

# CHAPTER 1

## INTRODUCTION



North from County Road 95A toward County Road 18A – 1995.



Downstream from right bank at Olivers – 1995.



Highway 99, upstream of East Frontage Road - 1995

## CHAPTER 1

### INTRODUCTION

#### **PURPOSE AND SCOPE OF REPORT**

This Draft Feasibility Report addresses the results of the feasibility study concerning flooding problems in the lower reach of Cache Creek and the City of Woodland, California. This report was prepared jointly by the Federal sponsor, the U.S. Army Corps of Engineers, Sacramento District (Corps), and the non-Federal sponsors, the Reclamation Board of the State of California (Board) and the City of Woodland.

The Feasibility Report and the accompanying *Lower Cache Creek, Yolo County, CA, City of Woodland Vicinity Draft Environmental Impact Statement/Environmental Impact Report for Potential Flood Damage Reduction Project* (Draft EIS/EIR) address potential effects of alternative plans as solutions to the identified problems and opportunities and recommend that Congress authorize the implementation of the proposed solution. This Draft Feasibility Report presents an evaluation of the planning, technical, and environmental information, including:

- The planning objectives to reduce flood damages within the identified problem area (lower Cache Creek, east of County Road (CR) 94B and north of Woodland);
- The project setting and without-project conditions;
- The problems and opportunities;
- The plan formulation process;
- The evaluation of the potential effects of alternative plans;
- The evaluation and comparison of final plans; and
- The identification of the Tentatively Recommended Plan.

## **NEED FOR THE PROPOSED PROJECT**

### **LOCATION OF STUDY AREA**

The area addressed in this report includes the entire Cache Creek watershed from the eastern foothills of the Coast Range Mountains to the western levees of the Yolo Bypass. The area includes parts of Yolo, Colusa, and Lake Counties. The focus of the report is flood damage reduction opportunities specific to the problem/study area: the city of Woodland (Figure 1-1).

### **BACKGROUND**

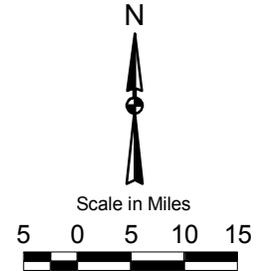
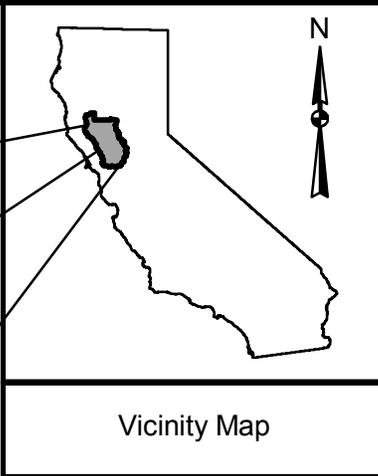
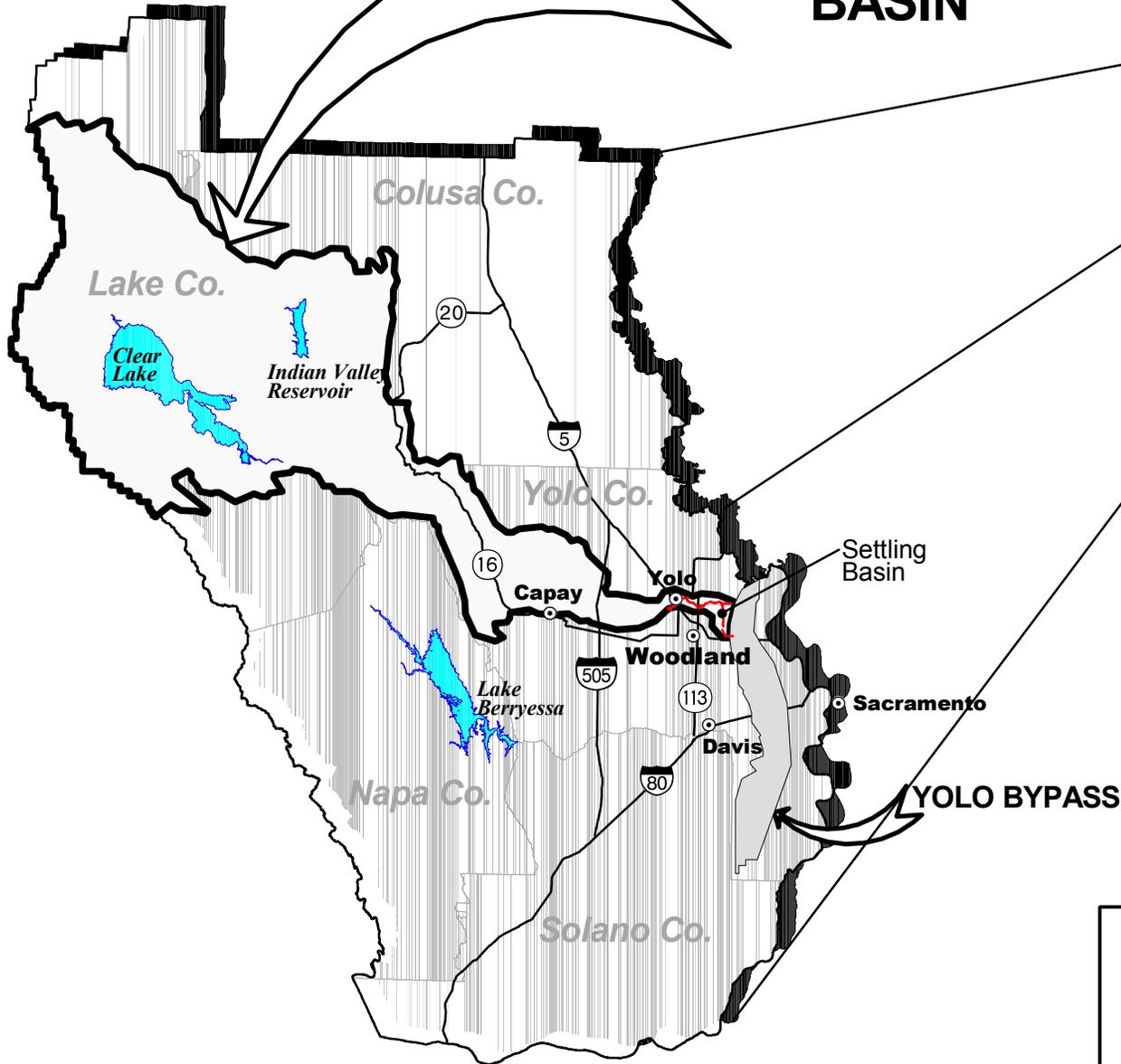
Cache Creek originates below the outlet channel of Clear Lake on the western foothills of the Coast Range Mountains and is fed by the North Fork of Cache Creek, on which is Indian Valley Dam and Reservoir, and Bear Creek on the northern slope of the upper watershed. The creek meanders from the upper watershed to the flat plain near Woodland and Yolo and ends at the settling basin near the Yolo Bypass, as shown on Figure 1-2. Cache Creek is no longer directly connected to the Sacramento River. In addition to providing water and habitat for fish and wildlife, Cache Creek is a source of water for domestic use, farming, cattle grazing, gravel mining, other industrial uses, and recreation. The creek is owned primarily by private parties and is not considered a navigable waterway of California.

Within the last 100 years, the creek has experienced dramatic human-induced and natural changes. The natural changes include shifting of the stream channel as a result of eroding banks and storms; eroding soil from the upper watershed; and poor water quality due to boron, mercury, and other naturally occurring chemicals. During periods of heavy runoff, the creek carries a significant sediment load, requiring the use of the Cache Creek Settling Basin to protect the Yolo Bypass from filling in with sediment. The human-induced changes include channel and levee work for flood damage reduction and irrigation, gravel mining within the channel, agricultural runoff, soil erosion due to overuse and livestock in the rangeland portion of the creek watershed, and introduction of nonnative plant species such as tamarisk and giant reed.

New Flood Insurance Rate Maps (FIRM's) issued by the Federal Emergency Management Agency (FEMA) took effect on April 2, 2002. These maps show a significant increase in the areas of Yolo County and the city of Woodland that have at least a 1 in 100 chance of flooding in any given year (100-year expected recurrence interval). The City of Woodland and surrounding local areas seek to reduce flood hazards. The Corps reconnaissance report indicates that there is an economically feasible project to provide the necessary flood damage reduction measures.

The Corps is conducting the feasibility study of flood damage reduction alternative plans with the cooperation of the California Department of Water Resources

# CACHE CREEK BASIN



LOWER CACHE CREEK, WOODLAND, CALIFORNIA  
AREA FEASIBILITY STUDY

**GENERAL AND VICINITY MAP  
CACHE CREEK BASIN**

SACRAMENTO DISTRICT, CORPS OF ENGINEERS  
OCTOBER 2002

Figure 1-1

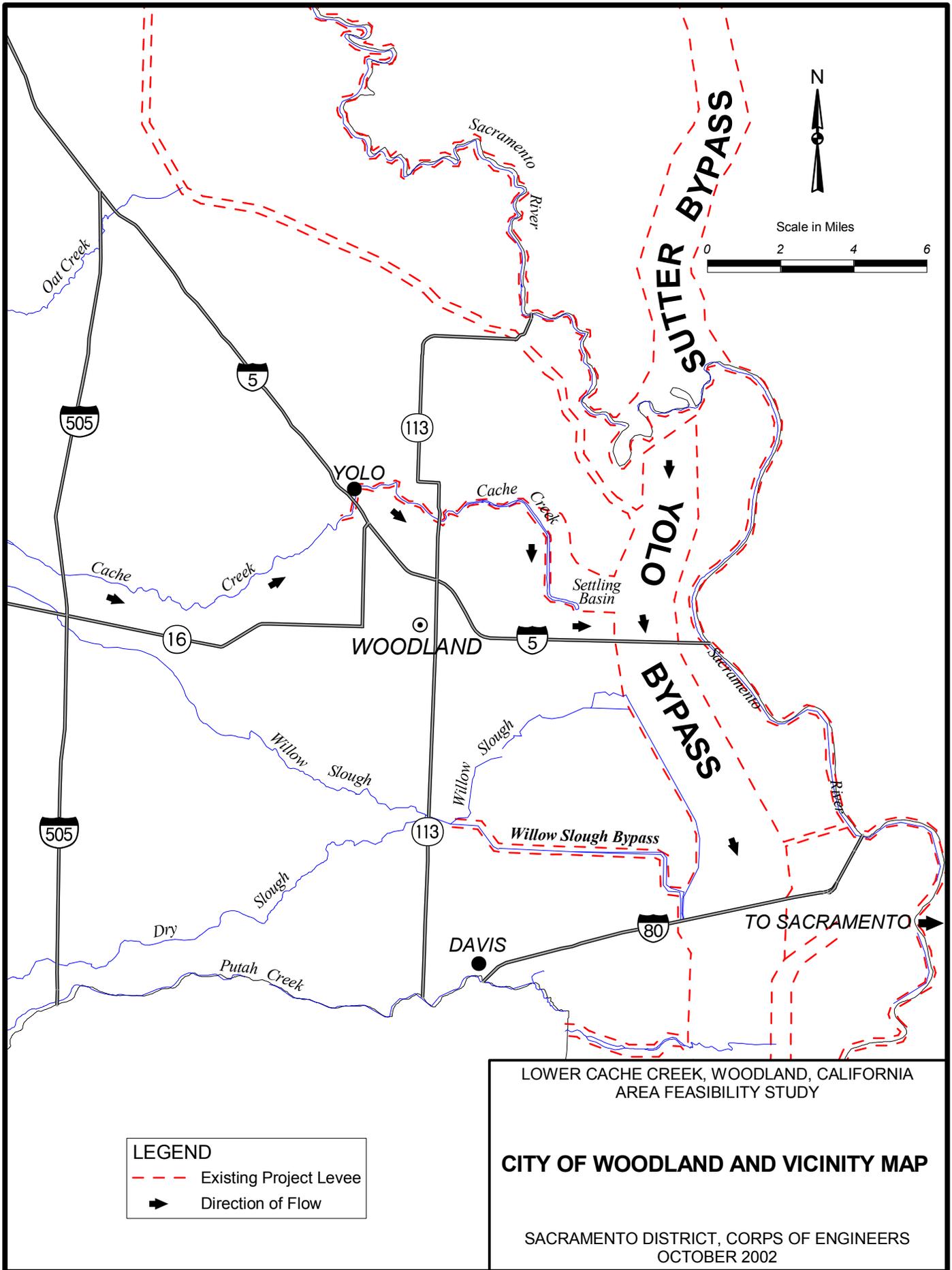


Figure 1-2

(DWR), Yolo County, City of Woodland, California Department of Fish and Game (DFG), U.S. Fish and Wildlife Service (USFWS), and other local agencies.

## **STUDY AUTHORITY**

The general authority for this investigation is provided by the Flood Control Act of 1962 (Public Law 87-874). In the Energy and Water Development Appropriations Act of 1993 (Public Law 102-377), Congress directed the Corps to conduct a "...reconnaissance study of flooding problems in the westside tributaries, Putah and Cache Creeks, of Yolo Bypass." The reconnaissance study was initiated in April 1993 at the request of the Yolo County Board of Supervisors. Sufficient potential Federal interest was identified to proceed with a feasibility-level investigation of flood damage reduction alternative plans along lower Cache Creek. A feasibility cost-share agreement between the Corps and the Board and a local feasibility cost-share agreement between The Board and the City of Woodland were signed in January 2000.

## **RELATED STUDIES AND REPORTS**

Numerous studies and reports have provided background information and detail on flooding problems and environmental resources in the study area. These studies and reports are described below.

### **CORPS OF ENGINEERS**

"Reconnaissance Report, Northern California Streams, Cache Creek Environmental Restoration, California," December 1995. This study examined options for restoring fish and wildlife habitat along the Cache Creek riparian corridor. Natural and human-induced changes, including aggregate extraction, nonnative plant growth, erosion and sedimentation, ground-water overdraft, agriculture and urban development, and channel and levee work for flood damage reduction have significantly affected fish and wildlife populations and their habitats. The study evaluated three environmental restoration plans to address these issues; however, no sponsor has been identified for any of the environmental restoration projects. The study identified a levee along the northern city limits as an economically feasible flood damage reduction project.

"Westside Tributaries to Yolo Bypass, California, Reconnaissance Report," June 1994. This reconnaissance study was to evaluate the water resource problems and opportunities of the Cache Creek, Willow Slough, and Putah Creek basins. The results of the reconnaissance study indicated that sufficient potential Federal interest existed to proceed with a feasibility-level flood damage reduction study for the city of Woodland and town of Yolo. The two plans that were economically feasible were the channel improvement plan and the setback levee plan. Due to financial uncertainties, Yolo County and the City of Woodland requested that the detailed feasibility studies be postponed.

“Cache Creek Basin, California, Final Feasibility Report and Environmental Impact Statement for Water Resources Development,” February 1979. This study investigated flood sediment deposits and related water-resource problems in the Cache Creek basin. This study resulted in the authorization for enlargement of the Clear Lake Outlet Channel and construction of a bypass channel 1.8 kilometers (1.1 miles) long. However, the July 1990 “Cache Creek Basin Outlet Channel, California, Final General Design Memorandum” found this project to be economically infeasible; therefore, the project was never constructed. The “Cache Creek Basin (Lake County), California, Reconnaissance Report,” October 1992, determined that nonstructural flood proofing was economically feasible.

“Cache Creek Basin, California, Cache Creek Settling Basin, General Design Memorandum,” January 1987. This project was authorized by Congress in 1986 to enlarge and raise the perimeter levees of the settling basin for sediment storage. Construction was completed in September 1993.

“Sacramento Metropolitan Area, Final Feasibility Report, California,” February 1992. This study investigated flooding problems along the Sacramento River and Yolo Bypass in the city of West Sacramento. This study recommended levee raising around the West Sacramento area to reduce the risk of flooding to less than 1 in 400 in any given year.

“Sacramento River Flood Control System Evaluation, Initial Appraisal Report – Lower Sacramento Area, Phase IV,” October 1993. This study identified portions of the project levees along Cache Creek, Willow Slough Bypass, and South Fork Putah Creek that do not have adequate freeboard above the design water surface. This report indicated that this deficiency might have been caused by regional subsidence due to excessive ground-water pumping, underground gas extraction, or seismic fault movement. The study recommended that the State and local agencies raise the levees to the 1956 design criteria of reliably passing a 1 in 10 chance flow event. The California Department of Water Resources completed the levee maintenance in October 1995.

“Sacramento River Flood Control System Evaluation, Design Memorandum Report – Mid-Valley Area, Phase III, California,” September 1995. This study is the third phase of the comprehensive analysis and evaluation of about 386 kilometers (240 miles) of project levees along the Sacramento and Feather Rivers and their tributaries. This study concluded that the project levees are susceptible to seepage and stability problems and recommended reconstruction of some of the levees.

“Yolo Bypass, California, Reconnaissance Report,” March 1992. This study investigated flooding and related water-resource problems associated with the Yolo Bypass. Results of the study indicated that there were no economically feasible plans to reduce flooding in the study area. However, the tributaries west of the Yolo Bypass were not investigated due to complex hydrologic and hydraulic conditions. This study

recommended that a separate study be conducted to investigate the flooding problems along the westside tributaries of the Yolo Bypass.

“Yolo Basin Wetlands, Sacramento River, California, Project Modification Report (Section 1135),” April 1992. This study evaluated the potential of wetland restoration/modification in the Yolo Bypass and vicinity. The study recommended restoration of seasonal wetlands, permanent wetlands, shorebird foraging areas, riparian forests, and grasslands. The work includes irrigation and drainage systems for flooding of the restored wetland areas. The areas recommended for wetland restoration were the Putah Creek Sinks and the Yolo Causeway site.

“Cache Creek Basin (Lake County), California, Reconnaissance Report,” October 1992. This reconnaissance study evaluated the need for additional flood damage reduction in the Clear Lake area of the Cache Creek basin. Flood damage reduction measures evaluated included a detention basin, upstream storage, outlet channel improvements, modification and reoperation of Clear Lake Dam, pumped storage, and nonstructural measures. Only nonstructural measures appeared to be economically feasible. Due to financial uncertainty, however, Lake County could not meet the cost-sharing requirement.

## **FEDERAL EMERGENCY MANAGEMENT AGENCY**

“City of Woodland, California, Flood Insurance Study,” revised preliminary, April 17, 2001. This study, conducted for FEMA, identified the flood-prone areas of Woodland. This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for Woodland. This Flood Insurance Study covers the incorporated areas of the Woodland. The data developed in this study were used to establish actuarial flood insurance rates. Approximate analyses were used to study areas with a low development potential or minimal flood hazard. A substantially larger area was mapped in the FEMA 1 in 100 chance flood plain for this study than for the previous Flood Insurance Study.

“Yolo County, California, Unincorporated Areas, Flood Insurance Study,” Revised March 30, 1990. This study investigated the existence and severity of flood hazards in the unincorporated areas of Yolo County. It contains developed flood risk data for four areas of the county including the area south of the Port of Sacramento to the cross levee near Riverview except for the areas west of the main canal and south of Bevan Road, the Town of Knights Landing, the Madison-Esparto area between Yolo County and the City of Winters, and Dry Creek. The data developed in this study were used to establish actuarial flood insurance rates. Approximate analyses were used to study areas with a low development potential or minimal flood hazard.

FEMA administers the National Flood Insurance Program (NFIP) in which Woodland participates. The purpose of the NFIP is to provide previously unavailable flood insurance protection to property owners in flood-prone areas, provided that the

community follows certain flood plain management regulations. FEMA has identified areas of special flood hazard in the vicinity of Woodland. Flood zones are designated on published FIRM's for Yolo County and Woodland. These maps indicate a significant portion of Woodland is subject to flooding from Cache Creek<sup>1</sup>.

## **U.S. DEPARTMENT OF AGRICULTURE – NATURAL RESOURCES CONSERVATION SERVICE**

“The Blue Ridge Coordinated Resource Management Plan,” signed in 1984. The plan included the area within Yolo County from the Colusa County line to the Solano County line along Cache Creek. The plan identified the need for proper livestock grazing; stabilization of critically eroding areas; and, especially, control of catastrophic wildfire through fuel reduction using the Vegetation Management Program of the California Department of Forestry. Due to Forestry's funding constraints, the fuel reduction program became inactive after a few years. It is the goal of both the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), and the Yolo County Resource Conservation District to reactivate the Blue Ridge Coordinated Resource Management Plan (CRMP) through the cooperation of landowners; local, State, and Federal agencies; and local conservation, rancher, and business organizations.

## **BUREAU OF LAND MANAGEMENT**

“Coordinated Resource Management Plan (CRMP),” initiated in 1990 and restarted in 1993. The purpose of the CRMP was to seek a balance between public use and protection of natural resources. The plan included areas in Yolo, Lake, and Napa Counties, from Rumsey to the upper Cache Creek watershed. The plan was scoped, and public workshops were held from January to May 1995.

## **U.S. GEOLOGICAL SURVEY**

“Water-Quality Assessment of the Sacramento River Basin, California: Water-Quality, Sediment and Tissue Chemistry, and Biological Data, 1995-1998,” February 2001. This report presents data collected and compiled during the first high-intensity phase of the Sacramento River Basin National Water-Quality Assessment (NAWQA) Program study unit. Data are presented from 78 ground-water wells and 55 stream sites. Ground-water measurements compiled in this report include chemical, physical, and water-level data. Stream water measurements compiled include chemical, physical, streamflow, bed-sediment contaminants, aquatic-tissue contaminants, fish community, invertebrate community, and periphyton algae assemblages. Quality-control chemical data are also presented.

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<sup>1</sup> FEMA 1998.

## **STATE OF CALIFORNIA**

“State Water project Conjunctive Water Use – Eastern Yolo County,” February 24, 1994. The report presents the results of a pre-feasibility level investigation of the potential for developing a conjunctive-use project in eastern Yolo County, summarizes hydrogeology and water supply conditions of the area, and presents a preliminary design for a modest conjunctive-use project. The investigation was conducted in cooperation with the Conway Conservancy Group.

“Mercury Concentrations and Loads from the Sacramento River and from Cache Creek to the Sacramento-San Joaquin Delta Estuary,” June 1998. The objectives of this study were to examine mercury concentrations in the Sacramento River to find out if mercury concentrations are in excess of U.S. Environmental Protection Agency (EPA) standards, to estimate bulk mercury loads to the estuary from the Sacramento watershed, and to determine the source(s) and fate of the bulk material. The study confirmed that Cache Creek was a major source of mercury and that EPA standards for mercury are exceeded when flows in the lower reaches exceed 100 cubic feet per second (cfs). Bulk mercury loads from Cache Creek to the Cache Creek Settling Basin were estimated to be 980 kg/year; and export to the Yolo Bypass from the settling basin was estimated to be 495 kg/year for the 1995 water year. Most subbasins in the Cache Creek watershed export significant amounts of mercury, but the majority came from Cache Creek Canyon downstream of the confluence of the north and south forks, but upstream of the confluence with Bear Creek. Runoff from storms accounts for the majority of the mercury exported from the basin.

## **YOLO COUNTY**

“Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan (Technical Studies),” October 1995. The report analyzed the lower reaches of Cache Creek from Capay to about 5 kilometers (3 miles) north of the town of Yolo. The report evaluated geomorphology, hydrology, riparian vegetation, and ground-water data based on the channel condition and computer modeling. The proposed recommendations included changes to instream gravel extraction and other human-induced practices to increase channel stability; improve riparian habitat; protect ground-water resources; provide opportunities for esthetic, recreational, and educational enhancement; increase instream flood-carrying capacity; protect county infrastructure; and gather and monitor data to promote a self-sustaining fluvial system. The study was completed in October 1995.

“Final Off-Channel Mining Plan for Lower Cache Creek” (OCMP), July 1996. The OCMP is one of two plans prepared by the county for managing the resources of the mining reaches of Cache Creek. The OCMP addressed a variety of issues relevant to mining outside the creek channel. The plan encourages off-channel, deep-pit mining under controlled and monitored circumstances as a plan to continue in-channel mining. It recommends a Technical Advisory Committee to assist the county in reviewing the

annual monitoring data, to provide feedback regarding the conditions of the creek, and to assist in identification of appropriate “creek improvement projects.” The OCMP seeks to secure a regular source of surface water in the remaining reaches of the creek when there is sufficient rainfall; to accept multiple reclamation uses; and to develop a future parkway plan to allow for public activities and uses along the creek.

“Final Cache Creek Resources Management Plan for Lower Cache Creek” (CCRMP), August 1996. The CCRMP is the second of two plans prepared by the county for managing the resources of the mining reaches of Cache Creek. The CCRMP addresses issues within the creek channel. Following initial shaping, sculpting, and smoothing within the creek, as prescribed in the technical studies, the plan would substantially limit the amount of annual mining within the channel to the amount of sand and gravel deposited during the previous year. Future commercial mining within the creek would be prohibited. Riparian woodland restoration and a continuous riparian habitat corridor are primary goals of the plan.