County Fuel Rank with Dobbins–Oregon House FPD



4.1.2.4 Landslide Hazard Profile

A landslide is a movement of earth (rock or soil) along a sloping surface or by the falling of a mass itself. This term is an umbrella term for events such as rock falls, debris flows, and mudslides. Landslide susceptibility is a result of various combinations of geology, topography, vegetation, and weather. Earthquakes, intense precipitation causing saturated soil, the removal of stabilizing vegetation as a result of fire, or the undermining of surface elevations due to the removal of subsurface support caused by water piping during the high–water season can trigger landslides. If a landslide occurs adjacent to a dam or in a reservoir a dam failure may occur, just as an occurrence adjacent to a levee may precipitate a levee failure.

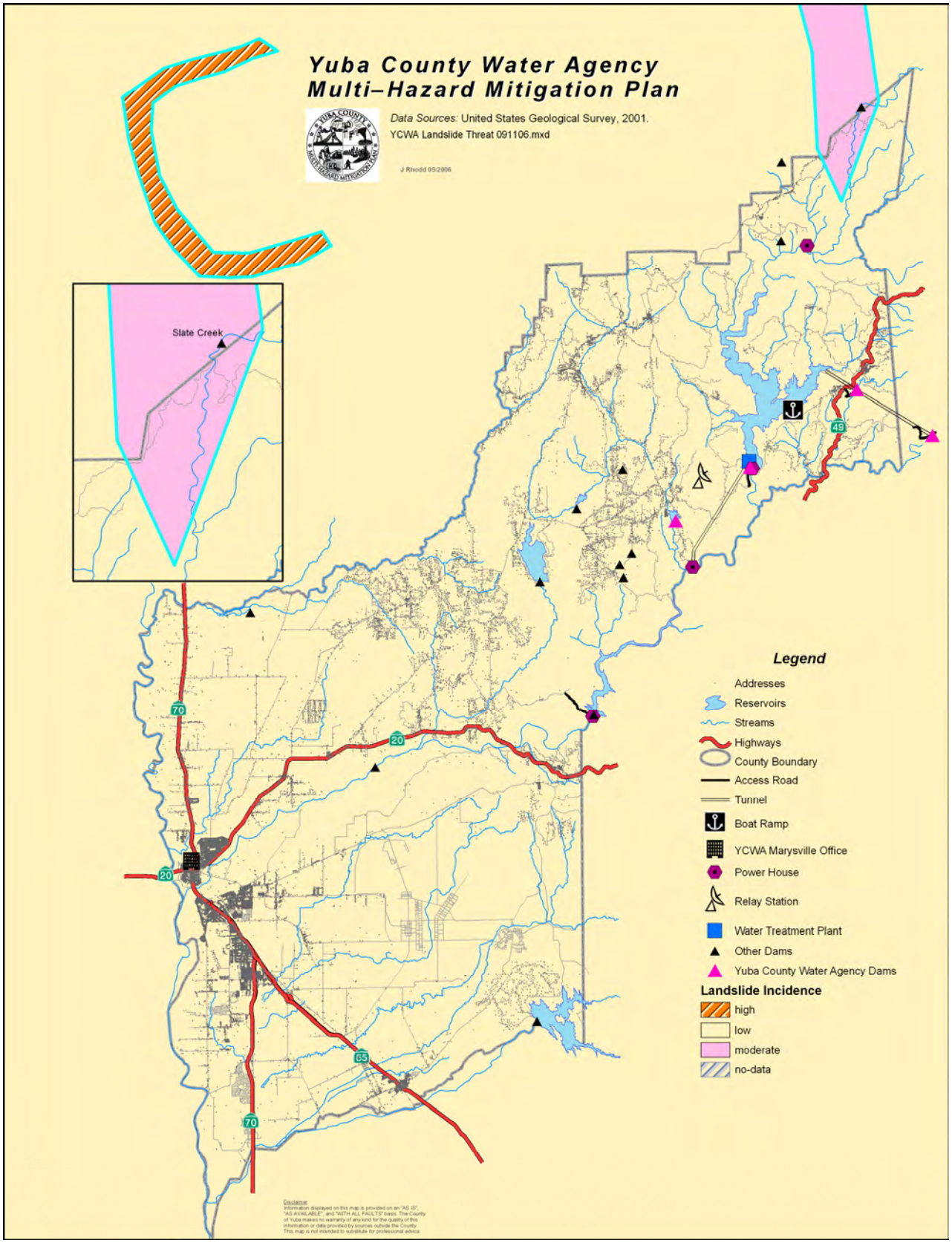
The valley area in Yuba County is underlain by sands and fine–grained material. Slopes in the valley area are slight and the resulting landslide hazard is low. The foothill and mountain areas of the county are generally underlain by a thin soil mantle developed upon metamorphosed bedrock. The potential for landslides in these areas is limited to portions of the western foothills area where unconsolidated bedrock units are encountered and on hillsides exceeding 60 percent slopes.

YCWA facilities are located in the rural foothills region of Yuba County, an area with a history of road closures due to landslides, slips, and slumps. Given the remoteness of the area, the steep terrain, and wet winter conditions, landslides can have a disastrous impact on YCWA facilities and assets. This section discusses the nature of the landslide hazard around YCWA assets and facilities.

4.1.2.4.1 Location, Extent, Magnitude and Severity of Landslide Hazard

Although landslide–prone areas can be identified with about 90 percent accuracy by geologic studies, only a small portion of California has been mapped in sufficient detail for land–use planning. FEMA has identified areas of estimated landslide risk across the U.S. Figure 4–16 shows the FEMA-identified landslide potential for Yuba County. Most of Yuba County has been classified by FEMA as having a low landslide potential. Only a small portion near the town of Strawberry Valley has a moderate landslide potential. (*source: USGS National Landslide overview map of the United States, 2005*)

Figure 4–16 YCWA Landslide Susceptibility



4.1.2.4.2 Previous Occurrences and Probability of Future Landslide Occurrences

Prior to the 2005–2006 wet season, there have been two known landslides in the area of YCWA facilities. One occurred in 1968 in Bullards Bar Reservoir near the dam. Another was in 1975 – ½-mile south of the dam where a section of road was destroyed. Other landslides have occurred in the foothills of Yuba County on access roads to YCWA facilities. The 2005–2006 wet season landslide damage to YCWA facilities and access roads can be seen in Figure 4–17 below.

Slides occur each rainy season near YWCA facilities as the soils cleared of natural vegetation for access roads in areas of steep terrain become saturated. These areas will continue to be plagued by slides as the lands degrade through soil erosion caused by gradient and rainfall erosivity. Figure 4–18 illustrates the repetitive landslide damage to roads that has occurred within Yuba County.

Figure 4–17 YCWA Landslide Damage 12/31/05

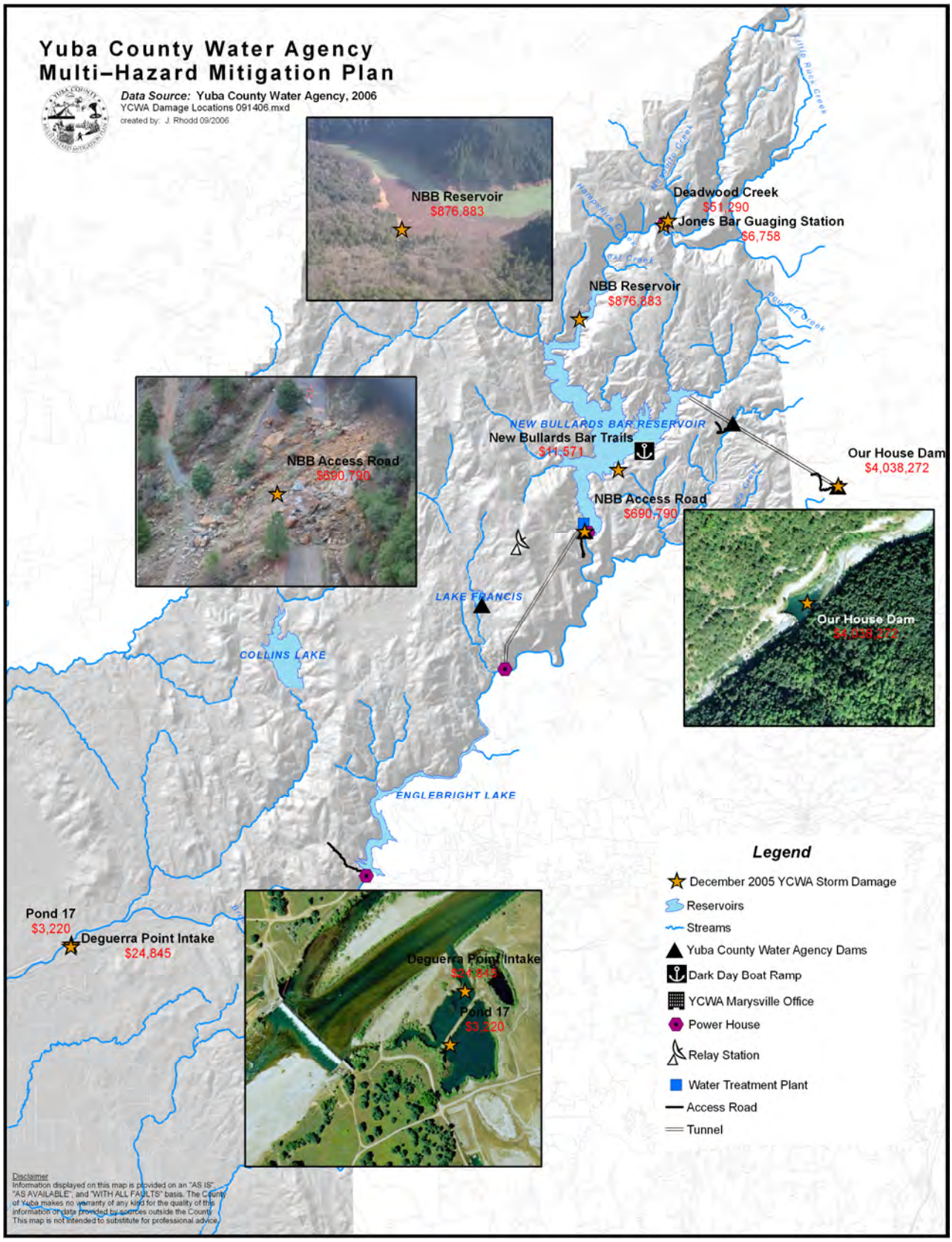
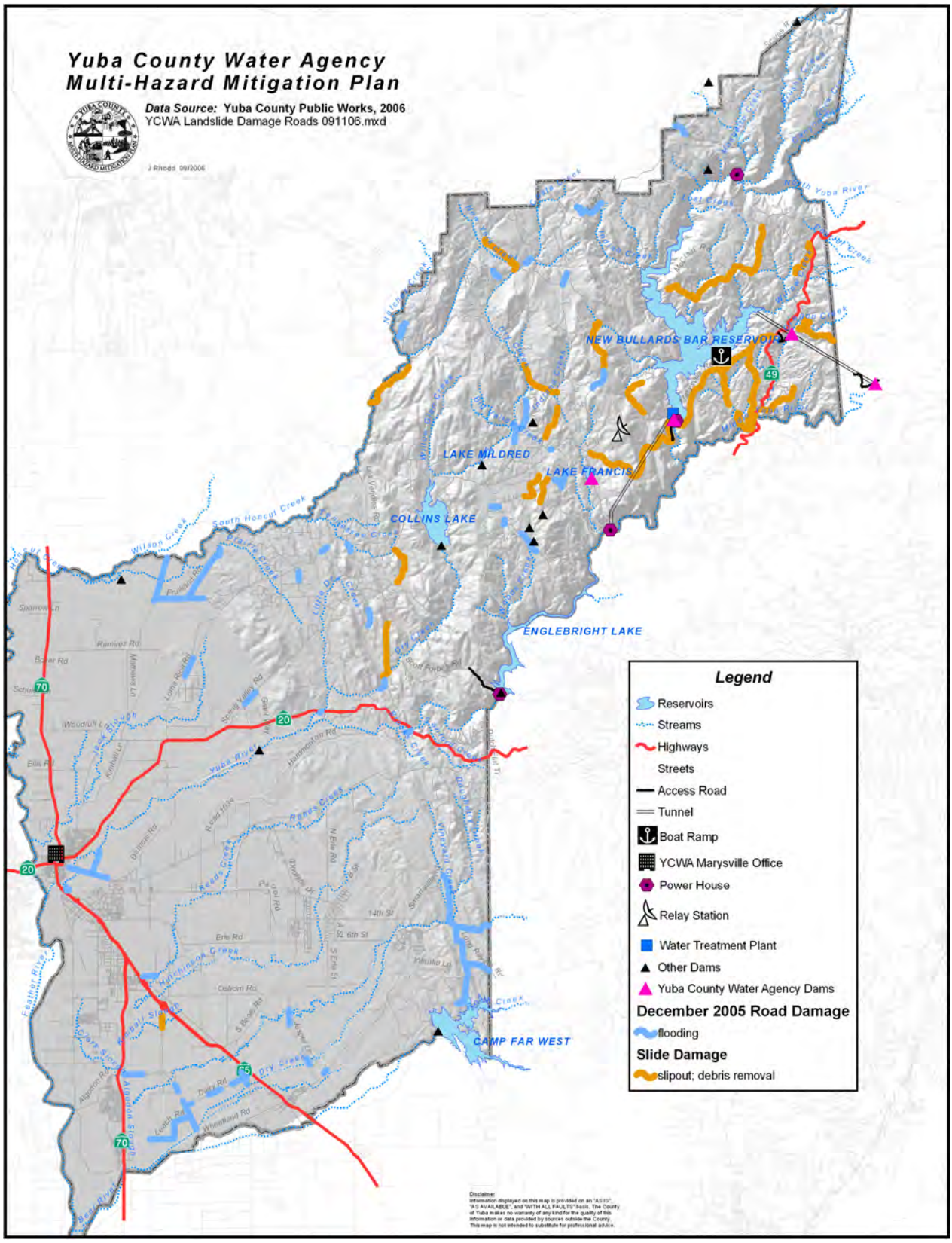


Figure 4–18 Landslide Damaged Roads



4.1.2.5 Dam Control

The Yuba County Multi-Jurisdiction has rated loss of Dam Control as a MODERATE PRIORITY HAZARD.

The loss of dam control can result from a number of natural or manmade causes such as, erosion of the face or foundation, improper citing, 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 also 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.

4.1.2.5.1 Location, Extent, Magnitude, and Severity of Dam Control Hazards

There are five major dams which could have significant impact on the County of Yuba in the event of a loss of dam control, they are: **New Bullards Bar, Englebright Dam (The Narrows), Virginia Ranch Dam (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. To date there have been no significant dam failures in Yuba County, although Lake Francis Dam reportedly failed in 1902 due to hasty construction practices and was rebuilt in 1905). (*source: Brown–Buntin Associates, Inc., 1994*) Due to the method of construction they have performed well and failure is not expected to occur.

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 EPA Plan is also be used to provide emergency notification when flood water releases may present a potential for major flooding. Copies of Dam EPA for the following facilities are located in the **County of Yuba Emergency Operations Center (EOC)** and at the DWR in Sacramento.

Additionally; Emergency Personnel and Phone Numbers for each of these facilities can be found in the Appendix of this plan.

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

Description and Location: 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, Nevada and Sierra Counties, and consists 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 form the original Bullards Bar Dam. Tunnels supply water from the latter two dams to Bullards Bar Dam for power generation and water supply. 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. (*source: USACE, July 2005*) 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. Flood control is coordinated with operations of the Oroville facility according to rules prescribed by the USACE.

Areas of Inundation: Should a breach in the dam occur, the water released would flow in a southwesterly direction toward the City of Marysville (Figure 4–19). Marysville lies within the dam's flood plain/inundation path, in the event of a dam failure, the flood wave would reach the Simpson Lane Bridge in Marysville approximately 90 minutes later and the confluence with the Feather River in approximately 3 hours. The flood wave would continue to move through Linda and Olivehurst, inundating the western section of the community in approximately 4 hours. It should be noted that the peak inundation stage in Marysville, Linda and Olivehurst would be within 7 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 Reservoir on the Feather River had been in operation during the 1955-1956 floods, they would have prevented the loss of 40 lives and $50.5 million in damages that occurred on the Feather River. (*source: Emergency Action Plan, Yuba River Development Project, FERC Project No. 2246, 2004*)

Englebright Dam (Narrows Project
Narrows Project FERC No. 1403 / NAT. Dam No. (Englebright Dam) CA10105
DWR # ENG

Description and Location: Englebright Dam and associated facilities are the properties of the U.S. USACE of Engineers. Yuba County Water Agency (YCWA) and Pacific Gas and Electric (PG&E) both have licenses to operate facilities. The dam is located on the Yuba River partially within Yuba County, on the Yuba Nevada County boarder. 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.

Areas of Inundation: 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

Description and Location: 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 Oroville 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–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 750,000 acre-feet of the total 3,538,000 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 2,788,000 acre-feet of the project. (*source: USACE, July 2005*) Flood control is coordinated with operations of the New Bullards Bar facility according to rules prescribed by the USACE.

Areas of Inundation: Should a breach in the dam occur, the downstream current of water would flow in a southerly direction (Figure 4–19). 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

Description and Location: Virginia Ranch Dam and Collins Reservoir are located in a widening area of the Dry Creek Channel 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.

Areas of Inundation: 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 2 hours later.

Camp Far West Dam
FERC No. 2997-001
DWR # CFW

Description and Location: 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, NGV Datum (1929). This allows 20 feet of surcharge between the ungated crest and the top of the dam, representing storage of 47,500 acre-feet.

Areas of Inundation: 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 (Figure 4–19). The flood wave would reach Wheatland in approximately 25 minutes. Other downstream communities that would be affected include Sheridan, Olivehurst and Nicolas, however, rural and suburban

development is underway in the inundation area. This area flooded in 1997 when a levee broke on the Bear River.

4.1.2.5.2 Previous Occurrences & Probability of Future Occurrence of Dam Control Hazard

Historical Occurrences

In 1902 Lake Francis Dam reportedly failed due to hasty construction practices and was rebuilt in 1905. (*source: Yuba County General Plan, Volume 1, 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). In addition several smaller mining and agricultural dam exist in the watershed. Some of these small earth filled dams have failed over the years. (*source: Yuba County General Plan, Volume 1, 1994*)

Likelihood of Future Occurrences

The following dams are located within the Yuba County Jurisdiction boundaries:

New Bullards Bar Dam, (latitude 39.39222, longitude –121.14) at the New Bullards Bar Reservoir

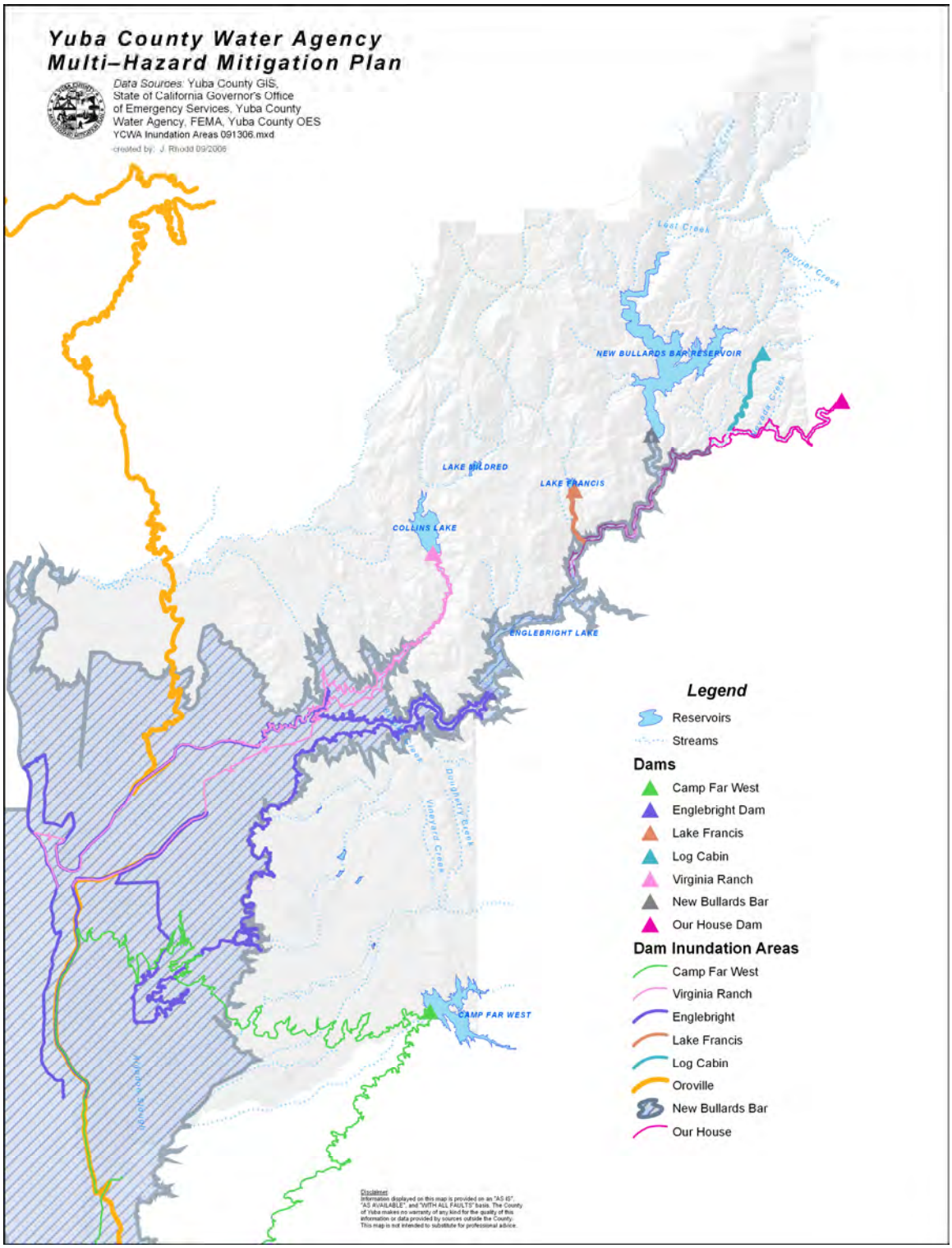
Lake Francis Dam, (latitude 39.36, longitude –121.20278) at Lake Francis

Los Verjeles Dam, latitude 39.36833, longitude –121.28278) at Lake of the Springs

Virginia Ranch Dam, (latitude 39.32306, longitude –121.30861) at Collins Lake

The incorporated areas of the county have increased an average of 2.09 percent annually from 2000 to 2005. The unincorporated areas of Yuba County have increased and average of 2.19 percent over the same time period. (*source: California Department of Finance Table 2:E-4 Population Estimates for Cities, Counties and State, 2001-2005 with 2000 DRU Benchmark, 2005*). Sacramento Area Council of Governments (SACOG) an association of local governments approves the distribution of affordable housing in the region and assists in planning for transit has determined a population increase for Yuba County of over 30 percent by 2015. This translates to a population increase of over three percent annually. SACOG has determined a population increase for the unincorporated areas of the County of over 34 percent (3.4 percent annually), over five percent for the incorporated area of the City of Marysville (0.5 percent annually), and over 64 percent for the City of Wheatland (over 6.4 percent annually) by 2015. (*source: http://www.sacog.org/demographics/projections/index.cfm, 2005*) Unless infrastructure is developed to protect the increase population from the threat of flood in the County losses from the dam control hazard will continue to increase in the future.

Figure 4–19 Dam Inundation Areas



4.1.2.6 Terrorism Hazard Profile

The definition of terrorism as it appears in the United States Code, Title 18, Section 2331 (18 USC 2331): United States federal statue defines terrorism as "violent acts or acts dangerous to human life that…appear to be intended (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by assassination or kidnapping."

All terrorist acts involve violence or the threat of violence and instill fear. These violent acts are generally committed by nongovernmental groups or individuals. Generally, terrorists are neither part of, nor officially serving in the military forces, law enforcement agencies, intelligence services, or other governmental agencies of an established nation-state.

Terrorists attempt to invoke panic and undermine confidence in our government and the political leadership of our country. Terrorism is designed to have far reaching psychological effects beyond the impact of the victims or target of an attack. Terrorists intend to frighten and intimidate a rival audience, ethnic or religious group, country, political leadership or the international community as a whole.

For this reason they rely on dramatic, often spectacular, bloody and destructive acts of hit-and-run violence to attract attention to themselves and their cause. Terrorists use the publicity generated by their violence to leverage influence and power.

Historically, California has had a long experience combating terrorist groups, both domestic and international. Domestic terrorist groups in the state have been largely issue-oriented, while the few known internationally based incidents have mostly targeted the state's émigré communities and been related to foreign disputes. Today, however, both groups are more likely to be aligned nationally and/or internationally through electronic networking. The issues and politics of these groups remain essentially unchanged but now include increasing expressions of hatred for existing forms of government. The World Trade Center Incident demonstrates that international terrorist groups have the potential to operate with deadly effectiveness in this country. Such groups may offer no allegiance to any particular country but seek political or personal objectives that transcend national/state boundaries.

There is appropriate concern that such attacks as witnessed in Tokyo, New York City, and Oklahoma City could occur in California. A terrorist acting alone or in concert with any of the known national or international groups could readily commit acts of terrorism in California. The open availability of basic shelf-type chemicals and mail order biological research materials, coupled with an access to even the crudest laboratory facilities, could enable the individual extremist or an organized terrorist faction to manufacture proven highly lethal substances or to fashion less sophisticated weapons of mass destruction. The use of such weapons could result in mass casualties, long-term contamination, and wreak havoc to both the state and national economies.

The freedom of movement and virtually unrestricted access to government officials, buildings, and critical infrastructure afforded to California's citizens and foreign visitors, presents the terrorist with the opportunity and conditions of anonymity to deliver such devastation and its tragic consequences with only the crudest devices of nuclear, chemical, or biological content.

Terrorist incidents create a unique environment in which to manage emergency response. Local responders are typically the first on-scene during an actual incident and local government has primary responsibility for protecting public health and safety. Ordinarily, the local first response will be conducted under California's Standardized Emergency Management System (SEMS). This system forms the basis of California's concept of operations for managing any kind of

emergency or disaster, including terrorist incidents. The local responders will manage all aspects of the incident until the FBI assumes command, by virtue of its legal authority, of the law enforcement aspects relating to identifying, apprehending, and neutralizing the terrorists and their weapons. Local and state authorities always maintain control of their response resources and continue to operate utilizing SEMS.

4.1.2.6.1 Location, Extent, Magnitude and Severity of Terrorism Hazards

The most likely target of terrorism in Yuba County is New Bullards Bar Dam. It is the only potential terrorist target identified by the Department of Homeland Security within the jurisdiction of the Yuba County Water Agency.

Other targets for terrorism would be YCWA facilities and infrastructure including the dams and related facilities. Failure of the dams would have a devastating impact to downstream residents. Section 4.1.2.1 details the hazard posed by failure of a YCWA dam. In the case of dam failure, not only would there be potential for immediate loss of life and property throughout the inundation area, but there would also be the collateral loss to power generation, tourism, and negative environmental effects to fisheries and natural habitats.

Similarly, arson is a threat. Section 4.1.2.3 details the nature of the fire hazard in Yuba County and the potential threat to YCWA facilities. Multiple fires could be set with ease on a dry windy day. The resulting situation could easily strain the firefighting resources of local fire protection districts. Historically, damages incurred from fires have been the most traumatic in terms of lives and monetary damages in the region. The Yuba County foothills are particularly vulnerable to region-wide wildfires that would create a situation wherein resources could not be centralized and coordinated to fight the fire.

4.1.2.6.2 Previous Occurrences and Probability of Future Occurrence of Terrorism

Historical Occurrences

Violence and terrorist acts plague our communities and schools and has plagued Yuba County. In 1992 school violence resulted in a tragic event when a former Lindhurst High School student, Eric Houston, held students and teachers hostage for 8 ½ hours. The initial shooting and rampage left several students seriously wounded and resulted in the deaths of three students and one teacher. Law enforcement and school officials are working together to address school crime and violence through preventive efforts.

Likelihood of Future Occurrences

A terrorist attack upon Bullards Bar Dam is considered to be rare at this time. This hazard ranking should be considered fluid depending upon the relationships that the USA has with foreign governments, unaffiliated militant organizations, and advocates for the hot internal topics of the day. An example would be Neo–Nazis, white supremacists, militant environmental groups and right to life activists. Due to the nature of YCWA facilities, the consideration of the potential for terrorism will not be discussed in this plan.

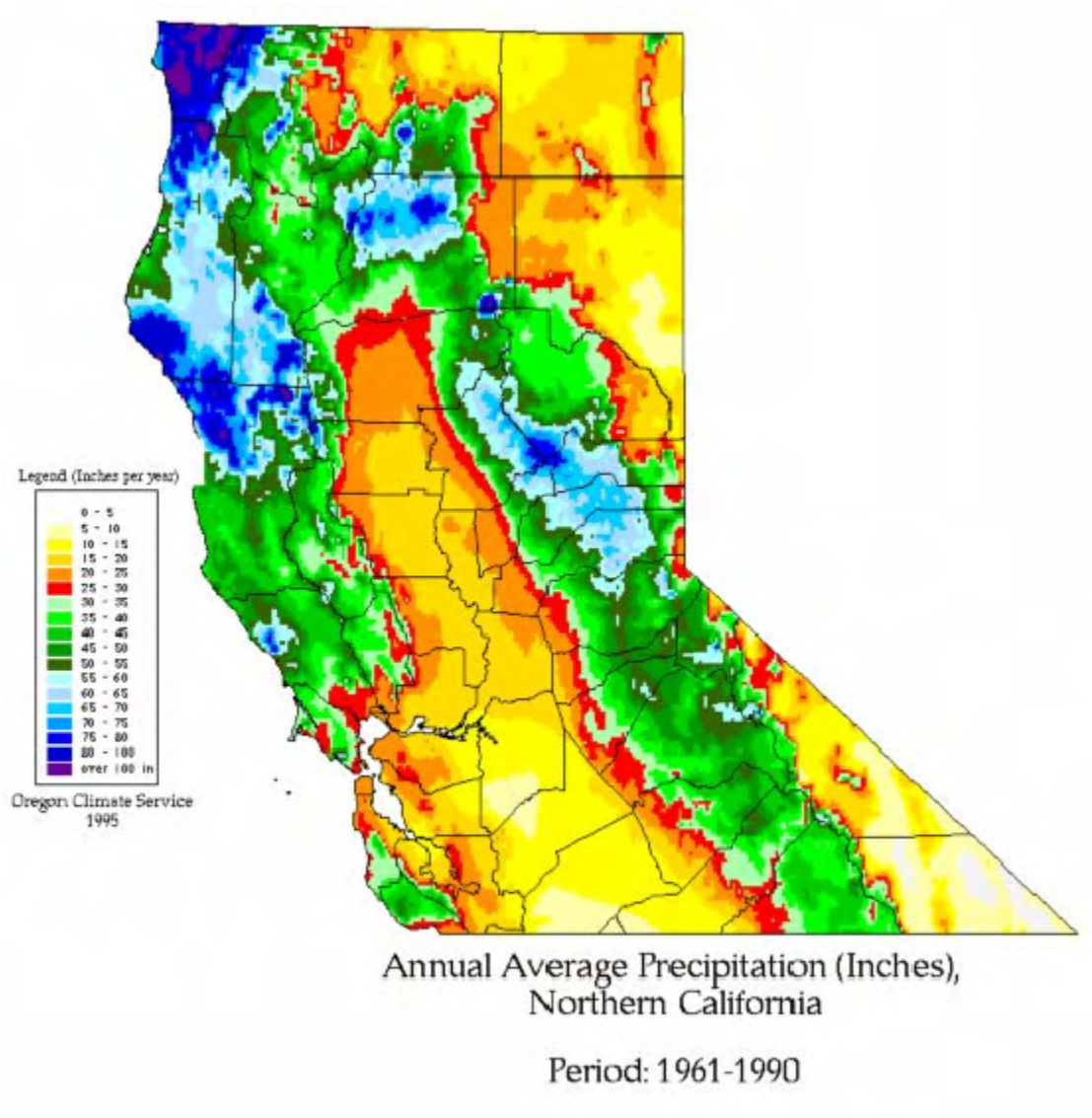
4.1.2.7 Drought

The YCWA Jurisdiction has rated Drought as a MODERATE PRIORITY HAZARD.

Drought typically defined from a combination of rainfall amounts, vegetation conditions, agricultural productivity, soil moisture, reservoir levels and stream flow, or economic impacts is a significant deficit in moisture availability due to lower than normal rainfall. Figure 4–20 below illustrates the average annual rainfall in inches for the Yuba County jurisdiction.

Figure 4–20 Average Annual Rainfall (Inches) 1961–1990

Drought, as measured by scientists, is defined by evaluating precipitation, temperature, and soil moisture data, for the present and past months. A number of different indices of drought have been developed to quantify drought, each with its own strengths and weaknesses. Two of the



most commonly used are the Palmer Drought Severity Index (PDSI) and the Standard Precipitation Index (SPI).

PDSI values are derived from measurements of precipitation, air temperature, and local soil moisture, along with prior values of these measures. Values range from -6.0 (extreme drought) to +6.0 (extreme wet conditions

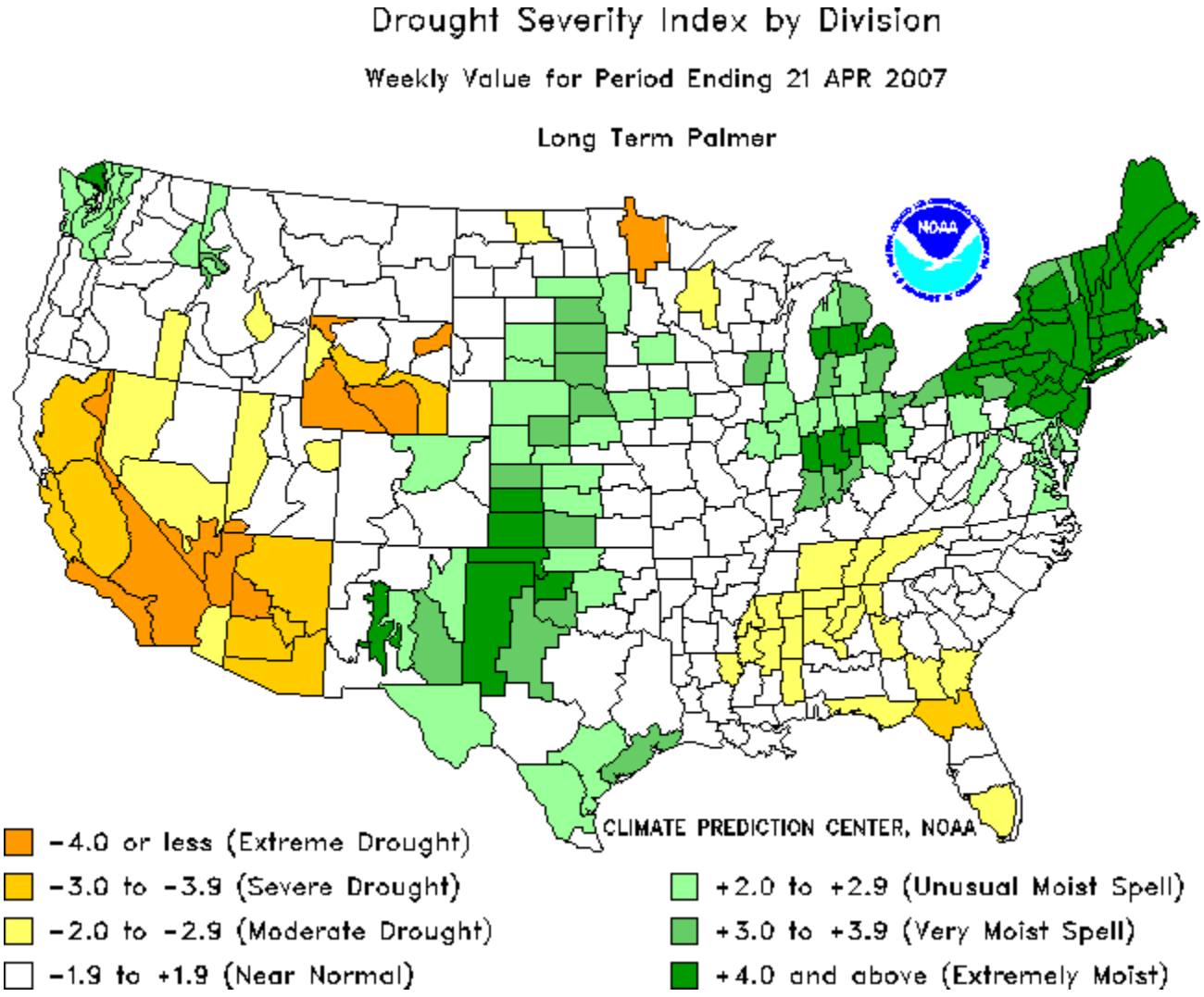
The SPI is a simpler measure of drought than the Palmer Drought Severity Index (PDSI) and is based solely on the probability of precipitation for a given time period. Values of SPI are derived by comparing the total cumulative precipitation for a particular station or region over a specific time interval (for example: the last month, the last 3 months, the last 6 months) with the average cumulative precipitation for that same time interval over the entire length of the record. The

severity of a drought can be compared to the average condition for a particular station or region. SPI Values range from 2.00 and above (extremely wet) to -2.00 and less (extremely dry) with near normal conditions ranging from 0.99 to -0.99.

Although droughts may be less spectacular, they are often more costly than other types of natural disasters. Drought is a natural hazard that cumulatively has affected more people in North America than any other natural hazard (Riebsame et al. 1991). The cost of losses due to drought in the United States averages $6-8 billion every year, but range as high as $39 billion for the three year drought of 1987-1989, which was the most costly natural disaster documented in U.S. history.

Beyond the monetary costs, the impacts of drought on society, the economy, and the natural environment are tremendous. Although measures such as development of irrigation systems, financial aid programs and interbasin water transfers have been undertaken to mitigate the impacts of drought in recent decades, some regions of the U.S. are becoming more vulnerable to the impacts of drought. Figure 4–21 below indicates the recent past drought conditions for the Yuba County jurisdiction.

Figure 4–21 United States Drought Severity



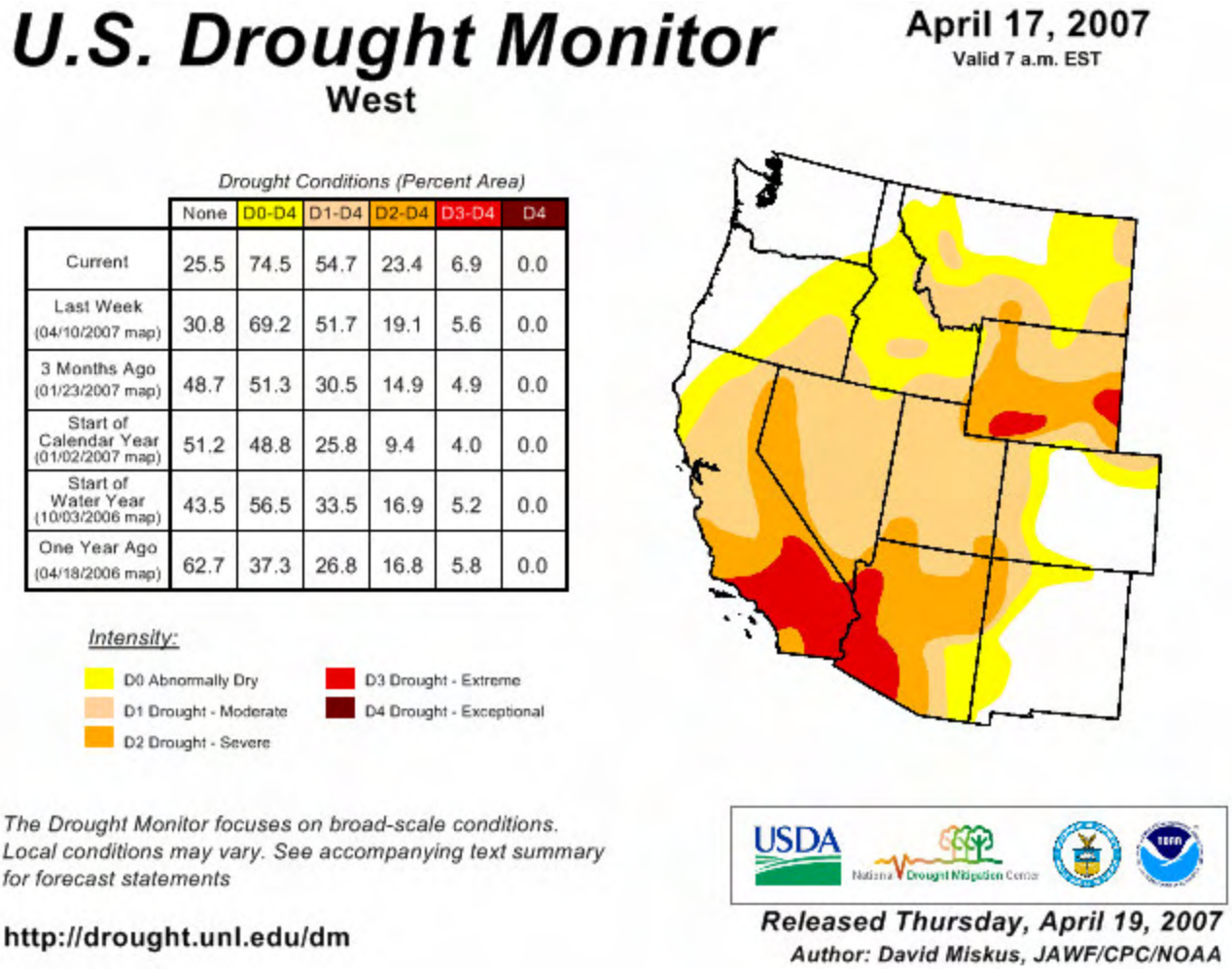
Although irrigation has made it possible to grow crops on land that was once considered barren, this practice has led to a reliance on ground water and surface storage in reservoirs. Increasing demands on water have resulted in the depletion of ground water reserves in many areas, which can make the removal of additional water uneconomical if not impossible, especially during a drought. In many urban areas of the semi-arid and arid western U.S., population growth, expansion into marginal areas, and the subsequent development is overtaxing water supplies and heightening vulnerability to drought.

4.1.2.7.1 Location, Extent, Magnitude, and Severity of Drought Hazards

The County's increased vulnerability to drought is due in part to farming on marginally arable lands and pumping of ground water to the point of depletion. In 1976 through 1977 California along with the Pacific Northwest and adjoining areas were afflicted with an extremely intense drought. Although the drought was of relatively short duration, water supplies became stressed.

Again in 1986 through 1993 the U.S. West Coast experienced a seven-year drought in causing Californians to take aggressive water conservation measures. California, the Pacific Northwest, and the Great Basin states experienced a drought that stressed water systems and resources, impacting water quality and supplies for agriculture, public use, recreation, fish and wildlife, and other uses. According to the National Oceanic and Atmospheric Administration (NOAA), the region containing the YCWA watershed is not undergoing long-term drought conditions. See Figure 4–22..

Figure 4–22 United States Current Drought Situations



Thousands of miles of artificial waterways were created in the Sierra Nevada in the form of ditches, flumes, and canals to service the regions mining interests. This network was later largely incorporated into modern hydropower systems as well as modern irrigation, and domestic water supply systems. The effect of the network is to store water during the annual rainy season to be slowly released and distributed during the annual drought, ensuring that seasonal water surpluses are converted to a reliable year–round supply. Even during a prolonged drought there appears to be adequate domestic and irrigation water. However, when surface water supply is low, more ground water is drawn, with the result that ground water is much reduced in years of below average rainfall and the groundwater table becomes depleted. Groundwater supply is therefore being depleted by the dual factors of reduced recharge rates and greater draw–down from increase dependence on groundwater.

4.1.2.7.2 Previous Occurrences & Probability of Future Occurrence of Drought Hazard

Historical Occurrences

Variations in the El Nino/Southern Oscillation (ENSO) in the equatorial Pacific are accompanied by changes in atmospheric flow and pressure systems in mid-latitudes. These changes, in turn, affect climate across North America, especially in winter. Thus, certain phases of ENSO can increase the likelihood of more unusual and/or persistent weather conditions, such as drought, in

some areas. For example, during El Nino, winters are wetter from California to the southeastern United States, while unusually warm conditions tend to persist from Alaska south through southwestern Canada and eastward to the Great Lakes. During La Nina, drought conditions are likely across the southwestern and southeastern U.S. while the northwestern U.S. can experience unusually wet winters, and cool conditions persist in a broad band from Alaska to western Canada and across the northern tier of the U.S. See Figure 4–23 below.

Figure 4–23 California Annual Drought Occurrences 1895–2004

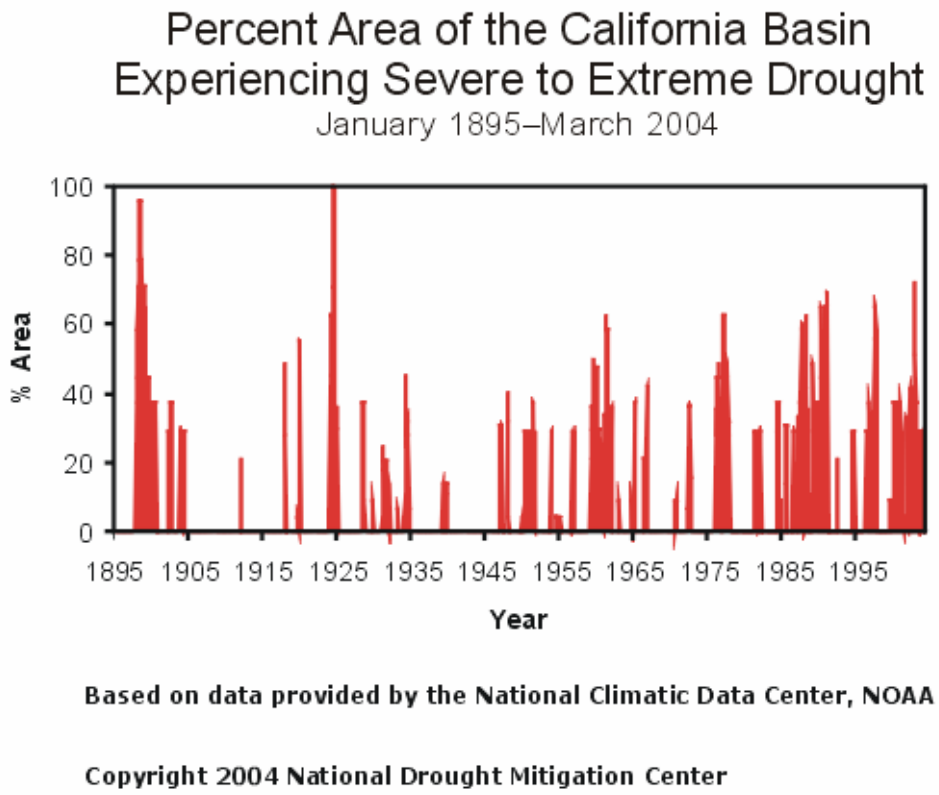


Table 4–5 below shows the USDA issued disaster declaration due to drought for the YCWA watershed:

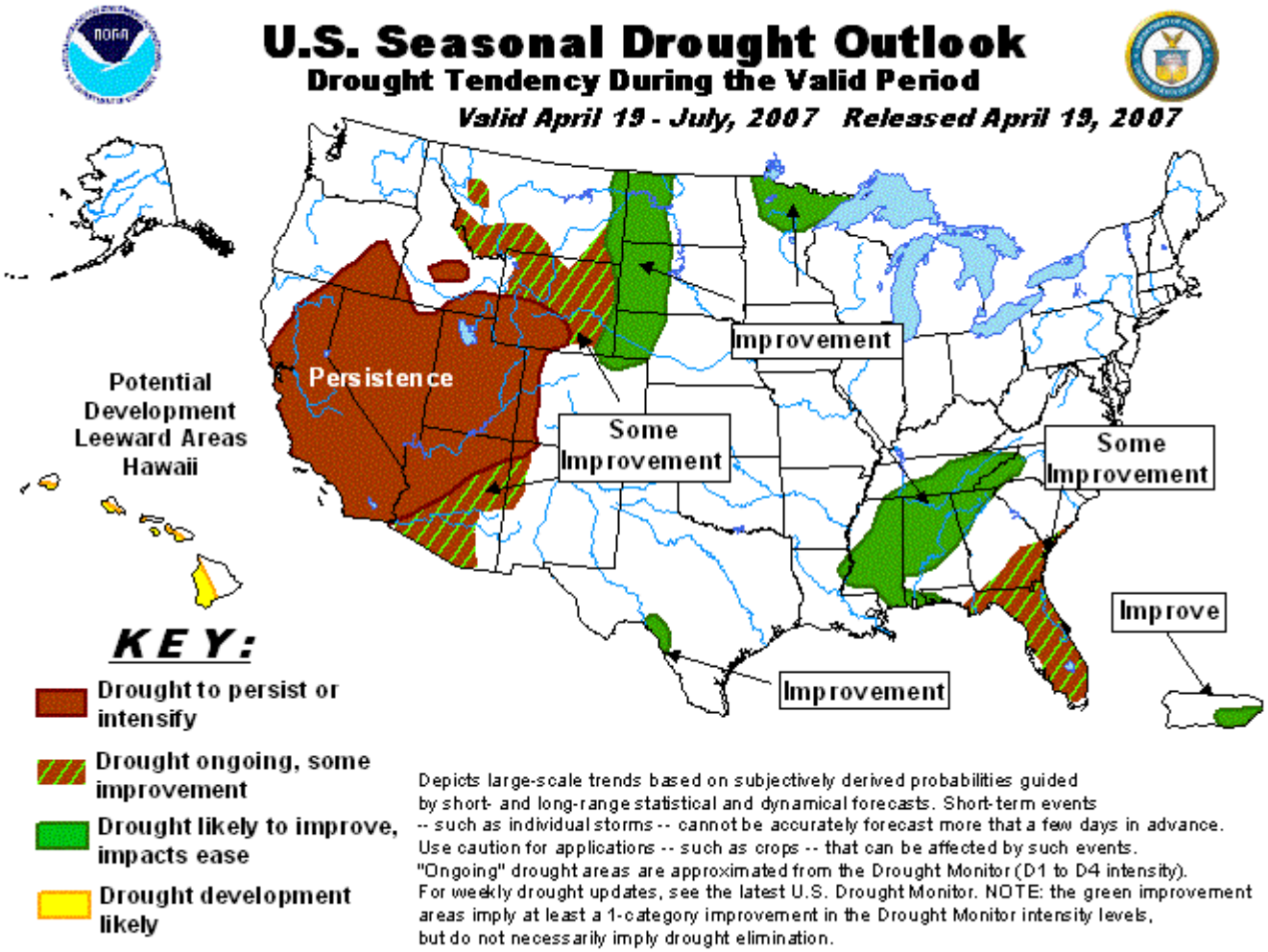
Table 4–7 Declared Drought Disasters

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

Likelihood of Future Occurrences

Figure 4–26 indicates the likelihood of drought occurring from April 19-July 2007 At this time, the YCWA watershed is not expected to develop a drought for the 2006 fall season.

Figure 4–24 United States Drought Outlook



Although the watershed is not expected to develop a drought for the 2006 fall season, episodes of water shortages in the foothills are increasing. In the foothills, fracture systems within the metamorphosed bedrock are considered the dominate controlling factor on the occurrence of groundwater. The hydrogeology of the foothill area is very complicated due to steeply dipping fracture systems in the bedrock. In general, the greater the extent of fracturing in the bedrock, the greater the permeability and its ability to transmit water is. Thus the occurrence and quantity of groundwater available for domestic use is dependent upon the nature of the bedrock, fracture distribution, and interconnection of the fractures. The more fractured the bedrock the easier and faster the flows of water and conversely the tighter the fractures the lower the conductivity. As a result, wells within the foothills and mountain areas yield low to moderate flows adequate for domestic purposes.

In the foothills, groundwater recharge occurs primarily from the direct infiltration of precipitation and water losses from ephemeral or seasonal streams. The downward migration of rainwater is impeded by and filtered through clay–filled fractures in the weathered bedrock zone. Groundwater generally follows surface topography and is expected to flow in approximately the same direction and the slope of the land.

Water scarcity will continue to plague YCWA watershed in general and the foothills in particular as the region experiences the cyclical effects of the El Nino/Southern Oscillation (ENSO). Furthermore, the steady growth that has be characteristic for the YCWA watershed today will create increased demands for agricultural, municipal and industrial water supplies. Such competing demands as the public's rising concern for meeting "quality of life" and environmental objectives will continue to create water supply management challenges in the future.

The incorporated areas of the county have increased an average of 2.09 percent annually from 2000 to 2005. The unincorporated areas of Yuba County have increased and average of 2.19 percent over the same time period. (*source: California Department of Finance Table 2:E-4 Population Estimates for Cities, Counties and State, 2001-2005 with 2000 DRU Benchmark, 2005*). Sacramento Area Council of Governments (SACOG) an association of local governments approves the distribution of affordable housing in the region and assists in planning for transit has determined a population increase for Yuba County of over 30 percent by 2015. This translates to a population increase of over three percent annually. SACOG has determined a population increase for the unincorporated areas of the County of over 34 percent (3.4 percent annually), over five percent for the incorporated area of the City of Marysville (0.5 percent annually), and over 64 percent for the City of Wheatland (over 6.4 percent annually) by 2015. (*source: http://www.sacog.org/demographics/projections/index.cfm, 2005*) Unless infrastructure is developed to protect the increase population from the threat of drought and water shortages in the YCWA watershed, losses from this hazard will continue to increase in the future.

4.1.2.8 Man-Made Hazardous Materials

The YCWA Jurisdiction has rated hazardous materials as a MODERATE PRIORITY HAZARD.

Hazardous material is defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or threatened hazard to human health and safety or to the environment, if released into the workplace or the environment" (Health and Safety Code, §25501 (o)).

On average Yuba County receives 26 reports of a hazardous substance release every year. In many cases, the person or company responsible for the release is the one who discovers and reports it. In other cases, a local public safety official who is trained in recognizing and responding to hazardous substance threats discovers the release. Occasionally hazardous substance releases are discovered by people as they go about their every-day activities.

Several ways exist to recognize the presence of a hazardous material or the warning signs of a hazardous material release. The shapes of containers are often a clue that they may be storing hazardous materials. The federal government has a system for labeling containers used to store or transport hazardous materials that uses colors and symbols to designate potential hazards (Table 4–8).

Table 4–8 Hazardous Materials Identifying Symbols

Hazard Class	Color	Symbol
Explosives	Orange	Starburst
Non-flammable Gases	Green	Cylinder
Flammable Gases or Liquids	Red	Flame
Flammable Solids	Red/White Stripes	Flame
Oxidizers	Yellow	Flaming Ball
Poisons	White	Skull & Crossbones
Radioactives	Yellow/White	Propeller
Corrosives	White/Black	Test Tube

The EPA maintains summaries of information on over 300 chemicals, including their identifying characteristics, health hazards, ecological effects, and methods to reduce exposure to the chemical at http://www.epa.gov/enviro/html/emci/chemref/index.html. Table 4–9 lists 12 of the more common hazardous materials, their common sources, and their health effects.

Table 4–9 Common Hazardous Materials

Common Sources	Contaminants	Potential Health Effects
Household Items, such as Batteries, Thermometers, and Paints	mercury	Toxic to kidneys. Can cause eye and skin irritation; chest pain; tremor; fatigue; weakness.
Car Radiators and De-icing Agents	ethylene glycol	Can cause abdominal pain; vomiting; weakness; dizziness; central nervous system depression.
Photocopy Machines	chromium	Toxic to kidneys; potential human carcinogen.
Dry Cleaning Agents and Degreasers	trichloroethane and trichloroethylene	Central nervous system depression: decreased alertness, headaches, sleepiness, loss of consciousness. Kidney changes: decreased urine flow, swelling (especially around eyes), anemia. Liver changes: fatigue, malaise, dark urine, liver enlargement.
Herbicides for Vegetation Control	chlorophenoxy compounds; 2;4- dichlorophenoxyacetic acid	Chloracne, weakness or numbness of arms and legs, long-term nerve damage.
	dioxin	Dioxin causes chloracne and may aggravate pre-existing liver and kidney disease.
Pesticides	chlorinated ethanes; DDT;	Acute symptoms of

	lindane	apprehension, irritability, dizziness, disturbed equilibrium, tremor, and convulsions.
	Cyclodienes (aldrin; chlordane; dieldrin; endrin); chlorocyclohexanes	Acute symptoms of apprehension, irritability, dizziness, disturbed equilibrium, tremor, and convulsions. Liver toxicity and permanent kidney damage. Chlorocyclohexanes can cause anemia.
	Organophosphate: diazanon; dichlorovos; dimethoate; trichlorfon; malathion; methyl parathion; parathion carbamate: aldicarb; baygon; zectran	All cause a chain of internal reactions leading to neuromuscular blockage. Acute symptoms include headaches, fatigue, dizziness, increased salivation and crying, profuse sweating, nausea, vomiting, cramps, diarrhea, tightness in the chest, and muscle twitching
Electrical Transformers and Other Industrial Uses	polychlorinated biphenyls (PCBs)	Various skin ailments, including chloracne. May cause liver toxicity. Carcinogenic to animals.
Commercial Solvents	benzene; ethyl benzene; toluene; xylene	Benzene suppresses bone marrow function, causing blood changes; chronic exposure can cause leukemia. Central nervous system depression: decreased alertness, headaches, sleepiness, loss of consciousness. Defatting dermatitis.
	carbon tetrachloride; chloroform; ethyl bromide; ethyl chloride; ethylene dibromide; ethylene dichloride; methyl chloride; methyl chloroform; methylene chloride; tetrachloroethane; tetrachloroethylene; trichloroethylene; vinyl chloride	Central nervous system depression: decreased alertness, headaches, sleepiness, loss of consciousness. Kidney changes: decreased urine flow, swelling (especially around eyes), anemia. Liver changes: fatigue, malaise, dark urine, liver enlargement, jaundice.
Various Commercial and Industrial Manufacturing Processes	arsenic; beryllium; cadmium; chromium; lead; mercury	All are toxic to kidneys. Decreased mental ability, weakness, headache, abdominal cramps, diarrhea, and anemia. Also affects blood-forming mechanisms and the peripheral nervous

		system. Long-term exposure to lead can cause permanent kidney and brain damage. Cadmium can cause kidney and lung disease. Chromium, beryllium, arsenic, and cadmium have been implicated as human carcinogens.
	PCBs	Various skin ailments, including chloracne; may cause liver toxicity; carcinogenic to animals.
Chemical Manufacturing	benzene; ethyl benzene; toluene; xylene	Benzene suppresses bone marrow function, causing blood changes; chronic exposure can cause leukemia. Central nervous system depression: decreased alertness, headaches, sleepiness, loss of consciousness. Defatting dermatitis.
Steel and Glass Manufacturing	chromium; lead; mercury	All are toxic to kidneys. Lead causes decreased mental ability, weakness, headache, abdominal cramps, diarrhea, and anemia. Also affects blood-forming mechanisms and the peripheral nervous system. Long-term exposure to lead can cause permanent kidney and brain damage. Chromium has been implicated as a human carcinogen.
Chrome Plating Operations	chromium	Toxic to kidneys; potential human carcinogen.

Events involving hazardous materials usually are the result of leaks during production and manufacturing process, or during their transportation and storage. There are 53 major production or manufacturing facilities within Yuba County. Highways 65 and 70 in the southern part of the County and Marysville Road which crosses the New Bullards Bar Dam in the northern portion of the County provide the major transportation route through Yuba County.

4.1.2.8.1 Location, Extent, Magnitude, and Severity of Man-Made Hazardous Materials Hazard

The following sites contain a high amount of hazardous materials.

- Hardware store: various flammable liquids and chemicals.
- Propane gas distributor: large propane storage area with trucks, tanks, and delivery system.
- Gas station: gasoline and diesel, propane storage.

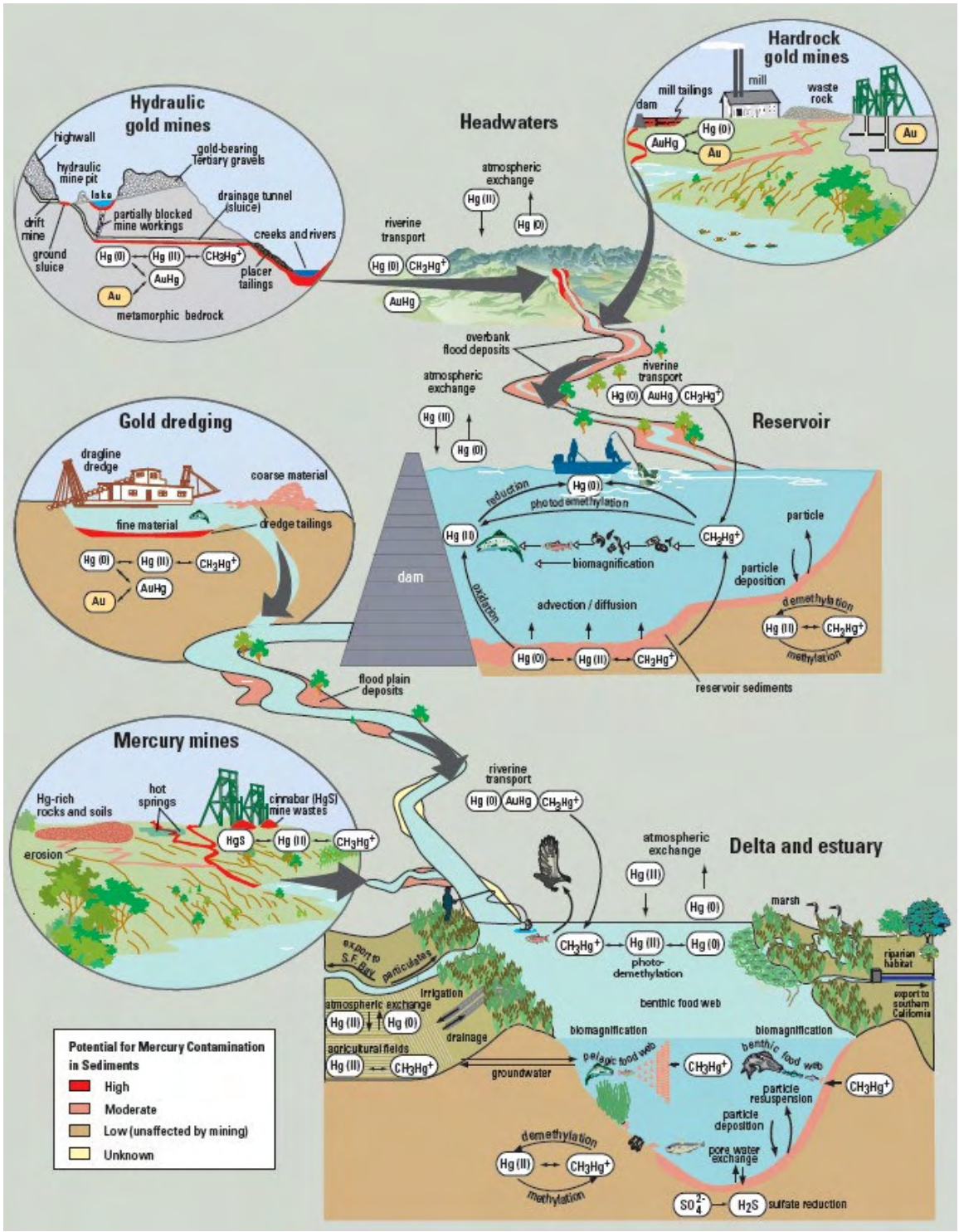
- Wrecking yard: old cars and trucks with oil, gas, tires, etc.
- RV resorts: gasoline, diesel, and propane storage
- Power plant: oil filled transformers, gas and diesel tanks
- Pesticide, herbicide, and fertilizer distributorships/wholesalers

The isolation afforded by the woods and forests of the foothills makes the area one of the prime locations in California for the production of methamphetamines and other designer drugs. The compounds used in their production are well known sources of hazardous contamination, and require specialized handling. Explosions and fires resulting from the mishandling of these volatile compounds are a relatively common occurrence in the County. Yuba County responded to 13 hazardous material spills calls during 2004. This is below Yuba County's seven year annual average of 26 hazardous materials incidents.

The major state highways Highway 65, Highway 70, Highway 20, and Highway 49 traverse the County. These corridors receive heavy truck and trailer traffic and are the major artery for delivery of propane gas and other volatile materials to the area. The state highway transportation corridors provide timber-logging trucks access to the railways and logging mills, increasing the incidents for HAZMAT spills and transportation accidents.

Mercury exists in the County's river and creek beds from earlier hydraulic gold mining activity. Hydraulic mining started on a small scale in 1854 in the hill claims near Timbuctoo. The early method was to wash away the hills with streams of water. Later tunnels were cut into hills varying from 500 to 4,000 feet in length through the bedrock. Flumes were placed at the end of the tunnels for discharging the "tailings" into the watercourse. The floor of the tunnel was scattered with "quicksilver" to collect the gold as it was carried along with the mud and water. The side tunnels were packed with explosives and the main tunnel was stopped up with sand. The resulting debris was then washed down through the main tunnel and over the mercury into the creeks and rivers. (*source: Thompson & West, 1879*) See Figure 4–25.

Figure 4–25 Mercury Transport Schematic Diagram



Millions of pounds of mercury (approximately 26,000,000 pounds) were used, especially in hydraulic placer mining operations that displaced and processed more than 1.5 billion cubic yards of gold-bearing sediments in the Sierra Nevada (Figure 4–26). An estimated 10 to 30 percent of the mercury was lost to the environment in this process, transported into streams and reservoirs along with the discharged sediments from the hydraulic mining operations. (*source: Swain, 2005*) The total amount of mercury lost to the environment from placer mining operations throughout California has been estimated at 10,000,000 pounds, of which probably 80 to 90 percent was in the Sierra Nevada (Churchill, 2000)

Figure 4–26 Sierra Nevada Watersheds & Goldmines

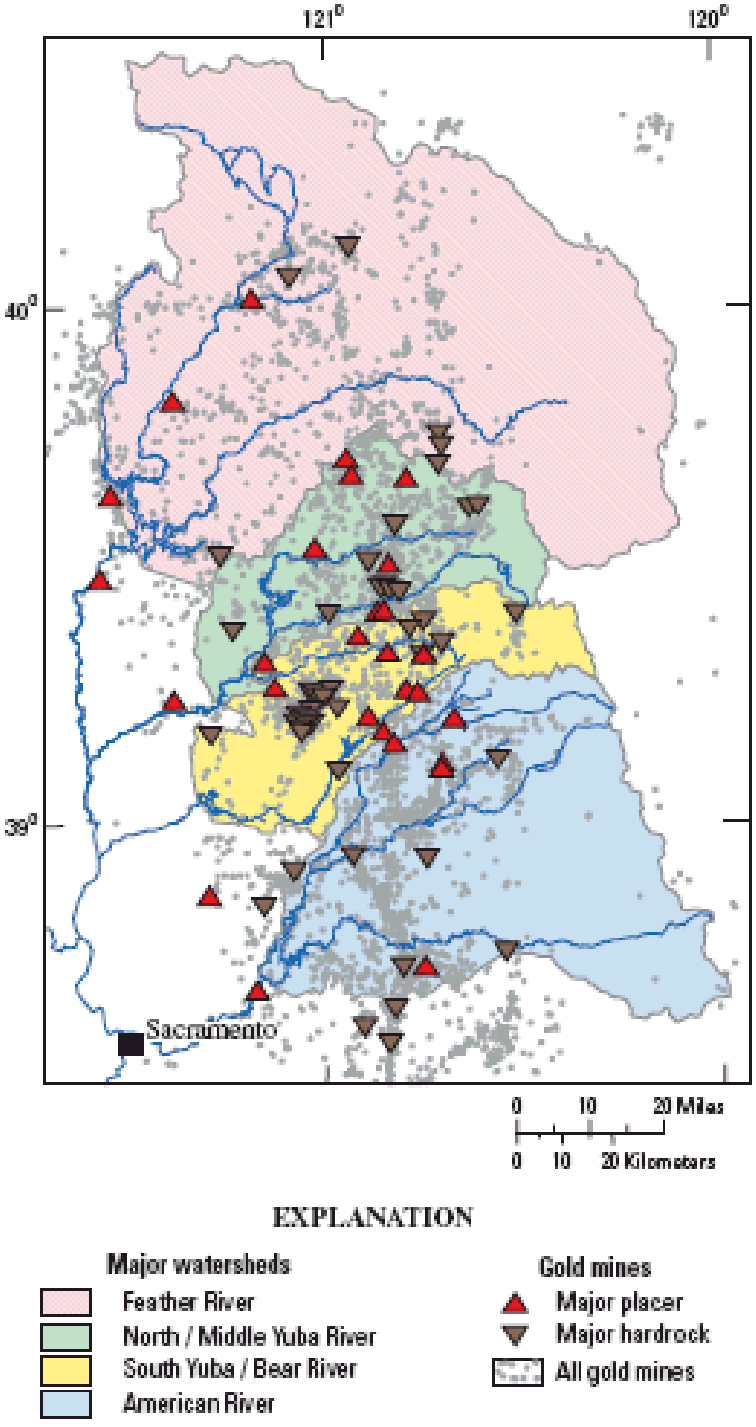
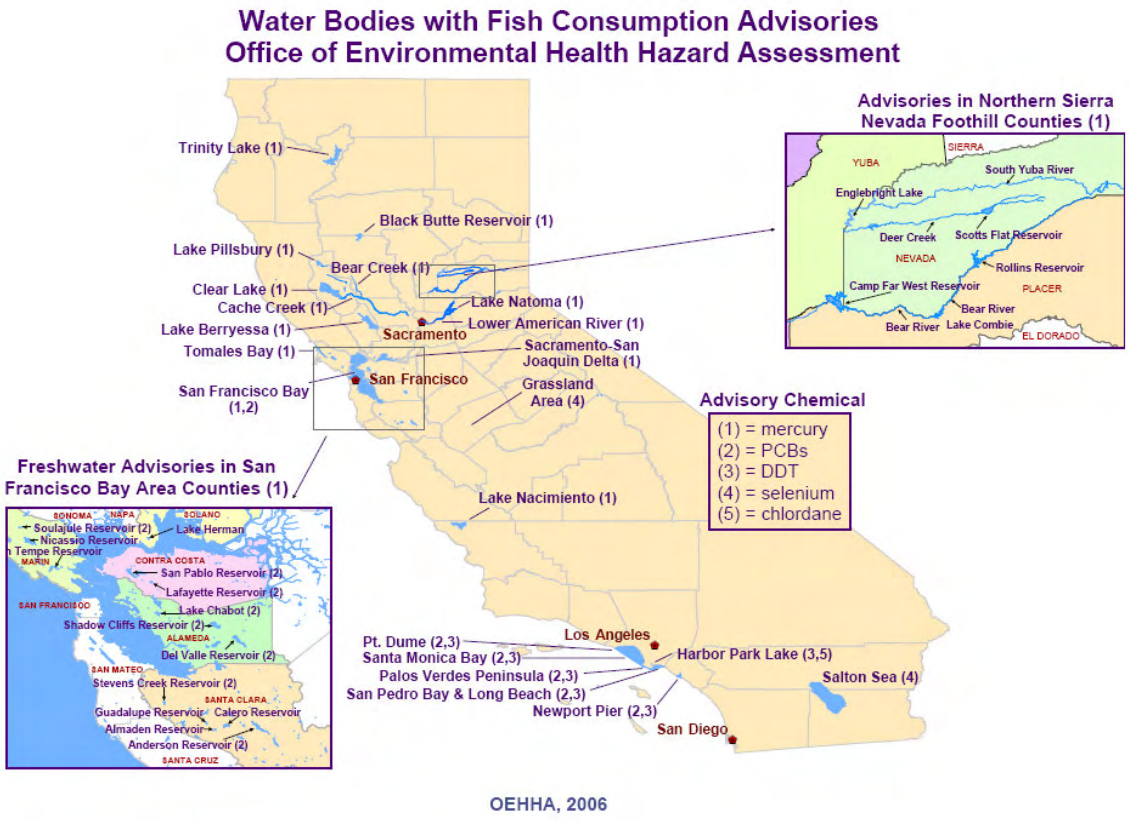


Figure 4–27 Mercury Contaminated Watersheds



Methylmercury is of particular concern because it is the most prevalent form of mercury in fish and is a potent neurotoxin that bioaccumulates at successive tropic levels within food webs. Mercury at elevated concentrations may pose a health risk to piscivorous wildlife and to humans who eat fish on a regular basis. (*source: May, Hothem, Alpers, and Law, 2000*) Figure 4–27 shows the watersheds in California with fish consumption advisories for mercury contamination. The Environmental Protection Agency's Office of Environmental Health Hazard Assessment recommends that no more than one meal per month of largemouth, smallmouth or spotted bass, or catfish taken from the lower Feather River from the Fish Barrier Dam to the confluence of the Sacramento River. Striped bass or Sacramento pike–minnow taken from this stretch of Feather River should be avoided altogether. (*source: California EPA, 2006)* All fish taken from the South Yuba River below Lake Spalding should be consumed no more that one meal per week. Meals of trout taken in the Sierra Nevada foothills should be limited to no more than 2 meals per month. Meals of trout taken from Deer Creek should be limited to no more than two meals per month. Meals of fish taken from Camp Far Reservoir are limited by species, with no consumption of bass and limited consumption of all other fish to no more than one meal per week were recommended. (*source: California EPA, 2006)*

4.1.2.8.2 Previous Occurrences & Probability of Future Occurrence of Man-Made Hazardous Materials Hazard

Historical Occurrences

Although real property within the YCWA watershed has sustained damages attributable to hazardous materials, no YCWA owned structures or equipment have been damaged due to hazardous materials. Yuba County responded to 13 hazardous condition materials calls during 2004.

Thousands of pounds of mercury were used to extract gold from ore at the Alpha Diggings whose runoff feeds into Washington and Scotchman creeks. These creeks feed into the South Yuba River, which had state trout–consumption warnings issued in 2003 because of high mercury levels in the fish. The levels were high enough that no more than one fish per week should be eaten out of the stretch from Lake Spaulding to Lake Englebright. High mercury level fish consumption warnings were also issued in the Bear River and Deer Creek watersheds.

Man-made hazardous materials events usually impact the County through the release of a toxic gas plume (chlorine, ammonia, or propane gases), a substance release that contaminates the groundwater or soil (diesel or gasoline) which can then cause chronic or long-term effects. Another source that impacts Yuba County is clandestine illegal substance labs. These clandestine labs can produce methamphetamine in as few as six to eight hours (Swetlow, 2003) and generate between five and seven pounds of toxic waste for every pound of methamphetamine (Butterfield, 2004; NCDOJ, 2004). Riverside California statistics indicate that most "cooks" make meth 48 to 72 times a year (Riverside DEC, 2005). Typical toxic chemicals found in clandestine meth labs in the County include acetone, methanol, ammonia, benzene, ether, freon, hydriodic acid, hydrochloric acid, iodine crystals, lithium, muriatic acid, phosophine gas, pseudosphedrine, red phosphorus, sodium hydroxide, sulfuric acid, and toluene. Toxic substances seep into the pores of structures contaminated in the production of clandestine meth manufacture where they are touched or inhaled by unsuspecting occupants for years after the labs are gone. Contaminates must be removed from the structure, cleaning with soap and water and painting are not enough to ensure that chemical dangers are eliminated.

Table 4–10 below, lists the contamination incidents from confirmed meth drug labs in the County.

Table 4–10 Yuba County Meth Lab Hazardous Materials Incidents

Incident Date	Number of Lab Cases	Incident Substance
		Meth Drug Lab
1995		Meth Drug Lab
1996		Meth Drug Lab
1997		Meth Drug Lab
1998		Meth Drug Lab
1999	22	Meth Drug Lab
2000	7	Meth Drug Lab
2001	13	Meth Drug Lab
2002	16	Meth Drug Lab
2003	8	Meth Drug Lab
2004	11	Meth Drug Lab
2005		Meth Drug Lab

(*source: Yuba–Sutter Narcotics Enforcement Team Annual Reports, 2000–2004*)

Likelihood of Future Occurrences

The incorporated areas of the county have increased an average of 2.09 percent annually from 2000 to 2005. The unincorporated areas of Yuba County have increased and average of 2.19 percent over the same time period. (*source: California Department of Finance Table 2:E-4 Population Estimates for Cities, Counties and State, 2001-2005 with 2000 DRU Benchmark, 2005*). Sacramento Area Council of Governments (SACOG) an association of local governments approves the distribution of affordable housing in the region and assists in planning for transit has determined a population increase for Yuba County of over 30 percent by 2015. This translates to a population increase of over three percent annually. SACOG has determined a population increase for the unincorporated areas of the County of over 34 percent (3.4 percent annually), over five percent for the incorporated area of the City of Marysville (0.5 percent annually), and over 64 percent for the City of Wheatland (over 6.4 percent annually) by 2015. (*source: http://www.sacog.org/demographics/projections/index.cfm, 2005*) Unless infrastructure is

developed to protect the increase population from the threat of man–made hazardous materials in the County losses from this hazard will continue to increase in the future.

4.1.2.9 Utility Loss

The YCWA Jurisdiction has rated utility loss as a MODERATE PRIORITY HAZARD.

From 1978 to 1998 before California's electricity generation industry was restructured, the Energy Commission analyzed and approved 47 projects totaling 5,589 megawatts (MW). More recently, in the early 1990s the Energy Commission certified 14 power plants. Of the 14 plants, 10 were approved and eight were constructed totaling 995 MW (Figure 4–28). No power plant applications were filed with the Energy Commission between August 1994 and May 1997 because of the uncertainty during the pending restructuring of the electricity industry.

Electricity deregulation began on March 31, 1998. From 1998 through January 2004, 44 electric generation projects, totaling 18,399 MW, have been reviewed and licensed by the Energy Commission. Twenty-four of these licensed facilities have been built and are on-line producing 8,311 MW. Workload has been at historic levels for the past several years with the peak number of applications for new projects twice that of the peak in the 1980s. Over the past several years, the Commission tracked upwards of 150 potential projects 50 MW and larger; however, most of these projects were not filed with the Energy Commission due to unfavorable market conditions.

As of July 2005, 80.92% of California's electricity was sourced within the State (Table 4–11).

Table 4–11 California Energy Sources

Electricity (2004)
Source

In-State	80.92%
Natural Gas	*41.9%*
Nuclear	*12.9%*
Large Hydro	*14.8%*
Coal*	*19.8%*
Renewable	*10.6%*
Imports	19.08%
Pacific North West	*6.33%*
Domestic South West	*12.75%*

Source: Net System Power Calculation Report, Energy Commission Publication # CEC-300-2005-004

Table 4–12 California Gross Power System Power in Gigawatt-Hours

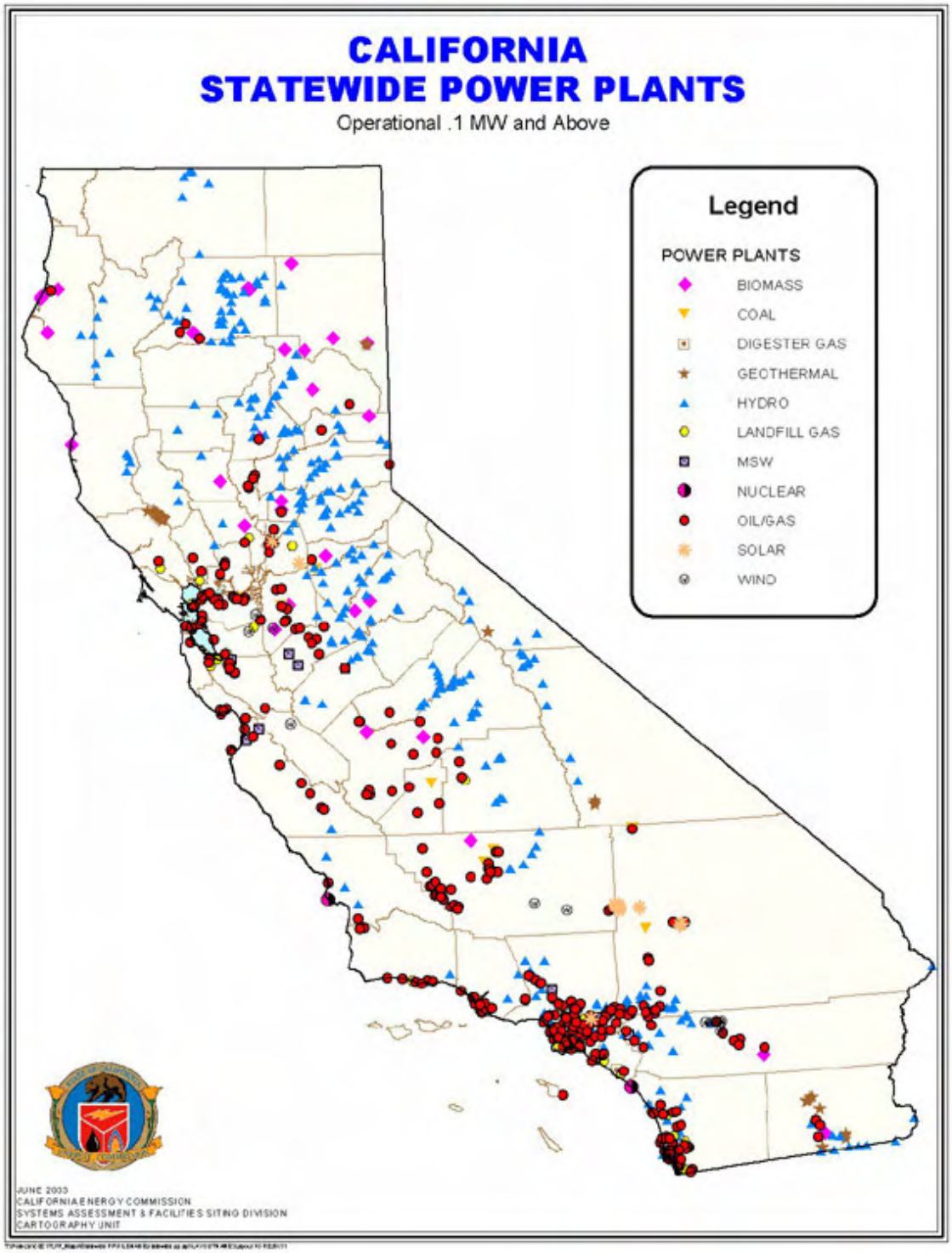
Fuel Type	In-State	NW Imports	SW Imports	GSP	GSP Percentage
Coal	28,589	5,154	20,760	54,503	19.80%
Large Hydro	29,667	9,560	1,445	40,672	14.80%
Natural Gas	104,858	1,926	8,400	115,184	41.90%
Nuclear	30,241	786	4,467	35,494	12.90%
Renewables	29,238	-0-	-0-	29,238	10.60%
Biomass	5,997			5,997	2.20%
Geothermal	13,571			13,571	4.90%
Small Hydro	4,669			4,669	1.70%
Solar	743			743	0.30%

Wind	4,258			4,258	1.50%
Other	-0-			-0-	0.00%
TOTAL	**222,593**	**17,426**	**35,072**	**275,091**	**100**

Source: 2004 Net Power System Power Calculation Report, Energy Commission Publication #CEC-300-2005-004

California's estimated kWh use in 2004 was 235,439,000,000 (*source: www.energy.ca.gov/electricity/us percapita electricity.html 12/0205)*

Figure 4–28 California Power Plant Sites



4.1.2.9.1 Location, Extent, Magnitude, and Severity of Utility Loss Hazard

Generally, the power system is said to have adequate capacity if it has enough generation and transmission resources to meet the customer demand and to maintain a reserve of capacity for contingencies. However, it would be prohibitively expensive to build a power generation and transmission system that would never experience a service outage. Historically, increasing economic activity, population growth, and weather influence the level of power use.

Isolated power failures occur within Yuba County due to transmission line interruption from storm damage, fire, and transportation incidents. This type of isolated power failures will impact the YCWA main office due to its location in Marysville and its dependence upon the local power supply. The power supply to other YCWA critical facilities are of lesser concern as they generate their own power and therefore are not as susceptible to power interruption. Their problem will be continued power generation to the grid.

YCWA, at the New Colgate Power Plant, has backup generators, and means of communication that does not require electricity, such as mobile radios and cellular phones. YCWA also has a small power plant, Fish Release, at the base of the dam, which can assist in the operation of the spill gates.

The California Legislature passes Assembly Bill 1890 in 1996 to restructure the electricity industry to increase reliance on competitive market forces. However, most retail customers had their rates frozen as part of the overall legislative design for restructuring. During the summer of 2000, the price of electricity at the wholesale level increased precipitously. The commodities market use high prices to induce investment in new production capacity. As new resources come on line, prices decline and may cause idle capacity. However, it takes time for new production facilities to come on line.

The rotating power outages that occurred in the winter of 2000/2001 were attributable to several factors especially that a larger–than–normal amount of capacity was not generating due to planned maintenance and repairs and retrofits of emissions controls. In addition, many qualifying facilities, not paid as a result of the investor–owned utilities experiencing cash flow problems, were not producing electricity. The consequences of the energy crisis were due to flaws in the market design and electricity system infrastructure limitations.

The electrical outages disrupted businesses, schools, and residences. Traffic was snarled by inoperative traffic signals. As a result, the Federal Energy Regulatory Commission imposed a number of changes to the market structure to mitigate price and reliability problems. As a result market volatility has moderated.

At the local level, a power failure is an electrical power outage to over one customer for a sustained period of time. Power outages can occur from equipment failure, trees and vegetation falling onto equipment, birds and animals interfering with equipment, vehicles compromising equipment, and other undetermined agents of interference. From 2001 through 2005 over 41 percent of the sustained power outages in Yuba County were caused by equipment failure.

4.1.2.9.2 Previous Occurrences & Probability of Future Occurrence of Utility Loss Hazard

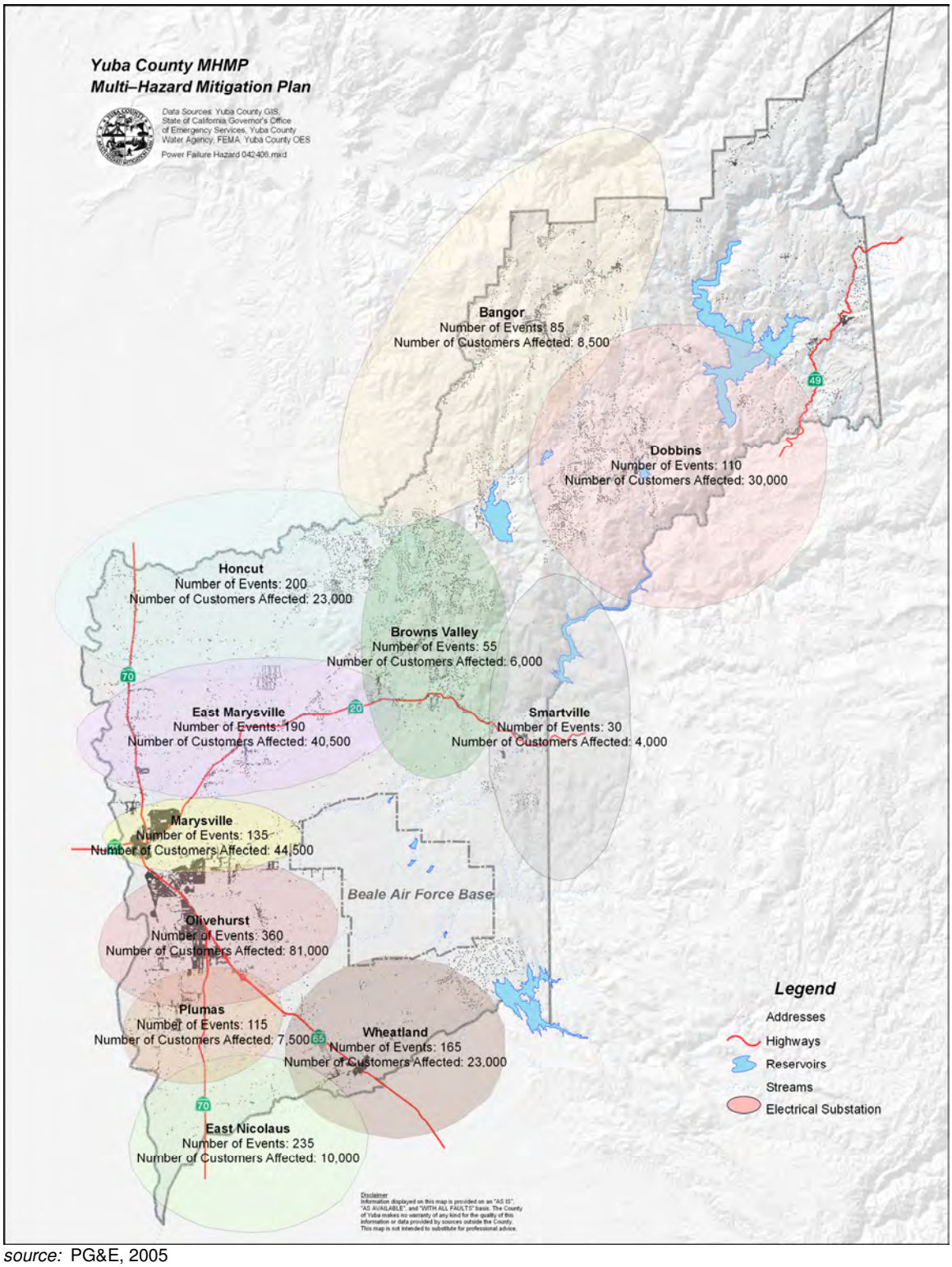
Historical Occurrences

From 2001 through 2005, the duration of over 39 percent of all sustained power outages was two hours or less, over 41 percent were of two to six hours of duration, and less than two percent of all power outages lasted over 24 hours. The remainder of the 2005 power outages was from six to 24 hours in duration. Power outages in Yuba County involved 100 customers or fewer 77 percent of the time from 2001 through 2005 and 100 to 1,000 customers over 17 percent of the

time. Unplanned sustained power outages affected more than 3,000 customers in 2001 alone, when the whole state experienced power outages and rolling blackouts from the market manipulation antics of the power broker Enron.

Figure 4–29 shows the service regions for the PG&E power substations located within Yuba County. The electrical substations have intertwined service regions as power lines fan across the County to provide service to the region.

Figure 4–29 Location and Impact of Yuba County Power Outages (2001–2005)



source: PG&E, 2005

Likelihood of Future Occurrences
Future occurrences of power interruptions from storms and fire is likely to occur in the future. The growth of the County and the ability of the power supply companies to develop the infrastructure necessary to keep pace with the increasing demand for power will be impacted as a greater demand is placed on power generation facilities

The incorporated areas of the county have increased an average of 2.09 percent annually from 2000 to 2005. The unincorporated areas of Yuba County have increased and average of 2.19 percent over the same time period. (*source: California Department of Finance Table 2:E-4 Population Estimates for Cities, Counties and State, 2001-2005 with 2000 DRU Benchmark, 2005*). (*source: http://www.sacog.org/demographics/projections/index.cfm, 2005*) Protection of critical infrastructure is essential to protect the increase population from the threat of power failure in the County losses from this hazard will continue to increase in the future.

4.1.2.10 Earthquake Hazard Profile

California is known for its earthquakes. However, not all of California is regularly subjected to strong earthquakes, and not all of California is subject to the *potential* for strong earthquake motion. This section profiles the earthquake susceptibility for YCWA facilities and assets by describing the nature of the hazard, historical occurrences, and potential for future occurrences.

4.1.2.10.1 Nature of the Earthquake Hazard

Earthquakes are a particularly destructive natural hazard. During the last 50 years there have been 456 recorded deaths resulting from earthquakes in the United States (Stover and Coffman 1993. 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).

Earthquakes are primarily characterized by their impact through *magnitude* and *intensity*. Table 4-5 depicts a comparison between the Richter scale magnitude of an earthquake, as typically reported in the media, to intensity represented in the Modified Mercalli scale. The Richter magnitude of an earthquake is a function of the energy released by an earthquake represented as a logarithmic, decimal scale. Intensity is the measurement of the shaking intensity at a particular location and its effect on people, structures, and the environment (http://neic.usgs.gov/neis/general/mag_vs_int.html, accessed 8/29/2005).

In Yuba County, damaging earthquakes are rare. Figure 4–30 depicts the location of faults and historic earthquake epicenters since 1800 in and around Yuba County. Earthquakes do occur in Yuba County. As recently as April 21, 2005, a 2.1 Richter magnitude earthquake occurred in the Oregon House area. 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. Figure 4–31 depicts the estimated peak ground acceleration (PGA) for a portion of northern California. As can be seen from this figure, the areas of greatest PGA surround the Central Valley of California, resulting from the occurrence of activity on faults on the east side of the Sierra Nevada, near the active volcanoes in the Cascade Range, and in the Coast Range near the San Andreas Fault. Figure 4–32 depicts the PGA 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 PGA, shown in Table 4–13. 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 PGA (1.0 equals the force of gravity).

Figure 4–30 Yuba County Regional Earthquake History

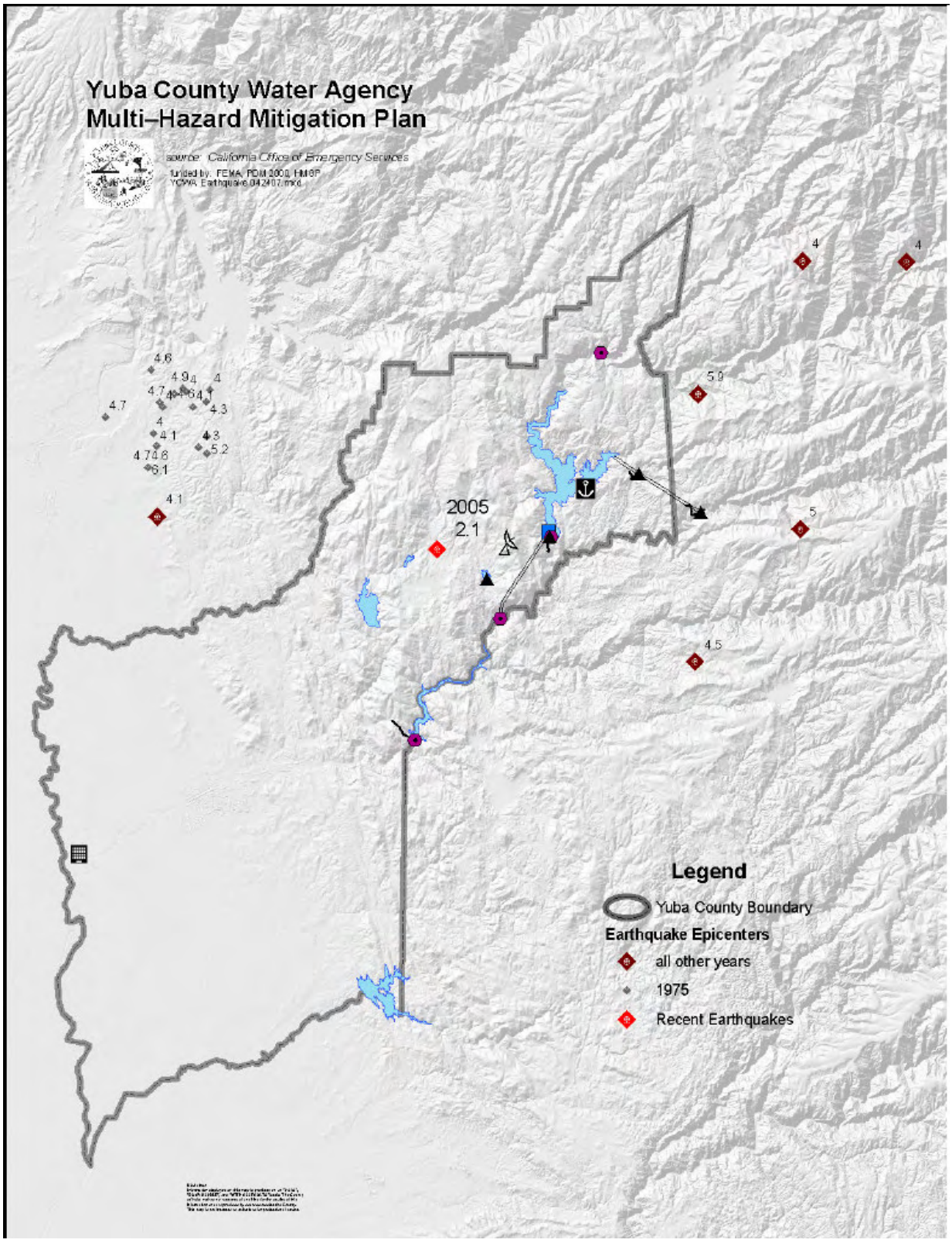


Table 4–13 Modified Mercalli Intensity Conversion

Conversion of Modified Mercalli Intensity to Peak Ground Acceleration

Modified Mercalli Intensity	VI	VII	VIII	IX	X	XI	XII
Peak Ground Acceleration	0.12	0.21	0.36	0.53	0.71	0.86	1.15

Source: (FEMA 2005) (HAZUS99 Technical Manual, www.fema.gov/hazus/pdf/dl_sr2t10.pdf, accessed 8/29/2005).

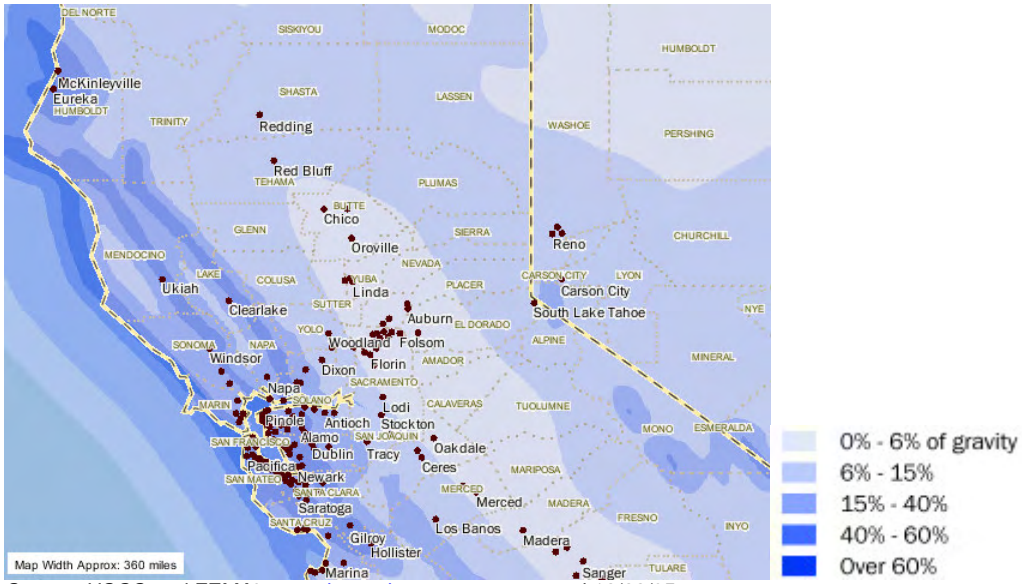
4.1.2.10.2 Location, Extent, Magnitude, and Probability of Future Occurrences

Several faults are found in the county, also shown on Figure 4–33. These include the Swain Ravine fault zone, Bear Mountain fault zone, and Spenceville fault (http://earthquake.usgs.gov/qfaults/ca/chi.html, accessed 8/29/2005). 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 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.

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/faq/effects.html, accessed 8/29/2005). These types of soils are typically found in areas of low-lying, current or former floodplains. Prime examples of the damage that can result from liquefaction was seen during the 1989 Loma Prieta earthquake near Santa Cruz. In the Marina District of San Francisco, some of the worst building damage was found on these sediments. Examination of Figure 4–33 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 PGA.

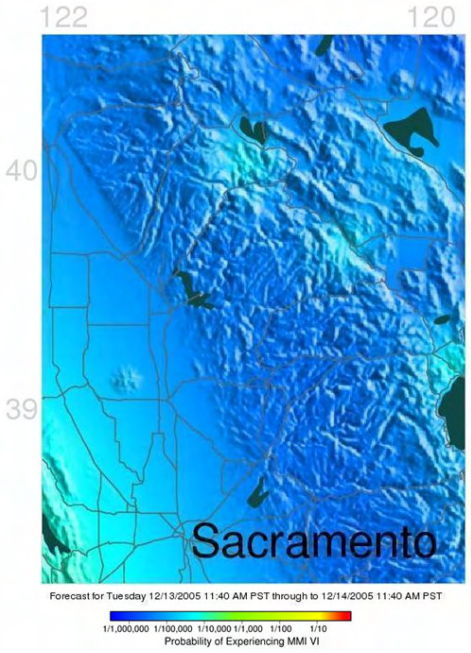
The threat of earthquakes exists in Yuba County, but compared to the rest of the state, the probability of strong earthquakes in the county is much less than areas near the San Andreas Fault and the eastern Sierra Nevada. There are no mapped earthquake fault hazard zones in the county as reported in the publication Earthquake Fault Hazard Zones in California (CDMG 1997). The USGS maintains several hazard-related services affiliated with the National Earthquake Information Center (NEIC, http://neic.usgs.gov). Some of this information includes the real-time earthquake forecast for the next 24 hours for California (http://pasadena.wr.usgs.gov/step/). Figure 4–32 shows the forecast centered on Yuba County for the 24-hour period ending August 31, 2005. Over the next 50 years, however, there is a 10 percent probability of exceedance (PE) of 0.1 g in Yuba County (Figure 4–33). These accelerations are roughly equivalent to a magnitude 5.8 and 6.3 earthquake, respectively (see Table 4–13).

Figure 4–31 Peak Ground Acceleration with 10% Potential Exceedance in 50 Years



Source: USGS and FEMA's www.hazardmaps.gov, accessed 12/22/05

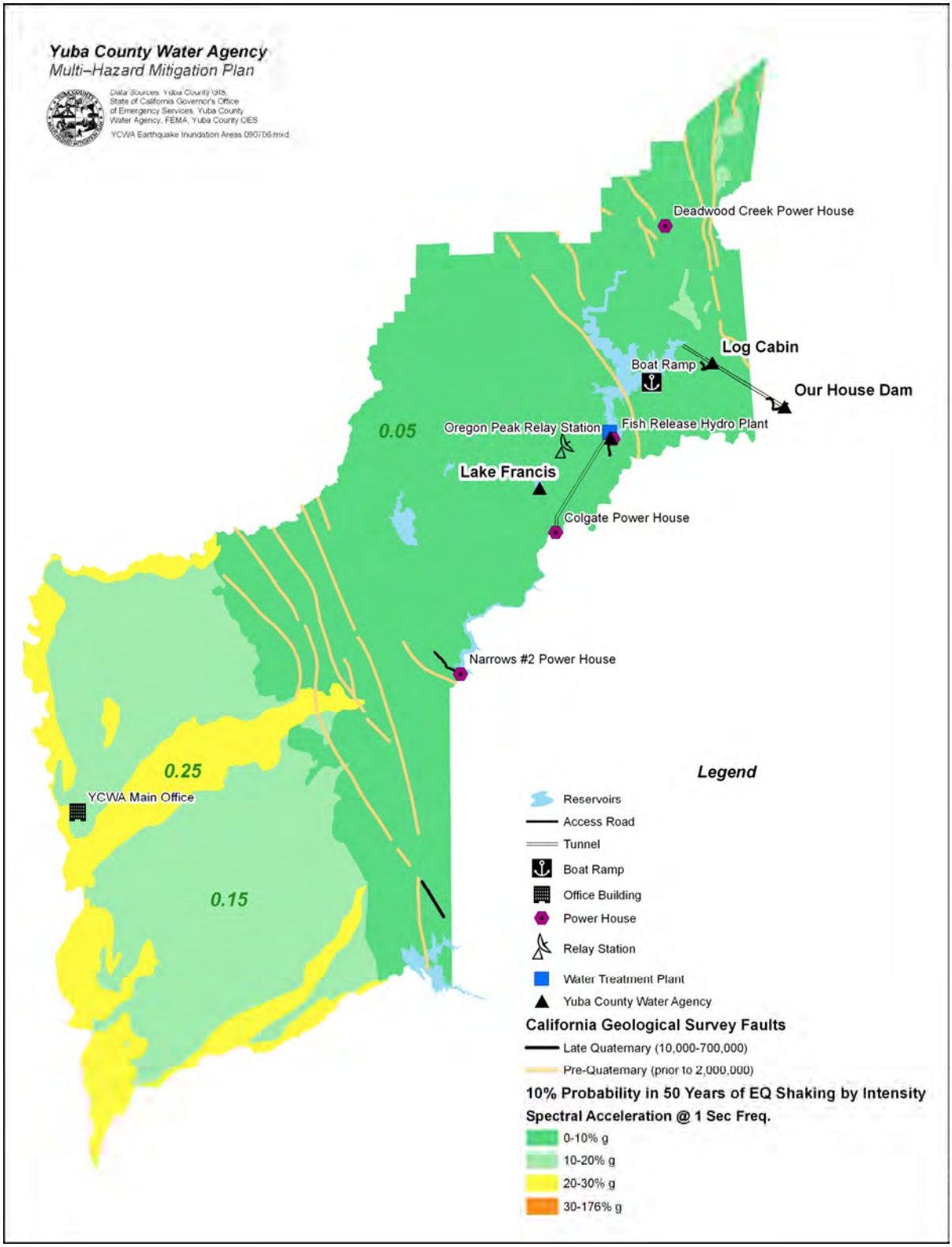
Figure 4–32 12/31/05 Yuba County Area Earthquake Forecast



YCWA conducted a detailed review of potential seismic sources in relation to New Bullards Bar Dam in 2004. Geomatrix, an earth sciences consulting firm, was contracted to perform the study. 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 (MCE), and an estimation of the range of ground motions. Of the identified or inferred lineaments or faults in the region identified by DWR's Division of Safety of Dams (DSOD), most are believed to be inactive according to DSOD criteria for faults (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).

Figure 4–33 shows the faults in the area identified by the California Department of Conservation, California Geological Survey (formerly the California Department of Conservation, Division of Mines and Geology) in the Fault Activity Map of California and Adjacent Areas by Charles W. Jennings (published in 1994). The relationship between faults and YCWA assets can be seen from this figure. For those faults identified by the California Geological Survey in the vicinity of YCWA assets, all are older than the Quaternary period (1.8 million years).

Figure 4–33 Yuba County Earthquake Faults & Peak Ground Acceleration



The New Bullards Bar Dam is inspected visually three times per week for any changed conditions such as increased leakage, cracking, or settlement. In addition, two seismic sensors are located at each end of New Bullards Bar Dam. An earthquake that registers 5.5 Richter magnitude within 50 miles of the dam triggers YCWA to inspect the dam.

4.2 Vulnerability Assessment

DMA 2000 Requirements – Risk Assessment
Assessing Vulnerability: Overview **Requirement §201.6(c)(2)(ii)**: [The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(1) of this section. This description **shall** include an overall summary of each hazard and its impact on the community. **FMA Requirement §78.5 (b)**: Description of the existing flood hazard and identification of the flood risk, including the estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.
Element A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard? B. Does the plan address the **impact** of each hazard on the jurisdiction?

Once the level of risk to a hazard event is assessed, the vulnerable assets can be identified. The susceptibility to an asset is quantified in relation to each particular hazard event. The vulnerability of an asset is partially assessed by the spatial relationship of an asset to the potential location of a hazard event and the amount of damage that may be sustained. This data provides the basis for prioritizing mitigation activities that could be implemented to reduce asset vulnerability.

4.2.1 Overall Summary of Vulnerability

This section assesses the vulnerability of YCWA facilities to the profiled hazard events. The vulnerability assessment considers the types of threats and the potential impact from loss of use of a facility or infrastructure. The degree of impact is measured in the amount of loss to the facility owner. There are several types of methods commonly used to assess vulnerability. The methodology used in this assessment, the assumptions made, and the data limitations are here.

Vulnerability is expressed as the relative risk of a population, critical facilities, infrastructure, and building stock to natural and man-made hazards. This relative risk is expressed as the number of people exposed to a hazard as well as the replacement cost of buildings, critical facilities and infrastructure. This is determined using spatial analysis methods. The location of facilities, the distribution of the population, and the general building stock are overlaid by the locations of hazards and relative hazard risk areas.

The terms *loss* and *exposure* are used frequently in vulnerability assessments. Loss is the relative amount of damage that may occur given a particular hazard event, while exposure is the total value, or replacement cost, for building stock or YCWA assets. For YCWA assets, loss is determined by referencing the location of a facility to the historical or potential occurrence of a natural hazard and determining the amount of damage that may be sustained, while exposure is the total value (often quantified as a replacement cost) of assets and facilities to a hazard event.

The determination of the population at risk was determined for each hazard using Census 2000 data in HAZUS. However, Yuba County is experiencing rapid residential development in the southern portion of the county. Where possible, the population growth experienced in the county since the 2000 Census was estimated for areas where numerous subdivisions have been constructed and the number of new residents estimated and added to the population loss estimates. Using the Census 2000 data, those residents with an annual income of less than $10,000 or those residents over 65 years of age were identified as special needs residents for the purpose of identifying people that may need assistance in leaving the hazard area.

Economic exposure is compiled from various sources. General building stock replacement costs are estimated using the Dun and Bradstreet square footage costs in the HAZUS loss estimation software. The replacement costs of assets, critical facilities and infrastructure are taken from recent insurance assessments where available. The vulnerability is expressed as a worst-case scenario where a complete loss of the structure or facility occurs. This allowed for the identification of the total damage that could occur.

4.2.2 Asset Inventory

DMA 2000 Requirements – Risk Assessment
Assessing Vulnerability: Identifying Structures **Requirement §201.6(c)(2)(ii)(A)**: The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … **FMA Requirement §78.5 (b)**: Description of the existing flood hazard and identification of the flood risk, including the estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.
Element A. Does the plan describe vulnerability in terms of the **types and numbers** of **existing** buildings (including repetitive loss structures), infrastructure, and critical facilities located in the identified hazard areas? B. Does the plan describe vulnerability on terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?

YCWA, as a flood control and water and power provider, is identified by its dams and related infrastructure. The list of YCWA assets is included as Table 4-5. Tables 4-X through 4-Y list YCWA assets and their vulnerability to each identified hazard. The vulnerability for each of these identified hazards is presented in Section 4.2.3.
Assets are any buildings, infrastructure, or equipment owned by a jurisdiction or agency. The purpose of a vulnerability assessment is to estimate the exposure of these assets to all hazard events. Table 4-3 lists the assets owned by YCWA and the most likely type of hazard exposure to all buildings, dams, powerhouses and related infrastructure, and equipment. Figure 4-5 depicts the locations of these facilities and infrastructure.

All of the hazards identified above can have a significant impact on the citizens and their residences, commercial and industrial businesses and services, and critical facilities and infrastructure. As previously noted, critical facilities and infrastructure are those resources that provide essential services to the public in case of emergency. Such facilities and infrastructure include hospitals, emergency shelters, evacuation routes, or producers of products that are essential to responding to an emergency, for example. Knowing the location of assets in case of a hazard event is important for the county to be able to respond effectively and efficiently. This section details the assets in the county by noting their function and location. This information will be subsequently used to prepare the vulnerability assessment that will outline potential mitigation options available to the county to lessen the county's exposure and respond timely to a hazard event.

4.2.2.1 Critical Facilities and Economic Assets

A critical facility is a facility that provides essential services or products to the community. These services can include emergency response and recovery roles, reconstruction services and supplies, safety to people and property, and utilities such as power, communication, and transportation. YCWA facilities protect thousands of people from potential flooding, generate significant amounts of electrical power for PG&E and supply water to districts in Yuba County. These critical facilities are listed in Table 4–14 and depicted in Figure 4–34. These include the

dams, powerhouses, water treatment facility, fish screens, and all access roads to these facilities. The critical facilities include:

- Three dams;
- Three powerhouses and a substation;
- Water treatment plant for nearby recreation facilities;
- Fish screens; and
- Access roads to all facilities.

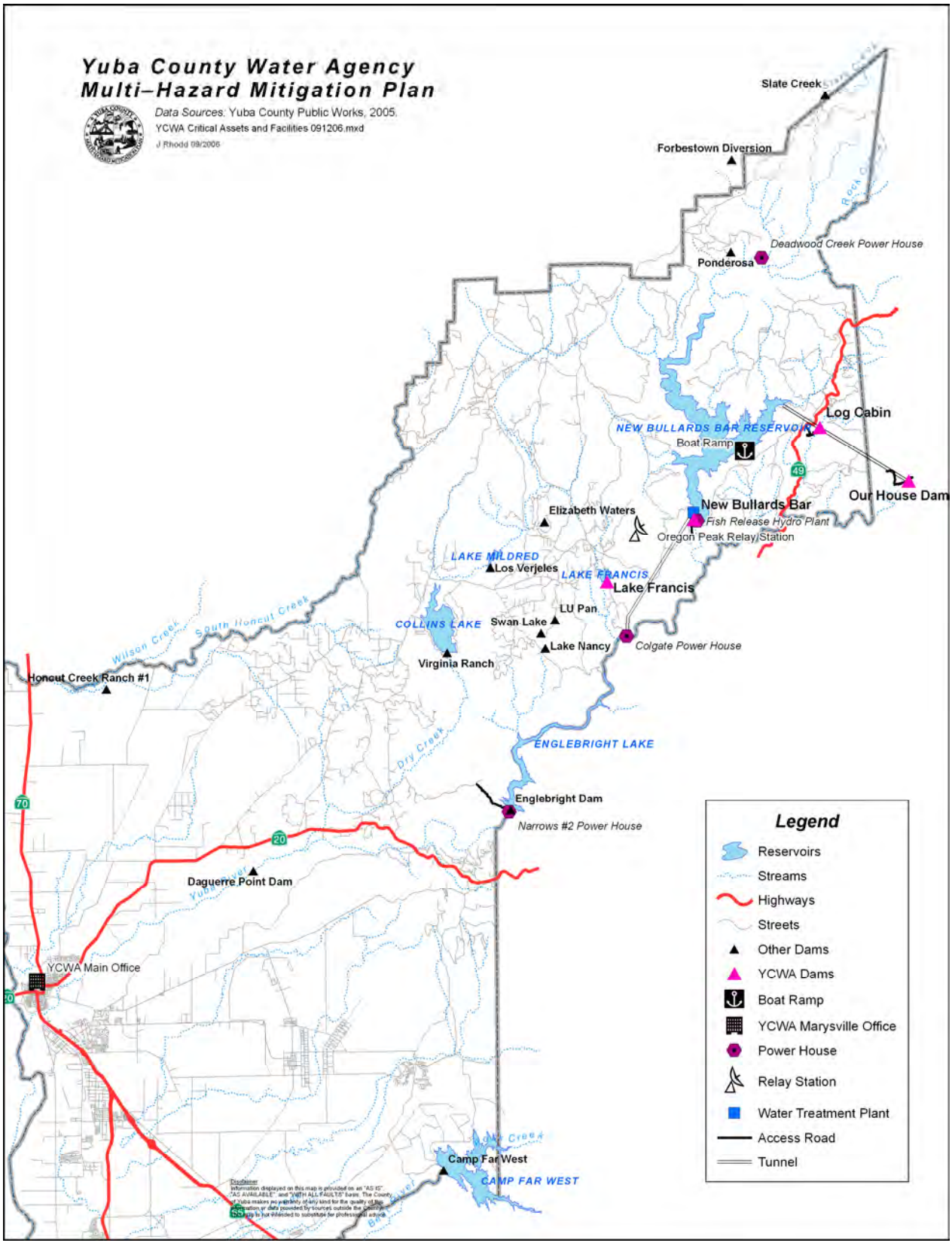
Table 4–14 YCWA Asset Inventory

Name / Description of Asset	Source of Information	Critical Facility ✓	Vulnerable Populations ✓	Economic Assets ✓	Special Considerations ✓	Other Considerations ✓	Size of Building (sq. ft)	Replacement Value ($)	Contents Value ($)	Function Use or Value ($)	Displacement Cost ($ per day)	Occupancy or Capacity (#)
Our House Dam	YCWA Records	✓						10,000,000				
Log Cabin Dam	YCWA Records	✓						10,000,000				
Bullards Bar Dam & Facilities	YCWA Records	✓						200,000,000				
Colgate Power House & Office	YCWA Records	✓						62,300,000			300,000	20
Colgate Tunnel	YCWA Records	✓										
Narrows 2 Power House	YCWA Records	✓						13,900,000			90,000	
Lake Francis Dam	YCWA Records			✓				15,000,000				
Cottage Creek Water Treatment Plant & Piping	YCWA Records	✓						1,500,000			1,000	
Main Irrigation South Canal	YCWA Records			✓				1,000,000				
Daguerra Dam Intakes & Roads	YCWA Records			✓				3,000,000				
Recreation Facilities	YCWA Records			✓				4,000,000			3,000	
Project Equipment Vehicles, Boats	YCWA Records			✓				1,000,000				
Project Access Roads	YCWA Records			✓				1,000,000				
Mini Hydro at Bullards Bar Dam	YCWA Records	✓						550,000			110	
Marysville Office 1902 D Street	YCWA Records			✓				186,000	445,000		1,000	10
Project Communications	YCWA Records	✓						1,500,000			3,000	
Project Residence	YCWA Records			✓				100,000				
South Fish Screens	YCWA Records	✓						500,000				
Deadwood Power House	YCWA Records	✓						4,000,000			2,500	
Deadwood Substation	YCWA Records	✓						900,000			2,500	

Table 4–15 Yuba County Water Agency Dam Information

	New Bullards Bar Dam	Log Cabin Dam	Our House Dam
Owner	Yuba County Water Agency	Yuba County Water Agency	
County	Yuba	Yuba	Sierra
Cost of Construction			
Name of River	North Yuba River	Oregon Creek	Middle Yuba
Nearest City	Marysville	Marysville	Marysville
Distance to Nearest City	35 miles NE	47 miles NE	45 miles NE
Purpose of Dam	Flood control, storage, recreation	Diversion to Bullards Bar Dam	Diversion to Bullards Bar Dam
Year Built	1969	1969	1969
Length of Dam	2,323	30	368
Height of Dam	636	46	70
Structural Height of Dam	645	51.5	89
Maximum Discharge rate (cfs)	5,500	800	800
Hydraulic Height of Dam (ft)	636	44	66
Maximum Storage Area (acre-ft)	966,000	90	280
Normal Storage Area (acre-ft)	966,000	90	260
Surface area of water (acres)	4,810	3	14
Drainage Area of Dam (sq. miles)	485	30	145
Relative Hazard Rating	High	Low	Low
Emergency Action Plan?	Yes	Yes	Yes
Spillway Type on Dam	3 Radial Gates	ungated	Ungated
Spillway Width (ft)	90	183.3	249.6
Spillway Volume (cfs)	160,000	12,000	60,000 cfs
Latitude	39.39	39.44	39.41
Longitude	121.14	121.06	121.0

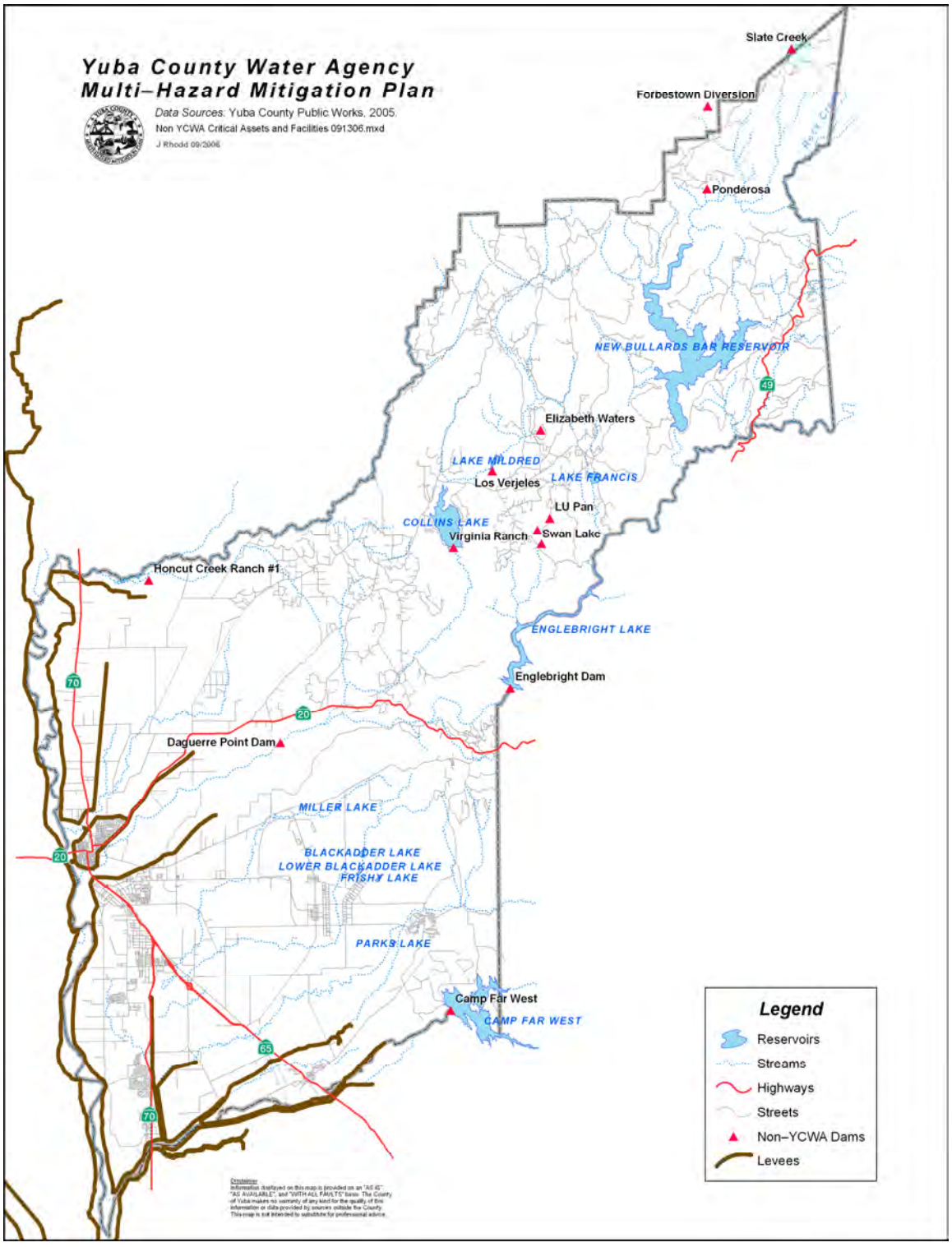
Figure 4–34 YCWA Asset Location Map



4.2.2.2 Non-YCWA Assets

In addition to YCWA facilities, other water control facilities are integral to the Agency's flood control mission along the Yuba River and its tributaries. The Non-YCWA assets are shown in Figure 4–35 below.

Figure 4–35 Non–YCWA Critical Assets and Facilities



4.2.2.1 Future Critical Facilities and Economic Assets

DMA 2000 Requirements – Risk Assessment
Assessing Vulnerability: Analyzing Development Trends **Requirement §201.6(c)(2)(ii)(C)**: [The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions
Element A. Does the plan estimate **potential dollar** losses to vulnerable structures? B. Does the plan describe the **methodology** used to prepare the estimates?

Discussion of future assets here

4.2.3 Vulnerability to Identified Hazards

DMA 2000 Requirements – Risk Assessment
Assessing Vulnerability: Estimating Potential Losses **Requirement §201.6(c)(2)(ii)(B)**: [The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate
Element C. Does the plan estimate **potential dollar** losses to vulnerable structures? D. Does the plan describe the **methodology** used to prepare the estimates?

The following sections detail the vulnerability to YCWA facilities and assets for each identified hazard. A summary of the vulnerability with extents of damage, type of damage, estimated replacement values, and displacements costs are presented in summary tables for each profiled hazard.

This section describes the methodology used to estimate the vulnerability of the residents of the county and YCWA assets to hazard events. The vulnerability assessment considers the potential impact of loss to a facility as well as the vulnerability of the facility to a natural hazard event. The impact of loss is the degree to which the facility is impaired by a natural hazard. This section measures vulnerability by the total exposure to the profiled hazards. By doing so, no consideration is given to varying levels of damage from the various natural hazards. The facility, equipment or infrastructure is assumed to be totally damaged by the hazard event and will require full replacement. In the case of inundation from the loss of a dam, the Federal Energy Regulatory Commission (FERC)-identified inundation areas were used to determine the number of people that could potentially be affected. An estimated number of deaths or injuries from the failure of a dam were not determined.

The locations of YCWA facilities, infrastructure, and inundation areas are shown in Figure 4-19. These locations were entered into HAZUS and compared to the locations of where natural hazards may occur or the probability and degree of hazard (for example, earthquakes). The assessment to natural hazards was performed using standard GIS spatial analysis techniques.

The results of the vulnerability assessment are summarized under each hazard in the following sections. First, a discussion of the limitations of the data sets and assumptions used is presented below.

Uncertainty is inherent in all vulnerability assessments. This assessment uses the best available data from many different sources. In consideration of this, we must note that the results of the assessment are approximations of relative risk by hazard. There are limitations in scientific knowledge as well; the assumptions made in determining seismic risk to facilities, population

sampling methods, the strength of building materials, uncertainties in hydrologic models, HAZUS loss estimation techniques where national or regional assumptions are used to represent local conditions – all represent limitations in scientific knowledge that must be considered when reviewing the results of the vulnerability assessment.

4.2.3.1 Winter Storms–High Water

YCWA facilities and infrastructure are primarily located in the mountainous portion of Yuba County. With elevation, precipitation increases in the county, along with the potential for heavy snowfall. As a result, there is an increased level of exposure to these facilities to damage from winter storms. Table 4–16 illustrates the seasonality of precipitation across the YCWA watershed as well as by location. Higher precipitation occurs near the New Bullards Bar Dam facility which has an annual average precipitation of 66.45 inches.

Table 4–16 Yuba River Watershed Annual Average Rainfall

Average Annual Precipitation													
Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
NBB Dam	13.84	9.61	8.93	5.47	2.47	0.61	0.02	0.16	0.71	3.71	8.36	12.56	66.45
Challenge	13.34	9.74	8.52	4.62	1.93	0.69	0.12	0.25	1.00	3.80	7.90	10.56	62.49
Camptonville	13.11	8.13	7.01	4.65	2.17	0.69	0.02	0.23	0.58	3.49	7.46	12.17	59.71
Dobbins	9.51	7.44	8.40	3.75	2.13	0.49	0.14	0.20	0.95	2.65	6.52	8.55	42.39
Colgate Power House	7.97	6.32	5.95	3.03	1.54	0.50	0.08	0.18	0.54	2.45	5.37	7.39	41.30
Englebright Dam	6.24	5.79	5.17	2.53	1.26	0.38	0.03	0.14	0.56	1.89	4.60	5.85	34.45
Marysville	4.32	3.50	2.96	1.60	0.67	0.23	0.04	0.08	0.33	1.31	2.81	3.74	21.59

4.2.3.1.1 Potential Loss Estimate

Table 4–17 provides the winter storm–high water vulnerability to YCWA facilities and infrastructure. By their very nature all YCWA facilities are exposed to the winter storm–high water hazard. Facilities exposed to winter storms and high water are the communications facilities on Oregon Peak north of Dobbins, the access roads to remote facilities, as well as the damage that occurs due to debris and sediment to the dams, fish ladders, and power generation facilities.

Table 4–17 YCWA Winter Storm Hazard Vulnerability

Name / Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Replacement Value ($) 2003	Contents Value ($)	Displacement Cost ($ per day)	Occupancy or Capacity
Our House Dam	YCWA Records	✓			10,000,000			
Log Cabin Dam	YCWA Records	✓			10,000,000			
Bullards Bar Dam & Facilities	YCWA Records	✓			200,000,000			
Project Access Roads	YCWA Records		✓		1,000,000			
Recreation Facilities	YCWA Records		✓		4,000,000			
Deadwood Power House	YCWA Records	✓	✓		4,000,000		2,500	
Deadwood Substation	YCWA Records	✓	✓		900,000		2,500	
Project Communications	YCWA Records	✓			1,500,000		3,000	
Cottage Creek Water Treatment	YCWA Records	✓			1,500,000			

Costs reflected depict severe damage and major impact to facilities

4.2.3.1.2 Impact of Future Development

There is the potential for development in the foothill portions of Yuba County. New development has the capacity to create increased erosion from new road development and the improvement of existing roads, which may allow for easier access to remote facilities. The increased traffic on roads in the YCWA watershed will increase erosion into the water channels that feed into YCWA critical facilities. New housing development in the watershed will remove vegetation that stabilizes erodible soils thereby increasing debris and erosion into the waterways that feed YCWA critical facilities.

4.2.3.2 Flood

This section identifies the vulnerability to YCWA facilities and assets from flooding. Figure 4–36 depicts the assets that are potentially exposed to flooding. This is based on the potential damage due to riverine flooding only. A separate section details the vulnerability to YCWA and residents downstream from dam failure.

4.2.3.2.1 Riverine Flooding

The threat of flooding to YCWA facilities and assets is based on FEMA's Flood Insurance Rate Maps (FIRMs). The digitizing of the Q3 Flood Data is consistent with those for mapping at a scale of 1:24000. A more accurate GIS layer of FEMA flood data is contained in the Digital Flood Information Rate Maps (DFIRMs), but the DFIRMs for Yuba County have not been completed at the time of this writing.

YCWA facilities and assets were overlain by the FEMA Q3 data to note which assets are potentially affected by 100-year flood hazards. This is shown in Figure 4–36. Note that no YCWA assets intersect the 100-year flood zone. However, since YCWA facilities are exposed to high water flows during extreme events, there is significant potential for damage to occur to YCWA facilities and infrastructure as a result of the flood protection that its facilities provide. YCWA engineers have conducted damage assessments to all facilities that could be damaged by excessive water flows. As a result, during 100-year or greater events, the damage estimates

provided in Table 4–18 note the estimated damages that could occur during these significant events and the resulting economic impact.

Figure 4–36 100–Year Flood Asset Exposure

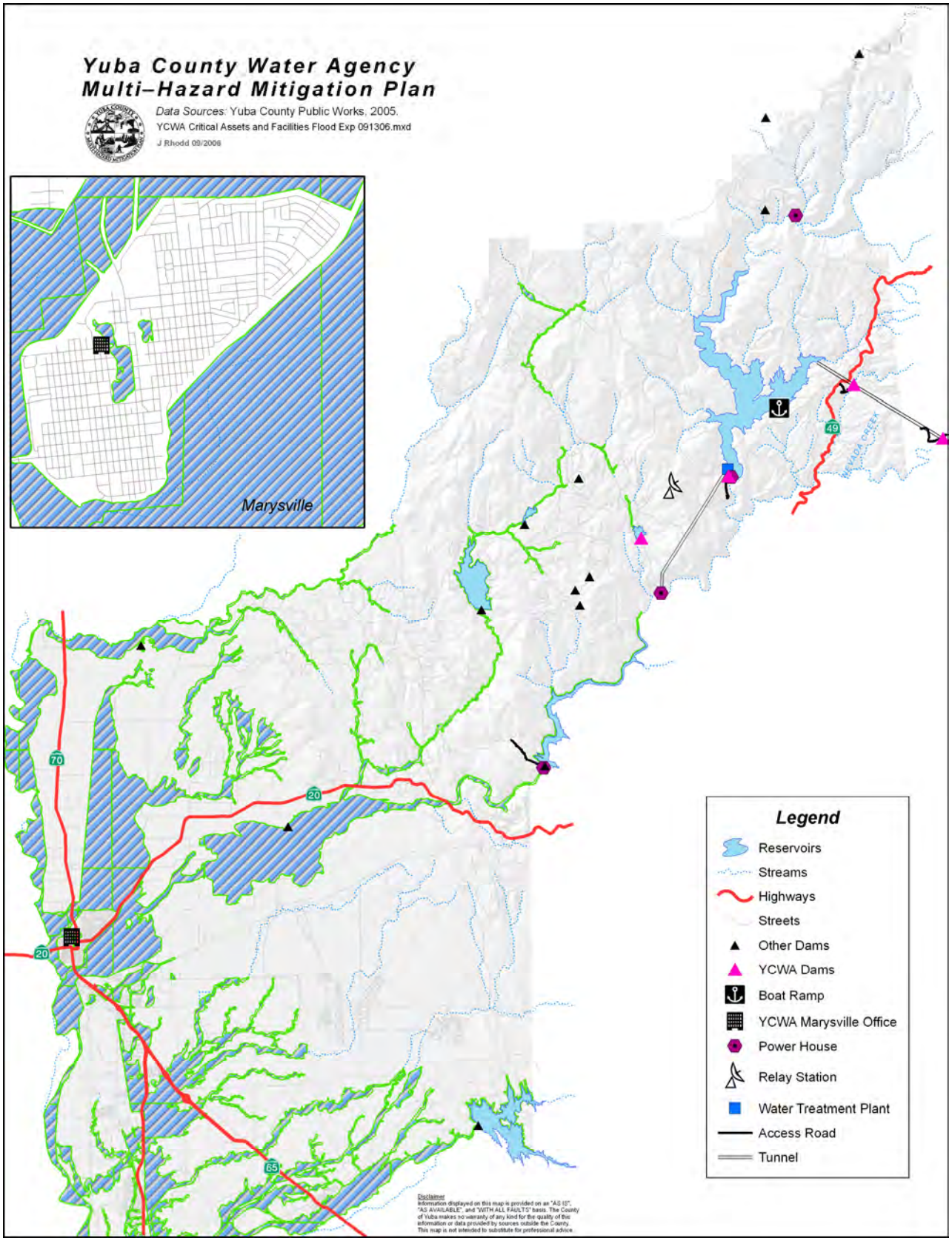


Table 4–18 YCWA Flood Hazard Vulnerability

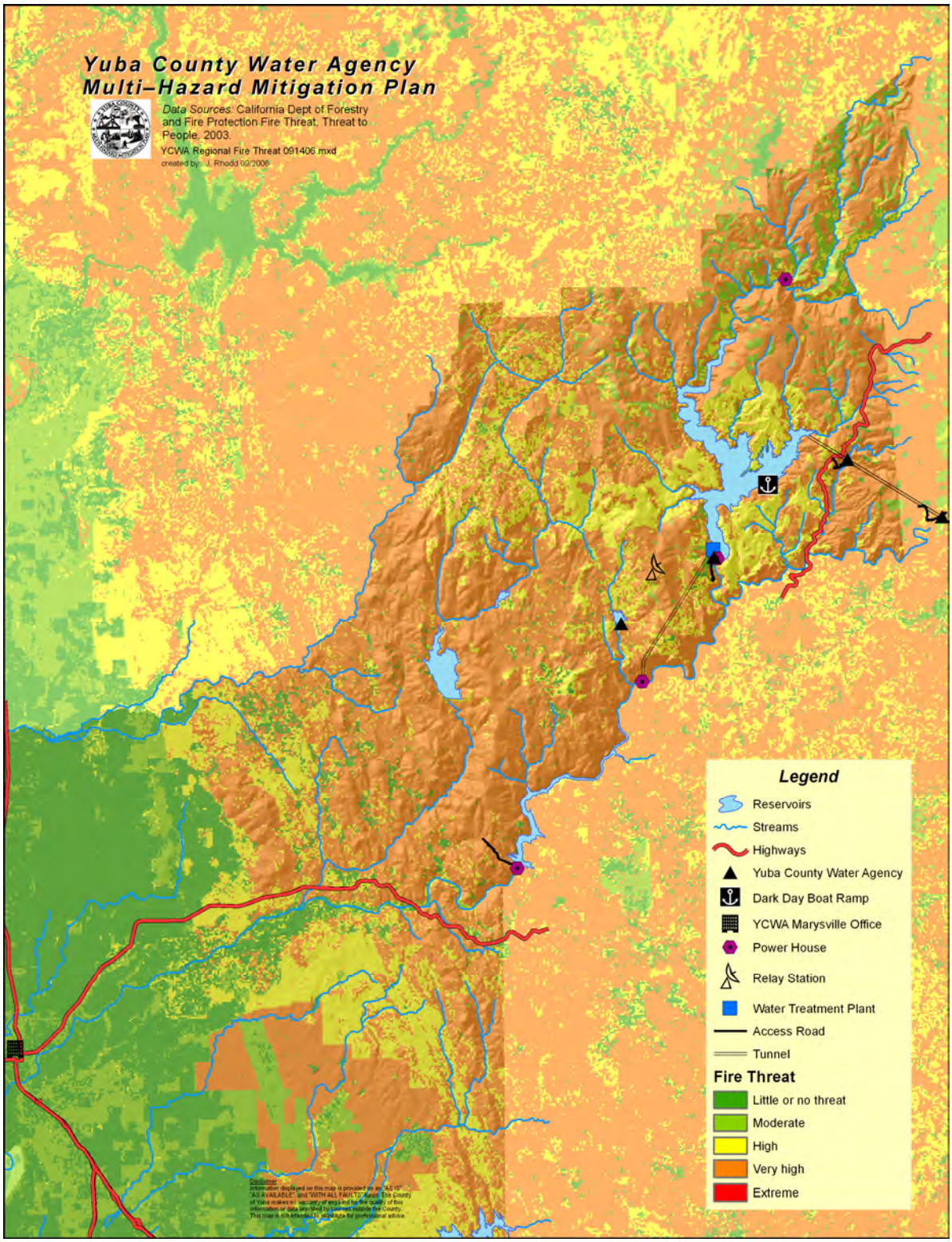
Name/Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Expected Damage Cost ($) 2003	Contents Damage Cost ($)	Displacement Cost ($ per day)	Occupancy or Capacity
Our House Dam	YCWA Records	✓			5,000,000*			
Log Cabin Dam	YCWA Records	✓			5,000,000*			
Bullards Bar Dam & Facilities	YCWA Records	✓			100,000,000*			
Colgate Power House & Office	YCWA Records		✓		62,300,000		330,000	20
Narrows 2 Power House	YCWA Records	✓			13,900,000		90,000	
Deadwood Power House	YCWA Records	✓			4,000,000		2,500	
Lake Francis Dam	YCWA Records			✓	15,000,000			
Cottage Creek Water Treatment Plant & Piping	YCWA Records	✓			1,500,000		1,000	
Main Irrigation South, Central	YCWA Records		✓		1,000,000			
Daguerra Dam Intakes & Roads	YCWA Records		✓		300,000			
Recreation Facilities	YCWA Records		✓		4,000,000		3,000	
Project Equipment Vehicles, Boats	YCWA Records		✓		1,000,000			
All Project Access Roads	YCWA Records	✓			1,000,000			
Mini Hydro at Bullards Bar Dam	YCWA Records	✓			550,000		110	
Marysville Office 1902 D Street	YCWA Records		✓		186,000	445,000	1,000	10
South Fish Screens	YCWA Records	✓			500,000			
Deadwood Substation	YCWA Records	✓			900,000		2,500	
Project Communications Facilities	YCWA Records	✓			1,500,000		3,000	

* Floods normally do not destroy dams. The estimated cost of damage is 50% of the total replacement cost.

4.2.3.3 Fire

The YCWA facilities are located in the foothills of Yuba County surrounded by heavily forested lands. Figure 4–37 depicts the fire history of Yuba County since 1950. As can be seen, there is a substantial portion of the county that has been exposed to wildfire. In recent years, two large fires, the 1997 Williams Fire and the 1999 Pendola Fire, ravaged large portions of the foothills of Yuba County (Figure 4–13). Fire has the potential of damaging YCWA facilities and cutting off access routes to several important YCWA facilities.

Figure 4–37 Regional Fire Vulnerability



Wildfire hazard is determined by examining the CDF fire threat coverage developed in 2004. This data is available from CDF's Fire and Resource Assessment Program (http://frap.cdf.ca.gov). This dataset identifies the relative threat of wildfire by comparing the fire frequency of an area to the potential fire behavior. The fire frequency or fire rotation half of the fire threat model considers the last 50 years of fire history for land groups (strata) defined by climate, vegetation, and land ownership. The factors are combined into a Fire Rotation Interval, the number of years it would take for past fires to burn an area equivalent to the area of a given stratum. The fuel rank half of the fire threat model is determined from the combination of topography, vegetative fuels under severe weather conditions (wind, humidity, temperature, and fuel moisture), and ladder or crown fuel percent (CDF 2004). These factors are combined into the five classes of the fire threat model. Five classes of fire threat are developed by combining these two assessments: Little or No Threat, Moderate Threat, High Threat, Very High Threat, and Extreme Threat (CDF 2004).

In consideration of the model above, there are other factors than contribute to, or exacerbate, the threat of wildfire: Meteorological conditions (high winds, recent precipitation, or humidity) or an increase or decrease in fuel load can contribute to or reduce the risk of wildfire.

Urban, or structural, fires occur where a fire on one building spreads to adjacent buildings due to their close proximity. The cities of Marysville and Wheatland are the areas most likely to suffer from this type of fire threat. The YCWA main office in Marysville is the facility most likely to be affected by this type of threat, especially since it is located next to a gasoline refueling station. An explosion there could quickly engulf the building and cause a total loss.

4.2.3.3.1 Potential Loss Estimate

Figure 4-38 shows the CDF Fire Threat categorization for Yuba County and the surrounding area. As can be seen in the figure, wildfire threat increases with the increased fuel load of the wooded foothills of the county. The majority of YCWA facilities and infrastructure are located in these areas of increased fire threat.

Because of the damaging nature of fires, facilities that could be damaged by fire would be counted as complete losses. This includes the following types of facilities:

- Powerhouses and substations;
- Communication facilities;
- YCWA main office;
- Water treatment plant; and
- Road access to these facilities.

Table 4–19 lists the loss of use to these facilities.

Figure 4–38 YCWA Regional Fire Threat

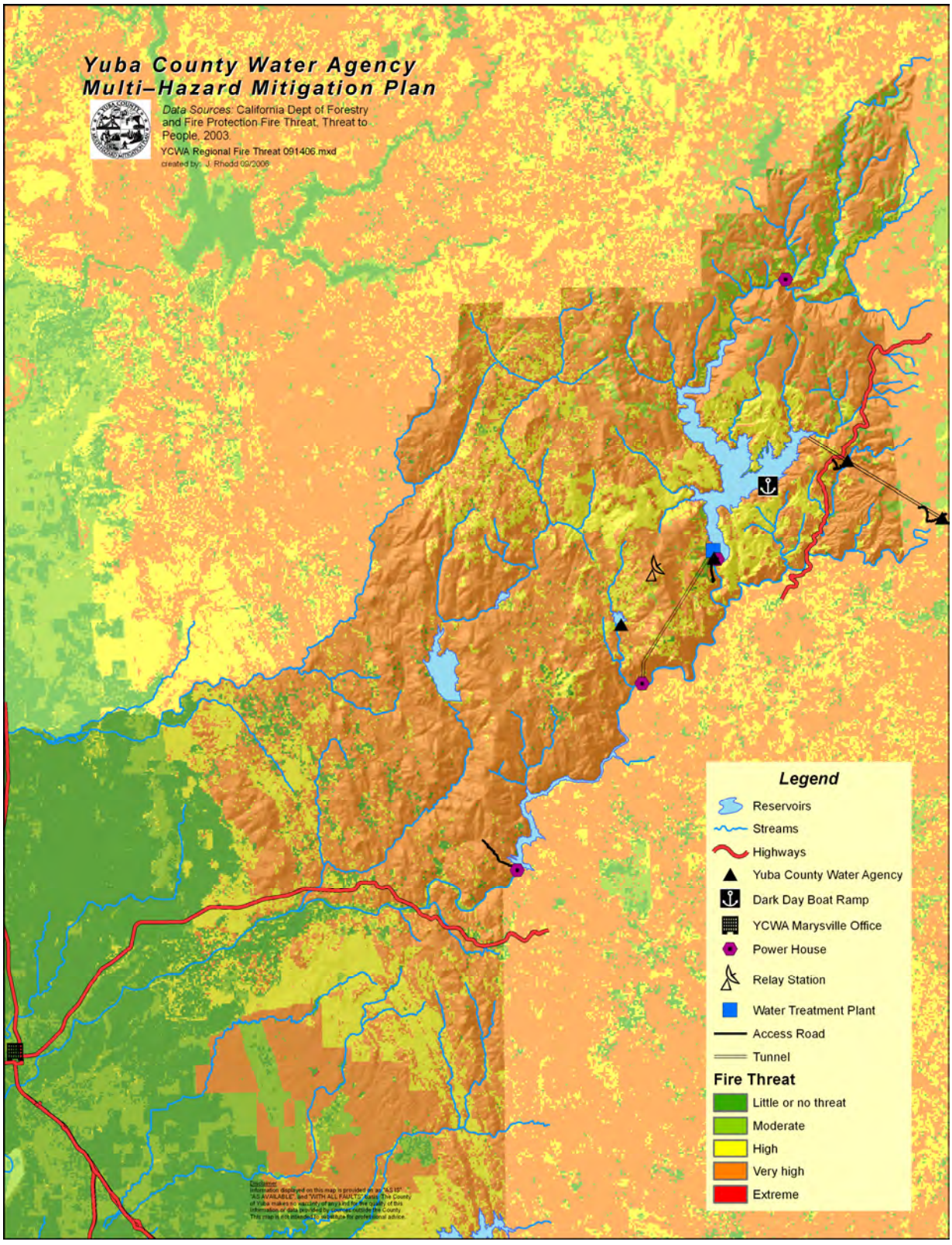


Table 4–19 YCWA Wildfire Hazard Vulnerability

Name / Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Expected Damage Cost ($) 2003	Contents Damage Cost ($)	Displacement Cost ($ per day)	Occupancy or Capacity	CDF Fire Threat Classification	Other Hazard Specific Information
New Bullards Bar Dam & Facilities	Historical Research	✓							Very High	Fire Fighting
Deadwood Power House	Historical Research	✓			4,000,000		2,500		High to Very High	
Deadwood Substation	Historical Research	✓			900,000		2,500		High to Very High	
Boat Ramp	CDF Fire Threat			✓					Very High	
Fish Release Hydro Plant	CDF Fire Threat	✓							Very High	
Oregon Peak Relay Station	CDF Fire Threat	✓			1,500,000		3,000		Very High	
Colgate Power House	CDF Fire Threat	✓			62,300,000		330,000		High to Very High	
Narrows #2 Power House	CDF Fire Threat	✓			13,900,000		90,000		Very High	
YCWA Main Office	CDF Fire Threat	✓			186,000	445,000	1,000	10	Little or No Threat	
Project Access Roads	Historical Research		✓		N/A	N/A	N/A	N/A	High to Very High	Clean Up

Costs reflected depict severe damage and major impact to facilities

4.2.3.3.2 Impact of Future Development

Future development in the foothills of Yuba County will have several effects on the threat of wildfire to YCWA facilities and assets, such as an increase in the potential for additional ignition sources in the remote or recreational areas of the county. Future development in Marysville is not expected to impact the YCWA main office.

4.2.3.4 Landslide

As noted earlier in the landslide hazard profile, most of Yuba County is estimated to have a low vulnerability to landslides. However, areas continue to experience repeated localized incidences of this hazard. Three physical factors–slope steepness, bedrock, and past history–are the minimum components necessary to assess landslide hazards. In addition, ground water and precipitation often play an important role in the occurrence of landslides, as well as vegetation and slope orientation in the determination of localized landslide hazard threat.

4.2.3.4.1 Potential Loss Estimate

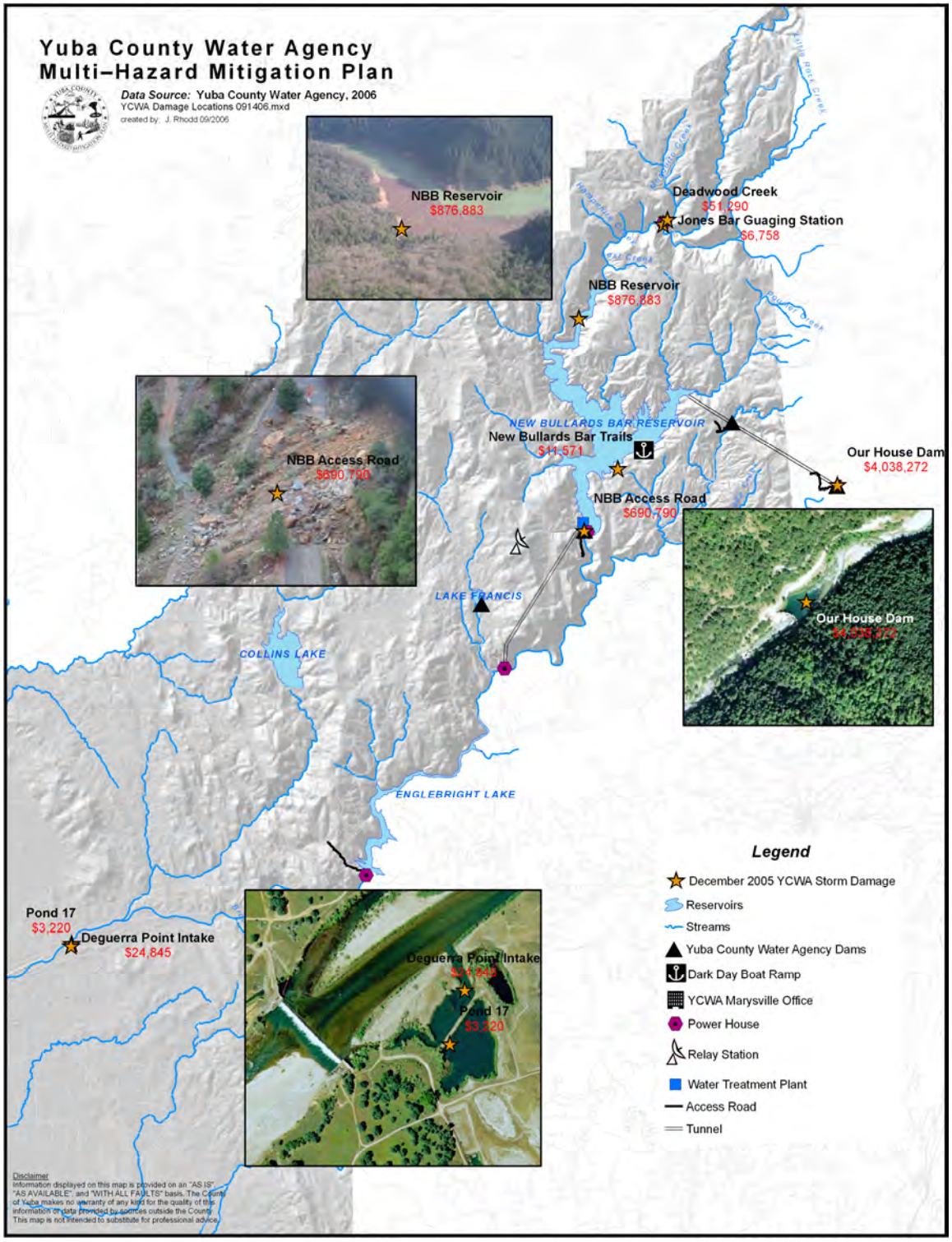
Table 4–20 details the estimated landslide susceptibility to YCWA facilities. It is estimated that vulnerable facilities include the Colgate Powerhouse, Narrows II Powerhouse, Deadwood Powerhouse, and Deadwood Substation to a total of $81,100,000. Other vulnerability is estimated as a result of clean-up activities following a landslide affecting YCWA facilities. Figure 4–39 outlines the estimated clean-up costs at each facility.

Table 4–20 YCWA Landslide Hazard Asset Inventory

Name/Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Expected Damage Cost ($) 2003	Contents Damage Cost($)	Displacement Cost ($ per day)	Occupancy or Capacity
Our House Dam	YCWA Records	✓	✓		10,000,000			
Log Cabin Dam	YCWA Records	✓	✓		10,000,000			
Bullards Bar Dam & Facilities	YCWA Records	✓	✓		200,000,000			
Colgate Power House & Office	YCWA Records		✓		62,300,000		330,000	
Narrows 2 Power House	YCWA Records	✓	✓		13,900,000		90,000	
Deadwood Power House	YCWA Records	✓	✓		4,000,000		2,500	
Deadwood Substation	YCWA Records	✓	✓		900,000		2,500	
Project Access Roads	YCWA Records	✓			1,000,000			
Daguerre Dam & Facilities	YCWA Records	✓			3,000,000			
Jones Bar Suspension Bridge & Guaging Station	YCWA Records			✓				
Deadwood Creek Facilities	YCWA Records			✓	4,900,000			

Costs reflected depict severe damage and major impact to facilities

Figure 4–39 Landslide Vulnerability



4.2.3.4.2 Impact of Future Development

Future development in the foothills of Yuba County will have several effects on the threat of landslide to YCWA facilities and assets, such as an increase in the potential for additional landslide sources in the remote or recreational areas of the county as increased traffic on rural roads cause increased soil erosion and new rural roads are cut into hillsides further destabilizing slopes. Future development in Marysville is not expected to impact the YCWA main office.

4.2.3.5 Dam Control

Description

Property loss of impacted properties from the dam control hazard in YCWA watershed were chosen from the overlay of the FERC inundation zones and the Yuba County Assessors' parcel data. The determination of the population at risk was determined using Census 2000 data and California Department of Finance population growth estimates in GIS. Where possible, the population growth experienced in the County jurisdiction since the 2000 census estimate was estimated for new construction and new residents then added to the population loss estimates.

Economic exposure is compiled from various sources. Structural values are estimated from the structural value in the Yuba County Assessors parcel database. The total land values are also estimated from the land value reported in the Yuba County Assessor's parcel database. The vulnerability is expressed as a worst-case scenario where a complete loss of the structure or facility occurs. No consideration is given to varying levels of damage from flooding. The facility, equipment or infrastructure is assumed to be totally damaged by the hazard event and will require full replacement. This allowed for the identification of the total damage that could occur. Federal Energy Regulatory Commission (FERC)-identified inundation areas were used to determine the number of people that could potentially be affected.

YCWA facilities and assets were overlain by the FERC data to note which assets are potentially affected by dam control hazards. The relationship of dam failure inundation areas to the location of YCWA assets is shown in Figure 4–40. Since YCWA facilities are exposed to high water flows during extreme events, there is significant potential for damage to occur to YCWA facilities and infrastructure as a result of the flood protection that its facilities provide. YCWA engineers have conducted damage assessments to all facilities that could be damaged by excessive water flows. As a result, during loss of dam control events, the damage estimates provided in Table 4–21 and 4–22 note the estimated damages that could occur during these significant events and the resulting economic impact.

4.2.3.5.1 Potential Loss Estimate

Dam Control Impact

Vulnerability of Yuba County residents to loss of dam control varies by the amount of water stored behind the individual water control facility. Dam failure inundation areas were obtained in GIS format from the State of California's Governor's Office of Emergency Services (State OES) or created in a GIS format by digitizing the inundation areas from YCWA or FERC documents.

Five dams in Yuba County have the potential to wreak devastation of catastrophic proportions as illustrated in Figure 4–40. Fourteen thousand seven hundred seventy–nine people in 5,684 residences are located within the Camp Far West Dam Failure inundation area. Five thousand seven hundred ninety–three people in 2,228 residences are located within the Englebright Dam Failure inundation area. Forty–six thousand five hundred sixty people in 17,908 residences are located within the New Bullards Bar Dam Failure inundation area. Forty–three thousand two hundred thirty–two people in 16,628 residences are located within the Oroville Dam Failure

inundation area. The remaining three dams have the potential of causing severe devastation but on a much smaller scale.

This assessment was conducted by intersecting the dam inundation areas with the Census 2000 census blocks. This creates a potentially exaggerated number of people at risk from dam failure. The calculation of the number of people threatened is based on the census blocks intersected by the inundation areas. In many cases, the inundation area covers only a small portion of the census blocks. The census blocks where a very small portion is covered by the inundation, less than five percent, were not included if there were no visible homes or other infrastructure after reviewing recent aerial photography.

Figure 4–40 FERC Identified Inundation Area with YCWA assets

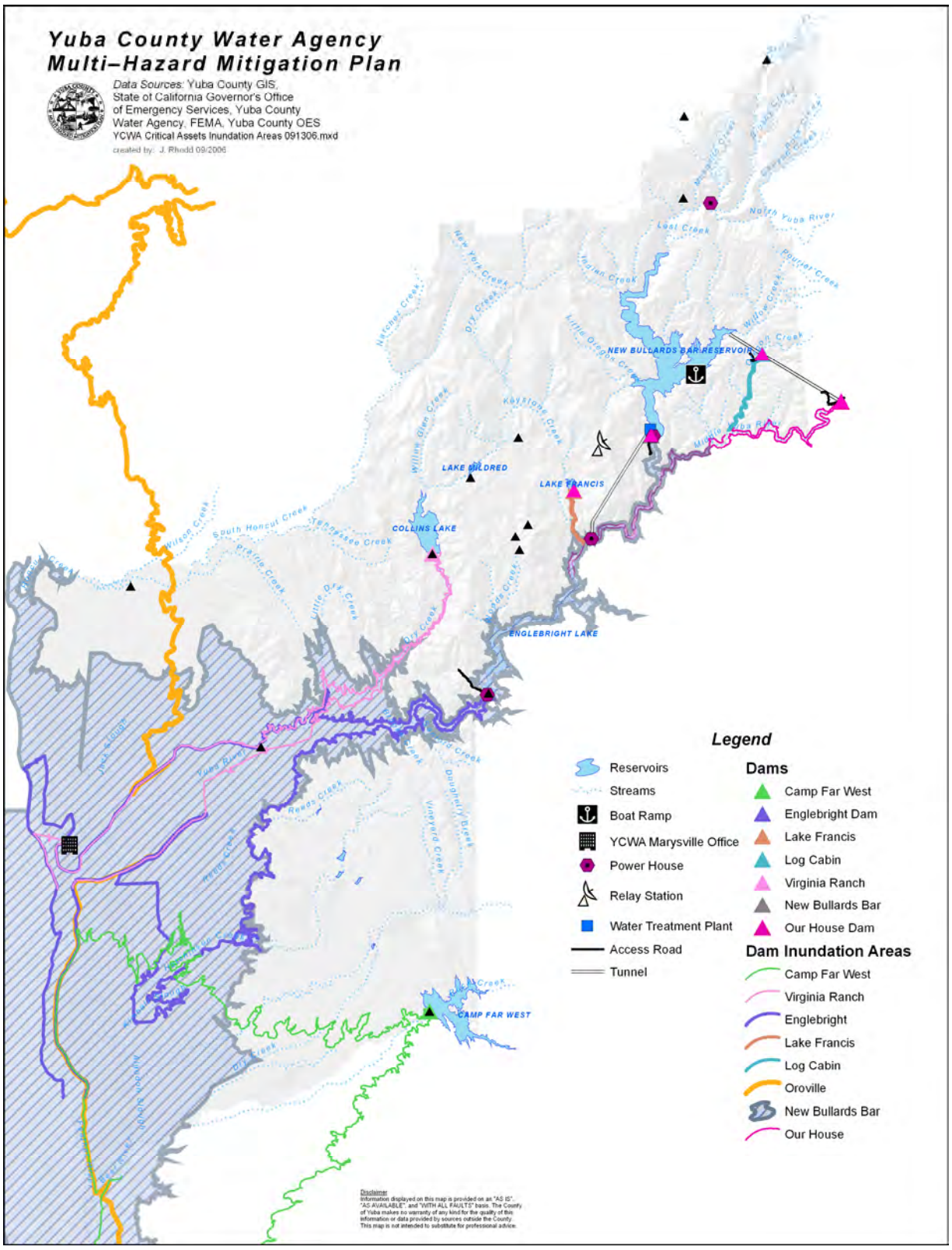


Table 4–21 YCWA Dam Control Hazard Vulnerability

Name/Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Expected Damage Cost ($) 2003	Contents Damage Cost ($)	Displacement Cost ($ per day)	Occupancy or Capacity
Our House Dam	YCWA Records	✓			10,000,000			
Log Cabin Dam	YCWA Records	✓			10,000,000			
Bullards Bar Dam & Facilities	YCWA Records	✓			200,000,000			
Colgate Power House & Office	YCWA Records		✓		62,300,000		330,000	20
Narrows 2 Power House	YCWA Records	✓			13,900,000		90,000	
Lake Francis Dam	YCWA Records			✓	15,000,000			
Cottage Creek Water Treatment Plant Piping	YCWA Records	✓			200,000		1,000	
Main Irrigation South Canal	YCWA Records		✓		1,000,000			
Daguerra Dam Intakes & Roads	YCWA Records		✓		300,000			
Project Equipment Vhicles, Boats	YCWA Records		✓		1,000,000			
Project Access Roads	YCWA Records	✓			200,000			
Mini Hydro at Bullards Bar Dam	YCWA Records	✓			550,000		110	
Marysville Office 1902 D Street	YCWA Records		✓		186,000	445,000	1,000	10
South Fish Screens	YCWA Records	✓			500,000			
Deadwood Power House	YCWA Records	✓						

Costs reflected depict severe damage and major impact to facilities

Table 4–22 Dam Control Hazard Vulnerability

Facility	Population affected	Population with incomes < $10,000	Population over 65 years old	Dollar Exposure (000) Total Exposure [1]	RES	COM	IND	AGR	REL	GOV	EDU
New Bullards Bar Dam	43232	2,175	4,273	$ 2,015,443	$1,803,817	$135,168	$ 27,052	$ 3,935	$ 5,183	$ 7,138	$ 17,330
Camp Far West Dam	14779	739	1,187	$ 850,035	$ 125,378	$ 6,085	$ 11,980	$ 34,053	$ 3,043	$ -	$ -
Englebright Dam	5793	289	586	$ 180,609	$ 645,745	$ 31,824	$ 29,515	$ 62,113	$ 2,805	$ -	$ -
Virginia Ranch Dam	877	43	109	$ 51,914	$ 31,004	$ 2,863	$ 10,452	$ 7,451	$ -	$ -	$ -
Lake Francis Dam	122 [2]	7	29	$ 6,532	$ 6,532	$ -	$ -	$ -	$ -	$ -	$ -
Log Cabin Dam	47	2	19	$ 1,850	$ 1,850	$ -	$ -	$ -	$ -	$ -	$ -
Our House Dam											

[1] Total Exposure includes building and content replacement values

[2] Examination of aerial photography shows no residences, and therefore any directly-affected population, within the Lake Francis Dam inundation area.

Notes : Census blocks selected by intersecting inundation areas onto Census 2000 blocks

4.2.3.5.2 Impact of Future Development

The population estimated at risk due to dam failure was much smaller than the intersected census blocks. This is especially true for Lake Francis Dam, as the flooding would be confined to the narrow canyon downstream where few, if any, people live. New development in the YCWA watershed area below dams will increase the population and structures exposed to potential damage from possible loss of dam control.

4.2.3.6 Terrorism

The impact of terrorism on YCWA facilities and assets is presented in Table 4–19. The loss of these facilities, in some instances, can be far greater than the replacement cost of the facilities by themselves. For example, the loss of a dam from a terrorist event would be much greater than the replacement cost of the dam itself by putting thousands of people downstream at risk from the dam failure. For further discussion on the effects of dam failure see Section 4.2.3.1.

Table 4–23 YCWA Terrorism Vulnerability

Name / Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Expected Damage Cost ($) 2003	Contents Damage Cost ($)	Displacement Cost ($ per day)	Occupancy or Capacity
Our House Dam	YCWA Records	✓			10,000,000			
Log Cabin Dam	YCWA Records	✓			10,000,000			
Bullards Bar Dam & Facilities	YCWA Records	✓			200,000,000			
Colgate Power House & Office	YCWA Records	✓	✓		62,300,000		330,000	20
Narrows 2 Power House	YCWA Records	✓	✓		13,900,000		90,000	
Deadwood Power House	YCWA Records	✓	✓		4,000,000		2,500	
Deadwood Substation	YCWA Records	✓	✓		900,000		2,500	
Lake Francis Dam	YCWA Records			✓	15,000,000			
Mini Hydro at Bullards Bar Dam	YCWA Records	✓			550,000		110	
Marysville Office 1902 D Street	YCWA Records		✓		186,000	445,000	1,000	10
Project Communications Facilities	YCWA Records	✓			1,500,000		3,000	

Costs reflected depict severe damage and major impact to facilities

4.2.3.7 Drought

Description

Drought is a concern for Yuba County on three fronts: first, drought increases the fuel loads in the foothill area leading to an increase in fire hazards; secondly, is the impact that drought has on the jurisdictions' agricultural community; third, is the impact that water shortages have on the watershed's foothills communities.

While drought is defined as a period of abnormally dry weather sufficiently prolonged for the lack of water to cause serious hydrologic imbalance. It is easier to think of drought as a period of unusually persistent dry weather that endures long enough to cause serious problems such as crop damage or water supply shortages. YCWA watershed experiences extended periods every

summer with little or no precipitation, a normal and expected condition. A drought can occur when the normal winter rain fails to materialize. A shortage of irrigation water stored at the beginning of the season in numerous reservoirs is serious, as normal summer precipitation does not provide a sufficient amount of agriculture's requirements

4.2.3.7.1 Potential Loss Estimate

Drought Impact

Vulnerability of the YCWA to drought shows up after a drought as debris in a winter storm–high water event or in a fire rather than as a result of the drought hazard itself. See Winter Storm–High Water or Fire Hazards for the loss estimates.

Table 4–24 YCWA Drought Vulnerability

Name / Description of Asset	Source of Information	Critical Facility ✓	Economic Assets ✓	Other Considerations ✓	Expected Damage Cost ($) 2003	Contents Damage Cost ($)	Displacement Cost ($ per day)	Occupancy or Capacity
Our House Dam	YCWA Records	✓			10,000,000			
Log Cabin Dam	YCWA Records	✓			10,000,000			
Bullards Bar Dam & Facilities	YCWA Records	✓			200,000,000			
Colgate Power House & Office	YCWA Records	✓	✓		62,300,000		330,000	20
Narrows 2 Power House	YCWA Records	✓	✓		13,900,000		90,000	
Deadwood Power House	YCWA Records	✓	✓		4,000,000		2,500	
Deadwood Substation	YCWA Records	✓	✓		900,000		2,500	
Lake Francis Dam	YCWA Records			✓	15,000,000			
Mini Hydro at Bullards Bar Dam	YCWA Records	✓			550,000		110	
Marysville Office 1902 D Street	YCWA Records		✓		186,000	445,000	1,000	10
Project Communications Facilities	YCWA Records	✓			1,500,000		3,000	

Costs reflected depict severe damage and major impact to facilities

4.2.3.7.2 Impact of Future Development

As the YCWA has the power to ensure that sufficient water may be available for the beneficial use of the lands or inhabitants for domestic use, irrigation, fire protection, and all other beneficial uses and purposes, the YCWA may respond to the future development in its watershed as it is impacted by drought.

New development in the YCWA watershed area will increase the population and structures exposed to potential damage from possible drought from the increased fire risk, increased

demand for irrigation waters in agricultural production areas, and increased demand of groundwater in the foothills. Increased development will lower groundwater tables generating localized water shortages, thereby increasing the demand by local constituents for action by and assistance from the YCWA to solve their domestic water needs.

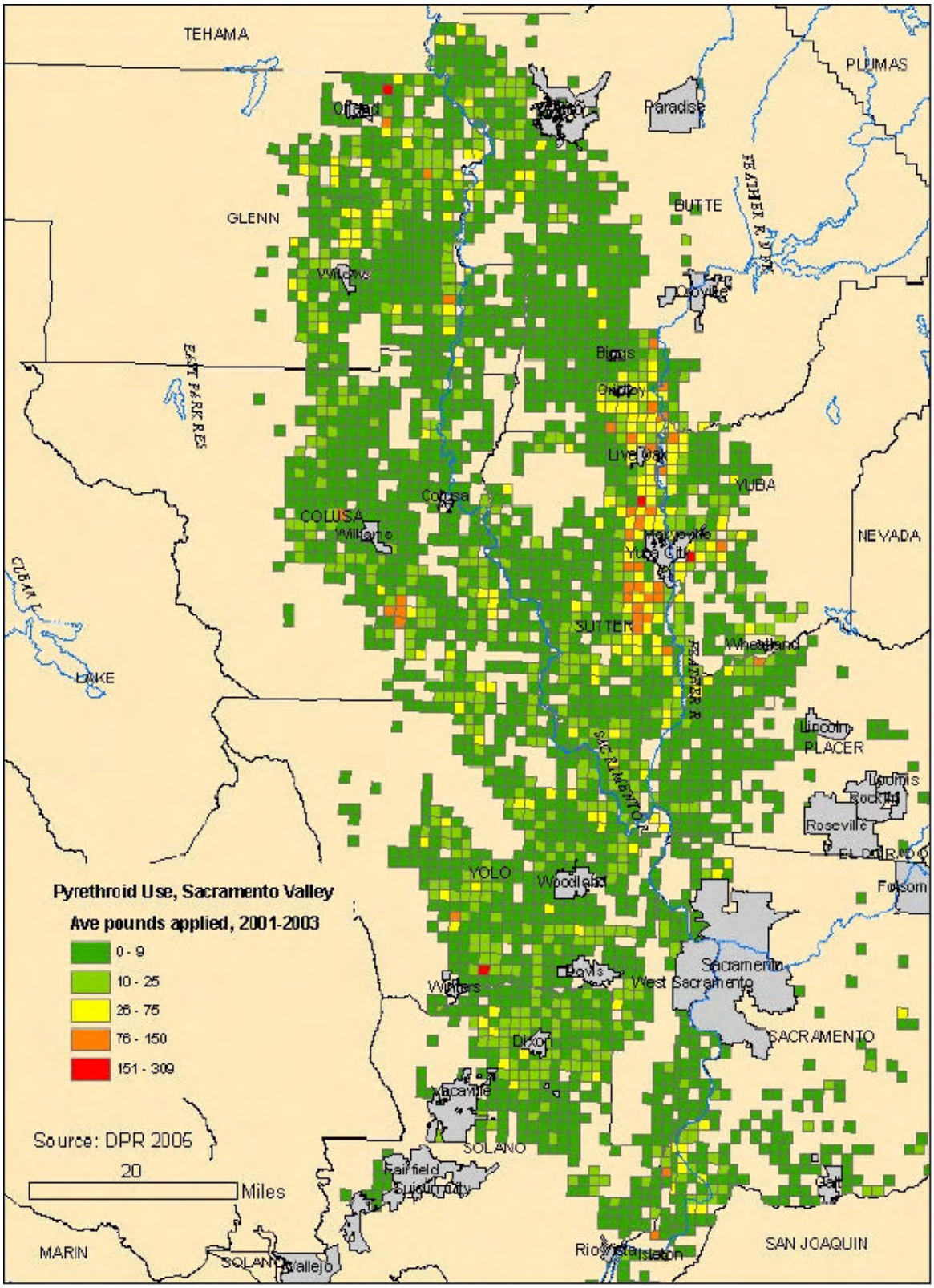
4.2.3.8 Man-Made Hazardous Materials

Description

Man-Made Hazardous Material usually does not impact property by directly destroying structures. Man-made hazardous materials events usually impact the YCWA through the release of a toxic gas plume (chlorine, ammonia, or propane gases) or a substance release that contaminates the groundwater or soil (diesel or gasoline) which can then cause chronic or long-term effects. Another source that impacts the YCWA watershed is clandestine illegal substance labs. These clandestine labs can produce methamphetamine in as few as six to eight hours (Swetlow, 2003) and generate between five and seven pounds of toxic waste for every pound of methamphetamine (Butterfield, 2004; NCDOJ, 2004). Riverside California statistics indicate that most "cooks" make meth 48 to 72 times a year (Riverside DEC, 2005). Typical toxic chemicals found in clandestine meth labs in the watershed include acetone, methanol, ammonia, benzene, ether, freon, hydriodic acid, hydrochloric acid, iodine crystals, lithium, muriatic acid, phosophine gas, pseudosphedrine, red phosphorus, sodium hydroxide, sulfuric acid, and toluene. Toxic substances seep into the pores of structures contaminated in the production of clandestine meth manufacture where they are touched or inhaled by unsuspecting occupants for years after the labs are gone. Contaminates must be removed from the structure, cleaning with soap and water and painting are not enough to ensure that chemical dangers are eliminated.

Insecticides are applied in the YCWA watershed on a variety of crops, including fruits, nuts, vegetables, and rice. For example, nearly 1,940 pounds of permethrin, esfenvalerate, lambda-cyhalothrin, cyfluthrin, bifenthrin, and cypermethrin by active ingredient, were used in 2003 throughout Yuba County (Figure 4–41). Due to the aquatic toxicity of the pyrethroid insecticides, offsite movement of these compounds to surface water is of concern. Recent studies conducted in California have shown pyrethroid contamination of both surface water/suspended sediment and stream bed sediment. Considering their high and potentially increasing use in California reliable information regarding the environmental fate of these compounds is increasingly important. (*source: Department of Pesticide Regulation, 2005*)

Figure 4–41 Average Pyrethroid Use, Sacramento Valley, 2001–2003



The assets impacted by man made hazardous materials were chosen from the overlay of known sources of potential man-made hazardous materials permitted with the Yuba County Certified Unified Program Agency (CUPA).

The vulnerability is expressed as a worst-case scenario where a complete loss of the structure or facility occurs. No consideration is given to varying levels of damage from man-made hazardous materials. The facility, equipment, or infrastructure is assumed to be totally damaged by the hazard event and will require full replacement. This allowed for the identification of the total damage that could occur.

4.2.3.8.1 Potential Loss Estimate

Man-Made Hazardous Materials Impact

Beale AFB is a federal facility with hazardous materials within the YCWA watershed. Because of the sensitive nature of the facility their materials will not be discussed in this document. Over 361 hazardous materials permitted sites were recorded as occurring within the YCWA watershed. Table 4–25 lists the number of permitted sites in the County by region. These permitted sites included hazardous materials such as petroleum products, fertilizers, pesticides, solvents, welding gases, manufacturing/processing chemicals, waste products (oils, solvents, etc.) as well as products that are flammable, toxic, reactive, or corrosive, in a significant quantity of at least 55 gallons, 500 pounds, or 200 cubic feet at any one time. (*source: Yuba County CUPA, 2005*)

Table 4–25 Hazardous Material Asset Location

Location	Number of Permitted Sites
Browns Valley	12
Brownsville	4
Camptonville	6
Challenge	4
Dobbins	6
Marysville	256
Olivehurst	26
Oregon House	7
Smartville	4
Strawberry Valley	1
Wheatland	33
Total	**361**

Over 17 percent of the County's total population lives in near a permitted man–made hazardous material site. The total structure value exposed to a permitted man–made hazardous material threat is over $132,141,970 in the County. The population over 64 years exposed to permitted hazardous man–made materials sites was developed from the Census 2000 population estimates. This information is presented in Table 4–26. An estimated 1,163 inhabitants over 64 years old live near permitted man–made hazardous material sites in Yuba County. Figure 4–42 shows the permitted hazardous materials sites located within the County. Over 87 percent of the permitted hazardous material sites are located in the Marysville–Olivehurst–Wheatland area of the County.

Figure 4–42 Hazardous Materials Permitted Sites

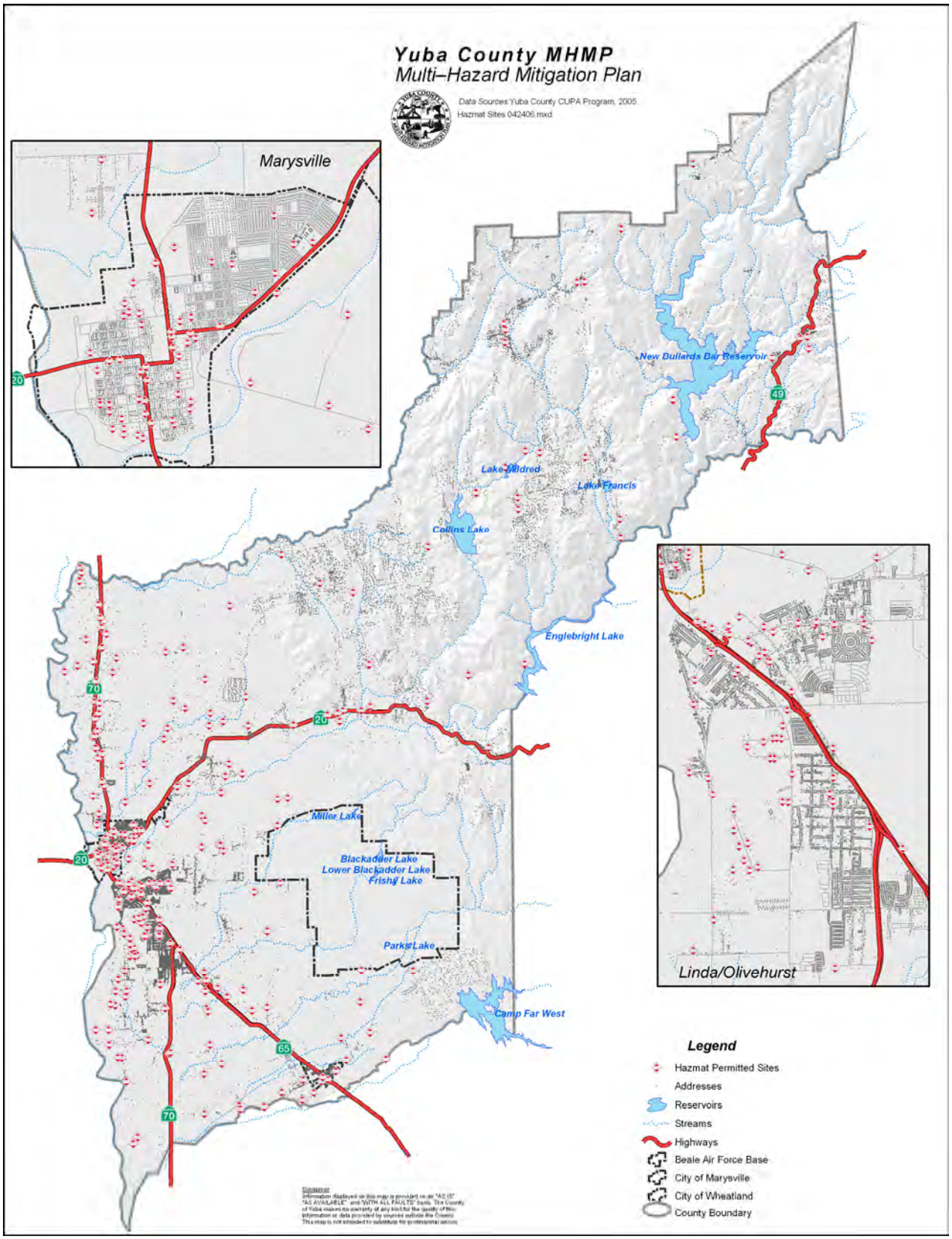


Table 4–26 Man–Man Hazardous Materials Hazard Vulnerability

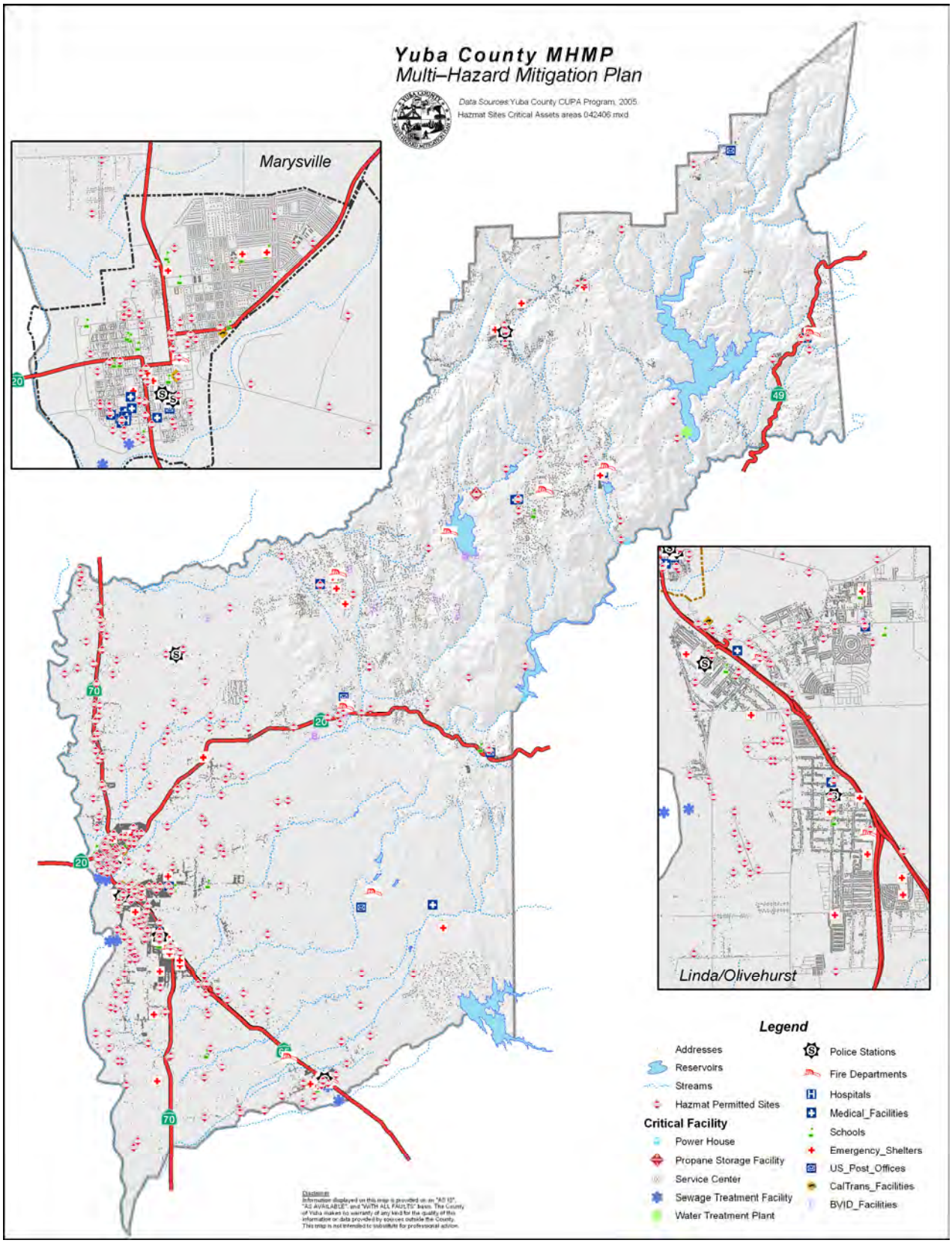
	Population affected	Population with incomes < $10,000	Population over 65 years old	Total Exposure [1]	RES	COM/IND	AG/R	REL	GOV	EDU	OTHER
Permitted Hazmat Sites	10,965	na	1,163	$132,141,970	$5,605,946	$83,514,614	$35,409,849	$7,449,743	$161,818	$0	$0

[1] Total Exposure based on structural improvement values per parcel

Notes : Census blocks selected by intersecting inundation sites onto Census 2000 blocks
OTHER includes private streets/walkways/roadways, other federal property, or historical properties
Source : Yuba County CUPA active permitted sites.

Costs reflected depict severe damage and major impact to facilities

Figure 4–43 Critical Facilities Exposed to Permitted Hazmat Sites



4.2.3.8.2 Impact of Future Development

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4.2.3.9 Utility Loss

Description

Power outages can occur from equipment failure, trees and vegetation falling onto equipment, birds and animals interfering with equipment, vehicles compromising equipment, and other undetermined agents of interference. In 2005, the duration of over 48 percent of all sustained power outages was two hours or less, over 40 percent were of two to six hours of duration, and less than one percent of all power outages lasted over 24 hours. The rest of the 2005 outages were from six to 24 hours in duration. Power outages in Yuba County involved 100 customers or fewer less than 73 percent of the time in 2005 and 100 to 1,000 customers over 20 percent of the time. At no time were there any power outages in 2005 that involved more than 3,000 customers.

4.2.3.9.1 Potential Loss Estimate

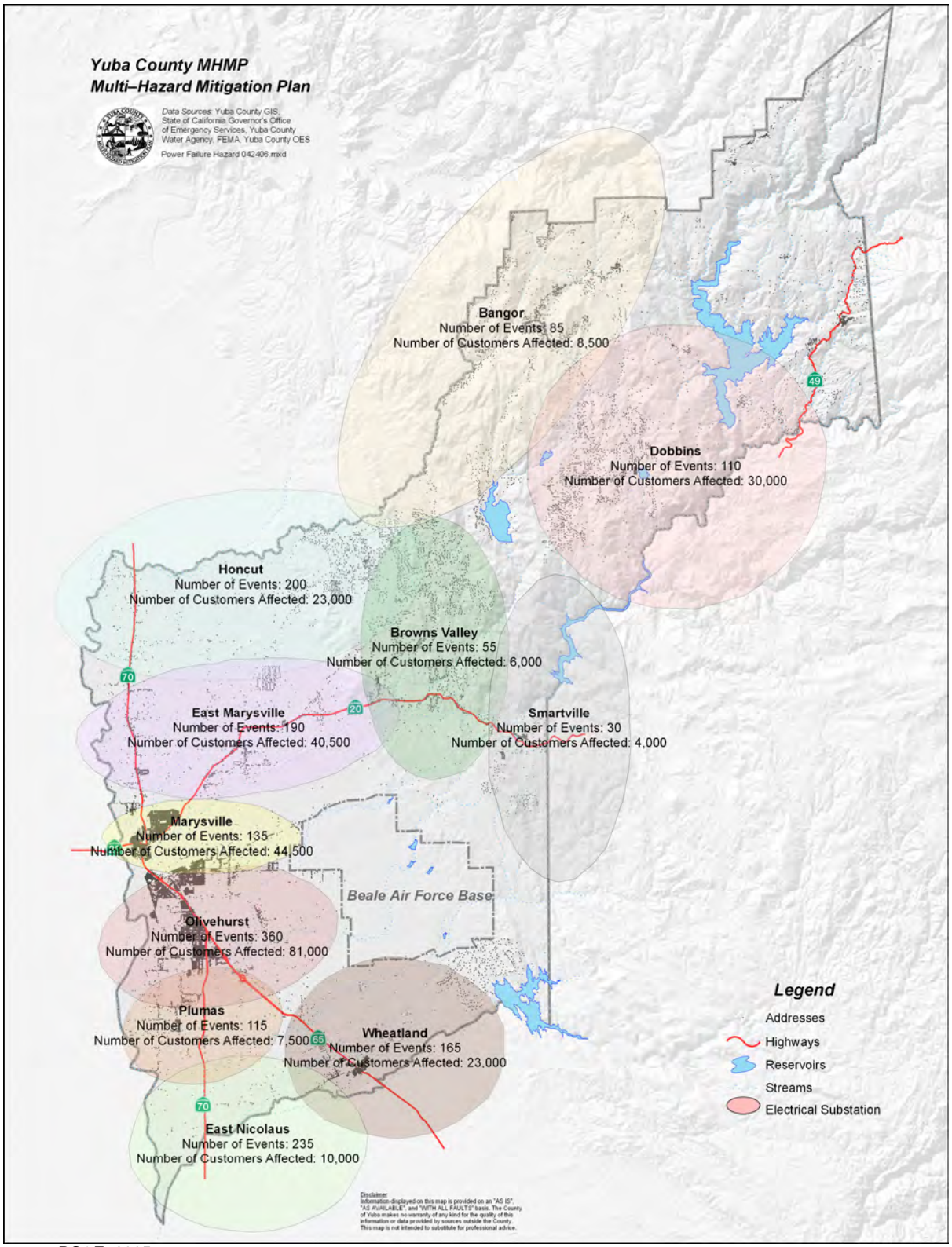
Power Failure Impact

This type of isolated power failures will impact the YCWA main office due to its location in Marysville and its dependence upon the local power supply. The power supply to other YCWA critical facilities are of lesser concern as they generate their own power and therefore are not as susceptible to power interruption. Their problem will be continued power generation to the grid.

The electrical substations operated by PG&E within the County are intertwined and extend into adjacent counties as can be seen in Figure 4–44. Over the period 2001 through 2005, the Olivehurst substation has had the greatest number of sustained unplanned power outage events (360) that affected the largest number of customers (81,000). Power failures in and of themselves do not cause structural damage to facilities, however power failures during another hazard event such as flooding can result in significant structural damage. An example would be the loss of power to pumps during an internal drainage flooding event.

Just such as power failure occurred during the winter storm season of 2005. In the evening of December 31, 2005, during the strongest storm event of the season, a power outage from storm related damage occurred that affected the power to the four main pumps in the south county operated by RD 784. These four pumps, located on the levees, are essential to prevent flooding to residential structures and other critical assets in the southern part of the county during winter storm events as well as protecting the community from day to day.

Figure 4–44 Electrical Power Substation Service Regions



source PG&E, 2005

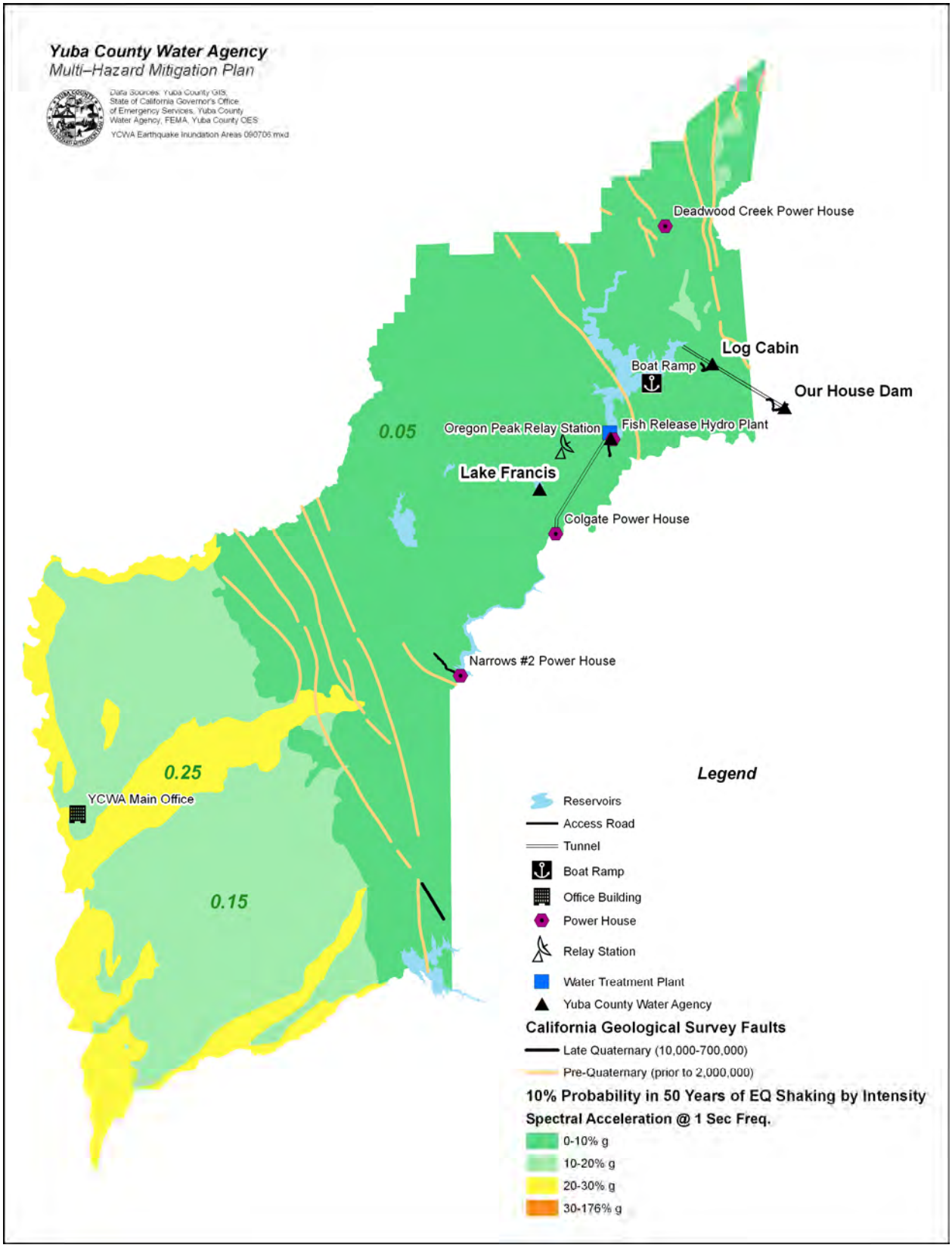
4.2.3.9.2 Impact of Future Development

The likelihood of a power loss event will increase as the economic activity and population continues to increase in Yuba County. As Yuba County will continue to experience high summer temperatures the demand for power will increase. The increase in power demand during the summer period will be dependent upon summertime temperatures. However, the future demand for power can be mitigated with the use of more energy efficient equipment.

4.2.3.10 Earthquake

The vulnerability to YCWA assets due to earthquake is presented in Figure 4–45 and tabulated in Table 4–27. Earthquake fault locations were obtained in GIS format from the CGS.

Figure 4–45 YCWA Earthquake Vulnerability



YCWA completed a seismic study of the Yuba River Development Project. The controlling earthquake for the area was estimated at a magnitude of 6.5 at 25 miles form the epicenter. An earthquake of this magnitude would cause the worst-case scenario damage seen in Table 4-27

Table 4–27 YCWA Earthquake Hazard Vulnerability

LOCATION OF DAMAGE	DESCRIPTION OF DAMAGE	ESTIMATED COST
Landslides on access roads	If there is s landslide on the access roads and YCWA cannot reach its facilities or generate power. PG&E as a major stakeholder would suffer as much as $500,000 in lost revenue	$1,000,000
Collapse of Colgate Tunnel	The rupture of the Colgate Tunnel would cause YCWA to lose the ability for generate power, supple water for fisheries, or divert water to farmers for irrigation	$10,000,000
Collapse of Narrows 2 Tunnel	YCWA would lose the ability to generate electricity at this site and divert water to farmers for irrigation. The reservoir would be able to be spilled after 6 days.	$1,000,000
Rupture of Colgate Penstock	The rupture of the Colgate Penstock would cause YCWA to lose the ability for generate power, supple water for fisheries, or divert water to farmers for irrigation	$10,000,000
Colgate Powerhouse Generator damage	During an earthquake, the generators could be shaken and damage rotating parts. YCWA would be unable to generate power. Water could be bypassed at the base of the dam to meet fishery and farmers water requirements	$10,000,000
Narrows 2 Generator damage	During an earthquake, the generators could be shaken and damage rotating parts. YCWA would be unable to generate power. Water could be bypassed at the base of the dam to meet fishery and farmers water requirements	$10,000,000
Colgate Switchyard damage	If the Colgate switchyard were to be affected by an earthquake, the transformers could be shaken off their foundations and would no longer be usable. YCWA would be unable to generate	$10,000,000

	electricity.	
Narrows Switchyard damage	If the Narrows 2 switchyard were to be affected by an earthquake, the transformers could be shaken off their foundations and would no longer be usable. YCWA would be unable to generate electricity.	$1,000,000
Bullards Bar valve at base of dam	The valves at the base of Bullards Bar Dam could be damaged by shifting on their foundation. If YCWA was unable to open or close the valves, YCWA could not bypass water short-term or generate electricity. YWCA can manually close the valves, but once closed YCWA would not be able to bypass water	$5,000,000
Oregon Peak Communications	The microwave tower or equipment of Oregon Peak could be damaged. YCWA would not be able to communicate with PG&E or ISO (Integrated Systems Operations in Sacramento, which controls all power generation in California). The Agency could manually control the communications, but YCWA would have to man the plant 24/7	$1,000,000

Source: Review of Potential Seismic Sources and Potential Ground Motions, New Bullards Bar Dam

5 Mitigation Strategy

DMA 2000 Requirements – Mitigation Strategy
Requirement §201.6(c)(3): The plan **shall** include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

In compliance with the DMA 2000, described below are the requirements for local hazard mitigation goals.

YCWA mitigation strategies and projects were developed in conjunction with and as part of the Yuba County Hazard Mitigation Project.

The information in the hazard vulnerability analysis and loss estimation information was used as a basis for developing mitigation goals and objectives. Mitigation goals are defined as general guidelines explaining what YCWA wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing YCWA visions. Objectives are statements that detail how YCWA's goals will be achieved, and typically define strategies or implementation steps to attain identified goals. Other important inputs to the development of goals and objectives include performing reviews of existing local plans, policy documents, and regulations for consistency and complementary goals. Stakeholder participation and community outreach to support the process of identifying hazard, risks, and mitigation goals was essential in the development of comprehensive goals.

The following provides an overview of the steps involved in preparing a mitigation strategy which consists of

1. Assessing current capabilities
2. Developing mitigation goals and objectives
3. Identifying and prioritize mitigation actions
4. Preparing an implementation strategy

The Agency's Multi-Hazard Mitigation Plan mission is served by goals that reduce the vulnerability of YCWA. Plan goals guide the overall direction of mitigation activities, which focus YCWA's overall mitigation program.

Yuba County Water Agency has embraced the following goals to reduce its vulnerability to each identified hazard.

- Maintain and enhance integrity of YCWA facilities
- Maintain and enhance flood operations capability of YCWA facilities and support enhancement of flood control operations, communications and facilities that provide flood damage reduction benefits to Yuba county
- Maintain and enhance power generation capability
- Maintain and enhance beneficial use of water within Yuba County
- Maintain and enhance fisheries habitat related to the project as a strategy to preserve continued project operations
- Maintain and enhance recreational facilities directly related to the project

At its inception in 1959, the Yuba County Water Agency has been charged to "make water available for any present or future beneficial use of uses of lands or inhabitants in the agency (§4); develop and sell at bus bar at wholesale rates hydroelectric power in connection with its projects (§4.1); control and conserve flood and storm waters (§4.2); store, conserve, reclaim, and

import water (§4.3); sell right to use of falling water (§4.11). The YCWA may cooperate and contract with State or U.S. in acquisition and sale of water and the construction and operation of works for controlling, conserving, and transporting flood or storm waters for beneficial uses, including recreational uses and generation of electric energy (§6.2) (1959:788:2780; D.A. 9407; West 84. "The Yuba County Water Agency Act").

Its 2004 Emergency Action Plan statement of purpose charges the Agency 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". (Yuba County Water Agency Emergency Action Plan, 2004)

5.1.1 Local Goals to Reduce Vulnerabilities to each Hazard

DMA 2000 Requirements – Mitigation Strategy
Local Hazard Mitigation Goals **Requirement §201.6(c)(3)(i)**: [The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards **FMA Requirement §78.5 (c)**: The applicant's floodplain management goals for the area covered by the plan.
Element A. Does the plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards? (**GOALS** are long-term; represent what the community wants to achieve, such as "eliminate flood damage"; and are based on the risk assessment findings.)

5.1.1.1 Flood/Winter Storms–High Water

Years of experience, studies and coordination with local state and federal entities have produced the following strategies to support the YCWA mission and purpose

- Develop improved capability to manage major storm and high water events including:
  - Enhance YCWA facilities to more effectively control major storm flow to maintain flood flows within the capability of the river system as determined by state and federal flood management organizations
  - Improved forecasting of major storm events including timing, magnitude and duration of major storm and flood flows
  - Improve data collection systems of real time storm data and communication of this data to emergency operations centers and the public
  - Improve forecasting of flood flows in the major waterways in Yuba County including magnitude, timing, stage and peak of river flood flows
  - Provide water operations data to the state and federal flood operations center and help coordinate the best release schedules for New Bullards Bar and Oroville flood operations
  - Work with the local, state and federal flood operations entities to improve communication of flood preparation and flood event data to local and state public safety entities
  - Identify and implement ways to improve flood damage reduction within Yuba County and establish partnerships with other entities to implement flood damage reduction projects
  - Assist the State flood Operations Center and the Corps of Engineers in setting and coordinating flood releases from New Bullards Bar Dam and Oroville Dam for public safety
  - Assist in the funding of flood protection improvements where financially feasible for protection of the public and property in Yuba county

5.1.1.2 Fire

- Protect critical facilities and infrastructure from fire and fire debris
- Coordinate fire protection mitigation actions with other federal, state, and local entities and non-profit agencies such as Fire Safe as appropriate
- Safeguard watershed through effective prevention measures and mitigation actions
- Participate in fuel reduction management and fire mitigation projects

5.1.1.3 Landslide–Slips

- Inspect facilities and critical infrastructure for potential and actual landslides or slip outs
- Monitor past landslide areas, potential landslide vulnerability and identify appropriate mitigation actions as needed

5.1.1.4 Dam Control

- Inspect dam facilities on a regular basis
- Assist the Federal Energy Regulatory Commission and the California Division Safety of Dams in performing dam inspections
- Perform regular structural analysis of New Bullards Bar Dam
- Work with FERC and DSOD on performing failure analysis of critical dam facilities
- Prepare and implement projects to address dam safety weaknesses in accordance with FERC and DSOD
- Inspect project facilities after earthquake events greater than 2.5 magnitude within 50 miles of YCWA dams
- Maintain engineering and construction capability to make emergency repairs

5.1.1.5 Terrorism

FERC regulations require that terrorism strategies and projects remain confidential thus there is no discussion of these actions in this document. Information exchange and coordination with law enforcement regarding potential risk is secured

5.1.1.6 Drought

- Promote water conservation and protect assets
- Develop improved operations modeling capability to conserve as much water as possible for project purposes including delivery to YCWA customer
- Construct the Wheatland Water District water conveyance system to deliver surface water to the Wheatland Water District
- Maintain and enhance groundwater monitoring systems to help manage groundwater supplies during drought conditions
- Implement the Yuba Accord
- Develop water right permits into water right licenses
- Develop an Integrated Regional Water Management Plan
- Develop improved irrigation water systems monitoring real time capability

5.1.1.7 Hazardous Materials

- Maintain system for managing hazardous materials on the project
- Coordinate with Yuba County entities to promote environmental protection programs

5.1.1.8 Utility Failure

- Maintain reliability of YCWA electric generation facilities
- Maintain and enhance project preventative maintenance program
- Work with Pacific Gas and Electric Company ensure proper maintenance of electric transmission lines serving YCWA generation facilities

5.1.1.9 Earthquake

- Maintain existing relationship with USGS for operating existing seismographs at New Bullards Bar and providing earthquake alerts on magnitude and location of any earthquakes
- Inspect facilities or earthquake damage after an earthquake
- Perform project upgrades as necessary to ensure dam safety for the maximum credible earthquake

5.1.1.10 Tsunami

- Identify the potential of Tsunami to cause damage to YCWA facilities
- Identify the magnitude of Earthquake necessary to generate a Tsunami

5.2 Identification and Analysis of Mitigation Actions

DMA 2000 Requirements – Mitigation Strategy
Identification and Analysis of Mitigation Actions **Requirement §201.6(c)(3)(ii)**: [The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. **FMA Requirement §78.5 (d)**: Identification and evaluation of cost-effective and technically feasible mitigation actions considered.
Element A. Does the plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard? B. Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure? C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?

The mitigation actions identified by YCWA and stakeholders address a comprehensive range of mitigation projects to reduce the potential for losses to and from YCWA'S facilities and infrastructure and potential impact of hazards. The following sections addresses hazards and present the proposed mitigation action and how they will reduce vulnerability to YCWA and downstream assets

In compliance with the DMA 2000, described below are the requirements for the identification and analysis of mitigation actions.

The goal of each strategy is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal and prioritizing each strategy, a set of criteria was applied to each proposed strategy.

The Hazard Mitigation Planning Committee was divided into sub-groups by area of responsibility. Each sub-group then met and identified potential strategies for their specific type of specialty and began prioritizing each strategy taking the following considerations into account:

- Plan goals and objectives: How does the mitigation action address the goals and objectives of the plan? Does it reduce disaster damage?

- Equity: Does the strategy benefit most, if not all the communities within the County? Is there an equitable distribution of strategies by each participating agency?
- System-wide impacts: How does it affect YCWA as a whole?
- Ease of implementation: Can this action be easily implemented first? Does the agency have the capability (funding, regulatory authority, staff) in place now to implement the strategy?
- Multi-objective strategies: Does this strategy achieve multiple goals?
- Time: Can this strategy be quickly accomplished compared to those that would take a long time to obtain the necessary approvals or funding?
- Post-disaster mitigation: Is this strategy more feasible in a post-disaster setting? Would the extent of damages, political will, and access to State and Federal mitigation funds dramatically alter the feasibility of implementation?

After each sub-group completed this process, the recommended strategies were then presented to and reviewed by the entire Planning Committee. The Planning Committee rated the strategies in order of overall priority based on the same considerations above and considered the STAPLEE criteria listed below.

- Social: Is the proposed strategy socially acceptable to the community? Is there equity issues involved that would mean that one segment of the community are treated unfairly?
- Technical: Will the proposed strategy work? Will it create more problems than it solves?
- Administrative: Can the community implement the strategy? Is there someone to coordinate and lead the effort?
- Political: Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
- Legal: is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?
- Economic: What are the cost and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- Environmental: How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

5.3 Implementation of Mitigation Actions

DMA 2000 Requirements – Mitigation Strategy
Implementation of Mitigation Actions **Requirement §201.6(c)(3)(ii)**: [The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and other associated costs. **FMA Requirement §78.5 (d)**: Identification and evaluation of cost-effective and technically feasible mitigation actions considered. **FMA Requirement §78.5 (e)**: Presentation of the strategy for reducing flood risks and continues

compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.
Element A. Does the mitigation strategy include how the actions are **prioritized**? (For example, is there discussion of the process and criteria used? B. Does the mitigation strategy address how the actions will be **implemented and administered**? (For example, does it identify the responsible department, existing and potential resources, and timeframe?) B1. Does the mitigation strategy address continued compliance with the NFIP? C. Does the prioritization process include an emphasis on the use of a **cost-benefit review** (see page 3-36 of Multi-Hazard Mitigation Planning Guidance) to maximize benefits? C1. Does the mitigation strategy emphasize cost-effective and technically feasible mitigation actions?

In compliance with the DMA 2000, described below are the requirements for the implementation of mitigation actions.

After each sub-group completed this process, the recommended strategies were then presented to and reviewed by the entire Planning Committee. The Planning Committee rated the strategies in order of overall priority based on the same considerations above and considered the STAPLEE criteria listed above.

Projects ranked as priority projects were ranked by critical need and potential funding for implementation. Those projects with a more favorable cost-benefit analysis will be given higher priority. Strategies and projects identified to serve the communities needs may be considered by YCWA in the future, or should the opportunity arise and funding becomes available.

The Planning Committee acknowledges that these strategies have not gone through a rigorous and detailed environmental, historic, or benefit to cost analyses at this time. Although such considerations will play a role in the prioritization of these strategies, largely through the development of the probable scenarios, further analyses and feasibility studies will be undertaken before these strategies become scheduled for implementation.

SEPA ,NEPA. Historic Preservation Act, and benefit to cost requirements and guidance will be met by YCWA.

5.3.1 Flood/Winter Storm Hazard Reduction

The Agency has taken a lead role in the development of solutions to the flood problems on the Yuba River drainage system since the mid-1960s following several disastrous floods. New Bullard's Bar Reservoir with 170,000 acre-feet of storage dedicated to flood control was completed in 1971. The project was financed by a bond issue passed by Yuba county residents. The power sold to PG&E is used to pay off the bonds. New Bullard's Bar Reservoir enables the YCWA to provide irrigation water to seven local water districts: Brophy, Browns Valley, Cordua, Dry Creek, Hallwood, Ramirez, and South Yuba.

In 1997, the Agency launched the Yuba-Feather River Flood Protection Program which included studies of Thermalito Afterbay, Oroville Spillway inflatable Dam, New Bullard Bar Dam Raise, New Bullards Bar Lower Outlet, Tailwater Suppression at the Colgate Powerhouse a $ 3 Million Feasibility Study seven-phase study of potential projects to provide protection for floods with a 10 percent chance of a flood recurring every 50 years. The Formulation and Analysis of Alternatives was produced in 1999, which identified 14 alternatives to have merit for further study. Passage of legislation in 2000 added the South Yuba River to the California Wild and Scenic River System and the designation of the Central Valley steelhead and the Central Valley spring-run Chinook

salmon as endangered species have eliminated new dams on the lower Yuba River and South Yuba River. For example congress authorized a third dam, Lake Marysville, which was identified in the 1960's Corps flood control plan, but never built. This has resulted in a reduction of nearly 60 percent of the planned flood storage space on the Yuba River.

Table 5–1 YCWA Flood/Winter Storm Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Public Outreach and Education	Complete watershed and all downstream assets	Provide an outreach and education program on flood control and YCWA's role		Educate the public on issues relating to flood control							
Forecast Based Operations Project	Complete watershed and all downstream assets	Forecast Inflow & releases to minimize the flood effect on the dams and downstream structures	$1,500,000	Enhance operation plans, install weather stations, install gauging stations, develop computer modeling tools	$200,000,000 Flood damage reduction for all watershed and downstream	X	X	X		X	1
Lower Bullards Bar Dam Outlet	New Bullards Bar Dam	Existing New Bullards Bar Dam outlets are inadequate for releasing large volumes on the short pre-storm peak period	$50,000,000 (2005 estimate)	Install larger outlet to release large volumes of water when levee system can still handle releases prior to peak flows	$200,000,000	X	X	X			1
Tailwater Depression System	Colgate Powerhouse, New Bullards Bar Dam	Enhance the ability to regulate flood releases, increase power production	$5,000,000	Increase operational releases through the New Colgate Powerhouse	$79,000,000 $200,000,000	X	X	X	Reduce flood losses, increase flood storage control		1
Raise and strengthen southern Yuba County levees to	New Bullards Bar Dam	Raise and strengthen southern Yuba County levees to meet FEMA standards	$300,000,000	Deeper slurry walls, wider berms	$200,000,000				Reduce flood losses, increase flood storage & control for	X	1

meet FEMA standards									Arboga, Linda, Marysville & Olivehurst		
Lower Feather River Floodplain mapping study	Levee certification	FEMA levee certification	$2,000,000 - $3,000,000	FEMA certified levees						X	1
Colgate Penstock valve	Colgate Penstock	Install 168" diameter valve at the top of the Colgate Penstock for routine maintenance & emergency conditions	$3,500,000		$48,918,336						1
Spill gate remediation	New Bullards Bar Reservoir	Strengthening of spillgates at New Bullards Bar Reservoir	$800,000	Prevent the possibility of damage and downstream damage in the event of an earthquake	$200,000,000	X			Strengthens the ability of New Bullards Bar to withstand a major earthquake		1
Sediment pass through feasibility study	Our House Dam Log Cabin Dam	It is currently illegal for YCWA to pass sediment from upstream of its dams downstream. The project is study of the feasibility of constructing a sediment pass through at each dam site	$200,000	Identify the feasibility of constructing sediment pass throughs at Our House and Log Cabin Dams	Debris removal has cost YCWA over $8,000,000 over the past two years						
Our House Dam Sediment Pass Through	Our House Dam	Construct a sediment pass through to prevent winter storm debris from obstructing normal dam operations	$3,000,000	Prevent costly debris removal and limitation of operations.	Debris removal at Our House Dam cost YCWA $8,000,000 over the past two years.						
Log Cabin Dam Sediment Pass Through	Log Cabin Dam	Construct a sediment pass through to prevent winter storm debris from obstructing normal dam operations	$3,000,000	Prevent costly debris removal and limitation of operations	Debris removal has cost YCWA over $8,000,000 over the past two years						
Log Boom Debris Containment	New Bullards Bar Reservoir	Construction of additional log boom debris containment structures		Contain debris that enters New Bullards Bar Reservoir before it spreads out	Debris removal has cost YCWA over $8,000,000 over the past two years.						

1- Greatest potential for devastation
2 - Moderate potential for devastation
3 – Operational inconvenience

5.3.2 Fire Hazard Reduction

Description of YCWA's goals for current mitigation projects and programs

The Agency received $5,046,050.94 in FEMA funding for the removal of debris from its various reservoirs and diversion dams. The debris, which washed down during the 2005-2006 winter storm event, remained in the area as a result of the 1999 Pendola Fire.

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Table 5–2 YCWA Fire Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Oregon Peak communications	Oregon Peak Communications Equipment	Protection of critical communications equipment	$675,000	Mitigate fire risk to critical facility/assets							
Oregon Peak Access Road brush clearance	Oregon Peak Communications Equipment	Initiate brush clearance and monitoring program to ensure access to critical facilities	$275,000	Ensure access to critical communications facilities							

1- Greatest potential for devastation
2 - Moderate potential for devastation
3 – Operational inconvenience

5.3.3 Landslide Hazard Reduction

The Agency has experienced landslide damage to YCWA facilities and access roads. Prior to the 2005–2006 wet season, there have been two known landslides in the area of YCWA facilities. One occurred in 1968 in Bullards Bar Reservoir near the dam. Another was in 1975 – ½-mile south of the dam where a section of road was destroyed. Other landslides have occurred in the foothills of Yuba County on access roads to YCWA facilities.

The Agency is currently in the process of removing landslide debris that occurred in the 2005–2006 wet season.

The agency has determined that excavation at the head of the sliding mass to reduce the driving force along the sliding surface for the following access roads is of primary importance to reduce future damage to the following access roads:

The Agency has determined the following protective measures to eliminate immediate threats to life and property caused by landslide include; filling or buttressing at the toe of the potential sliding mass with gabions, toe rocks, cribwalls, binwalls, and the construction of subsurface drainage to lessen the pore–water pressure along the potential sliding surface are necessary.

Table 5–3 YCWA Landslide Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Hillside stabilization monitoring	New Bullards Bar Dam Our House Dam Log Cabin Dam	Monitoring of the stability of hillsides adjacent to access roads for critical YCWA facilities		Monitor and identify areas of concern that could impact access to critical YCWA facilities	A landslide along Burma Road cost YCWA $700,000 in 2006. The landslide also cut off access to the base of New Bullards Bar Dam	X					1
Hillside stabilization	New Bullards Bar Dam Our House Dam Log Cabin Dam	Stabilization of hillsides adjacent to access roads for critical YCWA facilities		Stabilize all areas of concern that could impact access to critical YCWA facilities	A landslide along Burma Road cost YCWA $700,000 in 2006. The landslide also cut off access to the base of New Bullards Bar Dam						
Stabilization of Left Bank of Yuba River above Daguerra Point Dam	Fish Screens	The left bank of the Yuba River above Daguerra Point Dam has been eroding at it base. The erosion of the 75 ft. tall bank threatens the fish screens downstream		Stabilize the left bank of the Yuba River above Daguerra Point Dam to protect project fish screens							

5.3.4 Terrorism Hazard Reduction

The YCWA owned and operated New Bullards Bar Dam is the only DHS identified critical infrastructure and key resource (CI/KR) site within Yuba County. As such, security precautions have been taken to ensure the safety of the dam structure through the Buffer Zone Protection Program (BZPP), a DHS administered grant program. The security efforts include:

- In 2006, YCWA, in cooperation with the Yuba County Sheriff's Department, applied for and received a grant for $48,000 from DHS for the first phase of a security camera system on Bullards Bar Dam (Buffer Zone Protection Plan).

  In 2007, YCWA, in cooperation with the Yuba County Sheriff's Department, applied for a second grant for $176,000 for DHS for the second phase of a security camera system on Bullards Bar Dam

- YCWA developed a Vulnerability and Security Assessment for the entire Yuba River project to handle existing security infrastructure and secure new areas that were identified. This plan was required by FERC and is not to be made public.

- Probable Failure Mode Analysis (PFMA), The Federal Energy Regulatory Commission, in 2005 required YCWA to gather a panel of experts to identify potential failure modes for project facilities (dams, penstocks, powerhouses, roads, communications, and transmission lines) and develop plans to protect or respond to potential failures.

Table 5–4 YCWA Terrorism Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Buffer Zone Protection Plan	New Bullards Bar Dam	Continued participation on the Buffer Zone Protection Program to ensure the safety of New Bullards Bar Dam	TBD	Ensure the safety of New Bullards Bar Reservoir	$200,000,000						

5.3.5 Drought-Water Supply Hazard Reduction

The YCWA was an integral partner in the Yuba County Integrated Regional Water Management Plan and will continue with water supply planning as outlined by its mission

Table 5–5 YCWA Drought Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Regional well monitoring program	Monitoring wells	Install 6 dedicated monitoring wells to supplement the existing well network	$246,246	Protect against aquifer overdrafting							

5.3.6 Earthquake Hazard Reduction

YCWA is mindful of the threat of earthquakes to its critical facilities and structures, and the downstream effect of any damage to its facilities as the result of an earthquake. YCWA currently maintains a relationship with the USGS, who operate seismographs at New Bullards Bar and provide earthquake alerts on magnitude and location of any earthquakes that could potentially affect the Agency.

YCWA has also conducted studies of the potential effects of the earthquake hazard on its facilities, particularly New Bullards Bar Dam, and the measures necessary to protect against these effects. YCWA is in the process of ensuring that these measures are taken to secure the safety of the downstream residents who are protected by YCWA dams

Table 5–6 YCWA Earthquake Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Spill gate remediation	New Bullards Bar Reservoir	Strengthening of spillgates at New Bullards Bar Reservoir	$800,000	Prevent the possibility of damage in the event of an earthquake	$200,000,000	X			Provides protection from flooding downstream of New Bullards Bar Dam		1

1- Greatest potential for devastation
2 - Moderate potential for devastation
3 – Operational inconvenience

5.3.7 Tsunami Hazard Reduction

The affects of a Tsunami and the magnitude of an earthquake or landslide event necessary to generate a Tsunami at New Bullards Bar Reservoir are unknown. The goal of YCWA in relation to the Tsunami hazard is to identify potential occurrence of this event

Table 5–7 YCWA Tsunami Mitigation Actions

Mitigation Project	Assets Affected	Project Description	Project Cost ($)	Project Goals	Asset Replacement Value	Reduce Flood Losses	Increase Flood Storage	Increase Flood Control	Other Benefits	Partnerships	Criticality
						X	X	X	X	X	
Tsunami Threat Identification Study and project Implementation	New Bullards Bar Dam and Reservoir	Identification of the magnitude of earthquake necessary to trigger a tsunami at New Bullards Bar Reservoir. Identification of possible extent of damage from a tsunami event	$3,000,000	Identification of the risk posed to YCWA by the tsunami hazard							

6 Plan Maintenance Process

6.1 Monitoring, Evaluating and Updating the Plan

DMA 2000 Requirements – Plan Maintenance Process
Monitoring, Evaluating, and Updating the Plan **Requirement §201.6(c)(4)(i)**: [The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluation, and updating the mitigation plan within a five-year cycle **FMA Requirement §78.5 (e)**: Presentation of the strategy for reducing flood risks and continues compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.
Element A. Does the plan describe the method and schedule for **monitoring** the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits., phone calls, and meetings?) B. Does the plan describe the method and schedule for **evaluating** the plan? (For example, doe sit identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?) C. Does the plan describe the method and schedule for **updating** the plan within the five year cycle?

This section of the Plan describes the formal process that will ensure that the Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years.

This section describes how the Yuba County Water Agency will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how jurisdictions intend to make considerations for the mitigation strategies outlined in this Plan into existing planning mechanisms.

Yuba County Water Agency will be responsible for monitoring the plan annually for updates to jurisdictional goals, objectives, and action items. If needed, these will be coordinated through the Yuba County Water Agency's Hazard Mitigation Planning Committee to integrate these updates into the Plan. The Chairman of the Hazard Mitigation Planning Committee will be responsible for monitoring the overall Plan for updates on an annual basis. The Chairman will reconvene the Planning Committee as needed to make these updates.

The Plan will be evaluated by YCWA annually to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The Plan will also be re-evaluated by YCWA representative based upon the initial Plan criteria used to draft goals, objectives, and action items for this Plan.

Action items will be reviewed to determine their relevance to changing situations in the District, Yuba County Operational Area, as well as changes in State or Federal regulations and policy. YCWA Committee Members will conduct an assessment of each portion of the Plan to determine if this information should be updated or modified, given any new available data.

YCWA committee members will be the responsible group for updates to the Plan. All participants will be responsible to provide the Committee Chairperson with department-level updates to the Plan when/if necessary as described above. Every five years the updated plan will be submitted to the State of California and FEMA for review.

YCWA will have the opportunity to implement recommended action items through existing programs and procedures that are deemed appropriate. Upon adoption of the Plan, it can be used as a baseline of information on the hazards that impact the District.

6.2 Incorporation into Existing Planning Mechanisms

DMA 2000 Requirements – Plan Maintenance Process
Incorporation into Existing Planning Mechanisms **Requirement §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 improvement plans, when appropriate.
Element A. Does the plan identify other local planning mechanisms available for incorporating the requirements of the local mitigation plan? B. Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?

In compliance with the DMA 2000, described below are the requirements to incorporate the Plan into existing planning mechanisms.

6.2.1 Monitoring, Evaluating and Updating the Plan

The Yuba County Water Agency will use the YCWA Multi-Hazard Mitigation Plan as its guide for mitigation projects. The hazards and strategies identified will be adhered to as the Agency moves forward. However, YCWA also acknowledges that there may be additional mitigation measures that could be identified at a future date, and the potential effects of hazards may differ from those outlined in the plan when experienced by future event. Because of this, YCWA is prepared to implement procedures to monitor, evaluate, and update the plan.

Following hazard events, YCWA will assess the damages the result and compare them to the predicted hazard severity, and make changes as necessary. As studies identify new measures to mitigate the hazards that affect the Agency, these measures will be added into the YCWA Multi-Hazard Mitigation Plan.

To accomplish these goals, the YCWA Hazard Mitigation Committee will continue to meet as necessary, and at a minimum one type per year to review the YCWA plan and address the Agency's adherence to the specified mitigation goals and actions. As new information is obtained, the Committee will update the plan as necessary.

At a minimum, the Yuba County Water Agency will update and resubmit its mitigation plan every five years.

6.2.2 Other Local Planning Mechanisms and Plans

Insert text here

6.3 Continued Public Involvement

DMA 2000 Requirements – Plan Maintenance Process
Continued Public Involvement **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.
Element A. Does the plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)

In compliance with the DMA 2000, described below are the requirements to continue the plan maintenance process through continued public involvement.

The Yuba County Water Agency has developed a plan for continued public involvement following completion and approval of the YCWA Multi-Hazard Mitigation Plan. The plan lays the foundation for continued public input and access to the Plan.

The YCWA is dedicated to involving the public directly in review and updates of the Plan. A representative from the Planning Committee will be responsible for monitoring, evaluating, and updating the Plan as described above. During all phases of plan maintenance the public will have the opportunity to provide feedback.

A copy of the Plan will be publicized and available for review on the Agency's website. In addition, copies of the plan will be catalogued and kept at appropriate locations in the Agency. The existence and location of these copies will also be posted on the Agency's website. The site will contain contact information for the YCWA Hazard Mitigation Planning Committee to which people can direct their comments and concerns.

A press release requesting public comments will also be issued after each evaluation or when deemed necessary by the Planning Committee. The press release will direct people to the website or appropriate location where the public can review proposed updated versions of the Plan. This will provide the public an outlet for which they can express their concerns, opinions, or ideas about any updates/changes that are proposed to the Plan. Committee members will assure the resources are available to publicize the press releases and maintain public involvement through web pages and other appropriate means.

There are several objectives to the public involvement plan. Creating an open and visible decision-making process to which the community and stakeholders have equal access and input is integral to ensuring the concerns of the community is addressed. To that end, it is important that a mechanism is provided by which the community is informed and has an understanding of the process, issues, and possible solutions from the perspectives of various interests. Once the public has had the opportunity to comment, incorporating these comments throughout the decision making process will make for a more comprehensive plan.

All public comments about the YCWA Multi-Hazard Mitigation will be considered for inclusion in future versions of the plan through the process outlined in section 6.1.

Addition State and Federal Requirements
Insert text here

6.4 Integration of State and Federal Regulations

Insert text here

6.4.1 Federal

"The Federal Civil Defense Act of 1950"

Public Law 96-342, "The Improved Civil Defense Act of 1980"

Public Law 91-606, "Disaster Relief Act"

Public Law 93-288, "The Robert T. Stafford Disaster Relief Act of 1974", as amended

Section 322, Mitigation Planning of the Robert T. Stafford Disaster Relief and Emergency Assistance Act

Public Law 106-390, enacted by Section 104 of the "The Disaster Mitigation Act of 2000" Interim Final Rule as published in the February 26, 2002, in the Code of Federal Regulations, at 44 CFR Part 201, and any subsequent revisions to the Rule.

6.4.2 State

Insert text here

6.4.2.1 California Government Code, Section 3100, Title 1, Division 4, Chapter 4

States that public employees are disaster service workers, subject to such disaster service activities as may be assigned to them by their superiors or by law. The term "public employees" includes all persons employed by the state or any county, city, city and county, state agency or public district, excluding aliens legally employed. The law applies when:

- A local emergency has been proclaimed.
- A state of emergency has been proclaimed.
- A federal disaster declaration has been made.

Provides the basic authorities for conducting emergency operations following a proclamation of Local Emergency, State of Emergency, or State of War Emergency by the Governor and/or appropriate local authorities, consistent with the provisions of this Act

6.4.2.2 The California Emergency Plan

Promulgated by the Governor, and published in accordance with the Act and provides overall statewide authorities and responsibilities, and describes the functions and operations of government at all levels during extraordinary emergencies, including wartime. Section 8568 of the Act states, in part, that "...the State Emergency Plan shall be in effect in each political subdivision of the state, and the governing body of each political subdivision shall take such action as may be necessary to carry out the provisions thereof." Local emergency plans are, therefore, considered to be extensions of the California Emergency Plan.

6.4.2.3 California Civil Code, Chapter 9, Section 1799.102

Provides for "Good Samaritan Liability" for those providing emergency care at the scene of an emergency: "No person, who, in good faith and not for compensation, renders emergency care at the scene of an emergency, shall be liable for any civil damages resulting from any act or omission The scene of an emergency shall not include emergency departments and other places where medical care is usually offered."

6.4.2.4 California Disaster Assistance Act, Government Code Section 8680—8692

Insert text here

6.4.2.5 State of California Multi-Hazard Mitigation Plan, July 1, 2004

Insert text here

6.4.2.6 California State Law

Power of County in regards to flood control, water code:

§ 8100. Under such limitations and restrictions as are prescribed bylaw, and in addition to jurisdiction and powers otherwise conferred, the boards of supervisors, in their respective counties, may appropriate and expend money from the general fund of the county for any of the following purposes in connection with streams or rivers in the county: The construction of works, improvements, levees or check dams to prevent overflow and flooding.

- The protection and reforestation of watersheds.
- The conservation of the flood waters.
- The making of all surveys, maps and plats necessary to carry out any work, construction or improvement authorized by this article.
- The carrying out of any work, construction or improvement authorized by this article outside the county if the rivers or streams affected flow in or through more than one county.

6.4.2.7 Costa-Machado Water Act of 2000: "Safe Drinking Water, Clean Water Watershed Protection and Flood Protection Act"

Insert text here

6.4.2.8 Fish and Game Code Section 1600-1616

1602. (a) An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake, unless all of the following occur:

(1) The department receives written notification regarding the activity in the manner prescribed by the department. The notification shall include, but is not limited to, all of the following:

(A) A detailed description of the project's location and a map.
(B) The name, if any, of the river, stream, or lake affected.
(C) A detailed project description, including, but not limited to, construction plans and drawings, if applicable.
(D) A copy of any document prepared pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.
(E) A copy of any other applicable local, state, or federal permit or agreement already issued.
(F) Any other information required by the department.

(2) The department determines the notification is complete in accordance with Chapter 4.5 (commencing with Section 65920) of Division 1 of Title 7 of the Government Code, irrespective of whether the activity constitutes a development project for the purposes of that chapter.

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